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The journal aims to allow research in botanical topics such as taxonomy, systematics, nomenclature, molecular phylogeny, conservation, biogeography, and history of botany, and botanical collections.
It was founded in **1905** in Florence by **Ugolino Martelli** (1860-1934), a botanist well known for his studies of and contributions to the systematics of the tropical genus *Pandanus* and on the Flora of Sardinia.
In the 19th century Florence represented one of the most important European centres in Plant Taxonomy and Phytogeography with several notable Italian botanists worth mentioning such as Filippo Parlatore, Teodoro Caruel, Eugenio Baroni, Stefano Sommier, Odoardo Beccari and Ugolino Martelli himself. In 1842 **Filippo Parlatore** (1817-1877) founded in Florence the *Herbarium Centrale Italicum (FI)*, which soon became one of the most important herbaria in the world. Most of the specimens described and/or cited in *Webbia* are still kept in it.
In 1905, and as a consequence of this multitude of activities in Plant Systematics and Phytogeography, Ugolino Martelli established the journal *Webbia-Raccolta di Scritti Botanici*, firstly published annually in a single issue, and later twice a year. Webbia also began to be a place of publication of contributions from Tropical Botany, especially after the Royal Colonial Herbarium founded in 1904 in Rome was moved to Florence in 1914, currently named Tropical Herbarium Study Center (Centro Studi Erbario Tropicale - Herbarium FT) belonging to the Department of Biology of the University of Florence.
Webbia had been created in honor of **Philip Barker Webb** (1793-1845), a close friend of Filippo Parlatore, who before passing away entrusted his personal herbarium and a library rich of old botanical books and publications to the then Botanical Museum in Florence.

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Inga Hedberg (1927-2024) – inspirational driving force in tropical African botany for 60 years

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Docent, fil. dr. Inga Hedberg (Fig. 1) died in Uppsala on the 13th of January 2024, at the age of 96 years. Together with her husband, Olov Hedberg, she has been a central and tireless figure in a range of important international projects on African botany, probably with the Flora of Ethiopia and Eritrea (1980-2009) as the most remarkable.

Inga Hedberg (from birth Inga Maria Margareta Holmbäck) was born on the 18th of November 1927, in the town of Luleå at the Bothnian Bay in

Figure 1. Inga Hedberg in her home in Uppsala, October 2023. Photograph by Mariette Manktelow.

northern Sweden. Her parents were the managing forester and industrialist Bure Holmbäck and his wife Ellen Holmbäck, née Lindeberg (Uddling and Paabo 1993: 453). Manktelow in Lidén and Morrison (2016) have related how Inga developed an interest in biology, particularly genetics, from her teachers Maj (mathematics) and Kjell Fahlander (biology). The latter had taken his doctorate at Uppsala University in 1938, and the Fahlanders convinced Inga's parents that it was a good idea that Inga should study genetics in Uppsala. She arrived at Uppsala in the autumn of 1950, planning to study for a degree of fil. mag. (M.Sc.). A couple of years later she accepted a temporary position as a teacher in biology at Luleå Secondary School. After this stay back in Luleå, she returned to Uppsala to continue her studies with the aim of a degree of fil. dr. (Ph.D.) in genetics. During her first time in Uppsala, she heard about an Uppsala student of botany who had joined a Swedish zoological expedition in 1948. He had visited the high mountains of Uganda, Kenya, and Tanzania, stayed on in East Africa to visit more mountains after the other members of the expedition had returned to Sweden, and finally came back to Uppsala with an immense load of observations. This was Karl Olov Hedberg, born in 1923 in Västerås in central Sweden and with an interest in mountain and Arctic flora. Eventually, Olov and Inga met in the student circles of Uppsala, and they married in 1953. They had five children: Per, Bengt, Göran, Björn, and Maria, whom they brought into the field to give them a personal relationship with nature (Fig. 2) and took them to London to combine sightseeing with herbarium studies at Kew. This marked the beginning of a fruitful period of botany in Uppsala and elsewhere that has been called "the era of the Hedbergs". Here, we will try to follow Inga's role through the many projects and events during the Hedberg era.

Figure 2. Inga, Olov, and their son Bengt Hedberg at a flowering *Lobelia rhynchopetalum* on Mt. Gunna east of Lake Tana, Ethiopia, in 1986. Photograph by Mesfin Tadesse (reproduced from Symb. Bot. Upsal. 38 with permission).

Inga and Olov become "the Hedbergs" – cytology of grasses, Afroalpine flora, and engagement in AETFAT

It seems that it was Olov who suggested Inga Holmbäck to work on the cytology of the genus *Anthoxanthum* for her Ph.D. studies in genetics. From 1961 to 1994, Inga continued studying grass cytology on species from temperate and African countries, including her Ph.D. defended in 1970 (see publications in bibliography Genetical and taxonomic studies of grasses …).

Soon after their marriage, Inga and Olov went on a trip to England, spending time in Oxford where the second plenary meeting of AETFAT (Association pour l'Etude Taxonomique de la Flore d'Afrique Tropicale) was held during late September and early October 1953. Bentje (2008) cites how A.W. Exell, keeper of the herbarium at the British Museum (Natural History), in his introduction to the symposium mentioned that Olov had "made the utmost sacrifice to science by devoting part of his honeymoon to the congress", to which Inga has been reported to whisper: "And what about my honeymoon?" (Even the present authors have heard Inga telling this anecdote). Exell's bias was repeated later but resisted by Olov: when Addis Ababa University in Ethiopia asked Olov to receive an honorary doctorate, he refused to accept it without Inga, as she was his scientific partner and peer.

Olov had been a member of AETFAT since its founding in 1951. The proceedings of the meeting in Oxford were edited by R.E.G. Pichi Sermolli (1955) and contained a contribution by Olov on Afroalpine plants. Olov's first publication on East Africa dealt with the vegetation zonation on the high mountains (Hedberg

O 1951) and did not mention any collaboration with or input by Inga, but after that, Inga assisted Olov in all his ecological and floristic studies of the Afroalpine flora and vegetation, or she wrote or co-authored joint papers. Olov's Ph.D. thesis was based on results from the 1948 expedition and on visits to nearly all the European herbaria that housed collections from the Afroalpine zone in East Africa (Hedberg O 1957: 7). In this work, Olov acknowledged Inga's contribution: "From an early stage, she took a lion's share of the "donkey work" with annotation of specimens, typewriting, checking, drawing of illustrations, and, finally, proofreading [with] unfailing enthusiasm …" Similar acknowledgments appeared in a work on Afroalpine plant ecology (Hedberg O 1964). Olov and Inga later wrote joint papers on tropical alpine life forms, and Inga collaborated with others on the phytogeography of tropical alpine flora (see in the bibliography Ecology of African plants and phytogeography of plants of high altitudes).

Inga and Olov again attended the third AETFAT meeting in Paris in September 1957, the fourth in Lisbon and Coimbra in 1960, and the fifth in Genova and Firenze in September 1963, again with the proceedings edited by Pichi Sermolli (1965) and with contributions by Olov. At the Genova-Firenze meeting, Olov was elected the next General Secretary of AETFAT, the Secretariat moved to Uppsala, and Inga became listed as an AETFAT member (Hedberg O & Hedberg I 1966: 4). In September 1966, the fifth AETFAT Plenary Meeting was held in Uppsala on a subject of equal interest to Inga and Olov, the conservation of African vegetation. The accounts reported country by country on the state of conservation of the vegetation in Africa south of the Sahara. In Olov's foreword (Hedberg I & Hedberg O 1968), he acknowledged that the preparations for the symposium had been made by Inga, who also did the editing of the book. For many years, Inga and Olov continued to be regular visitors at AETFAT's meetings, and Inga continued to publish on plant conservation (see publications in bibliography Conservation of African Flora and Vegetation). From the 1966 AETFAT symposium, Inga and Olov developed a diplomatic relationship with the Swedish Agency for Research Cooperation with Developing Countries (Sida/SAREC), resulting in a large project in Tanzania, the Tanzanian-Swedish-Hungarian integrated Usambara rain forest project (1983 – 1991). This was successful in various ways: it produced proper inventories of the forests, made the case to the Tanzanian government for the proper conservation of the vital areas, and resulted in several Tanzanian researchers being trained both in the field and the herbarium.

Generally, Olov and Inga believed in training by doing. When Olov in 1958 began his teaching in plant taxonomy in Uppsala as a newly appointed docent, he organized the taxonomic course as a teamwork with Inga and his students to produce a taxonomic revision of the genus *Canarina*, a genus with two Afromontane forest species and one species with disjunct distribution in the Canary Islands. The revision was published in 1961 (Hedberg O et al. 1961). Inga and Olov later worked on several joint taxonomic papers, studying the genera *Colpodium*, *Dipsacus*, and *Callitriche* in Africa, as well as cytological studies of African plants (see publications in bibliography Genetical and taxonomic studies of grasses, and Taxonomic revision and cytology of African plants), and joint contributions to the Ethiopian Flora project (see publications in bibliography Flora accounts contributed to the Flora of Ethiopia and Eritrea).

Publicizing the importance of teaching and research in plant taxonomy ("the taxonomic impediment"); ethnobotany, useful and medicinal plants; the editor of the Symbolae Botanicae Upsalienses

Since their first works together, Inga and Olov had been convinced that the teaching of plant taxonomy was of basic importance for all botanical disciplines, including the study of useful plants and the conservation of species of plants and vegetation. In the 1990s, Inga began a sequence of lectures and papers advocating the teaching and study of plant taxonomy. She lectured on this topic at symposia (at the AETFAT conference in Malawi in 1991, at the Frank White Memorial Symposium in Oxford in 1996, at a conference on the conservation of European plants in 1998), and lately wrote about it in the preface to a volume dedicated to the Swedish botanist Vivi Täckholm, who spent her working life in Egypt.

Inga initiated the first courses of ethnobotany at Uppsala University and published on the subject either separately, with Olov, or with other botanists. (See publications in the bibliography Ethnobotany; medicinal and other useful plants).

Inga's meticulous work with written words, broad scientific knowledge, and excellent command of a wide vocabulary in English made her a highly suitable editor of the monograph series Symbolae Botanicae Upsalienses, a task on which she worked for more than 40 years, editing volumes on a wide range of subjects, including published Ph.D. theses (see publications in the bibliography Edited volumes on parasites, lichens and Linnaeus's Species plantarum in the series Symbolae Botanicae Upsalienses).

The biggest project, a Flora of Ethiopia and Eritrea – planning, negotiating, waiting, and organizing

Inga's most imposing achievement was undoubtedly her work for the Ethiopian Flora Project, which would not have been so successful without her deep-felt enthusiasm and never-failing energy. Gathering the family contributions, editing them, and organizing them for publication brought her in contact with 43 scientific institutions and 92 scientists from 18 different countries in Europe, Africa, and America (Tadesse 2011: Table 3).

The Ethiopian plant world, not studied in great detail before the beginning of the Ethiopian Flora Project, was an obvious subject of interest for the Hedbergs. Already in Afroalpine Vascular Plants (Hedberg O 1957), there were many references to the high mountain flora of Ethiopia, particularly plants collected by the German naturalist G. H. W. Schimper, who lived for more than 40 years in northern Ethiopia, and an early account on the Ethiopian flora was published in two volumes in 1847-1850 on collections made by Schimper and other early travellers. During the Scramble for Africa, Ethiopia largely managed to stay out of attempts at European colonization. Due to the nearness of the Italian colonies of Eritrea and Italian Somaliland, the Ethiopian flora had raised the interest of Italian botanists, not least during the Italian occupation of Ethiopia in 1936-1941. A comprehensive amount of Eritrean and Ethiopian plants, particularly from Eritrea and northern and central Ethiopia, had been gathered in the Erbario Tropicale (FT) in Firenze, which by then held a total of ca. 230,000 collections, mainly from the Horn of Africa (Moggi 1976; Baldini 2011). However, no typical "colonial flora" had been started or produced by Italian botanists, as had been done for nearly all other parts of Africa (Tadesse 2011: Table 1). So apart from Ethiopia's attraction as the country with Africa's largest area of high mountains, it was also tempting for the Hedbergs to work with the flora of a country with a highly diverse flora and a rich tradition for domesticating local plants. It may be of interest to note that a flora project for the only other non-colonized tropical country, the Flora of Thailand Project, has many similarities with the Flora of Ethiopia project, although they developed along completely separate lines. The Thai project was initiated in 1963 under joint Thai-Danish leadership and in collaboration with the Royal Botanic Gardens, Kew, and the Museum d'Histoire Naturelle, Paris, and is now near completion, being edited and published in Thailand.

Modern collecting activity – with cars on mud tracks or roads as the main tool – began in Ethiopia after WW2 (Friis 2011). The most prolific early collector from this period, and the founder of the Ethiopian National Herbarium (ETH), was the Irish-British forester H. F. Mooney, who was sent by the British Government as forest advisor to the Middle East in 1953, after having serviced in India. He arranged the Middle East to include Ethiopia and travelled in many parts of the country for nearly 11 years, having all duplicates of his collections sent to Kew, where they were named, labelled, and mounted, and one set sent back to Addis Ababa. (Unfortunately, this did not always happen; see Tadesse 1991). The Ethiopian National Herbarium was inaugurated in 1959, mainly based on the collections by Mooney. An Ethiopian keeper of the herbarium was trained in England and the Netherlands, but he left Ethiopia in 1963.

The first international steps towards an Ethiopian flora project were taken in mid-December 1967, when Olov returned to Uppsala from a three-and-a-half-month stay in East Africa and Ethiopia, carrying with him, *inter alia*, a request from the Faculty of Science in Addis Ababa for assistance in finding funds and scholars to produce a Flora of Ethiopia. However, mention must also be made that R.E.G. Pichi Sermolli, the General Secretary of AETFAT immediately before Olov, also intended to publish a flora of "Aethiopia" (a territory also including the former Italian colonies of Eritrea and Somalia, and the former French colony Djibouti). Pichi Sermolli wanted first to do a precursor for a monographic flora with careful nomenclatural and floristic documentation, published family by family under the common heading Adumbratio Florae Aethiopicae (Adumbratio meaning, "sketch, outline, or silhouette"). The family treatments for the Adumbratio were published in Webbia, beginning with an introduction by Chiarugi (1953). Other and different plans were drafted at the Agricultural University in Wageningen, the Netherlands; since 1965 Professor H.C.D. de Wit had been supporting the Alemaya College of Agriculture (now Harmaya University) near Lake Alemaya, in the Hararghe province of eastern Ethiopia. Scientific staff from Wageningen were sent as teachers and researchers of botany and agriculture to the college, to teach, organize fieldwork, and make collections for a herbarium at Alemaya (ACD), the National Herbarium in Addis Ababa (ETH), the herbarium in Wageningen (WAG), and elsewhere, where there was an interest in Ethiopian plants (van der Maesen and Wieringa 2011).

With three competing, but very different projects for an Ethiopian Flora underway, some diplomatic activities were necessary. Inga (Hedberg I 2001: 14) has written about this: "Because of the urgent need to produce a complete (as far as possible) Flora of Ethiopia in the shortest possible time both professor R.E.G. Pichi Ser-

molli and professor Hendrik C.D. de Wit gave their blessing to the enterprise. To settle potentially conflicting interests between the European partners, an informal meeting was arranged in Firenze in April 1968 between Pichi Sermolli, de Wit, and Inga and Olov Hedberg." According to the memory of one of us (Sebsebe Demissew), this did not finally settle the difficulties. De Wit continued with the plan to publish a Flora of Ethiopia and even raised some money for this, continuing with his plans until the money to the Addis Ababa-Uppsala project had been granted. According to Tadesse (2011: 7), some of the ideas in Wageningen were to focus on useful plants, perhaps even writing a separate flora of useful plants. De Wit had suggested to Tewolde Berhan Gebre Egziabher that mainly Dutch scientists should write the Flora, and that suggestion was rejected by Tewolde. Pichi Sermolli also continued with the Adumbratio, written mainly by Italians, and he argued that the family accounts of the Adumbratio would in any case be useful for a Flora of Ethiopia, as well as for floras for other parts of the Horn of Africa.

The ideas about an Ethiopian Flora were discussed in a broader setting at a mini-symposium at the seventh plenary meeting of AETFAT in Munich in 1970, with an introductory presentation by Michael G. Gilbert (1971). The meeting almost coincided with the publication of the final parts of an annotated checklist by Georg Cufodontis, Vienna (Cufodontis 1952-1972). Like Pichi Sermolli's Adumbratio, this checklist covered all species recorded from the entire Horn of Africa. At the AETFAT meeting in Munich, it was decided to set up a committee with members from Uppsala, Copenhagen, Addis Ababa, Kew, Genoa, Vienna, Wageningen, Nairobi, and St. Louis, to draft plans and guidelines. The detailed text of the committee's report was presented at the AETFAT meeting in Geneva in 1974, and a summary was published in the proceedings of the AETFAT meeting in Las Palmas in 1978 (Hedberg O et al. 1979).

However, during consultations with interested partners in Ethiopia, it was found that although the plans of the AETFAT committee counted on the Flora of Ethiopia to be written by an international team of specialists, it still focussed too much on the production of the printed work, and did not sufficiently involve the development of botany, teaching, and the future of scientific botanical work in Ethiopia. An Ethiopian ad-hoc committee representing a range of stakeholders from Ethiopia consisted of Zemede Worku, Seme Debela, and Sue Edwards from the Institute of Agricultural Research (IAR), Tadesse Ebba from the Plant Genetic Resource Centre for Ethiopia (PGRCE), Lemma Gebre Selassie from the State Forest Development Agency, Taye Bezuneh and Amare Getahun from Alemaya College of Agriculture, and Tewolde Berhan Gebre Egziabher, Getachew Aweke, Mesfin Tadesse, and Michael G. Gilbert from the Faculty of Science, Addis Ababa University (Tadesse 2011: 9-10; Demissew 2014: 6). This group redrafted and expanded the AETFAT proposal to include a strong component of botanical training and capacity building in Ethiopia, as well as the printing and publication of the Flora volumes in Addis Ababa.

While all this was being discussed, Ib Friis continued with fieldwork in southwestern Ethiopia, closely consulting Inga, Olov, and Michael G. Gilbert. One field trip was organized in 1970 with senior lecturer K. Jakobsen, Copenhagen, and Asfaw Hunde, who was by then studying in Copenhagen. Another and longer field trip was carried out in 1972-1973 with Michael G. Gilbert and Getachew Aweke from Addis Ababa University, and Kaj Vollesen and Finn Rasmussen, students from Copenhagen. Both trips were financed by the Carlsberg Foundation, as was nearly everything that Copenhagen contributed to the Ethiopian Flora Projects and associated projects. The floristic and ecological results of these two periods of fieldwork were published as a short monograph of observations on floristics and vegetation (Friis et al. 1982). This led later to works on a map and classification of Ethiopian vegetation (Friis et al. 2010) and a monograph of the western woodlands of Ethiopia (Friis et al. 2022).

However, from about 1974 Ethiopia endured a period of severe unrest and was agonized by a brutal military government and civil wars in the 1980s. In 1974, a provisional committee of Ethiopian soldiers known as the Derg seized power and executed many members of the former governments, including the Emperor himself. In July 1977, the army of Somalia invaded eastern Ethiopia, but with military assistance from the Soviet Union and Cuba, the Somali army was driven back. Gradually, the situation under the Derg became more established, and the country converted into an autocratic socialist state. Due to strong resistance groups established in Tigray and Eritrea, the regime of the Derg finally collapsed in 1991, and a transitional government of Ethiopia was established, leading to the two present states, Ethiopia and Eritrea. During this development, the collaboration between Ethiopian scientists at the country's few academic institutions and the European and American scientists interested in Ethiopia was not easily maintained, and only in certain areas travelling and fieldwork was possible. Tadesse (2011: 10) commented on the period ending in 1978: "Not much could be accomplished during [these] intervening years, [in this] one of the most difficult times in Ethiopia's political history … a new

[Ethiopian] committee [for the plans for the Flora] was reconstituted … to study the proposal ['plan' according to the European committee] and to modify it to safeguard Ethiopia's interest and solicit its acceptance by the Ethiopian Government. The committee came up with a revised proposal in 1979, and it was communicated to the Ethiopian Science and Technology Commission through the Addis Ababa University for funding."

The plans were eventually approved by the Ethiopian Science and Technology Commission, and – amazingly, considering the political situation in Ethiopia – initial funding was secured from the Swedish Agency for Research Cooperation with Developing Countries (Sida/SAREC) to be given to Ethiopia via the Ethiopian Science and Technology Commission. In retrospect, one must admire the diplomatic skills of Tewolde, Olov, and Inga. The leadership of the project was established at the University of Addis Ababa and the University of Uppsala. In Ethiopia, the project should be led by Tewolde Berhan Gebre Egziabher, and in Sweden by a "secretariat based at Uppsala University, Sweden, under the general guidance of the European coordinator, Professor Olov Hedberg, and co-editor, Dr. Inga Hedberg." (Tadesse 2011: 10). Two editors should be appointed, one in Uppsala and one in Addis Ababa, and the text should be written either by volunteering scientists with specialist knowledge about particular groups in the flora of tropical Africa or Ethiopia, by qualified Ethiopians or Ethiopian Ph.D. students or by two scientists employed by the project and based primarily at the Royal Botanic Gardens, Kew.

During this phase of the Ethiopian Flora Project, Mats Thulin, Uppsala, after his Ph.D. on the genus *Wahlenbergia* (Thulin 1975), took on the task to prepare an account of the Leguminosae of Ethiopia. Mats had in 1971 worked in Ethiopia on a project on legumes with the Swedish-sponsored Chilalo Agricultural Development Project in the Arsi region of Ethiopia. This account of the Legumes of Ethiopia was to serve as a pilot project for the planned flora and try out what had been accepted of the AETFAT plan for the flora. The task could be coordinated with the preparation of the Leguminosae for the Flora of Tropical East Africa by a team at Kew and in Nairobi. From the staff at Kew, Inga (Hedberg I 2001: 14) has mentioned Roger M. Polhill as the longest supporter of the Ethiopian Flora Project. However, working with Polhill at Kew on the flora of tropical East Africa was an encouraging group of botanists that also included Bernard Verdcourt, Gerald Wickens, Charles Jeffrey, the retired botanist Jan B. Gillett, and the keeper of the Herbarium, Grenville Lucas, who all supported Inga and Olov and the Ethiopian Flora Project. This laid the foundation for a close collaboration between Flora of Tropical East Africa and the Ethiopian Flora Project. The account of the Ethiopian Leguminosae was prepared by Mats Thulin, Asfaw Hunde (both Uppsala), and Roger M. Polhill, and was published separately as a monograph (Thulin 1983).

Applying the style of the Ethiopian Flora Project and with the support of Sida/SAREC, Mats carried out the huge task of writing and editing the Flora of Somalia during the years from 1988 to 2006, a work in many ways comparable to the Ethiopian Flora Project, but different from it concerning the possibilities for capacity building in Somalia. The Somali Flora appeared in four volumes and covered more than 3000 species. As for the Ethiopian project, Mats's work included extensive fieldwork and herbarium studies. However, in Somalia it had neither been possible to publish the Flora of Somalia in the country, nor to associate the project with extensive training of Somali students. The Somali botanist Ahmed Mumin Warfa got his Ph.D. in 1989, but, unlike in Ethiopia the civil war that gradually developed in Somalia during the 1980s changed the conditions, and the herbarium in Mogadishu (MOG) was destroyed in 1991, instead of developing into a national institution.

In 1978, Pichi Sermolli decided to publish the last issue of the Adumbratio Florae Aethiopicae. This issue was No. 32, Nephrolepidaceae, again published in Webbia (Pichi Sermolli 1978). Thus, the accounts in the Adumbratio were discontinued before all families of ferns and fern allies had been dealt with. Fortunately, an arrangement between the Ethiopian Flora Project and Pichi Sermolli had been reached earlier, and Pichi Sermolli had promised to provide accounts of the families of ferns and fern allies to Vol. 1 of the Flora of Ethiopia and Eritrea.

In 1984, still five years before the publication of the first volume of the Flora of Ethiopia, Inga and Olov organized the first international symposium in Uppsala on the Ethiopian Flora (Hedberg I 1986). In 1986, the Uppsala symposium was followed by a symposium in Addis Ababa, organized by Mesfin Tadesse (Tadesse et al. 1986), then keeper of the Ethiopian National Herbarium. Finally, in 1999, near the end of the 20 years after the Flora Project had been launched, a third International Flora of Ethiopia and Eritrea symposium was held in Copenhagen, organized by Ib Friis and Olof Ryding (Friis and Ryding 2001).

The realization of a Flora of Ethiopia and Eritrea

After most of a decade of politically turbulent years, the Ethiopian Flora Project was formally launched in 1980. However, the start was not without practical com-

plications, for example, the partitioned distribution of the grant from SAREC to all recipients in the Project. The grant had to come via the Science and Technology Commission in Addis Ababa to the staff at Kew, where initially Kaj Vollesen and Michael G. Gilbert had to wait for a very long time for their salaries because money did not travel easily to and from Ethiopia. Inga also suffered bureaucratic problems with her appointment as editor and has related (Hedberg I 2014: 32) that "once in the 1990's I had to wait for the contract for about nine months!" Eventually, Inga and Sue Edwards were appointed as the chief editors in Uppsala and Addis Ababa. The Flora office for Sue Edwards in Addis Ababa had a larger assistant staff but had also the responsibility for the printing of the Flora volumes and their sale within Ethiopia. The Ethiopian office was established at the National Herbarium with the Addis Ababa University. The smaller office in Uppsala, with a part-time assistant for Inga, was set up at the Department of Systematic Botany in Uppsala. Inga (Hedberg I 2001) pointed out that some of the more difficult problems during the project arose in early 1984, when the Ethiopian project leader, Tewolde Berhan Gebre Egziabher, and the Ethiopian editor, Sue Edwards, had to move to Asmara University, to which Tewolde was seconded. This meant that equipment, etc., had to be bought for a third office, causing expenses that were not budgeted for. However, with the complete independence of Eritrea from Ethiopia in 1993, the Ethiopian Flora office had to move back from Asmara to Addis Ababa and was again given a room near the Ethiopian National Herbarium at Addis Ababa University. While Tewolde was at Asmara, Mesfin Tadesse, keeper of the Ethiopian National Herbarium 1990-1993, functioned as the Ethiopian leader of the Flora Project.

For some volumes, assistant editors were listed on the covers of the Flora volumes: Vol. 1: Inga Hedberg, Ib Friis, and Eva Persson. Vol. 2(1): Sue Edwards, Mesfin Tadesse, Sebsebe Demissew and Inga Hedberg. Vol. 2(2): Sue Edwards, Mesfin Tadesse and Inga Hedberg. Vol. 3: Inga Hedberg & Sue Edwards. Vol. 4(1): Inga Hedberg, Sue Edwards and Sileshi Nemomissa. Vol. 4(2): Inga Hedberg, Ib Friis, and Sue Edwards. Vol. 5: Inga Hedberg, Ensermu Kelbessa, Sue Edwards, Sebsebe Demissew, and Eva Persson. Vol. 6: Sue Edwards, Sebsebe Demissew, and Inga Hedberg. Vol. 7: Inga Hedberg, and Sue Edwards. Vol. 8: Inga Hedberg, Ib Friis, and Eva Persson.

The first Editorial Board was established during the preparations for Vol. 3 and consisted of Tewolde Berhan Gebre Egziabher, Olov Hedberg, Mesfin Tadesse, Ib Friis, Inga Hedberg, Sue Edwards, from ca. 1990 also Sebsebe Demissew, and from Vol. 4 and 5 also Ensermu Kelbessa, who took responsibility on the Editorial Board after Mesfin Tadesse had moved to the USA (Fig. 3). Otherwise, the Board remained largely the same for all volumes. As far as possible, all members of the Board met regularly at alternative years in Addis Ababa or Uppsala during the 1990s. The manuscripts were edited, and they were checked against the material at the Ethiopian National Herbarium. Ib Friis read all manuscripts to check the nomenclature and citation of type material. A detailed list of the editors, the editorial boards, and the editorial teams, which included the editorial assistants, is given by Tadesse (2011: Table 4) together with more information about the international contribution to the family treatments to the Flora.

Figure 3. Inga Hedberg in the Editorial Board of the Flora of Ethiopia and Eritrea, photographed on the stairs of the National Herbarium, Addis Ababa, 1998. From left to right: Tewolde Berhan Gebre Egziabher, Sue Edwards, Ensermu Kelbessa, Inga Hedberg, Olov Hedberg, Ib Friis, and Sebsebe Demissew. Photograph by Ib Friis.

Already before the formal launching of the Ethiopian Flora Project in 1980, foreign students, mostly African, but also some Scandinavian had come to study tropical African botany with Olov and Inga under other projects (Nordal 2011). In 1969, just before Olov's appointment as professor, Inger Nordal had come from Oslo (then Inger Bjørnstad, defended her thesis in Uppsala in 1977) and Ib Friis from the University of Copenhagen (defended his thesis in Uppsala in 1985 and – for the degree of Dr. Scient. – in Copenhagen in 1992), while Mats Thulin was a student from the "home university" of Uppsala and defending his thesis in Uppsala in 1975. Asfaw Hunde, Ethiopian, but living in Uppsala, having moved there from Copenhagen, defended his thesis in Uppsala in 1982 with Mats as his supervisor. John Kokwaro (from Kenya) studied Ethiopian and East African Valerianaceae, Geraniaceae, Rutaceae, and Anacardiaceae at Uppsala and defended his Ph.D. there in 1968. William Mziray (from Tanzania) defended his

thesis in Uppsala in 1992. Pius Temu (from Tanzania) defended his thesis in Uppsala in 1990 with Mats as his supervisor. In 1980, the first students sponsored by the Ethiopian Flora Project began to arrive in Uppsala, the first being Mesfin Tadesse, who defended his thesis in Uppsala in 1984, Sebsebe Demissew, who defended his thesis in Uppsala in 1985, Ensermu Kelbessa, who defended his thesis in Uppsala in 1990, and Ghebrehiwet Medhanie from Eritrea, who defended his thesis in Uppsala in 1999. They all had Mats as supervisor, as had Ahmed Mumin Warfa from Somalia, who defended his thesis in Uppsala in 1989 (although printed in 1988). Zemede Asfaw, who defended his thesis in Uppsala in 1989, had studied the infraspecific taxonomy and land races of barley partly at the Carlsberg Laboratory in Copenhagen and partly at the University of Svalöv near Lund and had supervisors from outside the Department of Systematic Botany in Uppsala. Inga (Hedberg I 2001) has stated that receiving the Ethiopian students was probably the most stimulating and uncomplicated part of the Flora Project, but she also soon realized that living in a foreign country, under a different culture, and spending long periods far from home might cause problems. Nevertheless, the Flora Project students were all successful in their studies, and they have provided Ethiopia with excellent botanists.

Mats and Ib tried to follow the ideas of Inga and Olov about bringing African students to their university and sending European students to Africa to meet the African students in Africa. Ib managed during the politically most difficult period in Ethiopia to get external funding for a twinned Ph.D. project on the ecology of Ethiopian plantations and natural forests. This involved the Ethiopian Ph.D. student Lisanework Nigatu (now at Harmaya University) and the Danish Anders Michelsen (now professor of ecology at the University of Copenhagen), and later another pair of students on the ecology of grass fires in Ethiopia. However, the most successful in attracting and providing for African students was Inger Nordal who, with the help of a generous Norwegian program for foreign Ph.D. students managed to provide seven Ph.D. scholarships to work in Oslo on African monocotyledons and African ecology, four from Ethiopia (Fikre Dessalegn, Tilahun Teklehaymanot, Wendawek Abebe, Tesfaye Awas), three from Zimbabwe (Shakkie Kativu, Clemence Zimudzi, Ezekiel Kwembeya), one from Kenya (Emily Wabuyele), and one from Malawi (Elizabeth Mwafongo) (Nordal 2011).

At this time, the Ethiopian National Herbarium had grown from about 16,000 to more than 70,000 specimens (now it includes more than 100,000 specimens), partly due to the fieldwork of Ib Friis, which after 1980 continued with more than 25 trips thanks to the generous funding for this activity from the Carlsberg Foundation, and for many years in collaboration with Sally Bidgood (Kew). However, the growth was also due to many Ethiopian and visiting botanists associated with the Flora Project, and also a growing number of independent Ethiopian student-projects. During the early years of the Flora Project, particularly Mesfin Tadesse and Sebsebe Demissew went on long collecting trips. Currently, more room for the Ethiopian National Herbarium (ETH) is being provided to fit the collections, and Addis Ababa University has generously provided grants for refurbishment.

At around 1984, Sida/SAREC felt concerned and warned that nothing had as yet been published of the planned Flora. Unfortunately, another five years were to pass before the first volume was published. This was vol. 3, published in 1989, of which the text for the Leguminosae by Mats Thulin, Asfaw Hunde, and Roger M. Polhill had already been published as a monograph, which could now be updated. The editing of the remaining and rather numerous families in that volume, many of which had been worked up by Michael G. Gilbert and Kaj Vollesen, was mainly done at Uppsala. Although a number of these families were small, others were larger and some quite sizeable (Crassulaceae by Michael G. Gilbert, Urticaceae and Moraceae by Ib Friis), Celastraceae by Norman Robson (London) and Sebsebe Demissew, Burseraceae by Kaj Vollesen, and the Anacardiaceae by Michael G. Gilbert. Because of the independence of Eritrea in 1993, the title of all the volumes appearing after Vol. 3 was altered to Flora of Ethiopia and Eritrea, but the flora continued to cover the same area.

In the early 1990s, when only one volume had been published, SAREC again warned about the lack of printed output. However, by then the manuscripts for vols. 6 – the monocots except for the grasses, Vol. 7 with the grasses, and Vol. 2(2) – a large number of dicotyledonous families – were well underway. The grass specialist, Sylvia Phillips (Kew, UK), wrote the text for Vol. 7, which was edited in Uppsala and published in 1995. A change in the Ethiopian leadership occurred in 1996 when Sebsebe Demissew became the Ethiopian leader of the Ethiopian Flora Project and remained in that position until the end of the project in 2009. The first volume edited in Addis Ababa was 2(2) that appeared in 1995 with many small or moderately-sized families, of which the larger ones were Cucurbitaceae by Charles Jeffrey (Kew), Myrtaceae by Ib Friis (although with few indigenous species, Ethiopia has many introduced species of *Eucalyptus*), Combretaceae by Kaj Vollesen, Tiliaceae by Kaj Vollesen and Sebsebe Demissew, Malvaceae by Kaj

Vollesen and finally the large family Euphorbiaceae by Michael G. Gilbert.

One of the non-Swedish Scandinavians, Inger Nordal (whose Ph.D. thesis and many other works dealt with monocotyledons), and two Ethiopians (Sebsebe Demissew and Ensermu Kelbessa) worked hard on Vol. 6, the Monocotyledons. Inger Nordal wrote the accounts of the Hypoxidaceae, Anthericaceae, Asphodelaceae (with Sebsebe Demissew), and the Amaryllidaceae, while of other families Sebsebe Demissew wrote the Dioscoreaceae (with Jacques Miège, Geneva, Switzerland), Asparagaceae, and Aloaceae (with Michael G. Gilbert). Ensermu Kelbessa wrote the Commelinaceae with Robert B. Faden, Smithsonian Institution, Washington, USA). Contributions of two other particularly large and difficult families were also provided by European contributors: Cyperaceae by Kåre A. Lye (Ås, Norway) and Orchidaceae by Phillip J. Cribb and Sarah Thomas (Kew, UK). The volume was edited in Addis Ababa and published in 1997.

The occasional complaints from SAREC about the slow rate of publication continued, and sometimes even amounted to threats to close the project. Inga (Hedberg I 2011: 22-23) quoted a sentence from a letter from SAREC, written in 1999: "I suggest funding for two more years according to the budget. The Flora must be completed now and SAREC will not consider any more funds when these two years have passed." The need to finish the project within a time limit of fairly close to 20 years caused the distribution of the editing to be redistributed between Addis Ababa and Uppsala so that the editing of Vol. 4 was moved to Uppsala, while Addis finished the work on Vol. 2(1). Like in Vol. 2(2), Vol. 2(1), which appeared in 2000, was to contain many small and fewer moderately sized or larger families, for example, Ranunculaceae by Demel Teketay (at times associated with the Agricultural University in Wageningen; now in Botswana), Capparidaceae by Lars E. Kers (Bergius Botanical Garden, Stockholm), Brassicaceae by Bengt Jonsell (Uppsala), Polygalaceae by Michael G. Gilbert, Resedaceae by H.C.D. de Wit (Wageningen), Caryophyllaceae by Michael G. Gilbert, Amaranthaceae by Clifford C. Townsend (Kew, UK), and Flacourtiaceae by Kaj Vollesen. At Uppsala, the editing of Vol. 4 was divided into two parts, of which Vol. 4(1) was published in 2003, with larger families by Inga and Olov (Apiaceae), Focke Albers, Michael G. Gilbert, David Goyder, Sigrid Liede, and Johannes T. Venter (Asclepiadaceae), and Christian Puff (Vienna, Rubiaceae). Volume 4(2) was entirely dedicated to the Asteraceae, which Mesfin Tadesse studied during a long stay at Kew, and which was published in 2004.

In 2000, it was 20 years since the Flora Project had been launched, and this had in 1979 been stipulated as the project period. By then three volumes were left to do (vols. 5, 1, and 8), all to be edited from Uppsala. Vol. 5 was published in 2006 with contributions of large families by H. Riedl in Vienna and Sue Edwards (Boraginaceae), Sebsebe Demissew (Convolvulaceae and Verbenaceae), Ensermu Kelbessa (Acanthaceae), Mats Thulin (Lobeliaceae, Campanulaceae), Ib Friis (Solanaceae), and Olof Ryding (Lamiaceae). For detailed information on the publication of the individual volumes, see publications in bibliography Reports on the progress and history of the Ethiopian Flora Project. Due to unpredicted complications, Vol. 1 and 8 were only published in 2009 (see further below).

Table 1. Year of publication for the Flora volumes within the 20 years project period from 1980, as initially estimated by the Editorial Board, and the actual year of publication (from Hedberg I 2011: Table 1).

Volume	Estimated year	Actual year
3	1989	1989
7	1994	1995
2(1)	1994	2000
2(2)	1994	1995
6	1995	1997
4(1)	1996	2003
4(2)	1996	2004
1	1996	2009
5	1997	2006
8	1998	2009

Later years; the conclusion of the Ethiopian Flora Project after Olov's death in 2007

Retirement did not slow down the pace for Inga and Olov. However, Olov passed away in 2007 after some months of illness. Inga bravely continued with the characteristic "Hedberg engagement", now as a senior researcher at the Department. However, she was deeply affected by her experiences during Olov's final five weeks of illness and death in a Swedish hospital in 2007, and she published in 2017 a case study of Olov's treatment under the Swedish health care. The book had the title of *Så kan det vara: en fallstudie av svensk sjukvård* (in English: That is how it can be: a case study of Swedish health care. Recito Förlag; 85 pp). The book describes not least the unsatisfactory communication between elderly patients and the health staff.

In 2007, only Vol. 1 and 8 of the Flora of Ethiopia and Eritrea remained to be published, but the volumes

were to include the ferns, fern allies, and gymnosperms, plus several chapters with supplementary material and indices to be completed. The health of R.E.G. Pichi Sermolli, the planned main contributor to Vol. 1, had been failing for several years, and he died in 2005 without submitting a draft manuscript of the ferns and fern allies. Yet, he had produced a carefully prepared checklist of these groups, had published accounts of a number of the families in the Adumbratio, and had continued to gather well-prepared material of Ethiopian ferns in his private herbarium. Another complication with Vol. 1 – previously overlooked by the Editorial Board – was that the numbering system for the dicotyledonous families covered in Vol. 2(1) to 5, was based on the first of two family classifications by John Hutchinson (1926), and the numbering of that classification began with family no. 1, Magnoliaceae. This had also been used in the Ethiopian Flora, but not accounting for the families of ferns, fern allies, or gymnosperms, the numbering of which was unknown when the project began.

Inga was deeply concerned about the absence of manuscripts for the ferns and fern allies (Hedberg I 2014: 31): "I have a feeling that [Pichi Sermolli's] intention might have been not to send anything until all his families were written up. Anyhow, when he died, we had virtually nothing on the ferns, and the suggestion that we could publish his material posthumously did not appeal to his wife. A colleague at Kew then suggested to me that we should just leave out the ferns … This would have been an option, had the fern volume been the last one in number. But, because of their systematic position, they had been planned for Volume 1 …" The Editorial Board decided to distribute the task of drafting accounts of the ferns, the fern allies, and gymnosperms to Dr. Jacobus P. Roux, South Africa, a fern specialist from the Compton Herbarium who accounted for 16 families, some of them large and difficult, Sebsebe Demissew and Ensermu Kelbessa, who each accounted for eight families, Ib Friis, who accounted for six families, and jointly to Ensermu Kelbessa and Henk Bentje for one family, jointly to Roux and Ensermu Kelbessa for one family, and jointly to Sebsebe Demissew and Ib Friis for one family. Because of the problem with the numbering of Hutchinson's families, it was decided to start an independent numbering system from family no. 1 (Lycopodiaceae) to family no. 41 (Cupressaceae). To honour Pichi Sermolli, his family classification, and checklist should be followed as far as possible. All Ethiopian material in his private fern herbarium should be utilized for the accounts. By then, Pichi Sermolli's private fern herbarium was in the process of being transferred as a closed historical herbarium to the Natural History Museum in Firenze as FI-PS. To include the observations from this herbarium FI-PS, Ib Friis worked in Firenze with the preliminary manuscripts for Vol. 1 and communicated with Roux, Sebsebe Demissew, and Ensermu Kelbessa about the observations. Finally, Vol. 1 and 8 of the Flora of Ethiopia and Eritrea, were edited by Inga, Ib Friis, and Eva Persson and published as the last parts of the entire flora in 2009 (Fig. 4).

Inga was highly active in organizing the concluding international Flora of Ethiopia symposium held in Uppsala in 2009 (Friis 2009) and in the publication of the proceedings (Hedberg I and Persson 2011). Inga also contributed to a final workshop in 2010 in Addis Ababa to celebrate the completion of the Ethiopian Flora project, the growth of the National Herbarium of Ethiopia, and the establishment of the Gullele Botanic Garden (Tadesse 2011; Demissew and Kelbessa 2014a, 2014b; Hedberg I 2014).

With the death of Olov in 2007, Ensermu Kelbessa in 2016, Sue Edwards in 2018, Tewolde in 2023, and now Inga, major actors in the Ethiopian Flora Project are gone. Jacobus Roux was tragically killed by a hit-and-run car in 2013 while out cycling. John Kokwaro from Kenya died in 2019, and Ahmed Mumin Warfa from Somalia in 2021. During years, some for 30 years, these people have worked with Inga on the Ethiopian Flora Project.

About working with other people on the project, Inga said (Hedberg I 2011) that apart from the difficulty of keeping the speed wanted by the sponsors (SAREC originally wanted the Ethiopian Flora to be written in fifteen years), "other problems have been relatively few and often fairly easy to solve." She (Hedberg I 2014: 30) also named the main reason for the delays: "The decision, though well founded, to publish [the Flora] not family by family but in volumes covering up to 59 families, often caused considerable and unforeseen delays … This meant that some manuscripts had to wait for about ten years before all contributions for the relevant volume had arrived and were ready for printing, ..." Inga may here have overlooked that the highly useful training of Ethiopian botanists and capacity building in Ethiopia has also slowed down the project. The production of volumes might have been faster if the project had not involved so many other activities both in the North and in the South. But then the project and SAREC's funding would not have left such a profound positive impact on the scientific environment in Ethiopia. Many of these time-consuming, but worthwhile factors have caused much of the inspiration the Flora project has given to other Ethiopian projects (Demissew et al. 2011).

For all that have been involved, professors, lecturers, editors, Europeans and Africans, Inga's and Olov's

Figure 4. Inga in her home in Uppsala with six Ethiopian Flora volumes: blackish blue: Vol. 2(2); lighter blue: Vol. 2(1); pale blue: Vol. 1; green: Vol. 3; yellow: Vol. 4(2); red: Vol. 5. Photo by Maria Hedberg; taken soon after completion of the Flora.

work on African biodiversity and conservation and their enthusiasm for collaboration between botanists in North and South, have been an invaluable inspiration, and should indeed remain so for all future botanists, may they live and work in the North or in the South, and may we and coming generations of botanists continue to possess the good spirit that prevailed during the Ethiopian Flora Project with Inga as a central character.

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This bibliography intends to convey the richly varied themes in the publications and editorial work by Inga Hedberg. Only a few of these are cited in the main text. This list is based on and slightly revised from the mainly chronological bibliography in Symbolae Botanicae Upsalienses 38: 9-12. 2016. Here, the themes are arranged chronologically according to the first publication of each theme. Mimeographed publications and popular science publications in Swedish are not included.

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New taxa of *Barleria* sect. *Prionitis* (Acanthaceae) from the Horn of Africa biodiversity hotspot in Somalia

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Abstract. Two new taxa in *Barleria* L. sect. *Prionitis* Nees (Acanthaceae) are described from Somalia, namely *Barleria biramosa* Defty & I.Darbysh. from central Somalia and *B. compacta* Malombe & I.Darbysh. subsp. *minima* I.Darbysh. & Defty from the northeast coastal region. These taxa are further endemics of the Horn of Africa biodiversity hotspot and have highly restricted ranges. *Barleria biramosa* was previously included within *B. punctata* Milne-Redh., another range-restricted endemic of the Horn of Africa region form northeast Ethiopia and northern Somalia; an updated description of *B. punctata* is therefore provided. Notes on the habitat requirements and conservation status (extinction risk) of the species are provided. *Barleria biramosa* is considered to be globally Endangered whilst *B. compacta* subsp. *minima* is currently assessed as Least Concern; the published assessment of Vulnerable for *B. punctata* is confirmed. With these additions, 11 taxa in 10 species of *Barleria* sect. *Prionitis* are currently recognised in Somalia.

Keywords: Barlerieae, conservation, diversity, IUCN Red List, taxonomy.

INTRODUCTION

The Horn of Africa biodiversity hotspot-one of only two entirely arid biodiversity hotspots globally-ranges across the drylands of northeast continental Africa, the southern Arabian Peninsula and the Socotra archipelago. It covers most of Somalia, Djibouti, parts of Ethiopia, Eritrea, Kenya, Yemen and Oman, and a small portion of northeastern Sudan (CEPF 2024). This hotspot is particularly important for its rich endemic flora, with many plant species having highly restricted ranges (Thulin 2004; Friis et al. 2005; Marshall et al. 2016; CEPF 2024). For example, in Somalia, Thulin (2006a) reports a total flora of 3,165 species, of which approximately 800 (25%) are endemic.

Northeast Africa in general, and in particular the Horn of Africa hotspot, is amongst the most diverse areas globally for the Acanthaceae family

(Manzitto-Tripp et al. 2022). For example, in the species-rich genus *Barleria* L. (Acanthaceae: Acanthoideae: Barlerieae; Manzitto-Tripp et al. 2022), 32 species are known from Somalia alone, 12 (37.5%) of which are endemic (numbers modified from POWO 2024), this representing over 10% of the total species richness in *Barleria*. Several of the endemic species from this region have been described relatively recently, including *B. albomarginata* Hedrén, *B. compacta* Malombe & I.Darbysh., *B. dentata* Hedrén, *B. ensermui* I.Darbysh., *B. ilicifolia* Hedrén and *B. shebelleensis* Ensermu & I.Darbysh. from Somalia, and *B. gidoleensis* Ensermu & I.Darbysh., *B. ferox* Ensermu & I.Darbysh. and *B. negeleensis* Ensermu & I.Darbysh. from Ethiopia (Hedrén 2006a; Malombe and Darbyshire 2010; Ensermu and Darbyshire 2018). Many are known from few botanical collections, and *B. ensermui* and *B. ilicifolia* are both known only from the type collections, despite being showy, large-flowered species. Hence, the likelihood of further new discoveries in *Barleria* within this region is high, particularly as large areas remain under-explored botanically.

However, the Horn of Africa is one of the most degraded biodiversity hotspots in the world due to overgrazing, charcoal production, political instability and infrastructure development (Thulin 2004; CEPF 2024). Therefore, it is important that the endemic species of the region are identified and described in light of the high levels of threat faced in this region and the urgent need for effectively targeted conservation efforts.

As part of a planned monograph of *Barleria*, two interesting taxa within sect. *Prionitis* Nees that have come to light amongst herbarium specimens from Somalia are here investigated morphologically for their taxonomic status. The first is a taxon from central Somalia that has been previously included within *Barleria punctata* Milne-Redh. by Hedrén (2006b) in the *Flora of Somalia* treatment of *Barleria*. That species is otherwise known only from northern Somalia and northeast Ethiopia, and is disjunct from the central Somalian populations both geographically and ecologically. The second taxon is from arid coastal northeast Somalia and is closely allied to *Barleria compacta* Malombe & I.Darbysh., described in 2010 from the same region, although with most collections from further inland (Malombe and Darbyshire 2010).

MATERIALS & METHODS

Herbarium specimens of the potential new taxa and morphologically allied species housed at EA, ETH, FT, K and UPS herbaria were analysed and measured at K, using standard herbarium practices; herbarium abbreviations follow Thiers (updated continuously). Prior to dissection, flowers were soaked in Aerosol OT 5% solution; all other characters were measured on dry material. All duplicates seen by the authors are marked "!". Barcodes for duplicates are listed wherever available to facilitate digital access to the specimens.

The distribution map for the relevant taxa was produced in QGIS V.3.2, using georeferenced herbarium collections. Country borders and first-order administrative boundaries were downloaded from GADM (https://gadm.org/maps.html).

The species conservation (extinction risk) assessment follows the Categories and Criteria of the IUCN Red List (IUCN 2012) and the guidelines for their use (IUCN Standards and Petitions Subcommittee 2022). Extent of Occurrence (EOO) and Area of Occupancy (AOO) were calculated using the GeoCAT tool (https://geocat.iucnredlist.org/; Bachman et al. (2011).

RESULTS

Following detailed morphological investigation, two new taxa are described in the taxonomic account below. As noted in the Introduction, the first of these, *Barleria biramosa* Defty & I.Darbysh., was previously included in the circumscription of *B. punctata* by Hedrén (2006b). Whilst *B. biramosa* is superficially similar to that species, it differs in a number of vegetative and floral traits and the two are readily separable as well as being geographically and ecologically disjunct. As the description of *B. punctata* by Hedrén (2006b) includes specimens of *B. biramosa*, we also provide a full, modified description of *B. punctata s.s.* in the Taxonomic Account below.

The second new taxon is closely allied to *Barleria compacta* Malombe & I.Darbysh., described in 2010 from the same region, although with most collections from further inland (Malombe and Darbyshire 2010). In fact, one of the specimens now assigned to the new taxon was originally included among the paratypes of *B. compacta*. They differ primarily in vegetative characters and have very similar floral morphology and so they are treated as subspecies, with the new taxon *B. compacta* subp. *minima* I.Darbysh. & Defty described below.

Together with other taxonomic changes made after the *Flora of Somalia* account (Hedrén 2006b), i.e., the description *Barleria polhillii* I.Darbysh. and the reduction of *B. glaucobracteata* Hedrén to synonymy within *B. quadrispina* Lindau by Darbyshire *et al.* (2010), this work results in 10 species and 11 taxa being recognised within *Barleria* sect. *Prionitis* in Somalia at present.

However, there is still further taxonomic work needed on this group in the Horn of Africa biodiversity hotspot, particularly in relation to the variable species *B. proxima* Lindau and *B. quadrispina*, which are currently under investigation.

TAXONOMY

Barleria biramosa Defty & I.Darbysh., **sp. nov.**

Type: Somalia, Hiiraan, escarpement above Yasoomman, 04°03′N, 45°45′E, 24 May 1989 (fl., imm. fr.), *M. Thulin & Abdi M. Dahir 6493* (holotype UPS! [UPS No. V-048691]). (Figure 1).

Diagnosis

Barleria biramosa has previously been confused with *B. punctata* but differs in (1) the axillary spines having a stalk 5.5–13 mm long with similarly sized spine rays (versus stalk 1.5–3.9 mm long, usually shorter than the spine rays, up to 5× shorter); (2) the leaf indumentum including unequally biramous hairs (versus hairs all simple, uniramous); (3) the calyx having broad sessile glands on the median portion of the anterior and posterior lobes either side of the midrib (versus no visible glands); (4) the offset of the abaxial lobe relative to other lobes being 8.9–10.6 mm (versus 4.7–5.9 mm); (5) the abaxial corolla lobe shape being lanceolate and 5.8–6.5 × 1.6–1.8 mm in size (versus broadly obovate and 12.2–12.3 × 8.5–9.5 mm in size); (6) the ratio of the abaxial: lateral corolla lobes length being ca. 0.4: 1 (versus 0.88–0.91: 1); and (7) the flowers being held in the distal portion of the branches but the bracts barely differentiated from leaves (versus flowers held in a short terminal spike with the bracts clearly differentiated from the leaves). See Table 1.

Description

Harshly spiny compact shrublet to 30 cm tall (*fide Thulin & Abdi Dahir* 6493); young stems weakly 4-angular, shortly pubescent, hairs patent or slightly retrorse, most dense on two opposite sides, also with stiff appressed (strigose) hairs at and immediately below nodes; mature stems woody with rough bark, up to 6.5 mm diameter. Axillary spines numerous, beige-white, stalk 5.5–13 mm long, 4-rayed, rays of similar length, straight, longest ray 10–16.5 mm long. *Leaves* on petiole 2.4–3.5 mm long, with short fine spreading hairs adaxially; blade elliptic or obovate, 18–28 × 11–14 mm (length: width ratio 1.5–2.35: 1), base cuneate or slightly attenuate, margin entire, apex rounded or obtuse with apical spine 2.4–3.9 mm, adaxial surface glabrous except for short fine spreading hairs along midrib towards base, abaxial surface sparsely strigose along midrib, margin and occasionally on lateral veins, some of these hairs unequally biramous, with broad sessile glands concentrated in proximal half and towards midrib abaxially; lateral veins (2–) 3 per side, strongly ascending and sometimes brochidodromous, pale and somewhat prominent beneath. Inflorescences axillary in distal portion of stems, one per node, each single-flowered, flowers sessile; bracts barely differentiated from the leaves but distal bracts somewhat smaller, 12–19 × 7–9 mm, apex tapered into spine tip 1.8–2.5 mm long, veins more prominent beneath, strigose with hairs more numerous on lateral veins abaxially; bracteoles linear-lanceolate, spinose, white to green, 10–18 × 0.5–0.8 mm, glabrous. Calyx pale grey-green, eventually turning white, not accrescent; anterior lobe lanceolate with long-attenuate apex, 14–17.5 × ca. 4.2 mm, apex spinose or minutely bispinose, external surface with broad sessile glands concentrated in median portion either side of midrib before tapering into spine, midrib prominent distally, parallel veins on external and internal surface but more prominent on internal surface; posterior lobe as anterior lobe but 17.2–21.3 mm, apex spinose, external surface sparsely strigose; lateral lobes narrower, ca. 15 mm long, with minute fine hairs. Corolla yellow or cream-yellow, 31–33 mm long, glabrous externally; tube cylindrical, 10.4–12.7 mm long, ca. 4 mm diameter; limb in "4+1" configuration; abaxial lobe offset by 8.9–10.6 mm, lanceolate, 5.8–6.5 × 1.7–1.8 mm, apex rounded to bluntly acute; lateral lobes broadly elliptic, 14.2–16.4 × 8.8–10.6 mm, apex obtuse (ratio of abaxial: lateral lobe ca. 0.4: 1); adaxial lobes as lateral lobes but 10.3–15.6 × 7.9–10 mm. Stamens inserted ca. 6 mm from base of corolla tube; filaments of long stamens 13.5–13.7 mm long, shortly and sparsely hairy at base, elsewhere glabrous; anthers 3.4 –3.6 mm long; short lateral stamens ca. 0.7 mm long, conspicuously pubescent at base, antherodes 0.45–0.55 mm long. Ovary not seen; style glabrous; stigma linear, ca. 1.4 mm long. Capsule only seen in immature state, 12.5 mm long, glabrous; seeds not seen.

Etymology

The species epithet "*biramosa*" denotes the unequally biramous hairs, present on the foliage, that are unusual in *Barleria* sect. *Prionitis*; this is one of the key characters for separation of this species from *Barleria punctata*.

Distribution

Occurs only in Buloburde District, Hiiraan Region of Central Somalia (C2 floristic region). (Figure 2).

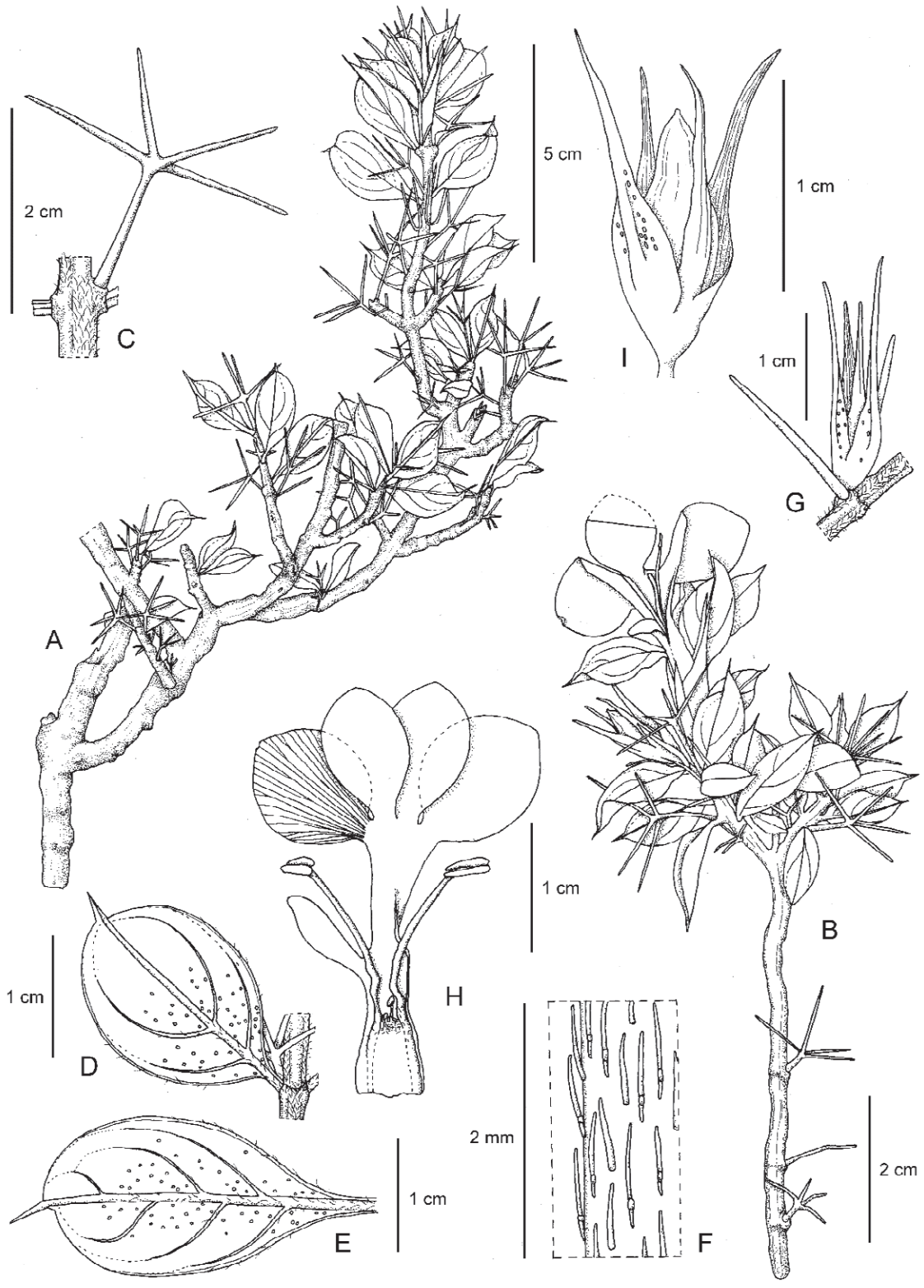

Figure 1. *Barleria biramosa.* **A.** Habit, mature stems and leafy branches. **B.** Habit, flowering branch. **C.** Axillary rayed spine. **D.** Leaf in situ, abaxial surface, with axillary spine. **E.** Leaf, abaxial surface, showing variation in leaf shape. **F.** Detail of leaf indumentum including biramous hairs. **G.** Calyx and bracteoles. **H.** Dissected corolla with androecium. **I.** Immature fruit within calyx. A, E and G from *P. Kuchar 15631* (UPS); B–D, F, H and I from *M. Thulin & Abdi M. Dahir 6493* (UPS, holotype). Drawn by Ellie Defty.

Habitat & Ecology

This species occurs in deciduous *Acacia-Commiphora* bushland on sandstone slopes (*Thulin & Abdi Dahir* 6493) and on eroding, overgrazed rocky slopes with open bushland (*Kuchar* 15631), at 280–300 m asl.

Conservation status

Based on current evidence, this species is highly range-restricted, with an area of occupancy (AOO) of 8 km^2; the extent of occurrence (EOO) based on application of a minimum convex polygon is less than 1 km^2, hence EOO is matched to AOO at 8 km^2 in accordance with the IUCN guidelines. This species occurs in deciduous bushland, where overgrazing by goats and use of wood for firewood, charcoal burning and house building pose some threat (M. Thulin, pers. comm. 2024). There is some habitat degradation and human activity observable on Google Earth imagery in the immediate vicinity of Yasoomman village. Agricultural activity is also present along the river valley to the west of the escarpment. Based upon this information, two threat-based locations are defined. These threats are inferred to result in a continuing decline in extent and quality of habitat and, combined with its small EOO and AOO, this species is assessed as Endangered (EN) under criterion B1 and B2: EN B1ab(iii)+2ab(iii).

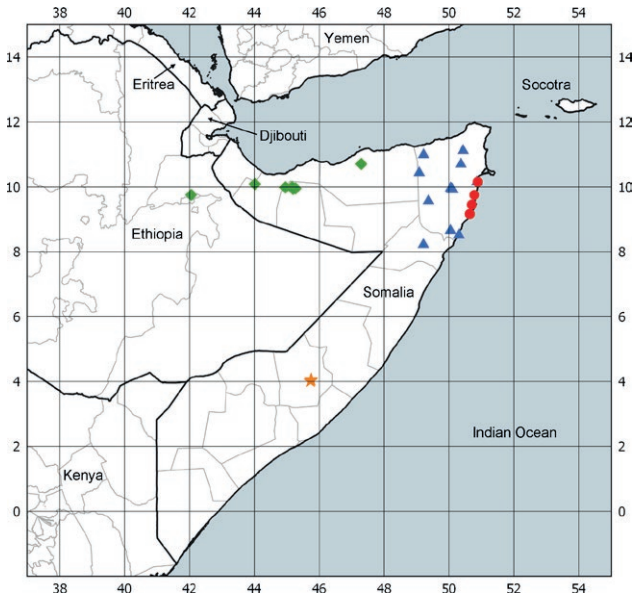

Figure 2. Distribution of *Barleria* species in the Horn of Africa: *B. biramosa* (orange stars); *B. compacta* subsp. *compacta* (blue triangles); *B. compacta* subsp. *minima* (red circles); *B. punctata* (green diamonds).

Taxonomic notes

Although this species has been previously confused with *B. punctata*, and this is the most likely species with which *B. biramosa* could be confused, the two are readily separated by the characters listed in the diagnosis and Table 1. The biramous hairs on the leaves are an unusual character in *B. biramosa*; such hairs are more frequent in *Barleria* sect. *Somalia* (Oliv.) Lindau, where they can be equally biramous to anvil-shaped, i.e., with one well-developed branch and a second, poorly developed or stunted branch (Balkwill and Balkwill 1997; Darbyshire et al. 2010). Within sect. *Prionitis*, unequally biramous hairs have otherwise been recorded in *B. brevispina* (Fiori) Hedrén, another species of the Horn of Africa biodiversity hotspot. That species also shares with *B. biramosa* the highly zygomorphic corolla with a strongly offset and much-reduced abaxial lobe relative to the other lobes. These two species may therefore be allied, and *B.brevispina* is included in Table 1 for completeness. However, *B. brevispina* is easily separated from *B. biramosa* in, amongst other differences, having only shortly-stalked (0.5–3 mm) axillary spines, the sessile glands on the leaves, bracts and (usually) calyx being absent or sparse and inconspicuous and having smaller anthers, 2.5–3.3 mm long. Most populations of *B. brevispina* are additionally most easily separated by having linear-lanceolate to narrowly oblong leaves with a length: width ratio 5.5–15.5: 1 and so markedly different from those of *B. biramosa*. However, there are a few specimens of *B. brevispina* with broader leaves, notably *P.E. Ellis 226* (K! [K001295268]) from SW of El Rago in eastern Ethiopia where the leaves are more elliptic or obovate (length: width ratio ca. 2.4–2.7: 1), similar in shape to those of *B. biramosa*. That specimen is, however, otherwise a good match for *B. brevispina*.

Ipomoea hiranensis Thulin has a similar distribution to *B. biramosa* in the Buloburde District of Hiiraan, with the type specimen (*M. Thulin & Abdi M. Dahir 6488*, holotype UPS, isotype K) from the same escarpment above Yasoomman as the type of *Barleria biramosa* (Thulin 2008).

Additional specimens examined (paratypes)

SOMALIA: Hiiraan Region, ai pozzi (asciutti) di Jessoma, 10 Aug 1959 (fl.), *G. Moggi & R. Bavazzano 755* (FT! [FT0007253]); Bulo Burti District, escarpment east of Aborey, 27 Nov. 1983 (fl.), *P. Kuchar 15631* (UPS! [UPS No. V-1047589]).

Table 1. A comparison of the diagnostic characters for separation of *Barleria biramosa* from *Barleria punctata* and *Barleria brevispina*.

Character	*Barleria punctata*	*Barleria biramosa*	*Barleria brevispina*
Length of spine stalk	1.5–3.9 mm	5.5–13 mm	(0.5–) 1–3 mm
Longest spine ray	15–22 mm	10–16.5 mm	4–15 mm
Leaf indumentum (strigose hairs)	Uniramous	Uniramous and unequally biramous	Uniramous and/or unequally biramous
Leaf spine length	1.2–2.5 (–3.4) mm	2.4–3.9 mm	0.5–2.3 mm
Leaf shape and length:width ratio	Elliptic or slightly ovate to obovate 1.78–3.25: 1	Elliptic or obovate 1.5–2.35: 1	Usually linear-lanceolate to narrowly oblong 5.5–15.5: 1 More rarely shorter and (oblong-) elliptic to obovate 2.4–4.7: 1
Veins on leaf	Inconspicuous	Prominent beneath	Inconspicuous in narrow-leaved form, more prominent on abaxial surface in broader-leaved form
Glands on leaf	Few broad sessile glands at base	Broad sessile glands scattered but numerous, densest at base	Few or no broad sessile glands at base
Inflorescence form	Short terminal spike with bracts clearly differentiated from leaves	Flowers held in distal portion of branches but bracts barely differentiated from leaves	Axillary, sometimes restricted to the uppermost axils
Bract spine tip length	2.5–4.9 mm	1.8–2.5 mm	0.5–2.3 mm
Arrangement of sessile glands on bracts	Broad cupular glands dense proximally between veins	As on leaves	As on leaves
Bracteole shape and size	Ovate or lanceolate, then 1–2 × 0.5–0.8 mm, or linear-lanceolate and spinose, then 4.5–11.5 × 0.5–1.6 mm	Linear-lanceolate and spinose, 10–18 × 0.5–0.8 mm	Linear-lanceolate, 9.5–19 × 1–2 mm
Calyx glands	Broad sessile glands absent	Broad sessile glands conspicuous on median portion either side of midrib	Broad sessile glands absent or rarely present either side of midrib
Calyx anterior lobe size	3–9 × 2–3 mm	14–17.5 × ca. 4.2 mm	14–19 × 3–6 mm
Corolla tube length	13.5–15.5 mm	10.4–12.7 mm	7.5–13 mm
Offset of abaxial lobe relative to other lobes	4.7–5.9 mm	8.9–10.6 mm	10–14.5 mm
Abaxial corolla lobe shape and size	Broadly obovate, 12.2–12.3 × 8.5–9.5 mm	Lanceolate, 5.8–6.5 × 1.6–1.8 mm	Lanceolate or subulate, 2.5–9 × 1–2 mm
Ratio of abaxial: lateral lobe length	0.88–0.91: 1	ca. 0.4: 1	0.25–0.6: 1
Insertion point of stamens	8.5–9.7 mm from base of corolla tube	ca. 6 mm from base of corolla tube	5–7 mm from base of corolla tube
Filament length (long abaxial stamens)	14.7–17.5 mm	13.5–13.7 mm	18–26 mm
Anther length (long, abaxial stamens)	3.5–3.8 mm	3.4–3.6 mm	2.2–3.3 mm

Barleria punctata Milne-Redh. (Milne-Redhead in Hutchinson & Bruce 1941, p. 170); Ensermu (2006: 415); Hedrén (2006b: 439),, pro parte, excl. spec. ex Somalia C2 region.

Type: Somalia, Somaliland, Barataga, 10°05′N, 44°01′E, 31 Oct. 1932 (fl., imm. fr.), *J.B. Gillett 4522* (holotype K!, 2 sheets [K000394468, K000394469]).

Description

Harshly spiny compact shrublet, 30–100 cm tall; young stems strongly 4-angular, shortly pubescent in two opposite grooves, hairs patent, elsewhere glabrous except for longer ascending or spreading hairs along nodal line; mature stems woody, greyish in colour, up to 7 mm diameter. Axillary spines numerous, beige-white, stalk 1.5–3.9 mm long, occasionally puberulous,

(2–) 4-rayed, rays sometimes of unequal length, straight, longest ray 15–22 mm long. Leaves on petiole 1.8–3.5 mm long, with short fine spreading hairs adaxially and continuing onto blade midrib, sparsely strigose abaxially; blade elliptic or slightly ovate to obovate, 15–28 × 6–13 mm (length: width ratio 1.78–3.25: 1), base cuneate, attenuate or obtuse, margin entire, apex acute or slightly attenuate with apical spine 1.2–2.5 (– 3.4) mm long, adaxial surface glabrous or sparsely strigose along midrib towards base, abaxial surface sparsely strigose along midrib, margin and occasionally on lateral veins, all hairs uniramous, and with few broad sessile glands proximally; lateral veins (2 –) 3 (– 4) per side, strongly ascending, inconspicuous. Inflorescences a series of single-flowered, opposite cymes together forming a terminal-spike 20–29 mm long, flowers sessile; bracts pale glaucous-green, falcate, obovate to elliptic or broadly so, 11.4–16 × 4.6–6.8 mm, apex tapered into spine tip 2.5–4.9 mm long, veins pale and prominent abaxially, densely strigulose on midrib and sparsely so on lateral veins and with broad cupular glands dense proximally between the veins; bracteoles white to green, variable, from ovate or lanceolate, then 1–2 × 0.5–0.8 mm (type specimen), to linear-lanceolate with a long spine tip, then 4.5–11.5 × 0.5–1.6 mm, sparsely strigose along abaxial midrib and margin. Calyx pale grey-green, eventually turning white, not accrescent; lobes variable in shape, anterior and posterior lobes either ovate, then 3–4.5 × 3.2–4.2 mm, apex obtuse to very shortly attenuate, or lanceolate-acuminate, then 5–9 × 2–3 mm, margin can be membranous and minutely and irregularly toothed towards acumen but mostly entire, apex spinose, midrib prominent distally, external surface otherwise smooth with no veins visible, strigose with ascending hairs concentrated along the midrib; lateral lobes similar but slightly narrower, external surface sparsely strigose along midrib. Corolla yellow or orange-yellow, 32–35 mm long, glabrous externally; tube cylindrical, somewhat curved, 13.5–15.5 mm long, 2.4–2.7 mm in diameter; limb in "4+1" configuration; abaxial lobe offset by 4.7–5.9 mm, broadly obovate, 12.2–12.3 × 8.5–9.5 mm, apex rounded to obtuse; lateral lobes elliptic, 13.3–14 × 6.5–9.4 mm, apex subacute to rounded with minute acumen (ratio of abaxial: lateral lobes 0.88–0.91: 1); adaxial lobes elliptic, 12.1–14.6 × 5.8–8.6 mm, apex acute. Stamens inserted 8.5–9.7 mm from base of corolla tube; filaments of long stamens 14.7–17.5 mm long, shortly and sparsely hairy proximally; anthers 3.5–3.8 mm long; short lateral stamens ca. 1.9–2.4 mm long, pubescent, antherodes 0.4–0.8 mm long. Ovary not seen; style glabrous; stigma linear, 1.5–1.9 mm long. Capsule 15.5–16 mm long, glabrous; seeds ca. 7.3 × 4.8 mm, with silky, straight hygroscopic hairs.

Distribution

Occurs in northeast Ethiopia within the Somali Regional State (Harerge floristic region), and in northern Somalia within Maroodi-jeeh [Marodijeh] and Sahil Regions of Somaliland (N1 and N2 floristic regions). (Figure 2).

Habitat & Ecology

This species occurs on rocky slopes and ridges associated with mountain valleys and on open stony ground, sometimes associated with limestone, at 884–1524 m asl.

Conservation status

This species is assessed as Vulnerable under criteria B: VU B1ab(iii)+2ab(iii) on the IUCN Red List (Darbyshire and Roberts 2023). It has an extent of occurrence of 12,915 km^2, an area of occupancy of 28 km^2 and is known to occur in seven locations. The major threat to this species is overgrazing by livestock, exacerbated by drought, and there is an inferred resultant continuing decline in area, extent and quality of habitat.

Taxonomic notes

The type specimen and the single specimen seen from Ethiopia—the two western-most collections—differ notably from the other material in having ovate calyx lobes 3–4.5 mm long (versus lobes lanceolate-acuminate, 5–9 mm long); minute to small, ovate to linear-lanceolate bracteoles, 1.2–6.7 × 0.6–0.8 mm (versus larger, always linear-lanceolate, 9.3–11.5 × 1.1–1.6 mm) and proportionately broader bracts with a shorter apical spine, 2.5–3.2 mm long (versus spine 3.4–4.9 mm long). Two subspecies may well be involved but it is desirable to see more material before drawing firm conclusions.

Barleria punctata is superficially similar to the more widespread species *B. proxima* but differs most clearly in having glabrous, not puberulous, corollas and capsules, in having more sparsely hairy calyces, those of *B. proxima* being strigose throughout externally, and in having a larger and broader abaxial corolla lobe, that of *B. proxima* being only 3–4.5 mm wide (measurements for *B. proxima* from Darbyshire et al. 2010).

Additional specimens examined

ETHIOPIA: 27 km NE of Dire Dawa on road to Djibouti, 09°45′N, 42°03′E, 10 April 1972 (fl., imm. fr.), *M.G. Gilbert 2333* (EA!, ETH!, K! [K001295170]). **SOMALIA:** Somaliland, near road from Erigavo to Mait, 29 July 1957 (fl., imm. fr.), *J.G.B. Newbould 715* (K! [K001295174]); foot of Sheikh Pass, 9 Oct 1957 (fl.), *P.R.O. Bally 11824* (K! [K001295175]); Sheikh, 8 June

1973 (fl.), *J.R.I. Wood S/73/143* (K! [K001295173]); Plateau edge, 09°57′N, 45°61′E, 25 June 1981 (fl., imm. fr.), *J.B. Gillett & R.M. Watson 23622* (EA!, K! [K001295172]); Sheikh Pass behind secondary school, 15 Oct 1983 (fr.), *J. Aronson et al. 19* (K! [K001295343]); mountains above Qoton, 09°59′N, 44°57′E, 27 May 2002 (fl., imm. fr.), *M. Thulin 11040* (K! [K001295171]).

Barleria compacta Malombe & I.Darbysh. subsp. ***minima*** I.Darbysh. & Defty, **subsp. nov.**

Type: Somalia, road 14 km W of Bender Beila [Bandarbeyla], 9°27′N, 50°43′E, 12 July 1980 (fl.), *J.B. Gillett 23105* (holotype EA!). (Figure 3).

Diagnosis

Subsp. *minima* differs from subsp. *compacta* in (1) the axillary spines having a stalk 7– 15.5 mm long and usually longer than the spine rays (versus (0.8–)1.5–5 mm long, usually shorter than the spine rays and up to 3–5× shorter); (2) the leaves being shortly oblong-elliptic or somewhat obovate (versus leaves linear, linear-lanceolate or narrowly oblong); (3) the flowers being subsessile (versus flowers usually on a peduncle 1.5–8 mm long, rarely subsessile); and (4) the anterior and posterior calyx lobes being lanceolate, with a gradually tapering apex that is not acuminate (versus anterior and posterior calyx lobes lanceolate-acuminate). See Table 2.

Description

Spiny minute shrublet, ca. 5 cm tall; stems with very short internodes 1–6 mm long, young stems 4-angular, with some minute and inconspicuous spreading hairs on distalmost internodes, nodal line can be strigulose; mature stems soon woody, with gnarled grey-brown bark, branches below leaves with numerous petiole scars. Axillary spines (sometimes sparse) white or at first (yellowish-) beige, stalk 7–15.5 mm long, 4-rayed, longest ray 8–14 mm long, straight. Leaves subsessile or on short, poorly defined petiole to 2.7 mm long, sometimes with minute spreading hairs adaxially; blade fleshy, glaucous-green, can be markedly glaucous due to whitish epidermal surface, sometimes pink-tinged, shortly oblong-elliptic or somewhat obovate, 11.5–17 × 3.9–7.8 mm (length: width ratio 2.2–3(–3.6): 1), base attenuate or cuneate, margin entire, apex acute or slightly attenuate with stiff apical spine 1–2.3 mm long, sparsely strigulose along midvein beneath, elsewhere glabrous or with few minute spreading hairs when young, with few broad sessile glands proximally beneath; lateral veins 2–3 per side, ascending, can be inconspicuous. Inflorescences axillary, single-flowered, subsessile; bracts foliaceous; bracteoles white (-green) or pale yellow-green, spinose, 9.5–13 × 0.5–0.8 mm, glabrous or with few minute spreading hairs. Calyx pale yellow-green turning white; anterior lobe lanceolate, (8.2–)12.5–14.5 × 2.3–2.6 mm, apex gradually narrowed to a spine or occasionally bispinose, external surface smooth or midrib and parallel lateral veins somewhat visible, glabrous except for few minute fine hairs along margin and at base; posterior lobe as anterior lobe but (9–)14–15 mm long, spinose; lateral lobes slightly narrower, (7.5–)10.7–12.5 mm long. Corolla pale-yellow, 23–26 mm long, sparsely and shortly pubescent towards apex of tube and base of limb; tube cylindrical, 10–14.7 mm long, 1.7–2 mm in diameter; limb subregular; abaxial lobe very slightly offset from other lobes by ± 1 mm, broadly obovate, 10–13 × 6.6–7.7 mm, apex rounded; lateral lobes similar to abaxial lobe but more elliptic-obovate, 8.5–12.7 mm long, apices obtuse or minutely attenuate (ratio of abaxial: lateral lobes ca. 1–1.1: 1); adaxial lobes as lateral lobes but 5.2–6.8 mm wide. Stamens inserted 5.2–7 mm from base of corolla

Figure 3. Holotype of *Barleria compacta* subsp. *minima*; *J.B. Gillett 23105* (EA). Reproduced with permission of the East African Herbarium, National Museums of Kenya.

tube; filaments of long stamens 11–13 mm long, shortly and sparsely hairy proximally; anthers exserted, 1.8–2.6 mm long; short lateral stamens ca. 0.3 mm long, pubescent at base, antherodes 0.2–0.3 mm long. Ovary and style glabrous; stigma linear, 0.7–0.9 mm long. Capsule ± 11 mm long including beak 3.5–4.5 mm long, glabrous; seeds ca. 5.2 × 4 mm, with silky, straight buff-coloured hygroscopic hairs.

Distribution

Occurs in the coastal region of northeastern Somalia in Bari Region, in the vicinity and north of Bandarbeyla town (N3 floristic region). (Figure 2).

Habitat & Ecology

Habitat information for this subspecies is very limited, with the three early (non-type) collections lacking any habitat notes; J.B. Gillett recorded it occurring on a limestone plateau with low sparse *Acacia-Commiphora* bushland and scattered *Dobera glabra* at the type locality. However, it has been noted that the habitat along the coast north and south of Bandarbeyla is composed of mostly bare rocks and sand with sparse vegetation, whereas the plateau a bit further inland has a vegetation of scattered low bushes (*M. Thulin* pers. comm. 2024). It is recorded from ca. 60–240 m asl (220 m recorded on *Gillett 23105*).

Conservation status

This subspecies has a restricted range, with an extent of occurrence (EOO) of 38 km^2 and an area of occupancy (AOO) of 16 km^2 based on known occurrence data. It was recorded as "occasional" at the type locality but no other notes on abundance are available. It is not known from any protected areas, but this species occurs in habitat that is mostly undisturbed by human activity. Despite having no or few permanent inhabitants, apart from in Bandarbeyla itself, the area north and south of the town would be visited after rain by nomads or people coming to fish during certain periods of the year – the latter mainly affecting the coastal strip only (M. Thulin, pers. comm. 2024). With no confirmed threats, this subspecies is assessed as Least Concern (LC), but threats should be assessed more completely and monitored as any increase in disturbance may quickly cause this subspecies to become Vulnerable.

Subsp. *compacta* was also assessed previously as of Least Concern (LC) by Malombe and Darbyshire (2010) and therefore the species as a whole, including the two subspecies now recognised, is considered to be LC.

Taxonomic notes

In the protologue of *Barleria compacta*, Malombe and Darbyshire (2010) noted that *Gillett 23105* (EA) from west of Bandarbeyla in NE Somalia was allied to that new species but differed in the longer stalks to the spines, the shorter and more elliptic or shortly oblanceolate, conspicuously glaucous leaves, and subsessile flowers. The *Gillett* specimen was therefore excluded from *B. compacta*, although a specimen with similarly shaped leaves (*Merla, Azzaroli & Fois* s.n. ex Migiurtinia, Altipiano presso Culule, FT) was included among the para-

Table 2. A comparison of the diagnostic characters for separation of *Barleria compacta* subsp. *compacta*, *Barleria compacta* subsp. *minima* and *Barleria tetracantha*.

Character	*Barleria compacta* subsp. *compacta*	*Barleria compacta* subsp. *minima*	*Barleria tetracantha*
Length of spine stalk	(0.8–)1.5–5 mm, usually shorter than spine rays, up to 3–5× shorter	7– 15.5 mm, usually longer than spine rays	(2.5–)4–12(–18) mm, often longer than or subequal to spine rays
Leaf shape and length: width ratio	Linear, linear-lanceolate or narrowly oblong 5–11(–16): 1	Shortly oblong-elliptic or somewhat obovate 2.2–3(–3.6): 1	Elliptic to narrowly oblong-elliptic or slightly obovate to oblanceolate 2–5.4: 1
Leaf colour	Green, rarely glaucous-green	Glaucous-green to markedly glaucous, can be pink-tinged	Blue-green or somewhat glaucous
Inflorescence form	Subsessile or usually pedunculate, peduncle 1.5–8 mm long, 1-flowered	Subsessile, 1-flowered	Subsessile, 1- or 3-flowered
Calyx shape and length (anterior lobe)	Lanceolate-acuminate, 7–14 mm long	Lanceolate, not acuminate, (8.2–)12.5– 14.5 mm	Lanceolate-acuminate, 6.7–11 mm
Corolla length	16.5–26.5 mm	23–26 mm	13–21 mm
Corolla lobe length	6.5–13 mm	8.5–13 mm	4–5.5 mm
Anther length	1.7–2.5 mm	1.8–2.6 mm	1.5–1.75 mm
Capsule length	7–13 mm including beak 3–5 mm	± 11 mm including beak 3.5–4.5 mm	9–10 mm including short beak 2.3–3.2 mm

types of *B. compacta*. This latter specimen had only been seen as a digital image at the time of the publication of *B. compacta* and so measurements and detailed observations were not taken from *Merla et al. s.n.* when preparing that description. A recent visit to the FT herbarium by one of us (I. Darbyshire) allowed for more detailed investigation of this specimen and also revealed two further collections by *Merla et al.* that match *Gillett 23105*. Detailed study of these four specimens has revealed that this taxon is indeed close to *Barleria compacta* in the compact growth habit, axillary single-flowered cymes, and a subregular corolla with the abaxial lobe barely offset from the other lobes and comparable in size. However, they differ in the characters noted in the Diagnosis above. The rank at which to separate these two taxa is debatable, and they may ultimately prove to be separate species, but given their floral similarity and the fact that some of the differences (e.g., whether or not the flowers are pedunculate) are not entirely diagnostic, we consider subspecies rank to be most appropriate based on current evidence. These two taxa appear to be largely allopatric, with subsp. *minima* occurring close to the Indian Ocean coastline and subsp. *compacta* occurring more inland except for one coastal locality to the south of the known range of subsp. *minima*.

The glaucous leaves of the type specimen are very striking and differ from the typically brighter green leaves of subsp. *compacta*. However, the *Merla et al.* collections are less markedly glaucous and there is some overlap between the leaf coloration on these specimens and on some specimens of subsp. *compacta* (e.g., *T. Fison 25*, K!).

Some of the characters observed in subsp. *minima*, notably the compact habit, long-stalked spines and short leaves, are reminiscent of *Barleria tetracantha* Balf.f., a species that is endemic to the Socotra (Soqotra) archipelago of Yemen. There are some phytogeographic links between northeast Somalia and the Socotran flora, rather unsurprisingly given that Socotra lies only ca. 350 km from the Somali coastline. For example, in Acanthaceae, the Bandarbeyla area is the only known locality in continental African for *Rhinacanthus scoparius* Balf.f., a species previously thought to be endemic to Socotra (Miller and Morris 2004; Thulin 2006b). However, *B. compacta*, including subsp. *minima*, differs from *B. tetracantha* in having markedly larger flowers particularly with regard to the corolla lobes, with the abaxial lobe slightly offset from the other lobes (so less strictly salverform than in *B. tetracantha*), larger anthers and always having single-flowered cymes. For completeness, the *Barleria compacta* subsp. *minima* is compared to both *B. compacta* subsp. *compacta* and *B. tetracantha* in Table 2. In the published RADseq phylogeny of *Barleria* (Comito *et al.* 2022), *B. tetracantha* is resolved as sister to a clade comprising *B. compacta s.s.* and *B. brevispina* (Fiori) Hedrén, the latter two species forming a morphological "species pair" which are almost inseparable in the vegetative and fruiting states but have very different corolla morphology, *B. brevispina* being highly zygomorphic with a much reduced and offset abaxial lobe (Malombe and Darbyshire 2010).

Additional specimens examined (paratypes)

SOMALIA: Migiurtinia: Altipiano, campetto presso Gibalei, 27 Dec. 1953 (fl.), *G. Merla, A. Azzaroli & V. Fois* s.n. (FT! [FT0010283]); Bur Gudodo (a nord di Bender Beila [Bandarbeyla]), 29 Dec. 1953 (fl.), *G. Merla, A. Azzaroli & V. Fois s.n.* (FT! [FT0010284]); Altipiano presso Culule (a sud di Bender Beila [Bandarbeyla]), 31 Jan. 1954 (fl.), *G. Merla, A. Azzaroli & V. Fois s.n.* (FT! [FT0010364]).

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Keetia nodulosa sp. nov. (Rubiaceae - Vanguerieae) of West-Central Africa: bacterial leaf nodulation discovered in a fourth genus and tribe of Rubiaceae

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Abstract. *Keetia nodulosa* Cheek, a cloud forest climber nearly endemic to Cameroon, with a single record from Nigeria, is described and illustrated. It is remarkable as the first known species to be recorded with bacterial leaf nodules (BLN) in the genus *Keetia,* and also, in the tribe Vanguerieae. Other genera in Rubiaceae with BLN are *Psychotria* (Psychotrieae-Rubioideae), *Sericanthe* (Coffeeae) and *Pavetta* (Pavetteae), both Ixoroideae/Dialypetalanthoideae. The BLN in *Keetia* (Vanguerieae) are illustrated for the first time here. The characteristics and significance of bacterial leaf nodulation in *Keetia nodulosa* are discussed in the context of rapidly growing knowledge on the subject in flowering plants. *Keetia nodulosa* is provisionally assessed using the 2012 IUCN standard as Endangered (EN B2ab(iii)). The importance of its conservation, and options for achieving this are discussed in the context of recent extinctions of other plant species in Cameroon. This discovery of a new cloud forest species is discussed in relation to other cloud forest plant species described in the last twenty years which are also distributed over the highlands of the western half of Cameroon.

Keywords: Bacterial leaf nodules, *Burkholderia*, cloud forest, conservation, horizontal transfer, *Paraburkholderia.*

INTRODUCTION

Keetia E.Phillips was segregated from *Canthium* Lam. by Bridson (1985, 1986). Restricted to sub-Saharan Africa, and extending from Guinea in West Africa (Gosline et al. 2023a; 2023b) also Senegal to Sudan in the North and East (Darbyshire et al. 2015) also Ethiopia, and S. Africa in the South (Bridson 1986), this genus of about 40 accepted species (POWO, continuously updated) are mainly forest climbers, distinguished from similar Canthioid genera in west Africa by their pyrenes with a fully or partly-defined lid-like area around a central crest and endosperm streaked with granular patches

(Bridson 1986). In a phylogenetic analysis of the tribe based on morphology, nuclear ribosomal ITS and chloroplast *trnT-F* sequences, Lantz & Bremer (2004), found that based on a sample of four species, *Keetia* was monophyletic and sister to *Afrocanthium* (Bridson) Lantz & B. Bremer with strong support. Highest species diversity of *Keetia* is found in Cameroon and Tanzania, both of which have about 15 taxa (Onana 2011; POWO, continuously updated). In contrast, neighbouring Gabon has only 10 species, although most specimens recorded remain unidentified to species, Sosef et al. 2006). Several *Keetia* species are point endemics, or rare national endemics, and have been prioritized for conservation (e.g. Onana & Cheek 2011; Couch et al. 2019; Murphy et al. 2023; Darbyshire et al. 2023) and one threatened species, *Keetia susu* Cheek has a dedicated conservation action plan (Couch et al. 2022)

Bridson's (1986) account of *Keetia* was preparatory to treatments of the Vanguerieae for the Flora of Tropical East Africa (Bridson & Verdcourt 1991) and Flora Zambesiaca (Bridson 1998). Pressed to deliver these, she stated that she could not dedicate sufficient time to a comprehensive revision of the species of *Keetia* outside these areas: "full revision of *Keetia* for the whole of Africa was not possible because the large number of taxa involved in West Africa, the Congo basin and Angola and the complex nature of some species would have caused an unacceptable delay in completion of some of the above Floras" (Bridson 1986). Further "A large number of new species remain to be described." Several of these new species were indicated by Bridson (1986), and other new species by her arrangement of specimens in folders that she annotated in the Kew Herbarium. One of these species was later taken up and published by Jongkind (2002) as *Keetia bridsoniae* Jongkind. In the same paper, Jongkind discovered and published *Keetia obovata* Jongkind based on material not seen by Bridson. Based mainly on new material, additional new species of *Keetia* have been published by Bridson and Robbrecht (1993), Bridson (1994), Cheek (2006), Lachenaud et al. (2017), Cheek et al. (2018a) and Cheek and Bridson (2019).

In the course of formally publishing new species to science from Cameroon so that they could be Red Listed and considered for inclusion in the Cameroon Important Plant Areas programme (e.g. Murphy et al. 2023), numerous new species to science have been published (see below), mainly based on species informally identified as new in the course of a series of surveys for improved conservation management of plant species and habitats conducted mainly in western Cameroon in the 1990s (Cheek et al. 2006). This paper continues the endeavour.

In this paper, a remarkable new species of *Keetia, K. nodulosa* Cheek is described.

Keetia nodulosa is unique in its genus and tribe for having conspicuous bacterial nodules on its abaxial leaf blade surfaces, resembling those seen in species of the genus *Pavetta* L., which also have conspicuous black nodules often at nerve junctions. The presence of bacterial nodules was first reported in the conservation checklist "The Plants of Mount Kupe, Muanenguba and the Bakossi Mts" (Cheek et al. 2004: 375). Rod like bacteria were then confirmed as present in the nodules by microscopic examination (B. Spooner pers. comm. to Cheek). The specimens *Etuge* 2798 and *Etuge* 2829 (both Mt Kupe) were matched with specimens from Cameroon, that had been included in the protologue of *Keetia purseglovei* Bridson (Bridson 1986), *Zenker* 2986 (Bipinde) and *Zenker & Staudt* 415 (Yaoundé). However, the two Etuge specimens concerned had been annotated as "vel sp. aff.", indicating that they might represent another but related species. Further research showed that all the Ugandan material of *Keetia purseglovei,* including the type, lacked bacterial nodules, and while very similar to the Cameroonian material, differed in several morphological characters (see Table 1 below). In searching all other material of *Keetia* at K, and other herbaria, for bacterial nodules, an additional specimen, *Emwiogbon* FHI 65823 from Nigeria, close to the Cameroon border, was found. This matched the Cameroonian material of *K. nodulosa*. It had been identified as a second specimen of *Keetia inaequilatera* (Hutch. & Dalz.) Bridson. While similar to the type and only other known specimen of that species, characters were found that separated this specimen from the type of that species (see Table 1 and diagnosis below) including the presence (vs absence) of bacterial nodules. Finally, just before the paper was completed, a further specimen, with flower buds, *Gereau et al.* 5639 from the Rumpi Hills, that had been identified as *K. cf. hispida,* was encountered and also placed in *K. nodulosa* in view of having bacterial nodules and other concordant characteristics.

Further searches on gbif.org revealed that additional specimens had been identified as *Keetia purseglovei*, mainly from Gabon, Central African Republic, R.D. Congo and Congo-Brazzaville. However, these differed from *K. nodulosa,* and only one of these, *Texier* 2164, possessed visible bacterial nodules (see notes below) so were discounted.

In this paper it is shown that two specimens from Cameroon previously ascribed to *Keetia purseglovei* in Bridson (1986) together with additional specimens, are specifically distinct from the Ugandan material of that species, including the type. The Cameroonian taxon,

which extends to Nigeria, is formally characterized and named as *Keetia nodulosa* sp. nov.

Within Africa, Cameroon remains a major source of discovery for new species to science of vascular plants, with more species new to science published per annum than any other country in tropical Africa (Cheek et al. 2020a). Recent novelties range from forest trees (Quintanar et al. 2023; Cheek et al. 2022a; 2023a), shrubs and small trees (Couvreur et al. 2022; Gosline et al. 2022; Stone et al. 2023; Cheek et al. 2023b), lianas (Jongkind and Lachenaud 2022), rheophytes (Cheek et al. 2022b), terrestrial herbs (Cheek et al. 2021), to epilithic herbs (Janssens et al. 2022; Cheek et al. 2023c) and ferns (Shang and Zhang 2023; Dubuisson et al. 2022).

MATERIALS AND METHODS

Names of species and authors follow IPNI (continuously updated). Herbarium material was collected using the patrol method e.g. Cheek and Cable (1997). Identification and naming follows Cheek in Davies et al. (2023). Herbarium specimens were examined with a Leica Wild M8 dissecting binocular microscope fitted with an eyepiece graticule measuring in units of 0.025 mm at maximum magnification. The drawing was made with the same equipment with a Leica 308700 camera lucida attachment. Pyrenes were prepared by boiling selected ripe fruits for several minutes in water until the flesh softened and could be removed. Finally, a toothbrush was used to clean the pyrene surface to expose the surface sculpture. Specimens were inspected from the following herbaria: BM, BR, K, P, WAG, YA.

It was not possible to view the duplicates of *Keetia nodulosa* deposited at YA because they are thought to be in the mounting backlog (Onana pers. obs. Feb. 2024). The format of the description follows those in other papers describing new species of *Keetia*, e.g. Cheek and Bridson (2019). Terminology follows Beentje & Cheek (2013). Herbarium codes follow Index Herbariorum (Thiers, continuously updated). Nomenclature follows Turland et al. (2018). All specimens seen are indicated "!" The conservation assessment follows the IUCN (2012) standard.

TAXONOMIC TREATMENT

Keetia nodulosa Cheek **sp. nov.**

Type: Cameroon. S.W. Province [now Region], Kupe-Muanenguba Division, alt. 850 m, Kupe Village, main trail towards Mount Kupe, forest near a valley, fr.16 July 1996, *Etuge* 2798 with Felix, Ewang, Bishop, P., Temple, R. (holotype K000109898!; isotypes BR0000025613452V!, MO, P, WAG1966136!, YA). (Figure 1).

LSID: urn:lsid:ipni.org:names:77336635-1

Keetia purseglovei Bridson (1986: 972) *quoad Zenker* 2986 (BM!, BR!, K!, P!) and *Zenker & Staudt* 415 K!); Cheek et al. (2004: 375).

Diagnosis

Keetia nodulosa differs from all known species of the genus in having bacterial nodules on the abaxial leaf blade surfaces (vs absent), further differing also from the similar *Keetia purseglovei* Bridson in the primary axis subterete (vs 4-fluted); stipules caducous at fruiting stage, persisting usually only at stem apex (vs persisting for 3 to 4 nodes from apex); stipule blades subquadrate (vs transversely elliptic); pedicels 2.5 –3(– 4) mm long (vs 5–7 mm) From *K. inaequilatera* (Hutch.) Bridson differing in the narrow elliptic or obovate-elliptic leaf blades with length: breadth ratio (2 –)3: 1(vs broadly ovate to suborbicular, 1.2–1.5:1), the domatia situated in the axils of the secondary nerves (vs on the secondary nerve bases) and the flower bud smooth, (not with the corolla bud head minutely papillate). See Table 1 above for additional diagnostic characters.

Description

Evergreen climber, climbing by clasping fruiting peduncles, 5–10 m tall. Primary stems with distal internodes glabrous, drying purple at first, subglossy, longitudinally finely ridged (microscope needed), distal internode flattened, other internodes subterete with a small central hollow, 5.3–6.5 x 0.35–0.4 cm, (distal, fertile internodes) at length with epidermis becoming longitudinally streaked with white. Secondary shoots (brachyblasts, plagiotropic or spur shoots) leafy, opposite, subequal in pairs, each 12– 37 cm long, with 4–9 internodes, internodes 2.5–6.1 x 0.12–0.2.5(– 0.3) cm, otherwise as the primary stems (Fig. 1A), glabrous at fruiting stage, at flowering stage with sparse, patent, bristle hairs as the leaves. Leaves of primary axis not seen; those of secondary shoots distichous, not dimorphic, opposite and equal at each node, thinly leathery to thickly papery, blades drying black on upper surface, grey-black, rarely grey-green, on lower surface, elliptic, narrowly elliptic, or obovate elliptic, (4.9–)5.3– 8.5(–10.8) x 2.3–3.9(–4.7) cm, acumen triangular 0.4–1.1(–1.5) x 0.25–0.5 cm long, apex rounded; base obtuse to broadly acute, or rounded, rarely subcordate, usually asymmetric and decurrent on

Table 1. Characters distinguishing *Keetia inaequilatera, K. nodulosa sp.nov.* and *Keetia purseglovei.* Data for the first and third species from Bridson (1986) and specimens at K.

	Keetia inaequilatera	*Keetia nodulosa sp. nov.*	*Keetia purseglovei*
Distribution	S.E. Nigeria	S.E. Nigeria & Cameroon	Uganda (and probably eastern DR Congo)
Habitat	Lowland forest <800 m alt.	Cloud forest 800–940 m alt.	Submontane forest 1200–1265 m alt.
Secondary (spur) shoots, number of nodes	(2 –)3–4(– 5)	7–10(– 13)	3–5
Bacterial nodules on abaxial surface of leaf blades	Absent	Conspicuous along tertiary nerves	Absent
Domatia, position	On the secondary nerve bases	In the axils of the secondary nerves	In the axils of the secondary nerves
Domatia, number of hairs	10–30	10–30	0 (–5)
Stipule persistence (fruiting stage)	Unknown	Highly caducous, present usually only at the distalmost node	Persistent for 3–4 nodes from the apex
Stipule blade shape at maturity	Triangular	Subquadrate	Transversely elliptic
Pedicel length (mm)	2 –3	(1.8 –)2.5–3(–4)	5 –7
Flower bud shape and surface	Capitate (apex ovoid, base narrow cylindric); papillate	Clavate (obovoid) to capitate; smooth	Constricted (waisted) in middle to capitate; smooth
Calyx indumentum	Glabrous	Apex of teeth densely long hairy (rarely glabrous)	Glabrous, or teeth with 2–3 hairs at apex
Leaf-blade shape (proximal leaves of spur shoots) and length: breadth ratio	Broadly ovate to suborbicular 1.2–1.5:1	Narrow elliptic or obovate-elliptic (2 –)3: 1	Elliptic (rarely oblanceolate-elliptic) 2–2.5:1
Leaf-blade colour, abaxial surface (dry)	Mid to dark brown	Grey-black (rarely green)	Pale orange or pale green
Number of secondary nerves on each side of the midrib	(3 –)4(– 5)	5–7	(4 –)5–6

petiole; midrib and secondary nerves dull white to pale yellow, raised on both surfaces; domatia pit-like, longitudinally elliptic-oblong, 0.4–0.55 x 0.25 mm, inserted in the axil of midrib and the subtending secondary nerve, with 14–25 copper-coloured bristle hairs c. 0.1 mm long inserted around the rim, directed randomly: inconspicuous on upper surface; margin slightly thickened, revolute; secondary nerves 5–6(– 7) on each side of the midrib, arising at 50– 60° from the midrib, curving gradually upwards, the apex terminating parallel to and 3–4 mm from the blade margin, sometimes uniting with the nerve above. Tertiary nerves faintly visible, quaternary nerves inconspicuous. Bacterial nodules conspicuous on the abaxial surface, jet black, mainly at the junctions or along the lengths of tertiary nerves, about (1 –)2 –4(–5) mm apart, each 0.75 –2.5 mm long, usually with 3 –7 short lateral lobes along their length, 0.3 mm (unlobed) or 0.5 –0.75 mm wide, with a few smaller, unlobed, T-shaped or comma shaped nodules interspersed (Fig. 1C); hairs sparse, 3–20 % cover, along the midrib, secondary nerves (abaxial surface), and margins, simple, pale bronze-coloured, 0.25–0.5 mm long, strigose, slightly curved from base to apex, distal part gradually tapering to an acute apex, leaf otherwise glabrous. *Petioles* plano-convex in transverse section, the adaxial surface extended as narrow wings, (0.4 –) 0.5–0.8(–0.9) x 0.1 cm, indumentum as midrib of blade. Stipules free, caducous (usually persisting at terminal node only at fruiting stage), glabrous apart from colleters, at apical bud narrowly triangular, c. 8 x 2 mm, the blade not distinct from the awn; at older nodes (flowering stage only, Fig. 1D & E) the blade distinct, subquadrate, widest at base, 4.5 –5 x 4.5 –5 mm, midrib not conspicuous; awn excurrent from the outer surface of the bade, arising below the apex, c. 6 x 0.8–1 mm, terete (or longitudinally 5 ridged on both surfaces), apex acute; colleters inserted on the adaxial surface near the base, botuliform, 0.4 –0.8 x 0.2 mm, apex rounded. Inflorescences (Fig. 1A), axillary on spur (plagiotropic) branches, held above the stem, in 2–4 successive nodes beginning 1– (–2) nodes below stem apex; anthesis ± simultaneously at all nodes, each inflorescence (11–) 40–60-flowered, forming heads 2.8–4.8 x 1.2–1.5 cm. Peduncles 15–22 x 0.75 mm, with two pairs of bracts 4–5 mm below the apex, bracts tri-

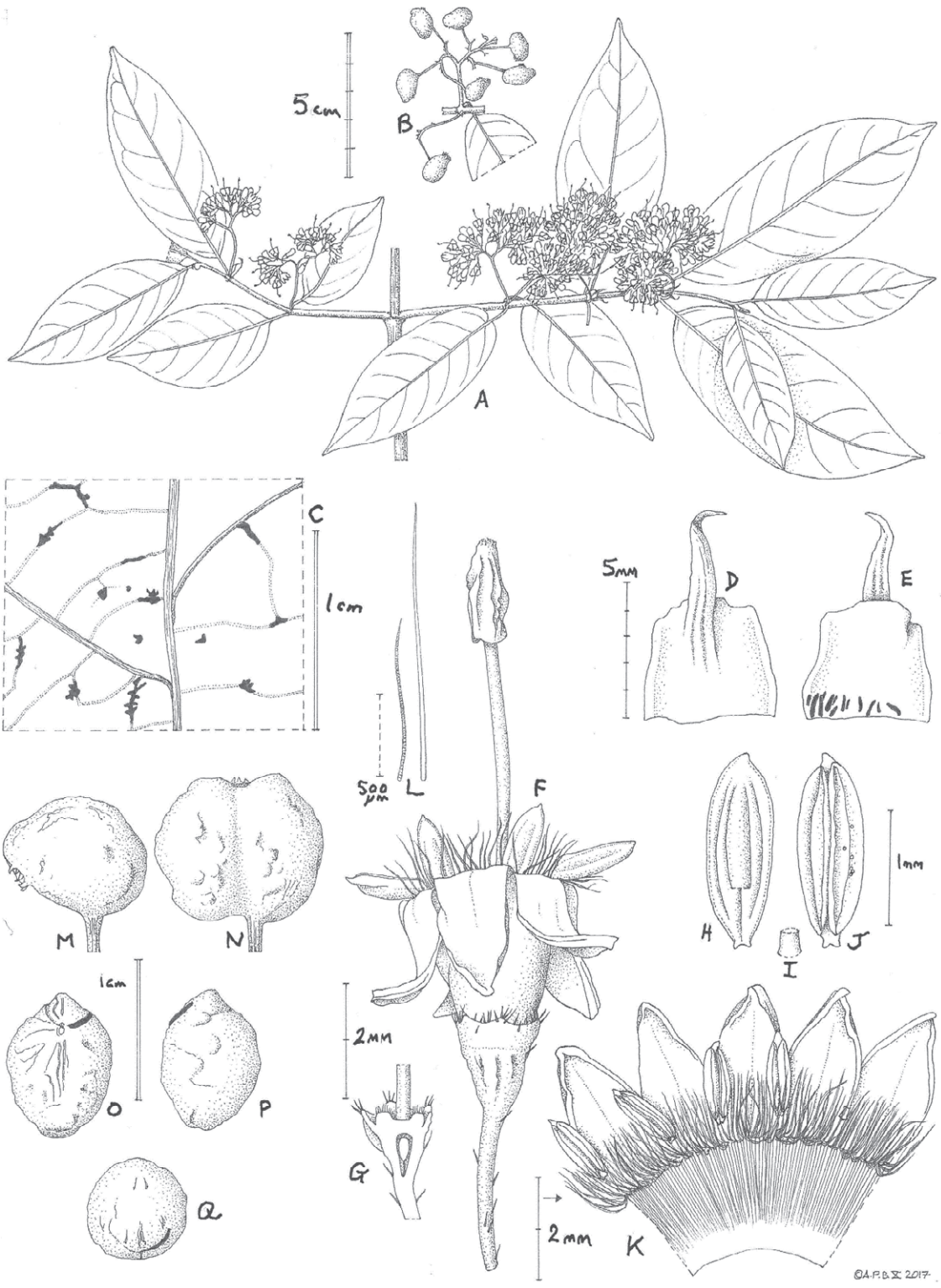

Figure 1. *Keetia nodulosa.* A. habit, flowering secondary (short plagiotropic or spur) shoots; B. infructescence; C. leaf-blade, abaxial surface showing bacterial nodules; D. stipule abaxial (outer) surface; E. stipule adaxial (inner) surface showing colleters; F. flower; G. near longitudinal section of flower base, showing disc; H. anther, outer surface; I. filament; J. anther, inner face; K. corolla, opened (one stamen removed); L. moniliform (L) and bristle (R) hairs from inner surface of corolla tube (see K); M. single seeded fruit; N. double seeded fruit; O. pyrene, frontal view; P. pyrene, side view; Q. pyrene, plan view. A, C-L. from *Zenker* 415; B, M-Q. from *Etuge* 2798. Drawn by Andrew Brown.

angular c. 0.75 x 0.4 mm, membranous, sparsely and inconspicuously simple hairy; branches two, equal, 4–7 mm long, with each branch further forked, or terminating in a fascicle of 5–12 flowers. Pedicels 2.5 –3(–4) x 0.75 mm long, with several scattered, slightly spreading, straight, acute hairs 0.25 mm long. Calyx-hypanthium obconical 1 x 1.25 mm, with c. 5 shallow longitudinal grooves, calyx tube shortly cylindrical, 0.3 –0.4 mm long; teeth 5, very shortly and broadly triangular, 0.1– 0.2 x 0.5 mm, the margins of the teeth apices with dense erect, simple hairs 0.1–0.15 mm long as the pedicel, rarely absent, or, with a few on the abaxial surface (Fig. 1F, G). Corolla in bud clavate or narrowly obovoid, unconstricted 4.2–4.5(– 5) x 2–2.5 mm, apex rounded; at anthesis white, tube 3 x 2 mm, lobes 5, valvate, reflexed, oblong triangular, 2 x 1 –1.5 mm, mouth with exserted, moniliform white hairs 0.7–1.5 mm long, from a ring inserted 0.3–0.4 mm below the mouth and 2 mm above the base of the corolla tube (Fig. 1F, K); inner surface glabrous from base to a ring of translucent deflexed bristle hairs c. 1.5 mm long adjacent to the ring of exserted hairs, inserted c. 2 mm above base (Fig. 1K). Stamens 5, inserted just below the corolla tube mouth, erect, filaments flat, 0.2 –0.3 x 0.2 mm (Fig. 1I); anthers exserted, introrse, narrowly ellipsoid, 1.5 x 0.5 mm, apical connective appendage conical, c. 0.1–0.1 mm (Fig. 1H, J), subbasifixed, base minutely hastate, the two bases conical, splayed, c. 0.1 mm long, acute. Disc annular, truncate, c. 0.2 x 0.8 mm, puberulent, hairs c. 0.1 mm long (Fig. 1G). Style c. 9 mm long, 0.2 mm wide, terete, the apex with a narrowly cylindrical, 10-fluted head or receptaculum pollinis, c. 1.75 x 0.75 mm, stigmatic apex papillate. Infructescences 3–7(– 9)-fruited, peduncles, clasping, reflexing, axes glabrescent, with a few thinly scattered simple hairs 1 mm long (Fig. 1 F.). Fruit green (mature fruits), fleshy, didymous, in side view suborbicular, 10 (–11) x 12 (– 13) x 11–13 x 8 mm, the two carpels united along their length but divided by a shallow longitudinal groove on each side (Fig. 1N), apex shallowly retuse, apical sinus c. 1 x 5 mm, including calyx 2 mm diam., teeth persistent, disc inconspicuous (Fig. 1 G.); base slightly cordate or rounded, surface with 2– 8 raised verrucae mainly on each side of each carpel, verrucae c. 1 x 1 mm; 1-seeded fruits (by abortion, the majority, 7/8 of all ripe fruit), ovoid-elliptic, asymmetric, (8–)10– 11 x (7–)7.5– 8 mm. Pyrene pale brown, woody, subellipsoid, 0.9–1 x 0.7– 0.75 x 0.5–0.7 cm, the surface with low, irregular, orbicular raised areas c. 1 mm diam., interlaced with white fibres. Lid apical, cap-like, c. 2–3 x 6 x 6 mm, angled c. 20 degrees towards the ventral face, crest (keel) distinct, broad; ventral face sometimes with a transverse slit opening 2(–3) mm long, at junction with main body of pyrene. Endosperm (seed in transverse section) with granular patches spread more or less evenly throughout. Fig. 1A-Q.

Etymology

The species is named for the bacterial nodules conspicuous on the abaxial leaf surfaces of this species, in which it is currently unique in the genus, and in the tribe.

Distribution

S.E. Nigeria and Cameroon.

Habitat & ecology

Submontane evergreen forest (where known); 800–940 m alt. The altitudes of two of the specimens cited above (from Cross River North and from Bipinde) are not given on the label so it is possible that they are from lower altitudes than the other specimens, where altitude is recorded. However, both locations include points that exceed 800 m altitude, so it is conceivable that they are consistent with the remaining specimens in this respect.

Phenology

The initiation of flowering in December (dry season, *Gereau et al.* 5639) occurs at the same time as stem extension when new leaves are formed. Fruits are ripe (June and July, early wet season) while the apical buds of the secondary stems appear dormant and no new leaves are visible.

Conservation status

The relative frequency of occurrence of *Keetia nodulosa* is extremely low, indicating that even at its known locations it is extremely rare. At each location it is known from only a single collection, except at Mt Kupe where two collections are known. However, these two were collected on the same day, by the same team, on the same path up the mountain, and were 31 numbers apart. It may be that they were collected from the same plant, first in the morning on the way up, and then at the end of the day, on the way down. While at the Ikom location few collections of any plants have been made, at the Mt Kupe and Bipinde locations many thousands of herbarium specimens have been collected (e.g. Cheek et al. 2004), so if the species was not extremely rare, further records would be expected.

Keetia nodulosa is here provisionally assessed as Endangered (EN B2 ab(iii)) under the IUCN (2012) standard because five locations are known (see specimens examined above), each with observed or inferred

imminent or actual threats of habitat clearance resulting from iron ore extraction infrastructure (Bipinde), quarrying and urbanisation (Yaoundé) and clearance for smallholder agriculture (Ikom, Rumpi Hills and Mt Kupe locations). *Keetia nodulosa* may already be extinct at the Yaoundé location due to the threats cited (Murphy et al. 2023). The area of occupation is assessed as 20 km^2, using the IUCN required 4 km^2 cell size. It is possible that the species also occurs in Gabon at Mt. Belinga (see notes below) but since the physical specimen, *Texier* 2164 has not been verified by the authors, only seen as an image (which shows some anomalous characters, see notes below), it is not included, taking the precautionary principle. *Keetia nodulosa* may yet be found in other locations within or outside the range documented here. However, the likelihood of this is not high, since tens of thousands of specimens have already been collected in surveys of suitable habitat in areas to the north and south of, and also within its known range (Cheek *et al.* 1992; Cheek et al. 1996; Cable and Cheek 1998; Cheek et al. 1996; 2000; Maisels *et al.* 2000; Chapman and Chapman 2001; Harvey et al. 2004; Cheek et al. 2004; Cheek et al. 2006; Cheek et al. 2010; Harvey et al. 2010; Cheek et al. 2011; Murphy et al. 2023).

Notes

Keetia nodulosa is highly similar to *K. purseglovei*. The fruits, including the endocarps, which can be useful in distinguishing species from each other in the genus, are more or less identical. Both species have lids angled across the top of the pyrene which throughout the genus correlates with finely reticulate nerves as noted in Bridson (1986). Also the endosperm with more or less evenly scattered granules (as opposed to clustered in streaks) is the uncommon state. It is not remarkable that material of the first species was included in the second. A disjunct distribution Cameroon to Kivu and Uganda is not without precedent e.g. *Keetia ornata* Bridson & Robbr. (Bridson and Robbrecht 1993).

In the protologue of *K. purseglovei*, five specimens from Cameroon are cited as paratypes, of which two are attributed here to *K. nodulosa* (see Specimens Examined above). A third Cameroonian paratype of *K. purseglovei, Bates* 1904 (Bitye, Ebolowa, BM! cited in error as 1940, but with a determination slip as *K. purseglovei* by Bridson) is a third, apparently undescribed species, differing from *K. nodulosa* in lacking bacterial nodules, in having suborbicular, strongly persistent stipules (vs subquadrate, caducous) and completely white, glossy primary stems (vs purple, streaked), and secondary stems completely glabrous in the flowering stage (vs sparse, patent, bristle hairs). This specimen also differs from *K. purseglovei s.s.* of Uganda, which has e.g. matt black primary stems, transversely elliptic mature stipules and much longer pedicels. *Bates* 1904 seems to represent yet another undescribed species. *Leeuwenberg* 5083 (60 km SW Eseka, BR image!, WAG image!) is a further paratype of *K. purseglovei*, also differing from *K. nodulosa* in lacking bacterial nodules. It appears to also differ from that species in lacking domatia, but this and other features needs to be confirmed by checking a physical specimen since even on the high quality images of BR, it is difficult to be certain. When this is possible, it may prove be conspecific with *Bates* 1904. Both specimens are lowland, c. 200 m alt. (vs 800 to 940 m alt. in *K. nodulosa*) and occur in southern Cameroon, between the Nyong and Ntem rivers. The remaining Cameroonian paratype, cited as *Bates* 1462 (BM) has not been found and neither has the remaining non Ugandan paratype of *K. purseglovei, Gossweiler* 9147 (BM, Zaire, Leopodville Province) (Cheek *pers. obs.* Jan. 2024).

In Bridson (1986: 991) it was noted that *Keetia venosissima* (type from Ghana) is close to *K. purseglovei*, and that two specimens from Cameroon, *Bates* 1048 and *Zenker & Staudt* 193 appeared to match. However, these two specimens seem to have been mislaid at K as they were not found despite searching for this paper.

Searching gbif.org for *Keetia purseglovei* retrieves 41 records of which 31 have associated images, and which amount to 18 unique specimen records. Apart from those attributable to *Keetia purseglovei* sensu stricto (Uganda, two specimens studied, also likely three specimens from DRC subject to confirmation after physical examination) and *K. nodulosa* (four specimens cited in this paper), specimens are also from Cameroon (*Leeuwenberg* and *Bates* see attributions above), the Central African Republic (3), Republic of Congo (1), Angola (1) and Gabon (2). Inspection of associated images, where available, and where resolution permits, reveals that with one exception, none have the bacterial nodules of *K. nodulosa*. These specimens also show dissimilarities with *Keetia purseglovei*. It is possible that they also may represent further new species to science, potentially conspecific with *Bates* 1904 (see above).

Texier 2164 (BR, BRLU, G, LBV, MO, P, WAG) was collected at the Mt Belinga chain, 60 km NE of Makoukou. The images available on gbif.org of plants live in the field clearly show black bacterial nodules on the abaxial surfaces of the leaves (https://www.tropi...imageid=100597044). Mt Belinga is known to host submontane forest, the habitat of *K. nodulosa*. However, *Texier* 2164 has 1) densely hairy stems, atypical of *K. nodulosa,* which has sparse hairs on the stem at the flowering stage, 2) leaf blades with length:breadth ratio c. 4: 1 (vs

2–3: 1), which 3) lack an acumen, 4) inflorescences 1.5 times the petiole length (vs c.3–4 times). Taken together these differences suggest that *Texier* 2164 may be a second species of *Keetia* with bacterial nodules. Verification of a physical specimen is desirable to establish a firm identification.

Gereau et al. 5639 had previously been identified (not by Bridson) as "*Keetia cf. hispida* sensu lato (aff. *setosum* Hiern)". This was no doubt due to the setose hairs. However, *Keetia hispida s.l.* has swollen, ant-inhabited primary stem nodes, larger leaves with domatia along the secondary nerves, and lacks the quadrate stipule blades of *K. nodulosa*. *Gereau et al.* 5639 has only immature flower buds but is consistent with *K. nodulosa* in all features including the presence of bacterial nodules.

Variation within *Keetia nodulosa*. While the four fruiting specimens of *Keetia nodulosa* are relatively uniform morphologically, the sole specimen with open flowers, *Zenker & Staudt* 415 ("Yaunde-Station") is slightly anomalous in that the leaves are longer (reaching 9–10 cm long vs <9 cm long). Only a small portion of one abaxial leaf is visible on the specimen, and this is insect-damaged, making unambiguous confirmation of the presence of bacterial nodules challenging. It is even possible that *Zenker & Staudt* 415 is taxonomically separable from the other specimens that comprise *Keetia nodulosa*.

That bacterial nodules were not previously detected in specimens of *Keetia nodulosa*, two of which have been in herbaria for more than 100 years, is likely because there was no reason to expect them to be found. It was only the first author's work identifying and describing other new species to science with bacterial nodules in the same location (Mt Kupe) and at about the same time (Cheek et al. 2008) that had raised awareness of this trait and facilitated its detection in the *Keetia* in 2004 (Cheek et al. 2004). Bacterial nodules can often be more easily seen in dried rather than fresh material.

Additional specimens examined.

NIGERIA. South-Eastern State, Ikom District, Cross North Forest Reserve, Ikom. High forest, fr. 8 June 1972, *J.A. Emwiogbon* in FHI 65823 (FHI, K!). **CAMEROON. Central Region:** Yaoundé, "Yaunde Station**"** 800 m, fl. 1890–1894, *Zenker & Staudt* 415 (B destroyed; BM, K!); **South Region:** Bipinde, Urwaldgebiet, fr. 1904, *Zenker* 2986 (BM!, BR!, K!, P!); **South West Region**, Kupe Muanenguba Division, Kupe Village, main trail towards Mount Kupe, forest near a valley, fr. 16 July 1996, *Etuge* 2798 (holotype K(K000109898)!; iso. BR(BR0000025613452V)!, MO, P, WAG(1966136)!, YA); ibid, main trail towards Mount Kupe, 800 m alt., fr. 16 July 1996, *Etuge* 2829 (K!, YA); Ndian Division, Rumpi Hills, ca. 6 km E of Dikome Balue on foot path to Ifanga Nalende, ca., 300 m E of junction with trail to Momboriba, in primary forest on clay loam with *Garcinia* and *Coelocaryon* spp., buds 10 Dec.1994, *Gereau, F. Namata, E. Jato, E. Sarabe,* 5639 (K!, MO, YA)

DISCUSSION

Leaf bacterial nodulation

Since first reported (in *Pavetta,* Rubiaceae, Zimmerman 1902), knowledge of bacterial nodulation in leaves of flowering plants, occurring only in palaeotropical Primulaceae and Rubiaceae (but see notes on *Dioscorea* L. and *Stryrax* L. below), has been growing steadily. Reviews on the subject include Boodle (1923), Lersten and Horner (1976), Lemaire et al. (2011), Yang and Hu (2018), and Pinto-Carbó *et al.* (2018). `Bacterial leaf symbiosis' is characterized as comprising endosymbiotic bacteria being organized in specialized leaf structures, usually known as nodules, or sometimes as galls, bacteriocecidia, or warts. These are visible macromorphological aspects of the symbiosis (Lemaire et al. 2011). The bacteria of the nodules are gram negative, rod or ellipsoid in shape, c. 2 micrometres long, and lack flagellae (Carlier et al. 2017). They are intercellular, and colonise the leaves through the stomata (Rubiaceae) or marginal teeth (Primulaceae) from the apical bud, from which inflorescences, flowers, and so eventually developing seeds, are also colonized.

The symbiotic bacteria concerned have been placed in the genus *Burkholderia* s.l. (Pinto-Carbó *et al.* (2018)). Bacterial colonization of leaves without the bacteria being organized into visible leaf structures also occurs, with the bacteria thinly scattered inside the leaf (endophytic) between the mesophyll cells (Verstraete *et al.* 2017). Such endophytic non BLN bacteria occur more widely in genera of Rubiaceae than do BLN and have been reported from two non BLN genera of Coffeeae (*Empogona* and *Tricalysia*) (Verstraete *et al.* 2023) and five non BLN genera of the Vanguerieae, but were not found in *Keetia* species sampled (Verstraete et al. 2013).

Transmission of bacteria between plants is known to be mainly vertical (Pinto-Carbó et al. 2018). However, in the Rubiaceae, though not in Primulaceae, there is evidence that horizontal transfer can also occur (Pinto-Carbó *et al.* 2018). It is speculated that this is effected by sap sucking insects moving from plant to plant, since the guts of some of these insects are known to be home also to *Burkholderia* bacteria. Lemaire *et al.* (2011) is a detailed recent study on the taxonomic occurrence of bacterial leaf nodulation in host plants. It is focused on

the phylogenetic placement (genes 16S, rDNA, *recA*, and *gyrB*) of the bacteria (endosymbionts) of 54 plant species in four of the six known leaf nodulated plant genera (see below). This amounts to nearly 10% of all known nodulated plant species. The genera *Ambylanthus* A.DC and *Ambylanthopsis* Mez, both Primulaceae of Asia in which BLN are recorded, were not sampled. The study confirmed that free living, soil dwelling bacteria are basal in the clade *Burkholderia* s.l. and sister to the leaf nodulating species. In almost all cases of BLN symbiosis, there is a 1:1 relationship of a species of bacteria with a taxon of plant. Only one example is known of a plant species, *Psychotria kirkii* Hiern, which has been colonised twice, by different taxa of bacteria (Lemaire *et al.* 2011). The earliest branching subclade of *Burkholderia* s.l. to colonise plants is that inhabiting some Asian *Ardisia* Sw. species (Primulaceae, formerly Myrsinaceae, Larson *et al.* 2023). The next earliest branching subclade colonises some species of the genus *Sericanthe* Robbr. (Rubiaceae Coffeeae, Cheek et al. 2018d), 11 to 12 of the 17 known species being considered to have nodules) and *Pavetta* (Rubiaceae Pavetteae De Block *et al.* 2015) of which 350/400 species are considered to have nodules). Another branch colonises several species of African *Psychotria* L. (Rubiaceae, Psychotrieeae, Lachenaud 2019) in which c. 80/1400 species are nodulated. The penultimate branches colonise mainly further species of the genus *Pavetta* but include colonisation of some other species of both *Sericanthe* and *Psychotria*. The final subclades colonise the majority of the *Psychotria* BLN species. Thus, the genera *Psychotria, Pavetta,* and *Sericanthe* have each been colonized more than once, independently, by bacteria likely either from the soil or from other plants. Therefore, there have been multiple horizontal transfers of bacteria to leaf nodulated plant species, and co speciation or evolution of endosymbionts with their host plants through vertical transfer has not been universal. Divergence estimates by Lemaire *et al.* (2011) point to a relatively recent origin of bacterial symbiosis in Rubiaceae, dating back to the Miocene (5 to 23 Mya).

Following strong support from genome analysis, the bacterial genus *Burkholderia* s.l. has been divided into several genera which largely correspond to different lifestyles or symbioses (Estrada de los Santos et al. 2018). *Burkholderia* s.s. are human and animal pathogens, while symbionts of the fungal phytopathogen *Rhizopus microsporus* are now classified as *Mycetohabitans*. *Mimosa* root nodulating bacteria are classified as *Trinickia*, and `plant beneficial and environmental strains' (including the bacterial nodulating leaf symbionts discussed above) are now classified as *Paraburkholderia*, which genus includes also other N_2 fixing legume root symbionts. N_2 fixing legumes are also colonized by bacteria of the genus *Caballeronia,* but *Caballeronia* are also endophytic in the leaves of the non BLN genera *Empogona* Hook.f. and *Tricalysia* A.Rich. ex DC. of Coffeeae (Verstraete et al. 2023). *Paraburkholderia* can also be symbionts of amoeba e.g. *Dictyostelium discoideum,* and of insect guts (Brock et al. 2020).

Bacterial leaf nodulation is also considered to occur in the tropical African monocot *Dioscorea sansibarensis* Pax (Dioscoreaceae), where folding of the leaf apices forms visible (pale green) pockets which allow development of bacterial colonies of *Orella dioscoreae* (Alcaligenaceae, Burkolderiales, Carlier *et al.* 2017). Bacterial colonisation of marginal leaf glandular hairs has been observed in *Styrax camporum* Pohl of Brazil (Styracaceae, Machado et al. 2014), but the bacteria, which are both intra and intercellular, remain unidentified and nodules are not formed.

The endosymbiont bacteria of Rubiaceae have a small genome size and low coding capacity, both characteristic of reductive genome evolution. Genome sizes range from 2.4 Mb to 6.1Mb, well below the c.8 Mb average of free living *Burkholderia* s.l. species. Loss of functional capacity likely explains the failure of repeated efforts to cultivate endosymbiont bacteria (Pinto-Carbó et al. 2018). Equally, cultivated plants which lack their endosymbionts grow poorly and eventually die (Verstraete et al. 2017).

Although the genome of endosymbionts is reduced, synthesis gene clusters have been detected in those of all *Psychotria* and *Pavetta* species investigated so far (Pinto-Carbó et al. 2018). Evidence that the novel C_7N aminocyclitol kirkamide is synthesized by the symbiont bacteria in *Psychotria kirkii* is that while it is detected in leaves of plants with the endosymbiont, it is not in aposymbiotic plants (lacking the endosymbiont). The compound is toxic to arthropods and insects, suggesting a role in protecting the host against herbivory (Sieber et al. 2015). A related compound, streptol glucoside is also found in the nodulated leaves of the same species. It displays potent herbicidal activity and may have allelopathic properties (Pinto-Carbó et al. 2018). Prescence of such bacterial endosymbionts may thus be advantageous for the hosts and confer an evolutionary advantage over plants which lack such endosymbionts. We can hypothesise that because species with bacterial leaf nodules contain many more bacteria than non BLN species, the quantity of advantageous compounds produced by the bacteria might be higher, increasing the evolutionary advantage further.

The bacterial nodules in Rubiaceae vary in form from genus to genus, and also within a genus.

In *Psychotria* they are usually black, raised and conspicuous to the naked eye on the abaxial leaf surface, scattered uniformly over the blade, the shape, size and density of the nodules helping to separate one species from another. In a minority of species the nodules are linear and positioned next to the midrib only (Lachenaud 2019; Cheek et al. 2008).

In contrast, in *Pavetta,* the nodules are usually most conspicuous on the adaxial surface, also black but in other species green and inconspicuous unless viewed in transmitted light. Frequently they occur as thickenings at the junction of the tertiary nerves, in western Africa they are mostly linear, but can also be dot-like, or absent (Manning 1996) while in eastern Africa they tend to be the other way around. In *Sericanthe*, the nodules are often inconspicuous unless viewed in transmitted light, and often linear and arranged along the midrib (e.g. Sonké *et al.* 2012) or even along the petioles. The regular pattern and spacing of the nodules through the leaf identifies them as such and differentiates BLN from e.g. epidermal fungal colonies which are more localized to only part of a leaf.

In herbarium specimens (and probably in live plants) of *Keetia nodulosa* the nodules have similarities with those commonly seen in *e.g. Psychotria asterogramma* O.Lachenaud and *Psychotria cryptogrammata* E.M.A. Petit. They are black, conspicuous, slightly raised, and often at nerve junctions. They differ from most *Pavetta* in being conspicuous only abaxially, as in the BLN of *Psychotria*.

The discovery of bacterial nodules in a further tribe and genus of Rubiaceae was unexpected. A survey of the occurrence of endosymbiotic bacteria specifically in the Vanguerieae found that they only occur in five genera (*Fadogia* Schweinf.*, Fadogiella* Robyns*, Globulostylis* Wernham*, Rytigynia* Blume and *Vangueria* Juss.), in none of which are nodules formed, and none of which were *Keetia* (Verstraete *et al.* 2017).

In summary, two subfamilies and four tribes of Rubiaceae have endophytic bacteria, subfam. Rubioideae: Psychotrieeae (*Psychotria* with BLN) and subfam. Ixoroideae/Dialypetalanthoideae: Coffeeae (*Sericanthe* with BLN, and *Empogona* and *Tricalysia* non-nodulating); Pavetteae (*Pavetta* with BLN); Vanguerieae (*Keetia* with BLN and *Fadogia, Fadogiella, Globulostylis, Rytigynia* and *Vangueria* non-nodulating).

Further work is needed to identify the species of bacterium that produces the nodules in *Keetia.* This can be done by genomic studies of dried leaf material (Danneels & Carlier 2023). The symbiont is almost certain to be a *Paraburkholderia,* given that all other leaf nodule forming endosymbionts of Rubiaceae belong to this genus, and that the non BLN endophytic bacteria recorded in Vanguerieae are also this genus (Verstraete *et al.* 2017). It will be especially interesting to find out in which subclade of *Paraburkholderia* it falls, and so to deduce the source and date of this colonization. It can be speculated that the colonization event is recent, since this is the only known nodule-forming species in a genus of 40 species. If the event was as old as in the other nodulated genera of Rubiaceae (see above), one might expect that a much higher number, and proportion of the species, would have been found to have been nodulated, as in those other three genera. We speculate that the event may have occurred in the vicinity of the Cross-Sanaga Interval (Cheek et al. 2001) which has the highest species and generic diversity per degree square in tropical Africa (Barthlott et al. 1996; Dagallier et al. 2020). Here, three of the five locations of *Keetia nodulosa* occur, two others being nearby). All three of the other Rubiaceae genera with bacterial nodules have centres of species diversity in the Cross-Sanaga Interval (Lachenaud 2019; Manning 1986; Sonke et al. 2012) from which horizontal transfer to *Keetia* mediated by sap-sucking insects may have occurred.

The discovery reported in this paper of bacterial leaf nodulation in a genus and tribe previously unknown to have this characteristic, is the first since the report 60 years ago by Petit (1962) of nodulation in some species he attributed to *Tricalysia* which are now placed in *Sericanthe.* It is conceivable that bacterial leaf nodulation remains to be found in other genera in which it is previously currently unknown.

Submontane forest species in the western half of Cameroon

Additional rare, threatened species of submontane forest found with *Keetia nodulosa* at Mt Kupe, Rumpi Hills, or elsewhere within the range of the species are *Coffea montekupensis* Stoffel. (Rubiaceae, Stoffelen et al. 1997), *Psychotria hardyi* O.Lachenaud (Rubiaceae, Lachenaud 2019), *Memecylon kupeanum* R.D.Stone et al. (Melastomataceae, Stone et al. 2008), *Sabicea bullata* Zemagho et al. (Rubiaceae, Zemagho et al. 2014), *Impatiens frithii* Cheek (Balsaminaceae, Cheek and Csiba 2002), *Microcos magnifica* Cheek (Cheek 2017) and *Microcos rumpi* Cheek (Cheek et al. 2023a) both Malvaceae s.l./Grewiaceae, *Cola etugei* Cheek (Malvaceae s.l./Sterculiaceae, Cheek et al. 2020b), *Psychotria spp.* (Rubiaceae, Cheek et al. 2008), *Deinbollia oreophila* Cheek (Sapindaceae, Cheek and Etuge 2009), *Kupea martinetugei* Cheek (Triuridaceae, Cheek et al. 2003), and *Vepris zapfackii* Cheek (Rutaceae, Cheek & Onana 2021). In several cases the species were initially con-

sidered point endemics but were shown after further surveys, to be more widespread in the surviving cloud forests of western Cameroon. However, in other cases despite additional surveys, species have remained point endemics e.g. *Brachystephanus kupeensis* I.Darbysh. (Acanthaceae, Champluvier and Darbyshire 2009). The high level of endemism in these submontane forests (extending to Bioko) contributes to the high species and generic diversity levels reported in the Cross Sanaga Interval mentioned above. There is no doubt that additional species remain to be described from these forests, although further survey work is hampered by the secession struggle in the two anglophone Regions, South West and North West that began in December 2016 and has taken thousands of lives and displaced half a million people (https://en.wikipedia.org/wiki/Anglophone_Crisis, accessed Feb. 2024). South West Region contains the majority of the surviving submontane forest in western Cameroon, indeed in the whole of the Gulf of Guinea.

Keetia nodulosa is one of many new species to science that came to light partly or entirely as a result of surveys for conservation prioritization in Cameroon. Cameroon has the highest number of globally extinct plant species of all countries in continental tropical Africa (Humphreys et al. 2019). The extinction of species such as *Oxygyne triandra* Schltr. (Thismiaceae, Cheek et al. 2018b) and *Afrothisia pachyantha* Schltr. (Afrothismiaceae, Cheek & Williams 1999; Cheek et al. 2019; Cheek et al. 2023d) and at least two species of the African genus *Inversodicraea* (Cheek et al. 2017), are well known examples, recently joined by species such as *Vepris bali* Cheek (Rutaceae, Cheek *et al.* 2018c), *Vepris montisbambutensis* Onana (Onana and Chevillotte 2015) and *Ardisia schlechteri* Gilg (Murphy et al. 2023). However, another 127 potentially globally extinct Cameroon species have recently been documented (Murphy et al. 2023: 18–22).

It is critical now to detect, delimit and formally name species such as *Keetia nodulosa* as new to science, since until they are scientifically recognised, they are essentially invisible to science, and only when they have a scientific name can their inclusion on the IUCN Red List be facilitated (Cheek et al. 2020a). Most (77%) species named as new to science in 2023 are already threatened with extinction (Brown et al. 2023). Many new species to science have evaded detection until today because they are in genera that are long overdue full taxonomic revision as was the case with *Keetia nodulosa,* or because they have minute ranges which have remained unsurveyed until recently.

If further global extinction of plant species is to be avoided, effective conservation prioritization is crucial, backed up by investment in protection of habitat, ideally through reinforcement and support for local communities who often effectively own and manage the areas concerned. Important Plant Areas (IPAs) programmes, often known in the tropics as TIPAs (Darbyshire et al. 2017; Couch *et al.* 2019; Darbyshire et al. 2023; Murphy et al. 2023) offer the means to prioritize areas for conservation based on the inclusion of highly threatened plant species, among other criteria. Such measures are vital if further species extinctions are to be avoided of rare, highly threatened species such as *Keetia nodulosa.*

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Begonia abhak (section *Petermannia*, Begoniaceae) a new species from Lanuza, Surigao del Sur, Philippines

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Abstract. A new *Begonia* species, *Begonia abhak*, from section *Petermannia* is described and illustrated. Growing on shady, moist, rocky slopes alongside a small creek of Bujon, Lanuza, Surigao del Sur. The new species resembles *Begonia panayensis* in having glabrous stems, membranous, shiny leaves, oblong to oblanceolate lamina, acuminate apex and green ovary with pink wings but is distinct in having short stems, broadly ovate stipules, acute leaf base, serrated margins, and the slashed or jagged to almost entire margins of the capsule wings. Based on IUCN criteria, *B. abhak* is hereby proposed as Least Concern (LC).

Keywords: *Begonia panayensis*, medicinal plants, Mindanao, Surigao provinces, taxonomy.

INTRODUCTION

The Pantropical genus *Begonia* Linnaeus (1753: 1056) is one of the largest angiosperm genera with *ca*. 2120 species classified into 70 sections (Hughes et al. 2015–, Moonlight *et al*. 2018). The Philippines has *ca*. 165 species (Pelser et al. 2011– ; Hughes et al. 2015–) recognized and categorized in 3 sections, namely: *Petermannia*, Klotzsch (1854: 124), *Baryandra* A. de Candolle (1859: 122), and *Platycentrum* (Amoroso et al. 2023; Hughes

et al. 2015–; Mazo et al. 2023). Currently the island of Mindanao recorded 42 known species of *Begonia* (Hughes et al. 2015–) including the latest discoveries *B. fritchiana* Amoroso et al. (2023:42), *B. sebodensis* Mazo and Rubite (2023: 88), and *B. noraaunorae* Blasco et al. (2023: 194). Based on PNH herbarium specimens and relevant literature, there are *ca*.11 recorded *Begonia* species in Surigao provinces (Blasco *et al*. 2023; Hughes *et al*. 2015–) including *B. noraaunorae* Blasco et al., (2023: 194). In addition, there are numerous medicinal plants and endemic species in the province of Surigao del Sur in southern Mindanao, however there are little data on their identification and conservation (Blasco et al. 2014).

Bujon creek is located in the municipality of Lanuza, Surigao del Sur and bounded by the adjacent municipalities of Cortes and Cantilan (Ilagan et al. 2022). During our field work at Bujon creek to document medicinal plants of Surigao del Sur, we discover a new species of *Begonia* growing abundantly on a shady, moist rocky slopes on both sides of a creek at lower elevation ca. 10 m. We assumed the species belongs to section *Petermannia* Klotch. From the first to the fourth location, we did not find any flowers but only capsules. Upon thorough examination of the capsule, we noticed its distinct morphology: the jagged edge and the sliced or slashed shaped of the wings of the capsules. One of our field guides said, we called that portion *abhak* in *Bisayan,* which means the margins of the capsule wings are somewhat sliced or slashed. Finally on the fifth location we found a complete inflorescence. We then confirmed its placement to *Petermannia* due to is axillary or terminal inflorescences, where male flowers are distal while the female flowers basal, with two-tepaled staminate flowers and five-tepaled pistillate flowers (Rubite 2012). According to our herbalist field guides, the species is locally called *dap-dap* which means succulent and with sour taste. It is edible and used to treat coughs, colds and skin rashes. We then got the idea from our field guides to name the new species to *Begonia abhak* due to its sliced or slashed margins of the capsule wings. We propose *Begonia abhak* Blasco, Tandang, Alejandro & Rubite (Figures 1 & 2) a new species under section *Petermannia*. The descriptions and color plates are hereby provided.

MATERIALS & METHODS

Fieldwork was done in Bujon creek, Lanuza, Surigao del Sur where the *Begonia* species was found. Morphological characterization of vegetative and reproductive parts was conducted following Blasco et al. (2021) and Rubite et al. (2021). Detailed examination of reproductive parts was based on preserved collections. Collected samples were then deposited to the PNH and HNUL as holotype and isotype, respectively. Further morphological comparisons were made based on literature, herbarium specimens and living collection of plants.

TAXONOMIC TREATMENT

Begonia abhak Blasco, Alejandro, Tandang & Rubite**, sp. nov.** (Figs. 1 & 2); Sect. *Petermannia*.

Type: Philippines: Mindanao, Surigao del Sur, Lanuza. Bujon. *ca*. 10 m. on shady, moist, rocky slopes alongside a small creek, 06 June 2022, *Freddie A. Blasco 22- 009* (holotype PNH, Isotype HNUL).

Diagnosis

Begonia abhak resembles *B. panayensis* Merril in having tall, erect and glabrous stems, oblanceolate leaves, glossy surface adaxially, light green abaxially, acuminate apex, acute base, 2 tepaled staminate flowers, 5 tepaled pistillate flowers and green ovaries with pink wings. However, *B. abhak* differs in having shorter stems at 1.3 m (vs. 1.5 m), stipules broadly ovate at 19–20 × 9–10 mm (vs. oblanceolate 15–20 mm long), smaller lamina at 14–15 × 5.5–6 cm (vs. 16–20 × 4–6 cm.) with serrated margins (vs. dentate), broadly ovate male tepals (vs. orbicular), shorter and narrower capsules at 16–17 × 14–15 mm. (vs. longer and wider 25 × 20 mm).

Description

Monoecious, perennial herb. Stem stands 1.3 m. tall, green to brownish, glabrous, erect, 7–8 mm in diam-

Figure 1. *Begonia abhak* Blasco, Alejandro, Tandang & Rubite, sp.nov. A. & B. Habit and Habitat. All from Freddie A. Blasco 22-009.

Figure 2. *Begonia abhak* Blasco, Alejandro, Tandang & Rubite, sp. nov. A. Stem, B. Stipule, C. Bracts, D. Staminate flowers, E. Young pistillate flower, F. Mature pistillate flower, G. Pistillate flower side view, H. & I. Immature capsules, J. Matured capsule, K. Cross section of the ovary. All from *Freddie A. Blasco 22-009*.

eter, internodes 9–12 cm. Stipules caducous, green, 19–20 × 9–10 mm. broadly ovate, margin entire, apex sharply acute, glabrous. Petioles terete, succulent, green, 6–10 mm long and 3–4 mm in diameter with tiny hairs near the lamina. Leaves alternate, lamina green membranous, oblong to oblanceolate 14–15 cm × 5.5–6 cm, apex acuminate, adaxial surface shows spaced tiny bristles, glossy, dark green, abaxial surface light green and glabrous, base obliquely acute, margin broadly serrate with slightly red tiny bristles and a red to brown stripe along its side, primary veins 3 or 4, hairs on the veins present. Inflorescences separate male and female; female inflorescence on short peduncle 2–3 cm**,** flowers solitary, basal to staminate flowers; male inflorescence with longer peduncle 9–10 cm, flowers apical on short cymes branching 4–6 times. Bracts persistent, light green with light pink color on the side, basal pairs, triangular, 9–10 × 3–4 mm, margin entire, apex acuminate**.** Staminate flowers pedicel 5–6 mm, tepals 2 pink, broadly ovate, 4–5 × 4–5 mm, margins entire, apex roundly obtuse, androecium actinomorphic 3 × 2 mm in dia. stamens 15–20 yellow, filaments 0.5–1 mm, exserted, exceedingly scattered at the top, anthers widely ovate, apex rounded *ca*. 0.5 mm. Pistillate flowers pedicel 2–4 mm, tepals 5 light pink, lanceolate to ovate 10–11 mm × 5–6 mm, margins entire, apex roundly acute, ovary light green oblong with pink wings 12–13 × 8–9 mm (wings included) locules at 9–10 × 2–3 mm, 3 locular placentation axile, 3 winged surrounding and extending beyond the ovary, wings pink unequal, abaxial wing 10–11 × 7–8 mm broadly ovate, lateral wings 9–10 × 5–6 mm ovate, 3 styles, yellow *ca*. 3mm long, apically 2–cleft, stigmas in spiral band. Capsule nodding drying pale brown, glabrous, pedicel 9–10 mm, trigonous elliptic, 16–17 × 14–15 mm (wings included) 3 unequal wings, abaxial wing 18–19 × 9–10 mm, slashed or jagged edge to entire margin, lateral wings 17–18 × 6–7 mm, shallowly rounded, apex truncate to rounded, base truncate to cordate.

Etymology

The specific epithet *abhak* is derived from the *Bisayan/Cebuano* word, which means sliced or slashed, referring to the margin of the capsule wings.

Phenology

Observed flowering and fruiting in April to June.

Distribution and ecology

Endemic to the province of Surigao del Sur, Caraga Region, Eastern Mindanao, Philippines. It grows on shady, moist, rocky slopes alongside a small creek of Bujon, Lanuza, Surigao del Sur on lower elev. *ca*. 10 m.

Proposed conservation assessment

Least Concern (LC), (>1000 individuals in 6 locations). Populations consists of *ca*. 250–300 plants in each of the 6 locations including both young and mature individuals. At the moment, *B. abhak* is only known from the type locality. The location is not a protected area. Based on what we observed, the species grow abundantly on both sides of the creek and some areas nearby. There are still locations that are not being explored due to time constraints. We are not allowed to stay overnight at the location due to peace and order situation. According to the locals, there are proposals from different mining companies to convert the location into a mining site but the local government, the church, the nearby indigenous inhabitants and the locals refused the offer. We proposed Least Concern [LC] (IUCN, 2022).

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Additions to the 'Flora of Borneo: The vascular plant genera' — I: *Chewlunia* (Rubiaceae) and *Zygogynum* (Winteraceae)

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Abstract. The newly recognized genus *Chewlunia* Junhao Chen, P.K.Hoo & K.M.Wong (Rubiaceae: Guettardeae), with eight species (seven from the Philippines and one from Sabah), and the genus *Zygogynum* Baill. (Winteraceae), recently recorded for the first time for Borneo with a single, novel, species, are incorporated as entries in the *Flora of Borneo: The vascular plant genera*, taking the Bornean flora to 1594 native genera and 12,592 species.

Keywords: *Chewlunia*, Rubiaceae, Guettardeae, new genus, *Zygogynum*, Winteraceae, new record, Borneo

INTRODUCTION

The *Flora of Borneo: The vascular plant genera* (Wong 2023) presented for first time in more than a century an exhaustive checklist of all genera of ferns and fern allies, gymnosperms, and angiosperms found in Borneo: 271 families: 39 families (ferns and fern allies), 5 families (gymnosperms), and 227 families (angiosperms) of 1877 genera (1592 native genera, 192 introduced genera) and 12590 species.

Inevitably with a project of such magnitude mistakes and omissions occurred, while with on-going research new records and new taxa are to be expected.

Chewlunia Junhao Chen, P.K.Hoo & K.M.Wong

The genus *Chewlunia* Junhao Chen, P.K.Hoo & K.M.Wong (Rubiaceae: Guettardeae) (Chen et al. 2023) was created to account for seven Philippines species previously assigned to *Timonius* DC., and one novel species from Sabah, Borneo – *C. sabahenis* P.K.Hoo & Junhau Chen, the type of the new genus.

"*Chewlunia* differs from other paleotropical Guettardeae genera by its free and valvate, large ('foliaceous') stipules that are flat, tightly appressed together, and broadly ovateobovate with rounded apex. Particularly, it is distinguished from *Timonius* s.l. by its typically long, many-flowered monochasial branches of the inflorescence (vs typically short, mostly few-flowered inflorescence branches), pink (vs pale yellow to white) corolla with plane (vs with longitudinally ridged or thickened) corolla lobes." (*fide* Chen et al. 2023).

Chewlunia may be incorporated as follows into Wong (2023: 243).

190.14.1 ***Chewlunia*** Junhao Chen, P.K.Hoo & K.M.Wong,, Sandakania 1: 32 (2023).
Revision status – A.
Borneo: 1 (native). World: 8. Chen at al. (2023).

Zygogynum Baill.

I was contacted by Tim Utteridge (SING, formerly K) drawing my attention to a paper (Utteridge and Rustiami 2022) I had overlooked in which two new species of *Zygogynum* Baill. are described from west of both Wallace's and Lydekker's Lines. *Zygogynum moluccanum* from the Moluccan islands of Indonesia, and *Z. sundaicum*, a new species and generic record for the Sunda shelf, from the northern part of the Malaysian State of Sarawak in Borneo.

This new generic record may be incorporated as follows into Wong (2023: 297).

225.2 ***Zygogynum*** Baill., Adansonia 7: 298 (1867).
Revision status – A.
Borneo: 1 (native). POWO (2023). World: 47. POWO (2023).

CONCLUSIONS

Recognition of *Chewlunia* and *Zygogonum* takes the flora of Borneo to 1594 native genera and 12,592 species.

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Supplement to the Rubiaceae in the *Flora dos Estados de Goiás e Tocantins*, Brazil: Nomenclatural revision, typifications, new records, new identifications, and new combinations

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Abstract. The contribution of the family Rubiaceae for the *Flora dos Estados de Goiás e Tocantins – Coleção Rizzo* (FGT), published in November 2010, includes the treatment of 61 genera and 245 species. Nomenclatural types were cited in various ways, depending on the information and photographs available to the author before 2008. For numerous names, lectotype designations were not accompanied by "here designated" or a similar expression, which is required by the *Internation Code of Nomenclature* starting from 1 January 2001, therefore those designations are not valid. Also, the barcodes of type specimens were not cited in that treatment, because at that time, it was not common practice to cite that information, especially in floristic treatments, and also because barcodes were not yet assigned to specimens in many herbaria. The type citations are here corrected, type citations correctly cited with additional information added, and designate lectotypes or neotypes of names that still need to be designated, are deginated. A total of 81 lectotypifications and 11 neotypifications are here presented. A list of names newly typified is available in Appendix 1. Updates of the taxonomic and systematic changes that occurred during the last 15 years, are provided. Major changes regarding generic delimitations, mostly in the tribes Palicoureeae, Psychotriae, and Spermacoceeae, have recently been proposed, and numerous new combinations have recently been published by several authors, which are here included. Following those recent generic rearragements, three new combinations in *Palicourea* are here published, namely *P. leiocarpa*, *P. stachyoides*, and *P. subtriflora*.

Keywords: Brazil, Cerrado, historical collections, Neotropics, nomenclature, Rubiaceae, typification.

Resumo. A contribução da família Rubiaceae para a *Flora dos Estados de Goiás e Tocantins – Coleção Rizzo* (FGT), publicada em novembro 2010, inclui o tratamento dos 61 generos e 245 espécies. Os tipos nomenclaturais foram citados de várias formas, dependendo da informacão disponivel ao autor até 2008. Por muitos nomes, os lectótipos foram designados, porem, em muitos casos não foram acompanhadas por "aqui escolhido" ou uma expressão similar, que é um requerimento do *Código Interna-*

cional de Nomenclatura a partir do 1 de Janeiro de 2001; então aquelas designações não são validas. Também, os *barcodes* (códigos de barras) dos especimens tipo não foram citados naquele tratamento, porque naquela época não era pratica comum de citar essa informação, principalmente em tratados florísticos, e também porque naquela época os *barcodes* ainda não foram atribuídos aos especimens de muitos herbários. As citações dos tipos das Rubiaceae da FGT são aqui corrigidas, as citações dos tipos coretamente citados com informação adicional, e os lectótipos ou neótipos dos nomes que ainda precisam serem designados. Um total de 81 lectotipificações e 11 neotipificações são aqui apresentadas. A lista dos nomes aqui tipificados é disponivel na Apéndice 1 . Este trabalho também providencia uma atualisação das mudanças taxonômicas e sistemáticas que ocorreram durante os ultimos 15 anos. Importantes mudanças relativas a delimitações de gêneros, principalmente nas tribos Palicoureeae, Psychotriae e Spermacoceeae, foram recentemente propostas, e numerosas novas combinações foram recentemente publicadas por vários autores, as quais são aqui incluídas. De acordo com estes recentes rearrangios genéricos, tres novas combinações em *Palicourea* são aqui publicadas, a saber *P. leiocarpa*, *P. stachyoides* e *P. subtriflora*.

Palavras-chave: Brasil, Cerrado, Neotropicos, nomenclatura, coleções historicas, Rubiaceae, tipificação.

INTRODUCTION

Before the 1960s, the floristic composition of the States of Goiás and Tocantins, Central-Western Brazil, was mostly known through the historical collections of European botanists travelling during the 1800s and the first decades of 1900, principally those of Johann Pohl (1976), Augustin de Saint-Hilaire (1944), Ernst Ule (1894, 2003), Auguste François Glaziou (1905, 1906, 1907, 1909a, 1909b, 1910, 1911), and George Gardner (1975). Starting from 1822, in Colonial Brazil, the region was called the Province of Goyaz, and 1889, when Brazil became a republic, it was re-named the State of Goiás. In 1988 the State of Goiás was divided into two states, the southern portion remained the State of Goiás, and the northern portion became the State of Tocantins. Ecologically, the modern state of Goiás and the southern portion of the state of Tocantins are within the Cerrado Biome, and the northern portion of the state of Tocantins is whitin the Amazon Region. The specimens collected during the historical expeditions of 1800s and through the first decades of 1900s are mostly present in European and North American herbaria, which in the 1960s were difficult to be studied by Brazilian botanists, due to the excessive costs of travelling.

The original state of Goiás also included the area that nowadays corresponds to the Federal District, where Brasília, the capital of Brazil, is currently located. Up to the 1960s, Central-Western Brazil was a vast region that needed to be developped and connected by main roads with the rest of the country. This general developmental policy was initiated by President Getúlio Vargas (1882–1954) with the program "March to the West" ("*Marcha para o Oeste*") during 1937–1945, to stimulate economic and agricultural growth in the Central-Western Region. The program was continued by the following President, Juselino Kubitshek (1902–1976), who founded the city of Brasilia on 21 April 1960, with the objective of moving the capital from Rio de Janeiro to the center of Brazil. That general move stimulated numerous local initiatives of political and economical development, as aggressive agricultural expansion, building of infrastructures and main roads, the florishing of academic education, scientific research, and environmental conservation. On 11 January 1961, President Juselino Kubitshek established the two national parks present in the state of Goiás, the *Parque Nacional das Emas* and the *Parque Nacional da Chapada dos Veadeiros*. On 15 December 1961, President João Goulart (1919–1976) inaugurated the University of Brasília.

In 1960, Howard Samuel Irwin (1928–2019) was employed by the New York Botanical Garden, Bronx, New York. Shortly after his appointment, Irwin initiated the project *Flora of the Brazilian Planalto*, an international collaboration composed by the New York Botanical Garden and several Brazilian institutions, and most importantly the recently founded University of Brasilia. Irwin was the founder, coordinator, and main collector of this project from 1964 to 1972. During those eight years, in collaboration with several Brazilian and foreign botanists, he gathered 32,195 collections (*Irwin et al. 5001–37196*; with up to 10 duplicates for each number) in the states of Goiás (which in those days included the state of Tocantins), Minas Gerais, and Bahia, and the Federal District. In 1971, Irwin was nominated Executive Director of the New York Botanical Garden, and in 1972 he passed the project *Flora of the Brazilian Planalto* to William "Bill" Russell Anderson (1942–2013), who had already accompanied Irwin in collecting expeditions during previous years for the project. During 1973–1975 Anderson gathered, in collaboration with several Brazilian and foreign botanists, 5,424 collections (*Anderson et al. 6200–11624*; with up to 10 duplicates for each number) in the states of Pará, Mato Grosso, Goiás,

Minas Gerais, Rio de Janeiro and São Paulo. The collections realized during that project were distributed to more than 25 herbaria in Brazil and abroad (the first set of duplicates was deposited at UB, and the second set at NY), with the objective to send specimens to family specialists for identification. The field books of Irwin and Anderson are kept in NY, and have been regularly updated as identifications of the numerous specialists arrived at NY. The examination of those field books is extremely important in solving cases of ambiguous or erroneous information present on the specimen labels. It should be emphasized that due to the gatherings of Irwin and Anderson being preserved in NY, it is the largest plant collection from the States of Goiás and Tocantins outside Brazil.

At the end of the 1960s, José Ângelo Rizzo (Feb. 1931–Nov. 2018), Professor at the Federal University of Goiás, Goiânia, initiated, coordinated, and realized a collection plan for the State of Goiás, which at that time still included the modern State of Tocantins. The collection plan was presented in the first volume of the series *Flora do Estado de Goiás – Coleção Rizzo* (hereafter FGT), with the subtitle *Plano de Coleção* (Rizzo, 1981). The botanical collections were made by Rizzo and collaborators in 28 stations distributed throughout the state of Goiás, from 1968 to 1974, producing 9,605 gatherings. In 1988 the State of Goiás was divided into two states; hence, out of the 28 collecting stations, 17 are in the State of Goiás, and 11 are in the State of Tocantins. A set of specimen duplicates collected during the project *Flora of the Brazilian Planalto* was not deposited at UFG, because Rizzo had the objective to limit the specimens in that herbarium to his own collections, which explains the phrase "*Coleção Rizzo*" in the title of the floristic series that he coordinated.

After the 1980s, the botanical collections in the states of Goiás and Tocantins continued to increase, as a result of several collecting programs realized by Brazilian and foreign botanists, and the specimens gathered in these two states are mostly deposited in the herbaria of Goiânia (UFG), Brasília (CEN, IBGE, and UB), Rio de Janeiro (RB), New York (NY), Kew (K), and Utrecht (U). Rizzo distributed duplicates of his collections to numerous specialists working in Brazilian and foreign institutions for the preparation of plant families for the series *Flora do Estado de Goiás – Coleção Rizzo*.

Starting from 1981, Rizzo coordinated the publication of the series *Flora do Estado de Goiás – Coleção Rizzo* (hereafter FGT). The first 14 volumes, published during 1981–1991, had this title. From volume 15, published in 1993, and onwards, due to the division of Goiás into two states, the series was re-named *Flora dos Estados de Goiás e Tocantins – Coleção Rizzo*. The volumes of the floristic series were published at a steady pace, reaching volume 50 (family Simaroubaceae; Devecchi & Pirani, 2021), published in 2021, three years after Rizzo's passing away, as he assisted in the editing of the last three volumes while he was still alive. A biography of José Ângelo Rizzo was published by Galli (2017). The FGT series is currently coordinated by Vera Lucia Gomes Klein, who is also the current Director of the UFG Herbarium.

HISTORY OF THE RUBIACEAE TREATMENT OF THE *FLORA DOS ESTADOS DE GOIÁS E TOCANTINS* (FGT)

In July 1997, during the Brazilian National Botanical Congress in Crato, state of Ceará, Prof. José Ângelo Rizzo invited me to contribute the treatment of the Rubiaceae family for the FGT. At that time I was recenty employed as a researcher at the New York Botanical Garden. Without hesitation, I accepted his invitation. During that event, he also invited me to visit the state of Goiás. I arrived there in October 1997, and Rizzo showed me the local herbarium and accompanied me on two short excursions in the state. One was in the Bosque Auguste de Saint-Hilaire, one of the few forest remants present in the state, which is within the Campus II of the Federal University of Goiás, Goiânia. The other excursion was on the Serra Dourada State Park, at ca. 175 km from Goiânia, which is mostly rocky outcrops on arenitic rocks, where I had the occasion to study savanna vegetation of *cerrado sensu stricto* (woody savanna) and *campos rupestres* (rocky outcrops) for the first time. After those brief excursions, I made a rapid assessment of the Rubiaceae specimens present in the UFG herbarium, and produced a preliminary checklist of 38 genera and 140 species present in the states of Goiás and Tocantins. By the end of 1997, after my return to New York, I started to organize the FGT Rubiaceae project and invited several specialists to contribute several genera.

In 1998, after compiling the data available and integrating all the collaborators in the team that had agreed to collaborate with me, I submitted to the CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico) and IBAMA (Instituto Brasileiro do Meio Ambiente) a project with the title "*Taxonomic study of the Rubiaceae of the Federal District, and of the states of Goiás, Tocantins, Ceará, and Santa Catarina*", with José Ângelo Rizzo (Goiás and Tocantins), Taciana Cavalcanti (Federal District), Francisca Simões Cavalcanti (Ceará) and Ademir Reis (Santa Catarina) as state coordinators, and Francisca Simões Cavalcanti as general coordina-

tor. The same year, the project was approuved by both the CNPq and the IBAMA. Particularly important was the approuval of IBAMA to collect on the Chapada dos Veadeiros National Park and in the Emas National Park, both in the state of Goiás. That year, I started my botanical collections in the states of Goiás and Tocantins, accompanied by José Ângelo Rizzo, Vera Lúcia Gomes-Klein and Heleno Dias Ferreira, with the economic support of the Federal University of Goiás and New York Botanical Garden. During 1999–2000, I studied the specimens from the states of Goiás and Tocantins in the NY herbarium. In 2003, I selected a large loan of Rubiaceae specimens in NY to be sent to UFG.

During 2004–2008, I worked as a Visiting Scientist at the Federal University of Goiás, Goiânia, sponsored by the CNPq, with three main objectives: 1) floristic treatment of the Rubiaceae states of Goiás and Tocantins, the major objective; 2) creation of a scientific journal, which became the *Revista de Biologia Neotropical*; and 3) floristic study of the Serra dos Pireneus. During 2004–2008, I realized numerous collecting expeditions in the two states, and continued the study of Rubiaceae specimens for the treatment. In 2005, I studied and annotated ca. 2,500 specimens present in UFG, CEN, UB, and IBGE, and made 251 collections (*Delprete et al. 9191–9442*; with 2–6 duplicates for each number). In 2006, I studied and annotated ca. 2,000 Rubiaceae specimens and made 572 collections (*Delprete et al. 9443–10015*; with 2–8 duplicates for each number) in the two states. In 2007, I studied and annotated ca. 2,700 Rubiaceae specimens and made 547 collections (*Delprete et al. 10016–10563*; with 2–8 duplicates each number). In 2008, I finalized the study of Rubiaceae specimens in CEN, IBGE, UB, UFG and HTO, and those on loan from NY. Especially important was the study of the specimens in CEN, as the personnel of that institution made numerous recent collections in remote areas of the state of Tocantins, mostly in connection with environmental impact studies of areas where new roads and new dams were built.

By September 2008, the manuscript was nearly complete, with the treatment of 58 genera finished and only a few genera still to be contributed by collaborators. From September 2008 to June 2009, I worked as a Researcher, with a permanent position, at the Institut de Recherche pour le Développement (IRD), in the AMAP Research Unit (CIRAD, CNRS, INRA, IRD, University of Montpellier), in the city of Montpellier, France. I had the occasion to study at MPU, the herbarium of the Institute of Botany of the Montpellier University, where I finalized the Rubiaceae treatment for the FGT. The MPU herbarium is the second largest in France, with about four million specimens, many of them are historical collections made in the Neotropics, including numerous original specimens collected by Ruiz & Pavon, Aublet, Glaziou, Salzmann, Saint-Hilaire, Ule, Chodat, Hassler, among many others, which helped in the clarification of numerous Rubiaceae taxa. In 2009 I also studied the herbaria of the National Museum of Natural History in Paris, especially P-Bonpl, P-JJR, P-Juss, and P-Lam, and the general herbarium (P).

For the realization of the Rubiaceae treatment for Federal District and the states of Goiás and Tocantins, during 1998–2008, I studied a total of ca. 60,000 specimens from the following herbaria, either by direct examination or the study by photographs: B, B-W, BR, CEN, F, G, G-DC, HEPH, HTO, IBGE, K, MBM, MO, MPU, NY, NX, P, P-JJR, P-Bonp, R, RB, U, UB, UFG, UFMT and US.

In June 2009, continuing as an IRD Researcher, I moved to CAY, which is also part of the AMAP Research Unit, at the IRD Center of Cayenne, French Guiana. By the end of 2009, I concluded the text of the FGT Rubiaceae treatment, produced the distribution maps for all the species, and organized the illustrations. Numerous species illustrations were reproduced from the Rubiaceae treament of the state of Santa Catarina (Delprete et al., 2004, 2005) with permission from the Smithsonian Institution and the Editor of the *Flora Ilustrada Catarinense*. Funds for the publication of FGT Rubiaceae were contributed in equal parts by the IRD and Federal University of Goiás. The Rubiaceae treatment was published in November 2010 as Volume 40 of the FGT, in three parts, with a total of 1610 pages, and includes the treatment of 61 genera and 245 species.

TYPE CITATIONS IN THE RUBIACEAE TREATMENT OF THE FGT

The style of the *Flora dos Estados de Goiás e Tocantins* (FGT) is typical of similar floristic series. It included the description of the family, key to genera, descriptions of the genera, keys to species within each genus, species descriptions, illustrations, distribution maps, and citation of material examined. As a general rule, the family treatments for the FGT did not require the citation of type specimens and usually, are not considered a place for typifications. Nevertheless, Prof. Rizzo, the series coordinator, left the decision to include typifications to the judgment of the contributing authors whether and which format to use citing type specimens and/or provide typifications.

For the FGT Rubiaceae treatment, I opted to cite the nomenclatural types in various ways, depending on

the information and photographs available to me up to 2008, while working at the Federal University of Goiás, Goiânia, Brazil. When I thought that only one original specimen for a given taxon existed, I called it a holotype. When several syntypes were cited by the original author, sometimes I opted to designate a lectotype, depending on the information that I had available, and whether I was able to see the original specimens in question or images of them. In several instances, the citation of a lectotype was not accompanied by "here designated" or a similar expression, which is required by the *Code* (Turland et al. 2018) starting from 1 January 2001; therefore, those lectotype designations are not valid.

Types were cited for all the accepted names in the FGT Rubiaceae treatment and the synonyms associated with original material collected in the states of Goiás and Tocantins, or, rarely, in contiguous states or outside of Brazil.

During the period that I studied the Rubiaceae of Goiás and Tocantins, very few herbaria sent type specimens on loan to UFG, and Jstor Global Plants was not available to me, which hampered the examination of original specimens via the internet.

For typification of the type specimens of Linnaean taxa, the ultimate reference is Jarvis' (2007) *Order out of Chaos*. However, that publication was not available to me while preparing the Rubiaceae treatment.

Finally, the citation of specimen barcodes was not included in the FGT treatment because in those days it was not common practice to cite that information, especially in floristic treatments, and because a barcode number was not yet assigned to the specimens in many herbaria.

For the above reasons, the present work corrects the type citations that were incorrectly cited in my Rubiaceae treatment (Delprete 2010a, 2010b, 2010c), add additional information that became available in recent years to the type correctly cited in FGT, and designate the needed lectotype or neotype to names that still need to be designated.

MATERIAL AND METHODS

The present work is intended as a nomenclatural addition and/or correction of the typification of names cited in the FGT Rubiaceae treament. For each accepted name present in the treament, either a previously existing typification is cited, or a previous first-step typification is here narrowed to a single specimen by a second-step lectotypification. For the names that were erroneously or invalidly typified, a correct typifiction is here presented. Numerous typifications were published after 2010 by other authors, those typifications are here cited and, when necessary, additional information is given and/or corrected.

For all typifications here presented, barcode numbers of herbarium specimens, when available, are cited in square brackets after the herbarium code; when the barcode number is not available, the accession number, preceded by "Acc. No.", is cited. All specimens cited have been examined, unless indicated by "n.v." (not seen) after the herbarium code.

The original specimens of each name were studied either by direct examination or examination of digital images available in virtual herbaria or sent by herbarium curators. Original specimens of the following herbaria were directly consulted: B, B-W, BHCB, BM, BR, C, CAY, CEN, CORD, E, EAC, F, FI-W, G, G-DC, GH, GOET, HAL, HBG, HPL, HRCB, HTO, HUEFS, IBGE, K, M, MA, MBM, MO, MPU, NY, P, P-JJR, P-Bonp, P-Lam, R, RB, S, SI, SP, SPF, TCD, U, UPS-THUNB, UB, UFG, US, VEN, WAG, and WIS. Digital images of original specimens were examined via the following virtual herbaria:

- Jstor Global Plants (https://plants.jstor.org/)
- SpeciesLink (https://specieslink.net/)
- Reflora (https://reflora.jbrj.gov.br/reflora/herbarioVirtual/)
- JaBot (https://ipt.jbrj.gov.br/jbrj/resource?r=jbrj_rb/)
- B and B-W (http://ww2.bgbm.org/bogartdb/BogartPublic.asp)
- CTES (http://ibone.unne.edu.ar/en/herbario/herbario/)
- COL (http://www.biovirtual.unal.edu.co/en/collections/search/plants/)
- LINN, LINN-HS, LINN-SM (https://linnean-online.org/)
- JACQ (https://www.jacq.org/)

Jarvis' (2007) *Order out of Chaos* was consulted, and the typifications of Rubiaceae Linnean names present in that work are here followed.

José Mariano da Conceição Vellozo (1742–1811) worked on the flora of the state of Rio de Janeiro and the southern portion of the state of São Paulo and had the drawings prepared for the species that he intended to publish. His work, due to a series of events, was published nearly two decades after his death. According to Borgmeier (1937) and Carauta (1969, 1973), the text of the *Florae Fluminensis* was printed in 1825 and distributed in 1829, and the illustrations in the *Florae Fluminensis Icones* were printed in 1827 and distributed 1831. Conceição Vellozo's personal herbarium has either been lost or destroyed (Stafleu and Cowan 1986: 696–697).

In the absence of original specimens, numerous authors cited the plates of *Florae Fluminensis Icones* as types of the names published by Conceição Vellozo. However, those plates cannot be treated as original material because they were published 20 years after his death. The original drawings prepared for Conceição Vellozo and included in the *Florae Fluminensis Icones* are preserved in two institutions: 1) the Manuscript Section of the National Library in Rio de Janeiro (http://bndigital.bn.gov.br/acervodigital), which is a complete set of the original plates, bound in 11 volumes, with each plate identified by a unique catalogue number; and 2) the Archives of the Torre do Tombo, Lisbon (https://digitarq.arquivos.pt/results?t=florae+fluminensis), which is an incomplete set, with only volumes 6, 7, 8, 9, and 11, and with the drawings slighty different from those in the Manuscript Section of the Brazilian National Library. Pastore et al. (2021) showed that the original plates in Lisbon are less precise than those in Rio de Janeiro. In the present taxonomic treatment, lectotypes were chosen from the original unpublished plates made for *Florae Fluminensis* kept in the Manuscript Section of the National Library of Rio de Janeiro.

Hipólito Ruiz López (1754–1816) and José Antonio Pavón y Jiménez (1754–1840) published the names in the *Flora Peruviana et Chilensis* resulting from the Botanical Expedition to the the Spanish colonial territories of the Viceroyalty of Peru and Chile, during 1777–1788. Their original material consists of the original plates made by several artists during that expedition and specimens collected during and after the expedition. The specimens collected by Ruiz and Pavón in the localities of Chinchao, Acomayo, Pillao and Muña were lost in a shipwreck along the coast of Portugal. Ruiz and Pavón returned to Spain in 1788, leaving the two botanists Juan José Tafalla and Juan A. Manzanilla to recollect, during 1793–1797, in the localities of the collections lost in the shipwreck (Estrella 1991; Tepe 2018), and in other areas. Tafalla and Manzanilla sent their collections to Spain, and they were then integrated into the Herbarium Peruvianum of Ruiz & Pavón; those specimens are original material, and the names associated with them were published in *Flora Peruviana et Chilensis* and *Suplemento a la Quinologia* (Ruiz & Pavón, 1798, 1799, 1801). Lectotypes of Ruiz & Pavón's names were designated by choosing among their original plates and specimens.

Taxonomic and systematic changes made during the last decade are updated. Major changes of generic delimitation within the tribes Palicoureeae, Psychotriae, and Spermacoceeae have been recently proposed, and numerous new combinations have recently been published by several authors. These changes are here included, and a few necessary new combinations in *Palicourea sensu lato,* are here presented.

The names are below organized in the same order that they were published in the FGT Rubiaceae treatment, with the citation of the corresponding volume, part, and page number, followed by the bibliographic references and type citation as reported in FGT, between quotation marks. Below each name, is indicated the currently **accepted name** for each species recognized in the FGT treatment, followed by a corrected type citation, and necessary notes explaining the typification process.

SYSTEMATIC TREATMENT

1. **ALIBERTIA** A. Rich. ex DC., Prodr. 4: 443. 1830.

FGT, vol. 40(1), p. 71:
"1-1A. ***Alibertia edulis*** (Rich.) A. Rich. in DC. var. ***edulis*** DC. - *Alibertia edulis* (Rich.) A. Rich. in DC., Prodr. 4: 443. IX/1830 (reimpr. A. Rich., Mém.Fam. Rubiaceé 154, tab. 11, fig. 1a–i. XII.1830, reimpr. Mém. Soc. Hist. Nat. Paris, ser. 3, 5: 234, tab. 21, fig. 1a–i. 1834). – *Genipa edulis* Rich., Actes Soc. Hist. Nat. Paris 1: 107. 1792. - *Gardenia edulis* (Rich.) Poir. in Lam., Encycl. Méth. Bot. Suppl. 2: 708. 1812. – *Alibertia utilis* A. Rich., *orth. var.*, Mém. Fam. Runiaceé, tab. 11, XII/1830 (reimpr. Mém. Soc. Nat. Paris 5:tab. 21. 1834). – *Garapatica edulis* (Rich.) H. Karst., Fl. Colomb. 1: 57. 1859. – *Cordiera edulis* (Rich.) Kuntze, Rev. Gen. Pl. 1: 279. 1891. – *Sabicea edulis* (Rich.) Semm. in Jackson, Index Kew 772. 1895. Tipo: Guiana Francesa ["Guyane Françoise"], sem localidade, 1782, *Le Blond s.n.* (lectótipo, P)."

Accepted name: ***Alibertia edulis*** (Rich.) A.Rich. ex DC. var. ***edulis***

Type: FRENCH GUIANA: Without locality, 1792, *J.B. Le Blond s.n.* (P [without barcode, currently on loan to GB], lectotype designated by Delprete and Persson in Taylor et al. (2011: 136)).

Notes: Delprete and Persson in Delprete (2010a: 71) cited the type of *Genipa edulis* Rich. as (translated from Portuguese) "Type: French Guiana [as "Guyane Françoise"], without locality, 1792, *Le Blond s.n.* (lectotype, P)." Persson and Delprete (2017: 79) later cited the type of this name as "French Guiana [as "Guyane Françoise"], without locality, 1792, *Le Blond s.n.* (lectotype, P, selected by Delprete and Persson (2010: 71)." However, because these two lectotype citations were published after 1 January 2001, according to the *Code* (Turland et al., 2018),

they should have been accompanied by "here designated" or a similar expression; therefore, they are not valid. The first valid lectotypification of *Genipa edulis* was made by Delprete and Persson in Taylor et al. (2011: 136).

FGT, vol. 40(1), p. 86:
"1-2. ***Alibertia latifolia*** (Benth.) K. Schum. in Mart., Fl. Bras. 6(6): 357. 1889. - *Cordiera latifolia* Benth., J. Bot. (Hooker) 3: 221. 1841. - *Alibertia latifolia* (Benth.) K. Schum. var. *latifolia*, Mem. New York Bot. Gard. 12: 225. 1965. Tipo: Guyana: Sem localidade, 1838 (fl masc), *Rob. Schomburgk 91.S* (lectótipo, K, aqui selecionado)."

Accepted name: *Alibertia latifolia* (Benth.) K. Schum.

Type: GUYANA: Without locality, 1838 (fl masc), *Rob. H. Schomburgk 91.S* (K [without barcode], lectotype designated by Delprete and Persson in Delprete (2010a: 86)).

Notes: Bentham (1841: 221) along with the description of *Cordiera latifolia* Benth. cited the material studied as "British Guiana, *Schomburgk*" without citing the collection number or herbarium of deposit. Delprete and Persson in Delprete (2010a: 86) designated the lectotype of *C. latifolia* as (translated from Portuguese) "Guyana, without locality, 1838 (fl masc), *Rob. Schomburgk 91.S* (lectotype, K, here designated)." The K specimen did not have a barcode at the time it was studied and is currently on loan to GB, and is still without barcode. As there is only one specimen of *Rob. Schomburgk 91.S* at K, this is a valid lectotypification. Delprete and Persson (2017: 94) cited the specimen *Schomburgk 91.S* at K as holotype, but since Bentham did not cite the collection number or the herbarium of deposit, the lectotypification presented by Delprete and Persson in Delprete (2010a: 86) is here recognized as the first one validly published.

2. **AMAIOUA** Aubl., Hist. Pl. Guiane, Suppl. 13. 1775.

FGT, vol. 40(1), p. 91:
"2-1. ***Amaioua guianensis*** Aubl., Hist. Pl. Guiane Suppl. 13, pl. 375. 1775. Tipo: Guiana Francesa, Rio Galibi, s.d. [1762-1764], *Aublet s.n.* (holótipo, BM, foto em NY)."

Accepted name: *Amaioua guianensis* Aubl.

Type: FRENCH GUIANA: Galibi Creek, "fructum ferebat Maio […], in sylvis propè amnem Galibiensis" and "arbre dans les forêts desertes, voisines de la crique des Galibis", s.d. [Apr–May 1763], *J.B.C.F. Aublet s.n.* (BM [barcode BM001008914] lectotype designated by Steyermark (1965: 216), photo in NY)).

Notes: Steyermark (1965: 216) cited the type of *Amaioua guianensis* Aubl. as a specimen at BG (which corresponds to the herbarium of the University of Bergen, Norway), which should be interpreted as an obvious typographical error. Delprete (2010a: 91) cited the type of *Amaioua guianensis* as "(holótipo, BM, foto em NY)." As pointed out in Delprete (2015: 599), the BM specimen, with barcode BM001008914, is the same cited by Steyermark (1965: 216) as holotype, and according to the *Code* that citation should be interpreted as an inadvertent lectotype designation. For more details, see Delprete (2015).

The illustration of Figure 2 of FGT identified as *Amaioua guianensis* (reproduced from *Flora Ilustrada Catarinense* RUBI, vol. I, fig. 02) represents *Amaioua intermedia* Mart.

FGT, vol. 40(1), p. 97:
"2-2. ***Amaioua intermedia*** Mart. in Schult. & Schult., Syst. Veg. 7(1): 90. 1829. - *Amaioua guianensis* var. *confertifolia* K. Schum. in Mart., Fl. Bras. 6(6): 359. 1889. Tipo: Brasil, Bahia, 1831, *Blanchet 1012* (holótipo, B, destruído; isótipo, NY)."

Accepted name: *Amaioua intermedia* Mart.

Type. BRAZIL. Bahia: Cachoeira, "In sylvis provinciae Bahiensis" ["in sylvis Capões et Coedrias ad Caxoeira, Febr."], s.d. [February 1819], *C.F.P. Martius Obs. 2156* (M [barcode M-0186321], **lectotype here designated**).

Notes: In the protologue of *Amaioua intermedia* Mart. in Schultes & Schultes (1829: 90–91) cited the original material as "In sylvis provinciae Bahiensis Brasiliae de Martius," without citing the herbarium of deposit. The protologue of *Amaioua intermedia* in Schultes & Schultes (1829: 90) attributed the name and the diagnosis to Martius, and the original material was collected by Martius in the Brazilian state of Bahia.

Steyermark (1965: 212) under *Amaioua intermedia* var. *intermedia* cited the synonym "*Amaioua guianensis* var. *confertifolia* K. Schum. in Mart. Fl. Bras. 6(6): 359. 1889, type. In umbrosis circa Bahia (Brazil), 1831, *J. Blanchet 1012* (isotype NY)." Then, on the following text page, Steyermark (1965: 214) wrote "the less common variant, with somewhat more congested inflorescence,

described as var. *confertifolia* by Schumann, must serve as the nomenclatural type of the species, *A. intermedia*." In the following paragraph, he wrote "The *Blanchet 1012* specimen from the Meisner Herbarium deposited at NY is labelled *Amaioua intermedia* and is undoubtedly the collection from Bahia cited by Schumann in Martius's Flora Brasiliensis (p. 359) as var. *confertifolia*. It shows the flowers of the staminate and pistillate inflorescences as "conferta" and with "floribus sessilibus"." Steyermark's statements are erroneous, as the original material was collected by Martius. Steyermark's mistaken citation of *Blanchet 1012* as type of *A. intermedia* was reproduced by Delprete (2010a: 97).

Searching for original material associated with of *Amaioua intermedia*, at M there is a specimen, barcode M-0186321, with the label "Dr. Martius Iter Brasil". On the label is the handwritten annotation "Amajoua intermedia Mart. No. 2156 Obs. Habitat in sylvis Capões et Campis ad Caxoeira, Proviciae Bah. Febr." Another label affixed on that sheet has the annotation "Amajoua intermedia, si tibi plante, Schult. fil." handwritten by Schultes filius. Cachoeira is a town at the margin of Rio Paraguaçu, at about 120 km from Salvador, the capital of the Bahia state. The annotation "Febr" means that the specimen was collected in February. According to Spix and Martius's (1976) travel diary, they were in Cachoeira in February 1819. The specimen M-0186321 consists of a branch with numerous leaves and three subsessile inflorescences with sessile flowers. On the branch is affixed a small label with the number "3324" handwritten by A. Töpfer (staff member of M) in early 1900s. This specimen is here designated the lectotype of this name.

3. **AUGUSTA** Pohl, Flora 12: 118. ("1828") 1829, *nom. cons.*

FGT, vol. 40(1), p. 103:
"3-1a. ***Augusta longifolia*** (Spreng.) Reheder var. ***longifolia*** - *Ucriana longifolia* Spreng., Syst. Veg. 1: 761. 1825. - *Schreibersia longifolia* (Spreng.) Kuntze, Rev. Gen. Pl. 298. 1891. - *Augusta longifolia* (Spreng.) Rehder, Kew Bull. 1935: 364. 1935. Tipo: Brasil, sem localidade, s.d. (fl, fr), *Sellow s.n.* (B destruído; lectótipo P [ex B], selecionado por Delprete (1997)."

Accepted name: *Augusta longifolia* (Spreng.) Reheder var. ***longifolia***

Type: BRAZIL: Without locality, s.d. (fl, fr), *F. Sellow s.n.* (B destroyed; P [ex B; barcode P00107974], lectotype designated by Delprete (1997: 493)).

4. **BATHYSA** C.Presl, Abh. Boehm. Ges. Wiss. 5(3): 514. 1845.

Notes: Kainulainen et al. (2010) using a molecular phylogenetic study demonstrated that *Bathysa,* as traditionally delimited, is a paraphyletic group and separated it from the genus *Schizocalyx* Wedd. in which they included the genus *Phitopis* Hook.f. *Schizocalyx*, as delimited by Kainulainen et al. (2010) and Taylor et al. (2011), is a genus of nine species ranging from Nicaragua through Brazil. In the states of Goiás and Tocantins, only one species of *Schizocalyx* occurs, *S. cuspidatus* (A.St.Hil.) Kainul. & B.Bremer, which was cited as *Bathysa cuspidata* (A. St. Hil.) K.Schum. in FGT.

FGT, vol. 40(1), p. 115:
"4-1. ***Bathysa cuspidata*** (A. St. Hil.) K. Schum., in Mart., Fl. Bras. 6(6): 237, tab. 119. 1889. - *Exostema cuspidatum* A. St. Hil., Pl. Usuell. Bras. 1: tab. 3. 304. 1824. - *Schoenlenia cuspidata* (A.St. Hil.) Klotzsch in Hayne, Getr. Darstell. Gew. 14: tab 15. 1846. Tipo: Brasil meridional, s.d., *A. Saint Hilaire s.n.* (holótipo P, n.v.)."

Accepted name: *Schizocalyx cuspidatus* (A.St.Hil.) Kainul. & B.Bremer, Amer. J. Bot. 97: 1976. 2010.

Type: BRAZIL. Minas Gerais: "Cueilli dans les bois près Itajuru, Cap des Moines", 1816–1821, *A. Saint-Hilaire Catal. B1 No. 970* (P [barcode P00752481] lectotype designated by Taylor et al. (2011: 503); isolectotypes P [2 sheets, barcodes P00752482, P00752483]; possible isolectotype F [ex P; barcode F0069068F, Acc. No. 970756, without collection number]).

Notes: In the protologue of *Exostema cuspidatum* A. St. Hil., Saint-Hilaire (1824) cited the material studied, collected by himself, as "cette plante croit dans les bois vierges du Brésil méridional". Delprete (2010a: 91) cited the type of *Exostema cuspidatum* A. St. Hil. as "Brasil meridional, s.d., *A. Saint Hilaire s.n.* (holótipo P, n.v.)." There are three original specimens associated with this name at P, which are discussed below.

On the P specimen with barcode P00752481, is affixed the distal portion of a branch with one leaf, and a small leaf-like bract subtending the terminal inflorescence. On the bottom left corner of the sheet there is a label handwritten by Saint-Hilaire with the following annotation "Exostema cuspidatum Aug de St. Hil. Plant. us. Bras. Vol. III, cueilli dans les bois près Itajuru, Capes des Moines." A second label has the heading "HERB. MUS. PARIS" and the bottom note "BRÉSIL.–Province

de Minas Geraes. Voyage d'Auguste de Saint-Hilaire, de 1816 à 1821. Catal. B', Nº 970" and the annotation handwritten by Weddell "Bathisia [sic!], Schloenlenia cuspidata Klotsch, Exostema cuspidatum A. St. Hil. (Weddell scr. [scripsit])." This specimen was designated as the lectotype of this name by Taylor et al. (2011: 503). It should be noted that Itajuru most likely refers to a mountain called Pico de Itajuru [ca. 22º12'S, 42º31'W] in the southern portion of the state of Minas Gerais.

On the P specimen with barcode P00752482, is present only one leaf. Near the leaf base is attached a small label with the number "970". At the bottom right corner of the sheet is affixed a label with the same heading, the same handwritten annotation, and Saint-Hilaire's collection number of the second label of the sheet with barcode P00752481.

On the P specimen with barcode P00752483, is affixed the distal portion of a branch with two leaves and a terminal inflorescence. On the sheet itself, there is handwritten "Schoenlenia Kl." A small label just below the annotation has the typewritten annotation "Herbarium FLORAE BRASILIAE meridionalis. Musaeo Parisiensi dedit Aug DE St. HILAIRE." And a third label on the bottom right corner of the sheet has the annotation "Exostema cuspidatum Aug de St. Hil. Plant. us. Bras. Vol. III, cueilli dans les bois près Itajuru, Capes des Moines. Bathysa" handwritten by Saint-Hilaire. On this sheet, there is no Saint-Hilaire's collection number.

5. **BERTIERA** Aubl., Hist. Pl. Guiane 180, tab. 69. 1775.

FGT, vol. 40(1), p. 121:
"5-1. ***Bertiera guianensis*** Aubl., Hist. Pl. Guiane 180, tab. 69. 1775 ("*Guyannensis*"). Tipo: Guiana Francesa, nos bosques perto de Aurora, s.d., *Aublet s.n.* (holótipo, BM)."

Accepted name: *Bertiera guianensis* Aubl.

Type: FRENCH GUIANA: Roura ("Aroura", town on the Oyak River), "in sylvis prope Aroura" and "arbrisseau dans les bois d'Aroura […] en fleur & en fruit dans le mois de Juin", s.d. [Apr, Jun 1763], *J.B.C.F. Aublet s.n.* (P-JJR 8: 272, lectotype designated by Lanjouw and Uittien (1940: 149); isolectotype BM [barcode BM001008867]).

Notes: Delprete (2010a: 121) cited the type of *Bertiera guianensis* Aubl. as "(holótipo, BM)." Delprete (2015: 599) later corrected his previous citation and stated that the lectotype of this name was first designated by Lanjouw and Uittien (1940: 149) citing the specimen at P-JJR.

6. **CHIOCOCCA** P. Br., Civ. Nat. Hist. Jamaica 164. 1756.

FGT, vol. 40(1), p. 126:
"6-1. ***Chiococca alba*** (L.) Hitchc., Report Missouri Bot. Gard. 4: 94. 1893. - *Lonicera alba* L., Sp. Pl. 175. 1753. Tipo: Cultivado no Jardim de Clifford (material originário das Grandes Antilhas), "Hort. Cliff. 496" (holótipo, BM-LINN)."

Accepted name: *Chiococca alba* (L.) Hitchc.

Type: [protologue] "Jamaica, St. Catherine Parish, savanna, towards Two-mile-Wood", [icon.] "Jasminum forte", Sloane, Voy. Jamaica 2, tab. 188, fig. 3. 1725, lectotype designated by Franck et al. (2021: 45). – "Jamaica", *H. Sloane s.n.* (BM [barcode 000594058], epitype designated by Franck et al. (2021: 45)).

Notes: Linnaeus (1737) on page 496 of *Hortus Cliffortianus* listed the polynomial "8. Lonicera recemis lateralibus simplicibus, floris oppositis pendulis, […]" and cited the references "*Dill. elth. 306. t. 228. f. 295.* […] *Tournef. inst. 597.* […] *Sloan. flor. 169. hist. 2. p. 97. t. 188. f. 3. Raj. dendr. 64.*"

Linnaeus (1753: 175) described *Lonicera alba* L. and cited several references as "racemis lateralibus simplicibus, floribus penduli, foliis integerrimis. – Lonicera racemis lateralibus simplicibus laxis, floribus oppositis pedunculis, geniculis compressis. *Hort. cliff.* 496. – Periclymenum racemosum, flore flavescente, fructu niveo. *Dill. elth. 306. t. 228. f. 295.* – Jasminum forte, folio myrtino acuminato, aliorum adminiculo se sustentans, flore albicante racemoso. *Sloan. jam. 169. hist. 2. p. 97. t. 188. f. 3. Raj. dendr. 64. – Habitat in* Jamaicae, Barbados *locis confragosis*." The reference "*Raj. dendr.*" refers to Ray's (1704) *Historia Plantarum* vol. 3, where, on page 64 of Section *Dendrologiiae* is described "13. Jasminum fortè, folio Myrtino acuminato, aliorum adminuculo se sustentans, flore albicante racemoso *Slon. Cat. Jamaic.*" In the prologue of *Lonicera alba,* Linnaeus (1753: 175) did not cite any specimen, but did cite two illustrations from previously published works, which are discussed below.

On Table 228, fig. 295, of Vol. 2 of Dillenius' (1732) *Hortus Elthamensis*, is depicted a branch with numerous leaves and numerous axillary inflorescences with flower buds and flowers in anthesis. The corollas are depicted as

pendulous and narrowly campanulate. On the left side of the branch are drawn the details of flowers in anthesis with exserted bifid style, a hypanthium topped by a bifid style, and ovaries transversally dissected. At the base of the drawing is the printed text "Periclymenum racemosum, flore flavescente, fructu niveo" and on bottom right corner is printed "Plum.", meaning that Dillenius reproduced this plate from a drawing previously made by Plumier.

On Table 188, figure 3, vol. 2 of Sloane's (1725) *Voyage*, is depicted a ramose branch with numerous leaves and numerous axillary inflorescences with flower buds and flowers in anthesis. The corollas are depicted as narrowly campanulate. By the side of the branch is the text "Fig. 3. Jasminum forte, folio myrtino acuminato, aliorum ad miniculo se sustentans, flore albicante racemoso." Franck et al. (2021: 45) designated Table 188, Figure 3 as the lectotype of *Lonicera alba* as "Jamaica, St. Catherine Parish, savanna, towards Two-mile-Wood, "Jasminum forte", Sloane, Voy. Jamaica 2, tab. 188, fig. 3. 1725."

Franck et al. (2021: 45) also designated an epitype for *Lonicera alba* as "Jamaica, *Sloane s.n.* (epitype, BM000594058)." The epitype designation was not necessary, as Table 188, Figure 3, vol. 2 of Sloane's (1725) *Voyage* provides sufficient characters for the unequivocal application of the name. The BM specimen with barcode 000594058 has a label with the annotation "Jasminum forte, folio myrtino, aliorum, ad minusculo fuslonlane [?], flore albicaulo racemoso, Cat. Jam. p. 169, hist. vol. 2. p. 97, Raij. hist. vol. 3. p. 64" handwritten by an unknown author. The specimens consist of a branch with numerous leaves and numerous axillary infloresences with flower buds and flowers in anthesis with campanulate corollas.

7. **CHOMELIA** Jacq., *nom. cons.,* Enum. Pl. Carib. 12. 1760.

FGT, vol. 40(1), p. 139:
"7-1. ***Chomelia kirkbridei*** Delprete, Blumea 53: 395, fig. 1. 2008. Tipo: Brasil, Distrito Federal, Perto do Rio das Salinas, 15°31'S, 47°57'W, 770 m, 8/X/1980 (fl), *Kirkbride 3628* (holotype, UB; isotypes, NY, UB, US n.v.)."

Accepted name: *Chomelia kirkbridei* Delprete

Type: BRAZIL. Distrito Federal: Perto do Rio das Salinas, 15°31'S, 47°57'W, 770 m, 8 Oct. 1980 (fl), *J.H. Kirkbride Jr. 3628* (holotype, UB [barcode UB0040426]; isotypes, NY [barcode 01085898], UB [barcode UB0040427], US [barcode 00955718]).

FGT, vol. 40(1), p. 143:
"7-2. ***Chomelia obtusa*** Cham. & Schltdl., Linnaea 9: 245. 1834. - *Anisomeris obtusa* (Cham. & Schltdl.) K. Schum. in Engler & Prantl., Nat. Pflanzenfam. 4(4): 98, fig. 34. 1891. "Tipo: Brasil meridional, s.d., *Sellow s.n.* (holótipo, B, destruído, foto em F)."

Accepted name: *Chomelia obtusa* Cham. & Schltdl.

Chomelia obtusa Cham. & Schltdl., Linnaea 4: 185. 1829.

Type: BRAZIL. "E Brasilia meridionali misit Sellow", s.d., *F. Sellow s.n.* (HAL [barcode HAL0113687]), lectotype designated by Cabral and Salas (2022a: 239); isolectotypes E [barcode E00285157], F [Acc. No. 607032, fragment ex B], HBG [barcode HBG-521788]).

Notes: In the protologue of *Chomelia obtusa* Cham. & Schltdl., Chamisso and Schlechtendal (1829b: 185) cited the material studied as "E Brasilia meridionali misit Sellow." The original material was at B and was destroyed during WWII. In Jstor Global Plants, the original specimens of *C. obtusa* collected by Sellow in Brazil were retieved and are described and discussed below.

On the sheet at HAL, with barcode HAL0113687, is affixed a small label with the annotation "Chomelia obtusa N., Sellow, Brasilia meridionalis" handwritten by Schlechtendal. On the bottom right corner is a recently printed label with the heading "Herbarium Universitatis Halensis" reproducing the same information present on the smaller label. The specimen is much-branched, with numerous leaves, and a few flowers buds and a few flowers in anthesis. This specimen was designated by Cabral and Salas (2022a: 239) as the lectotype of *Chomelia obtusa*.

On the sheet at HBG, with barcode HBG-521788 are affixed two labels. The lower label has the heading "Botanisches Museum su Hamburg", the stamps "Herb. H. Buek" and "ISOTYPUS", and the annotation "Chomelia obtusa Cham. & Schltdl., Linnaea 4: 185. 1829, Leg. F. Sellow, Brazil" handwritten in blue ink by an unknown author. The other label has the handwritten annotation "Chomelia obtusa N., Sellow, Brasilia meridionalis". Beside the second label, penciled directly on the sheet by an unknown author, is "Scr. D.F.L. v. Schlechtendal", meaning that the second label was handwritten by Schlechtendal. The specimen on this sheet is much-branched, with numerous leaves, and a few flowers and fruits. This specimen is an isolectotype.

A sheet at E, with barcode E00285157, has a label affixed in the center of the sheet with the annotation

"Chomelia obtusata N, Sellow, Brasilia" handwritten by Schlechtendal. The specific epithet "*obtusata*" is certainly an error, as the correct epithet is *obtusa*. The specimen is an unbranched single branch with numerous leaves and a few flower buds. In the attached envelope are present a few mature leaves. This specimen is an isolectotype.

On the sheet at F, with Acc. No. 607032, is affixed a label with the heading "Ex Museo botanico Berolinensis", and the annotation "Neg. 412, Anisomeris obtusa (C. & S.), Sello. Brazil" handwritten by an unknown author. On the sheet is mounted a small branchlet that originated from B, with a few leaves and fruits and a photograph of the B specimen, which was destroyed during WWII. This specimen is an isolectotype.

FGT, vol. 40(1), p. 151:
"7-3. ***Chomelia parviflora*** (Muell. Arg.) Muell. Arg. in Mart., Fl. Bras. 6(5): 41. 1881. - *Malanea parviflora* Muell. Arg., Flora 58: 453, 458. 1875. Sintipos: Brasil, Goiás: *Gardner 3110* (G), *3210* (G, P [3]), *3431* (G); Tocantins: Porto Nacional ["Goyaz, Porto Real"], *Burchell 8422* (G, P), *8500* (G, NY, P)."

Accepted name: *Chomelia parviflora* (Müll.Arg.) Müll.Arg.

Type: BRAZIL. Goiás: Without locality, s.d., *G. Gardner 3210* (G [barcode G00642004], **lectotype here designated**; isolectoypes BM [2 sheets, barcodes BM000832375, BM000832376], F fragment [Acc. No. 775772], G [2 sheets, barcodes G00642005, G00642006], K [barcode K000432618], NY [barcode 00888041], P [3 sheets, barcodes P00836606 P00836607 P00836608]).

Notes: Müller Argoviensis (Flora 58: 453, 458. 1875) cited several syntypes of *Malanea parviflora* Müll. Arg. as "Goyaz: Gardner n. 3110, 3210, 3431, Porto Real: Burchell n. 8422, 8500." Of the original gatherings cited by Müller Argoviensis, the one that has duplicates present in most herbaria is *Gardner 3210*. The duplicates of this gathering are described and discussed below.

The G specimen, with barcode G00642004, has two labels. One label has the annotation "Nº 3210. in Bras. prov. Goyaz leg. Gardner 1846" and another label with the annotation "Malanea parviflora Van Heurck et Müll. Arg., scripsit Müller-arg.!" The specimen is composed of a ramified branch with numerous leaves and numerous flowers in anthesis. Because this specimen is annotated by Müller Argoviensis, it is here designated the lectotype of *Malanea parviflora*.

The G specimen with barcode G00642005, has a label with the annotation "3210" and a label with the annotation "Chomelia parviflora Müll.-Arg., Province de Goyaz (Brésil), 3210, Mr Gardner 1841". The specimen is composed of a ramified branch with numerous leaves and numerous flowers in anthesis and is an isolectotype.

The G specimen with barcode G00642006, has a label with the annotation "3210, Brésil, Goyaz, Gardner" handwritten by an unknown author, and "Anisomeris parviflora (M. Arg.) Standl., det. Standley" handwritten by Standley. The specimen is also composed of a ramified branch with numerous leaves and numerous flowers in anthesis and is an isolectotype.

Additional duplicates of *Gardner 3210* as *Malanea parviflora* are present in BM, F, K, NY, and P, and are isolectotypes.

FGT, vol. 40(1), p. 155:
"7-4. ***Chomelia pohliana*** Muell. Arg., Flora 48 [! sic, 58]: 452, 457. 1875. Sintipos: Brasil, Goiás e Minas Gerais, *Pohl 592* (G n.v., W n.v., NY), *Regnell 106* (BR, G n.v.), *Riedel 2878* (BR, G n.v., P)."

Accepted name: *Chomelia pohliana* Müll. Arg.

Type: BRAZIL. Minas Gerais and Goiás: Serra de Cristães, Paracatù, Patrocinio, S. Luzia, s.d., *J.B.E. Pohl 592* (M [barcode M-0187118], **lectotype here designated**; isolectotypes, M [barcode M-0187117], NY [barcode 00131075]; isolectotype fragment F [Acc. No. 869992]).

Notes: Müller Argoviensis (1875: 452, 458.) cited three original gatherings of *Chomelia pohliana* Müll. Arg. as "Prov. Goyaz et Minas Gerais: Pohl n. 592, Regnell n. 106, *Riedel n. 2878*." Among the original gatherings cited by Müller Argoviensis, the one that has duplicates distributed in more herbaria is *Pohl 592*, which is discussed below.

The NY specimen, with barcode 00131075, has a label with the stamp "Duplum ex Mus. Hist. Nat Vindobon." and the handwritten annotations "592, Chomelia Pohliana Müll. Arg., Brasilia, Pohl" The specimen consists of a ramose branch with numerous leaves and inflorescences with numerous flower buds and numerous flowers in anthesis. This specimen is not annotated by Müller Argoviensis.

In M, there are two specimens associated with this name. Specimen with barcode M-0187118, has three labels. On one label, nearly illegible, it is possible to read only the basal portion with the localities "Para-

catu, Patrocinio, S. Luzia" by an unknown author, possibly Pohl. Another label, on the lower left corner, has the heading "Herbarium Zuccarinii" and the handwritten annotation "Legit in Brasilia, in Serra de Cristães, Paracatù, Patrocinio, S. Luzia" and "Communicavit M.C. Vindob., anno 1839." A third label has the annotation "Chomelia Pohliana Müll. Arg." handwritten by Müller Argoviensis. The specimen consists of two foliose branches with the characteristic straight axillary thorns and axillary inflorescences with flower buds and flowers in anthesis. This specimen is here designated the lectotype of *Chomelia pohliana*.

The second M specimen, with barcode M-0187117, has a label with the heading "Herbarium Regium Monacense" and the notation "Herb. Zuccarini, Herbar. Univ. Ludov. Maximil." On the label is handwritten "Brasilia, Serra Cristães, Pohl," without Pohl's collection number. Above that label is affixed a label with the printed annotation "Ad elaborandum Rubiacearum Florae Brasiliensis Do. J. Müller Communicat. 1873." This specimen is an isolectotype.

In G there is a sheet with barcode G00642008. On the sheet is affixed an envelope with the annotation "Chomelia Pohliana Müll. Arg., Serra Christaes: Pohl – vs Regnell" handwritten by Müller Argoviensis. Inside the envelope are included several small branches with leaves and inflorescences, but it is impossible to separate Pohl's and Regnell's gatherings.

In F, there is a sheet with accession No. 869992 and a label with the annotation "Chomelia Pohliana, Pohl 592, Brazil" handwritten by an unknown author. On the sheet is affixed an envelope with the annotation "Chomelia Pohliana, Pohl 592" handwritten by an unknown author, containing a small branch with a few leaves and axillary inflorescences with flower buds. This specimen is an isolectotype fragment.

Notes: Asa Gray (1860: 38) published *Chomelia ribesioides* Benth. ex A. Gray without citing any original material. According to Stafleu and Cowan (TL-2, vol. 1, p. 983. 1976), Gray's herbarium, types and original manuscripts are in GH. In GH there is a single original specimen annotated as *Chomelia ribesioides*. The specimen, barcode 00096696, has a label with the printed text "In vicinibus Santarem, Prov. Pará, coll. R. Spruce, Nov. 1849" and the annotation "Chomelia (Anisomeris) ribesioides sp. n." handwritten by Spruce. Directly on the sheet is handwritten in pencil "C. ribesioides Benth., type" by an unknown author. The specimen is composed of two branches, one with inflorescences and numerous flowers in anthesis, and the other with infructescences with mature fruits. In the attached envelope are present several mature fruits longitudinally dissected. This is the only specimen studied by A. Gray and is the holotype of *C. ribesioides* (Art. 9.1).

A specimen in M, barcode M-0187115, has a label with the printed text "In vicinibus Santarem, Prov. Parà, coll. R. Spruce, Nov. 1849" and the annotation "Chomelia (Anisomeris) ribesioides sp. n." and the collection number "324" handwritten by Spruce. That specimen also has the annotation "Pseudomalanea Spruce, Van Heurck et Müll. Arg." handwritten by Müller Argoviensis. The specimen consists of two branches, one with infructescences and inflorescences, as the holotype specimen in GH. This specimen is an isotype.

Three specimens, in FI-W (barcode FI004754), G (barcode G00642016), and TCD (barcode TCD0005650), have a label with the printed text "In vicinibus Santarem, Prov. Pará, coll. R. Spruce, Nov. 1849" and the annotation "Chomelia (Anisomeris) ribesioides sp. n." handwritten by Spruce. Each of these three specimens consists of two branches, one with infructescences and one with inflorescences, as the holotype specimen in GH. Those specimens are isotypes.

FGT, vol. 40(1), p. 162:
"7-5. ***Chomelia ribesioides*** Benth. ex A. Gray, Proc. Amer. Acad. Arts 4: 38. 1860. - *Malanea ribesioides* (Benth. ex A. Gray) Muell. Arg., Flora 58: 453, 458. 1875. – Sintipos: Citados por Muell. Arg. nas variedades."

Accepted name: *Chomelia ribesioides* Benth. ex A.Gray

Type: BRAZIL. Pará: Near Santarem, Nov. 1849 (fl, fr), *R. Spruce s.n.* [*324*] (holotype, GH [barcode 00096696] isotypes FI-W [barcode FI004754], M [barcode M-0187115], G [barcode G00642016], TCD [barcode TCD0005650]).

FGT, vol. 40(1), p. 162:
Synonym: "*Chomelia ribesioides* var. *tomentosa* (Muell. Arg.) Muell. Arg. in Mart. Fl. Bras. 6(5): 40. 1881. - *Malanea ribesioides* var. *tomentosa* Muell. Arg., Flora 58: 458. 1875. Sintipos: Goiás: "inter Paranahyba et urbem Goyaz" *Pohl 813 pr. p.*, *Burchell 5995*, *6401*; "in campis arenosis ad Serra da Chapada" *Riedel 1143*; Minas Gerais: "in campis siccis Caeté et Sabara" *Riedel 623*, *2863*."

Type: BRAZIL. Goiás: "inter Rio Paranahyba et urbem Goyaz" (between Rio Paranahyba and town of Goiás, s.d., *W.J. Burchell 5995* (BR [barcode 000000557773], **lectotype here designated**).

Notes: In the protologue of *Malanea ribesioides* var. *tomentosa* Müll. Arg., Müller Argoviensis (1875: 458) cited the following syntypes from three Brazilian states, "In prov. Goyaz et Minas, α: Pohl n. 313 pr. p., Burchell n. 5995, 6401, Riedel n. 1143, 623, 2876," without citing the herbarium of deposit. No original specimen of *Malanea ribesioides* var. *tomentosa* Müll. Arg. is in G. Therefore, a lectotype should be designated from specimens present in other herbaria. In BR, several of them (e.g., *Burchell 5995*, *Burchell 6401*, *Riedel 623*, *Riedel 1143*, *Riedel 2876*) bear the stamp "Mueller d'Argovie determ." in blue ink. The BR specimen with barcode 000000557773, has a label with the heading "HERBARIUM MARTII" and the handwritten text "Brasilià: inter Rio Paranahyba et urbem Goyaz. Communic. H. Kewense 1869, Burchell: no. 5995". The label also has the stamps "Mueller d'Argovie determ." and "Herb. Hort. Bruxell. – Coll. MARTII." The specimen is composed of two branches with numerous leaves and numerous inflorescences with flower buds and flowers in anthesis. This specimen is here designated the lectotype of *Malanea ribesioides* var. *tomentosa*.

FGT, vol. 40(1), p. 163:

Synonym: "*Chomelia ribesioides* var. *villosula* (Muell. Arg.) Muell. Arg., in Mart., Fl. Bras. 6(5): 41. 1881. - *Malanea ribesioides* var. *villosula* Muell. Arg., Flora 58: 458. 1875. Sintipos: Brasil, Goiás, "inter Cavalcante et Conceicão" [entre Cavalcante e Conceição de Tocantins], s.d., *Burchell 8020*; Goiás (cidade), *Pohl 813 pr. p.*; "Chapada Alto dos Rios", *Pohl 3441*."

Type: BRAZIL. Goiás or Tocantins: "inter Cavalcante et Conceicão", s.d. [1827-1828], *W.J. Burchell 8020* (BR [barcode 000000557742], **lectotype here designated**; isolectotype G [barcode G00642007]).

Notes: In the protologue of *Malanea ribesioides* var. *villosula* Müll. Arg., Müller Argoviensis (1875: 458) cited three syntypes from two Brazilian states as follows: "In prov. Goyaz et Minas, […], β: Pohl n. 813 pr. p., 3441, Burchell n. 8020." The BR specimen with barcode 000000557742, has a label with the heading "HERBARIUM MARTII" and the handwritten annotation "Brasilià: inter Cavalcante et Conceicão. Communic. H. Kewense 1869, Burchell: no. 8020". The label also has the stamps "Mueller d'Argovie determ." and "Herb. Hort. Bruxell. – Coll. MARTII." The specimen also has a label with the annotation "Malanea ribesioides β villosula Müll. Arg." (with "Pseudo" and "Sprucei" stroke through) handwritten by Müller Argoviensis. The specimen is composed of a single ramified branch with numerous leaves and numerous inflorescences. The BR specimen, with barcode 000000557742, is here designated the lectotype of with *Malanea ribesioides* var. *villosula*.

In G, there is a sheet, with barcode G00642007, with an envelope containing fragments with flowers in anthesis and a few leaves. On the envelope are the annotations "Pseudomalanea Sprucei" stroked through and "ribesioides v. villosula Müll. Arg., Cavalvante. Burchell 8020". This specimen is an isolectotype.

8. **COCCOCYPSELUM** P. Br., Civ. Nat. Hist. Jam. 144, t. 6, f. 1. 1756, *nom. cons.*

FGT, vol. 40(1), p. 177:

"8-1. ***Coccocypselum aureum*** (Spreng.) Cham. & Schltdl., Linnaea 4: 139. 1829. - *Schwenkfeldia aurea* Spreng., Neue Entdeck. 1: 280. 1820. Tipo: Brasil, Bahia, "inter Victoria et capitalem" [entre Vitória da Conquista e Salvador], *Sellow 14* (holótipo, B, destruído); Brasil, sem localidade, *Sellow s.n.* (lectótipo, LE n.v., designado por Costa, 2004; foto em K)."

Accepted name: ***Coccocypselum aureum*** (Spreng.) Cham. & Schltdl.

Type: Brazil. Without locality, s.d., *F. Sellow s.n.* (LE n.v. [barcode unknown], neotype designated by Taylor in Davidse et al. (2012a: 58); isoneotype, HAL [barcode HAL114247]).

Note: In the protologue of *Schwenfeldia aurea* Spreng., Sprengel (1820: 280) cited the material studied as "Hab. in Brasilia" without citing the collectors, collection locality or the herbarium of deposit. According to Stafleu and Cowan (1985: 806) "Kurt Sprengel's considerable and rich herbarium (21.806 species) came first to his son Anton. After the latter's death, in 1851, it was sold in parts. […] A certain number of families and genera were sold to specialists. […] Even after this rigorous impoverishment, a considerable portion remained and was acquired by Karl Müller in Halle. The Müller-Sprengel herbarium (12.000 species) was bought by Berlin (B) in 1890 and is now no longer extant. A certain number of specimens, however (240) is in the Willdenow herbarium […]. Further material is at BP, FI, G, GOET (some lich.), H-Ach (lich.), L (some musci and algae), LD (200, herb. Retzius), LE, PH, PR. […]."

Costa and Delprete in Delprete (2010a: 177) cited the lectotype of *Schwenkfeldia aurea* Spreng. as "Brasil, sem localidade, *Sellow s.n.* (lectótipo, LE n.v. designado

por Costa, 2004; foto em K).” However, Costa’s (2004) work is an unpublished doctoral thesis, and Costa and Delprete (in Delprete 2010a) did not cite “here designated” or a similar expression with their lectotype citation; therefore, both lectotype citations are not valid. Taylor (2012a: 58) designated the neotype of *Schwenfeldia aurea* as “Neotipo (designado aqui): Brasil, Sellow s.n. (LE).” Although the LE specimen was not examined, Taylor’s neotypification is accepted.

At F, there is a specimen, with accession number 607172 (barcode F0071088F) with the handwritten annotation (author unknown) “Coccocypselum aureum Cham. et Schlecht.” and “14”, with the printed text “Brasilia. Reliquiae d. Sello”. Sellow’s number “14” corresponds to that of the B specimen, no longer extant. Another label has the printed text “Isotype of: *Schwenfeldia aurea* Spreng., Neue Entdeck. 1: 280. 1820.” Two labels, one with the stamp “Mus. bot. Berol.” and the other with the heading “Ex Museo botanico Berolinensis” prove that this specimen is a duplicate from B. On the sheet are affixed a large branch with numerous leaves and a few inflorescences, and a smaller branch with several leaves and several adventitious roots. It is tempting to designate this specimen as the lectotype of this name; however, there is no proof on the sheet that it was seen by Sprengel.

A specimen at HAL, barcode HAL114247, has the label “Coccocypselum aureum. N. (with “erythocephalum” stroked through and substituted by “aureum”), Sellow. Brasilia aequinotialis” handwritten by Sprengel, and the stamp “F. Sellow”. At the bottom of the sheet is the annotation “Isoneo-Typus” in red ink. This specimen is constituted by a small branch with three leaves, and few flowers included in a small envelope. It is an isoneotype of this name.

A specimen at RSA, with barcode RSA0005726, has a label with the stamp “Herb. Reg. Berolinense” and the annotation “Coccocypselum aureum Cham. & Schlt.” At the bottom of the label is printed “Brasilia” and “Sellow legit.” The specimen is a ramified branch with numerous leaves, two inflorescences with flower buds and flowers in anthesis, and a few persistent fruits. Although this is a well preserved, complete specimen, there is no proof on the sheet that it was seen by Sprengel.

FGT, vol. 40(1), p. 183:
“8-2. ***Coccocypselum condalia*** Pers., Syn. Pl. 1: 132. 1805. - *Condalia repens* Ruiz & Pav., Fl. Peruv. Prodr. 1: 54, tab. 84, fig. a. 1798. Tipo: Perú, “Huánuco, Cuchero et Chinchao”, s.d., *Ruiz & Pavón s.n.* (MA).”

Accepted name: *Coccocypselum condalia* Pers.

Type: PERU. Huánuco: [protologue] “in nemoribus *Panatuhuarum* ad *Pillao*, *Cuchero* et *Chinchao* vicos” [“Cochero in umbrosis”], s.d., *H. Ruiz López & J.A. Pavón y Jiménez s.n.* (MA [barcode MA815739], **lectotype here designated**; isolectotypes, F [Acc. No. 845331, barcode F0040870F], MA [barcode MA815740]; MA [AJB04-D-0186_001]).

Notes: In the protolgue of *Condalia repens* Ruiz & Pav., Ruiz and Pavón (1798: 54) cited the original material as collected “in nemoribus *Panatahuarum* ad *Huánuco*, *Cuchero* et *Chinchao* vicos.”

Persoon (1805: 132) cited *Condalia repens* and its bibliographic citation in synonymy under *Coccocypselum condalia* Pers. The binomial *Coccocypselum repens* Sw. was published by Swartz (1788: 31), which is a superfluous name based on the previously published *Coccocypselum herbaceum* Aubl. (Aublet 1775: 68). *Coccocypselum condalia* is a replacement name for *Condalia repens*. Therefore, the type of *Coccocypselum condalia* must be the type of *Condalia repens* (Art. 6.13). There are at least three original specimens and one original drawing of *Condalia repens*, which are described and discussed below.

The MA specimen with barcode MA815739 has the printed annotation “Herbario de Ruiz y Pavón”. On the sheet is affixed a label with the handwritten annotation “Coccocipsilum repens, System. Vegetab., Fl. Per. pag. 28. Condalia repens Sp. Pl., Fl. Per. vol. 1. p. 54. ic. 84. de Chicoplaya. 1798. de Iscutunam. 1787. nº 385.” Another label has the heading “Herbarium Peruvianum Ruiz et Pavon” and the handwritten annotation “Coccocypselum condalia Pers., det. K. Krause, XII 31.” On the sheet is affixed a third label with the name “Coccocypselum repens” and a long, handwritten description of the species, starting from the front of the label and ending on the back of the label, terminating with the collection locality and flowering time “habitat Cochero in umbrosis. floret mense julii”. The specimen has several branches with inflorescences and infructescences. This specimen is here designated the lectotype of *Condalia repens*.

The MA specimen with barcode MA815740 has the printed annotation “Real Jardin Botánico C.S.I.C., Herbario numerado en abril de 2010”. It has a label with the annotation “Condalia repens - Fl. Peruv. 1. tab. 84 – Ex Herbario Fl. Peruv. anno 1828” probably handwritten by Pavón. Two other small labels have the annotations “Coccocipsilum repens, Fl. Peruv.” and “Coccocipsilum sessille” probably handwritten by Pavón. A fourth label has the printed text “Herbarium Horti Botanici Matritensis – Plantae a «Ruiz et Pavón» in vice-regno

Peruviano et Chilensi lectae. (1778-1788), the stamp "Ex antiquo herbario generali", and the typewritten annotation "Coccocypselum condalia Pers. v. repens." A fifth label has the annotation "Coccocypselum condalia Pers., C.B. Costa, 19/VIII/2002." On the sheet are present several small branches with a few inflorescences and infructescences. This is an original specimen of *Condalia repens* and is an isolectotype.

At MA, there is a drawing by Isidro Galvéz of the Royal Botanical Expedition to the Viceroyalty of Peru of Hipólito Ruiz & José Pavón. The drawing is affixed on a larger sheet, on which is a label with the printed annotation "REAL JARDÍN BOTÁNICO, CSIC ARCHIVO, Real Expedición Botánica al Virreinato del Perú, AJB04-D-0186_001". On the upper line of the drawing is the number "LXXXIV", which corresponds to the plate number published in 1798. On the drawing is depicted a branch with adventitious roots at almost every node, and leaf pairs at every node. The leaf blades are ovate to lanceolate, discolorous, and puberulent below. The infructescences are pedunculate, and with 3 or 4 sessile, blue fruits. The inflorescences have flowers in anthesis and flower buds. On the lower portion are depicted pink-colored corollas, anthers, a fruit inside view, a fruit transversally dissected, and seeds. At the base of the drawing is handwritten the name *Condalia repens*.

In addition, at F there is a specimen with Accession No. 845331 and barcode F0040870F. On the sheet is affixed the printed label "Herbarium Horti Botanici Matritensis, Plantae a "Ruiz et Pavón" in vice-regno Peruviano et Chilensi lectae. (1778-1788)", with the stamp "EX DUPLA", and the handwritten annotation "Coccocypselum condalia Pers." and "Núm. 12/78". On the sheet are present several branches with a few inflorescences. This specimen is an isolectotype.

FGT, vol. 40(1), p. 186:
"8-3. ***Coccocypselum erythrocephalum*** Cham. & Schltdl., Linnaea 4: 144. 1829. Tipo: Brasil, "in Brasilia aequinocialis", *Sellow s.n.* (holótipo B, destruído)."

Accepted name: *Coccocypselum erythrocephalum* Cham. & Schltdl.

Type: BRAZIL. Minas Gerais: "Villa Rica" [now city of Ouro Preto], s.d., *F. Sellow 1090* (F [Acc. No. 607169, barcode F0068790F], **lectotype here designated**).

Notes: In the protologue of *Coccocypselum erythrocephalum* Cham. & Schltdl., Chamisso and Schlechtendal (1829b: 144) cited the material studied as "In Brasilia aequinoctiali legit Sellow. 2. ?" without citing the herbarium of deposit. According to Stafleu and Cowan (1976: 482; 1985: 190) "Chamisso's own herbarium was also acquired by LE." and Diederich Franz Leonard von Schlechtendal "Herbarium and types: HAL. Several of the types of his Berlin period were at B (mainly destroyed). – Plants for the botanical gardens of Berlin and Halle, and material from his herbarium (but collected by others) are, e.g., at CAS, E, FI, G, L, M, MW, WAG."

In the Berlin Negatives on the Field Museum website, there is no image of any specimen associated with *Coccocypselum erythrocephalum*. Costa (2004) indicated as neotype of this name a specimen denoted as "Sellow s.n. in Herb. Chamisso" in LE. As Costa's citation is part of an unpublished dissertation, it is not a valid typification. Costa and Delprete (in Delprete 2010a: 186) simply stated that the B holotype was destroyed. Searching for possible original material, two specimens were found associated with this name, which are below discussed.

A specimen at F, with Accession No. 607169 and barcode F0068790F, has a label with the heading "Museo botanico berolinensi" and "Brazil" handwritten by an unknown author. On the lower right corner is the stamp "Mus. bot. Berol." proving that the specimen originated from the Berlin herbarium. On the lower left corner is affixed a label with the heading "Herb. Reg. Berolinense" and the handwritten annotation "Coccocypselum erythrocephalum Ch. et Schltdl. 1090" and the printed text "Brasilia. Sellow legit." On another smaller label is handwritten "Villa Rica." The specimen consists of a branch with numerous leaf pairs and a few pedunculate, globose inflorescences. The entire plant is characterized by the golden pubescence on the reproductive and vegetative parts. The gathering *Sellow 1090* was among the gatherings cited by Schumann in Martius (Fl. Bras. 6(6): 317–318. 1889) for this species. This specimen is here designated the lectotype of *C. erythrocephalum*.

A specimen in M, with barcode M-0187093, has a label with the heading "Herbarium Regium Monacense, Herb. Zuccarini. Herbar. Ludon. Maximil." and the handwritten annotation "Coccocypselum, e Brasilia." The specimen has the golden pubescence on the reproductive and vegetative parts that characterize this species and consists of one branch with several leaf pairs and an inflorescence. The collector is not indicated. On the specimen is affixed the annotation "Coccocypselum erythrocephalum Cham. & Schltdl., C.B. Costa, 4/7/2002". On the lower portion of the stem is also affixed a minute label with the number "3155" handwritten by A. Töpfer. This specimen is not original material.

FGT, vol. 40(1), p. 189:
"8-4. ***Coccocypselum hasslerianum*** Chodat, Bull. Herb. Boissier, 2(4): 169. 1904. Tipo: Paraguay, Río Y-acá, Dec. 1900 (fl, fr), *E. Hassler 6592* (lectótipo G, designado por Costa, 2004; isolectótipos, G, BM, K, MA, NY, P)."

Accepted name: *Coccocypselum hasslerianum* Chodat

Type: PARAGUAY: Valley of Río Y-acá, "inter rupes prox. Chololó", Dec. 1900 (fl, fr), *E. Hassler 6592* (G [barcode G00306695], lectotype designated by Cabral and Salas (2022b: 240); isolectotypes BM n.v., F [Acc. No. 768213], G [barcodes G00306693, G00306694 (2 sheets)], GH [barcode 00092537], K [2 sheets, barcodes K000424238, K000424239], MA n.v., MO [Acc. No. 1578885], MPU [barcode MPU016831], NY [barcode 00131100], P [2 sheets, barcodes P02273195, P02273196], S [Acc. No. S05-596], UC [barcode UC944237]; fragment F [Acc. No. 606639]; photo-B in F [Neg. F0BN000262] and G [barcode G00306692]).

Notes: In the protologue of *Coccocypselum hasslerianum* Chodat, Chodat and Hassler (1904: 169) cited two gatherings: "inter rupes pr. Chololó in valle fluminis Y-aca, Dec., [*Hassler*] n. 6592" and "*Balansa*: […] Santa Barbara, dans les forêts humides, Febr., n. 1740." Costa and Delprete in Delprete (2010a: 189) cited the type of *C. hasslerianum* Chodat as "Paraguay, […], *E. Hassler 6592* (lectótipo G, designado por Costa, 2004; isolectótipos, G, BM, K, MA, NY, P)." However, Costa (2004) is an unpublished doctoral thesis and that lectotype designation is not valid. Duplicates of the gathering *Hassler 6592* are present in many herbaria, and priority should be given to the specimens in G, as Robert Hippolyte Chodat (1865–1934) worked in Geneva, and after his death his personal herbarium was integrated into G. In G, there are several specimens associated with this name, which are discussed below.

On the G sheet with barcode G00306692, there is a photograph of the specimen *Hassler 6592* at B, which was destroyed during WWII. On the sheet, there is also a label with the heading "Types of the Berlin Herbarium, Rockefeller Foundation Fund for Photographing Type Specimens" and the handwritten annotation "262. Coccocypselum Hasslerianum Chod., Paraguay, Hassler 6592."

On the G sheet with barcode G00306693, there is a label "Acquis et intercalé dans la collection générale de l'Herbier Delessert en 1903" (Aquired and intercalated in the Delessert Herbarium in 1903). A second label on that sheet has the heading "Dr. E. Hassler, Plantae Paraguarienses. – 1900. Florula Cordillerae Centralis" and the annotations "No. 6592, Coccocypselum Hasslerianum Chodat. In regione cursus superioris fluminis Y-acá, Lect. mens. Dec." The specimen consists of a branch with several leaf pairs and a subsessile inflorescence.

The G specimen with barcode G00306694 is mounted on two sheets. On the first sheet is affixed the label "Plantes provenantes de l'herbier du Professeur Robert Chodat, intercalées dans l'herbier générale du Conservatoire botanique de la Ville de Genève en 1970." (Plants from the Professor Robert Chodat's Herbarium, intercalated in the Botanical Conservatory of the city of Ginevra in 1970). A second label on the first sheet has the heading "Dr. E. Hassler, Plantae Paraguarienses. 1900" and the annotations "No. 6592, In valle fluminis Y-acá, inter rupes prox. Chololó. Lect. mens. Dec." On the first sheet, there are two branches with several leaf pairs and several subsessile inflorescences. On the second sheet, there is pinned a label with the heading "Université de Genève – Herbiers" and the stamp "Université de Genève – Institute de Botanique – Collections", the number "6592" written in pencil, and "E. Hassler" written in black ink. On the second sheet there is no barcode number, as the two sheets belong to the same specimen. On the second sheet, there are two branches with several leaf pairs. One branch has an infructescence with immature fruits. Article 8.3, Ex. 9 of the Code (Turland et al., 2018) states "In the herbaria in Geneva (G and G-BOIS, but not G-DC) specimen folders may be used to house preparations, consisting of one to numerous herbarium sheets that comprise a single specimen and possess a single original label. Although the sheets themselves are usually not individually labelled as being part of the same specimen, they are physically kept together. The individual sheets are not therefore duplicates but are parts of a single specimen." As two sheets with barcode G00306694 are kept together and the label with the collection locality and the plant description is present only on the first sheet, they are treated as a single specimen with multiple preparations.

The G specimen with barcode G00306695 has the label "Herbier Emil Lasser, Plantae Paraguarienses, Herbier personnel du Dr Emil Lasser (1864-1937), constitué de plantes récoltés entre 1885 et 1919 au Paraguay et régiones adjacentes de l'Argentine, du Brésil et de la Bolivie. Il a été déposé […] et Jardin Botaniques de la Ville de Genève en 1919 et intercalé dans l'herbier générale à partir de 1955." The specimen consists of two branches with several leaf pairs and a few subsessile inflorescences. As it was deposited in G in 1919, and intercalated in the general herbarium in 1955, this speci-

men was probably not examined by Chodat before the publication of *C. hasslerianum*. Cabral and Salas (2022b: 240) designated this specimen as the lectotype of this name.

FGT, vol. 40(1), p. 191:
"8-5. ***Coccocypselum hirsutum*** Bartl. ex DC., Prodr. 4: 396. 1830. Tipo: Sem localidade [América Meridional], s.d., *T. Haenke s.n.* (holótipo, G-DC)."

Accepted name: *Coccocypselum hirsutum* Bartl. ex DC.

Type: [SOUTH AMERICA, unknown country]: Without locality, s.d., *T. Haenke s.n.* (holotype PR [Acc. No. 612586], isotype G-DC [barcode G00666465]).

Notes: In the protologue of *Coccocypselum hirsutum* Bartl. ex DC., Candolle (1830: 396–397) cited the material studied as "Patr. ign. (v.s. in h. Haenke.)." Candolle's statement means that he studied material from the Haenke's herbarium.

According to the Stafleu and Cowan (1979: 6) Haenke's "herbarium and types are at PR" and the "Reliquiae haenkeanae were distributed from Prague after 1816." The botanists Thaddeus Haenke (1761–1816) and Luis Née participated in the Malaspina expedition, which was commanded by Alessandro Malaspina (1754–1810) and José de Bustamente y Guerra (1759–1825), and toured around the World from 1789 to 1794, with purely scientific goals. Haenke missed the ships of the expedition (*Descubierta* and *Atrevida*) leaving from Cadiz (Spain) in July 1789, and eventually boarded them in Santiago de Chile in April 1790. In the New World, with Haenke on board, the expedition touched ground in Peru, Ecuador, Colombia, Panama, and Mexico, and eventually Alaska. As Haenke did not indicate the countries of his collections, it is impossible to know the country of origin of the original material of *Coccocypselum hirsutum*.

The Haenke Herbarium is intercalated in PR. In PR, there is an original specimen of *Coccocypselum hirsutum* collected by Haenke, with Accession No. 612586, constituted by two branches with typical hirsute vestiture, with numerous leaves, inflorescences, and infructescences. The specimen label has the annotation "Coccocypselum hirsutum Bartl." and the stamp "THADDAEUS HAENKE". That specimen is the holotype of this name.

In G-DC there is a specimen, barcode G00666465, with two labels handwritten by Candolle, "*Coccocypselum hirsutum* Bartl." and "herb. Haenk., patr. ign." The specimen consists of a portion of a branch with a few leaves and is an isotype.

FGT, vol. 40(1), p. 193:
"8-6. ***Coccocypselum lanceolatum*** (Ruiz &. Pav.) Pers., Syn. Pl. 1: 132. 1805. - *Condalia lanceolata* Ruiz & Pav., Fl. Peruv. 1: 54. 1798. Tipo: Peru, Cuchero e Chinchao, *Tafalla & Manzanilla s.n. [in Ruiz & Pavón]* (lectótipo MA, designado por Costa, 2004)."

Accepted name: *Coccocypselum lanceolatum* (Ruiz &. Pav.) Pers.

Type: PERU. Huánuco: "in nemoribus *Cuchero* et *Chinchao* locis umbrosis", s.d., *J.A. Tafalla & J. Manzanilla s.n. [in H. Ruiz López & J.A. Pavón y Jiménez s.n.*] (MA [barcode MA815737], **lectotype here designated**).

Notes: In the protologue of *Condalia lanceolata* Ruiz & Pav., Ruiz and Pavón (1798: 54–55) cited the collection locality as "Habitat in nemoribus *Cuchero* et *Chinchao* locis umbrosis." Costa and Delprete in Delprete (2010a: 193) cited the type of *Condalia lanceolata* as "Peru, Cuchero e Chinchao, *Tafalla & Manzanilla s.n. [in Ruiz & Pavón]* (lectótipo MA, designado por Costa, 2004)." However, Costa's (2004) monograph is an unpublished doctoral thesis, and her lectotype citation is not valid. Apparently in MA, there is no original drawing made during the Royal Botanical Expedition to the Viceroyalty of Peru that can be associated with this name. In MA there are two specimens that should be considered as possible original material of *Condalia lanceolata*, which are discussed below.

The MA specimen with barcode MA815737, has a label with the annotation "Condalia capitata Sp. Pl. Fl. Per. – Fl. Per. c. t. 3. de Chinchao. An Coccocipsilum?" handwritten by Pavón. A second label has the heading "Herbarium Peruvianum Ruiz et Pavon" and the handwritten annotation "3/100. Coccocypselum canescens Willd., det. Krause, VII. 1930." A third label has the annotation "Coccocypselum lanceolatum (Ruiz & Pav.) Pers., C.B. Costa, 19/VIII/2002." The name "Condalia capitata" has never been published. Most likely, Ruiz and Pavón changed their minds, and published the name of this species as *Condalia lanceolata*. The specimen consists of three branches with several leaf pairs. Two branches have an inflorescence at the distal node. This specimen is original material and is here designated as the lectotype of *Condalia lanceolata*.

The MA specimen with barcode MA815738, has a label with the annotation "Condalia capitata - Coccocipsilum?" handwritten by José Demetrio Rodríguez, one of the MA curators during 1827–1828 (He worked for Pavón in the Office of Flora Peruviana). The specimen has a second label written in pencil with the annotation "Coccocypselum canescens, HTW 21/ii/13". A third label has the handwritten annotation "Coccocypselum lanceolatum (Ruiz & Pav.) Pers., C.B. Costa, 19/VIII/2002." The specimen consists of two small branches with a few leaf pairs, and only one of them has an inflorescence. There is no evidence on this sheet that it was studied by Ruiz and Pavón for the description of the species, therefore it cannot be treated with certainty as original material.

FGT, vol. 40(1), p. 201:
"8-7. ***Coccocypselum lyman-smithii*** Standl., Field Mus. Nat. Hist., Bot. Ser. 8: 165. 1930. Tipo: Brasil, Rio de Janeiro, Mt. Itatiaya [Mt. Itatiaia], vicinity of Macieras, Estação Biológica, 2000 m, 10/XII/1928 (fl), *L.B. Smith 1464* (holotipo, GH)."

Accepted name: *Coccocypselum lyman-smithii* Standl.

Type: BRAZIL. Rio de Janeiro: Mt. Itatiaya [Mt. Itatiaia], vicinity of Macieras, Estação Biológica, 2000 m, 10 Dec. 1928 (fl), *L.B. Smith 1464* (holotype GH [barcode 00092538]; isotype F [Acc. No. 610162])."

9. **COFFEA** L., Sp. Pl. 172. 1753.

FGT, vol. 40(1), p. 206:
"9-1. ***Coffea arabica*** L., Sp. Pl. 172. 1753. Tipo: Cultivado no Hortus Cliffordianus (N. 59), na Holanda (holótipo, BM-LINN)."

Accepted name: *Coffea arabica* L.

Type: Herb. Clifford. 59, *Coffea* 1 (BM [barcode 000558021], lectotype designated by Bridson and Verdcourt (1988: 713)).

Notes: Bridson and Verdcourt (1988: 713) cited the type of *Coffea arabica* L. as "Type: cultivated in Holland, *Hort. Cliff.* (BM, holo!)." Bridson and Verdcourt's citation is an inadvertent lectotypification. The lectotype specimen has a label with the handwritten annotation "Jasminum arabicum, castaneaefolio, flore albo odoratissimo, cuius fructus Caffe – Coffea arabica."

10. **CORDIERA** A. Rich. ex DC., Prodr. 4: 443. 1830.

FGT, vol. 40(1), p. 215:
"10-1A. ***Cordiera concolor*** (Cham.) Kuntze var. ***goyana*** C. Perss. & Delprete, **var. nov.** Tipo: Brazil. Goiás: Serra Geral do Paraná, 3 km NE de São João da Aliança, 1070 m, 22/III/1973 (fl masc), *W.R. Anderson, M.T.K. Arroyo, S.R. Hill, R.R. dos Santos & R. Souza 7708* (holótipo, UB; isótipos NY, US, W)."

Accepted name: *Cordiera concolor* (Cham.) Kuntze var. ***goyana*** C.Perss. & Delprete

Type: BRAZIL. Goiás: Serra Geral do Paraná, 3 km NE de São João da Aliança, 1070 m, 22 Mar. 1973 (male fl), *W.R. Anderson, M.T.K. Arroyo, S.R. Hill, R.R. dos Santos & R. Souza 7708* (holotype, UB [barcode UB0040271]; isotypes NY [barcode 00803951], US [barcode 01106028], W).

FGT, vol. 40(1), p. 219:
"10-2. ***Cordiera elliptica*** (Cham.) Kuntze, Rev. Gen. Pl. 1: 279. 1891. - *Alibertia elliptica* (Cham.) K. Schum. in Mart., Fl. Bras. 6(6): 389. 1889. - *Thieleodoxa elliptica* Cham., Linnaea 9: 252. 1834. Tipo: Brazil meridional, "E Brasilia semel iterumque collectam", s.d., *Sellow B-1761* (*E-1182*) (lectótipo, S, aqui selecionado; isolectótipo, S)."

Accepted name: *Cordiera elliptica* (Cham.) Kuntze

Type: BRAZIL: "E Brasilia semel iterumque collectam", s.d., *F. Sellow B-1761* (*E-1182*) (lectotype, S [Acc. No. S 07-14917], designated by Persson and Delprete in Delprete (2010a: 219); isolectotype, S [Acc. No. S 07-14913]).

Notes: There are two original specimens of *Thieleodoxa elliptica* Cham. at S. In their publication, Persson and Delprete (in Delprete, 2010a: 219) did not indicate which of the two specimens is the lectotype. But they annotated the specimen with Acc. No. S 07-14917 as lectotype of *Thieleodoxa elliptica* Cham.

FGT, vol. 40(1), p. 231:
"10-3A. ***Cordiera humilis*** (K. Schum.) Kuntze var. ***humilis***, Rev. Gen. Pl. 1: 279. 1891. - *Alibertia humilis* K. Schum. in Mart., Fl. Bras. 6(6): 391. 1889. Tipo: Brazil. [Estado desconhecido], perto do Rio Pardo, "in campis arenosis" IX/1826 (fl masc), *Riedel 550* (holótipo, B*,

foto-B em BR, F, G, GH, MO, NY, RB; lectótipo, BR, aqui selecionado; isolectótipos, F, LE-n.v.)."

Accepted name: *Cordiera humilis* (K.Schum.) Kuntze var. ***humilis***

Type: BRAZIL. Unknown state: Near Rio Pardo, "in campis arenosis", Sep. 1826 (male fl), *L. Riedel 550* (holotype B† (photos in BR, F, G, GH, MO, NY, RB); BR [barcode 000000549127], lectotype designated by Andersson (1992: 75); isolectotypes, F [Acc. No. 617786], LE-n.v.).

Notes: Persson and Delprete (in Delprete, 2010a: 231) cited the lectotype of *Alibertia humilis* K.Schum. as designated in their publication. However, Andersson (1992: 75) previously cited the type of this name as "Type: Riedel 550; Brazil, Rio Pardo (BR)." Andersson's citation is an inadvertent lectotypification on the BR specimen with barcode 000000549127.

FGT, vol. 40(1), p. 233:
"10-3B. ***Cordiera humilis*** (K. Schum.) Kuntze var. ***amplexicaulis*** (S. Moore) C. Perss. & Delprete**, comb. et stat. nov.** - *Alibertia amplexicaulis* S. Moore, Trans. Linn. Soc. London, Bot. 4: 370. 1895. Tipo: Brasil, Mato Grosso, "cacumine Serra da Chapada" [topo da Serra de Santa Anna da Chapada], VIII/1891 (fl masculinas), *S. Moore 148* (holótipo, BM; isótipo, B*, foto-B em F, GH, MO, NY, RB)."

Accepted name: *Cordiera humilis* (K.Schum.) Kuntze var. ***amplexicaulis*** (S.Moore) C.Perss. & Delprete

Type: BRAZIL. Mato Grosso: "cacumine Serra da Chapada" [Santa Anna da Chapada, now Chapada dos Guimarães], Aug. 1891 (male fl), *S. Moore 148* (holotype, BM [barcode 00000073092]; isotype B†; photo-B in F, GH, MO, NY, RB).

FGT, vol. 40(1), p. 234:
"10-4. ***Cordiera macrophylla*** (K. Schum.) Kuntze, Rev. Gen. Pl. 1: 279. 1891. - *Alibertia macrophylla* K. Schum. in Mart., Fl. Bras. 6(6): 394. 1889. Tipo: Brasil, Goiás, Rio Maranhão, 1817-1821 (male fl), *Pohl 5116* (B*; lectótipo, NY, aqui selecionado; isolectótipos, G, W; foto-B em F, G, GH, MO, NY)."

Accepted name: *Cordiera macrophylla* (K.Schum.) Kuntze

Type: BRAZIL. Goiás: Rio Maranhão, 1817–1821 (male fl), *J.B.E. Pohl 5116* (B†; NY [barcode 00063065], lectotype designated by Persson and Delprete in Delprete (2010a: 234); isolectotypes G [barcode G00389663], W [Acc. No. W0627103]; photo-B in F, G, GH, MO, NY).

Notes: Andersson (1992: 75) cited the syntypes of *Alibertia macrophylla* K. Schum. as "Type: Pohl 5116, Riedel 1157 (BR); Brazil, Maranhão and Mato Grosso, respectively (syntypes)." Persson and Delprete (in Delprete, 2010a: 234) designated the lectotype of *A. macrophylla* the specimen *Pohl 5116* at NY to which it was later assigned barcode 00063065.

FGT, vol. 40(1), p. 239:
"10-5A. ***Cordiera myrciifolia*** (K. Schum.) C. Perss. & Delprete var. ***myrciifolia***, in Steyerm. et al. (Eds.), Fl. Venez. Guayana 8: 559. 2004. - *Alibertia myrciifolia* Spruce ex K. Schum. in Mart., Fl. Bras. 6(6): 393. 1889. Tipo: Brasil, Pará, perto de Santarem, IX/1850 (fl), *Spruce 978* (holótipo, B*; lectótipo M, aqui selecionado; isolectótipos, BM, F, G, GH, K, NY, P, W; foto-K em NY; foto-M et F, MO, NY, RB)."

Accepted name: *Cordiera myrciifolia* (K.Schum.) C.Perss. & Delprete var. ***myrciifolia***

Type: BRAZIL. Pará: Near Santarém, Sep. 1850 (fl), *R. Spruce 978* (B†; NY [barcode 00131141], lectotype designated by Andersson (1992: 75); isolectotypes, BM [barcode unknown], E [barcode E00285185], F [Acc. No. 768296], G [2 sheets, barcodes G00389975, G00389976], GH [barcode 00073068], K [barcode K000174109], M [barcode M-0186342], MPU [barcode MPU021513 (without collection number)], P [barcode P00870026], W [barcode W18890118400, "Acqu. 1889 Nº 118400"]; photo-K in NY; photo-M in F, MO, NY, RB).

Notes: Andersson (1992: 75) cited the type of of *Alibertia myrciifolia* Spruce ex K. Schum. as "Type: Spruce 978; Brazil, Pará (NY)." Andersson's citation is an inadvertent lectotypification on the NY specimen with barcode 00131141. Persson and Delprete (in Delprete, 2010a: 239) cited the lectotype of *A. myrciifolia* Spruce ex K. Schum. as a specimen at M. Persson and Delprete (2017: 165) realized that the lectotype was previously designated by Andersson, and corrected their type citation as "Type: Brazil. Pará: Near Santarem, Sep. 1850 (male fl), *R. Spruce 978* (holotype, B probably destroyed; lectotype,

NY 00131141, selected by Andersson 1992, p. 75; isolectotypes, BM, F, G, GH, K, M, TCD? (web photo), photo-K at NY, M, P, W; photo-M at F, MO, NY, RB)."

FGT, vol. 40(1), p. 245:
"10-6. ***Cordiera rigida*** (K. Schum.) Kuntze, Rev. Gen. Pl. 1: 279. 1891. - *Alibertia rigida* K. Schum. in Mart., Fl. Bras. 6(6): 391. 1889. Tipo: Brasil, Bahia, Jacobina, 1836 (fem. fl), *Blanchet 2614* (holotype, B*, foto-B em F, GH, MO, NY, RB, frag-B em BM, F, P; lectótipo, G, aqui selecionado; isolectótipos, BM, G, LE-n.v., P)."

Accepted name: *Cordiera rigida* (K.Schum.) Kuntze

Type: BRAZIL. Bahia: Jacobina, 1836 (fem. fl), *J.S. Blanchet 2614* (holotype B†; G [barcode 00389968], lectotype designated by Persson and Delprete in Delprete (2010a: 245); isolectotypes, BM [barcode 000073030], G [barcode 00389969], LE n.v., P [barcode P00870025]; photo-B in F, GH, MO, NY, RB; frag-B in BM, F, P).

Notes: Schumann (1889: 391) cited the material studied of *Alibertia rigida* K. Schum. as "Habitat in montibus prope Jacobina in provincia Bahia: Blanchet n. 2614" without citing the herbarium of deposit. Schumann worked at B, and the material studied by him in that herbarium was destroyed during WWII. Andersson (1992: 75) cited the type of *A. rigida* as the gathering *Blanchet 2614* without citing any herbarium. Persson and Delprete in Delprete (2010a: 245) designated the lectotype of *A. rigida* as the specimen of *Blanchet 2614* at G, to which it was later assigned barcode 00389968.

FGT, vol. 40(1), p. 249:
"10-7. ***Cordiera sessilis*** (Vell.) Kuntze, Rev. Gen. Pl. 1: 279. 1891. - *Gardenia sessilis* Vell., Fl. Flumin. 102. 1825; Icon. 3: tab. 11. 1831. - *Alibertia sessilis* (Vell.) K. Schum. in Mart., Fl. Bras. 6(6): 395. 1889. Lectótipo (aqui selecionado): Brasil, Vell., Fl. Flumin. icon. 3: tab. 11. 1831."

Accepted name: *Cordiera sessilis* (Vell.) Kuntze

Type: BRAZIL. [Rio de Janeiro: near Paratí] [protologue]: "*Habitat silvis maritimis Pharmacopolitanis*". [illustration] Original parchment plate of *Florae Fluminensis* in the Manuscript Section of the Biblioteca Nacional, Rio de Janeiro [cat. no.: mss1198652_014], **lectotype here designated**.

Notes: Persson and Delprete in Delprete (2010a: 249) cited the lectotype of *Gardenia sessilis* Vell. as plate 11 of Vellozo's *Florae Fluminensis Icones*. However, that plate was published in 1831, two years after the publication of the text, therefore it cannot be treated as original material. The original plates ordered by José Mariano da Conceição Vellozo (1742–1811) that were available to him before the time of publication, are currently preserved in the Manuscript Section of the National Library in Rio de Janeiro. The original parchment of *G. sessilis* ordered by Vellozo has the heading "Pent. Monog. GARDENIA sessilis" printed at the top-center of the drawing and next to the handwritten *Morinda* in pencil, and the number "11" handwritten on the upper right corner. On the drawing is depicted a male branch with several terminal inflorescences. The original plate of *G. sessilis*, with Catalogue No. mss1198652_014, is here designated the lectotype of this name.

FGT, vol. 40(1), p. 263:
"10-8. ***Cordiera triflora*** A.Rich. in DC., Prodr. 4: 445. IX/1830. [Mém. Fam. Rubiaceé 223, pl. 20, fig.2. XII/1830; reimpr. Mém. Soc. Hist. Nat. Paris, ser. 3, 5: 223, pl. 20, fig. 2. 1834]. - *Alibertia triflora* (A. Rich. in DC.) K. Schum. in Mart., Fl. Bras. 6(6): 392. 1889. - *Cordiera trifolia* Steud., *orth. var.*, Nom. 2nd ed., 1: 419. 1840. Tipo: Guiana Francesa, Rio Kourou, 1781-85, *L.C. Richard s.n.* (Lectótipo, P, aqui selecionado, foto-P em A)."

Accepted name: *Cordiera triflora* A.Rich. ex DC.

Type: FRENCH GUIANA: Kourou River, s.d. [1781–1785], *L.C.M. Richard s.n.* (P [barcode P03821428], lectotype designated by Persson and Delprete (2017: 195); isolectotypes F [Acc. No. 971705], P [3 sheets, P02273224, P03821425, P03821427]).

Notes: Candolle (1830: 445) cited the studied material of *Cordiera triflora* A. Rich. ex DC. as "Ad ripas fluvii Kourou Guianae (v. s. in H. Rich.)." Andersson (1992: 99) cited the original material of this name as "Type: Richard; French Guiana, Kourou River" without citing any herbarium. Persson and Delprete in Delprete (2010a: 263) cited a lectotype of *C. triflora* collected by L.C.M. Richard in P, without citing the specimen barcode. Later, Persson and Delprete (2017: 195) cited the lectotype of this name as the specimen in P with barcode P03821428. In P there are four specimens of female branches, annotated as *Cordiera triflora*, which might be part of the same gathering and are original material.

The P specimen with barcode P02273224 has a label with the title "L. Cl. Richard. Herbarium Guyan-Antillanum" handwritten in red ink, and the annotations "Genipella triflora", an unpublished name, probably handwritten by Louis Claude Richard, and "Cordiera triflora nob." handwritten by Achille Richard. The specimen consists of a sterile branch with numerous leaves and the characteristic acuminate stipules.

The P specimen with barcode P03821425 has a label with the title "L. Cl. Richard. Herbarium Guyanesis-Antillanum, Cordiera" handwritten in red ink, and "Genipella triflora mihi, Ad flumen Kourou" probably handwritten by Louis Claude Richard. The specimen consists of a branch with numerous leaves, one female flower in anthesis, and several mature fruits.

The P specimen with barcode P03821427 has a label with the title "L. Cl. Richard. Herbarium Guyanesis-Antillanum" handwritten in red ink, and "Cordiera triflora mihi, Ad flumen Kourou, Guyane" handwritten by Achille Richard. The specimen consists of a branch with numerous leaves, several ovaries (corollas fallen off), and one female flower in anthesis.

The P specimen with barcode P03821428 has a label with the title "L. Cl. Richard. Herbarium Guyanesis-Antillanum" handwritten in red ink, and "Cordiera triflora mihi, Ad flumen Kourou, Guyane" handwritten by Achille Richard. The specimen consists of a branch with numerous leaves, and several female flowers in anthesis. This is the specimen that was designated as lectotype of this name by Persson and Delprete (2017: 195).

In F there is a specimen with accession number 971705 [barcode V0068819F]. It has a label with the annotation "Cordiera triflora Rich., Rive du Kourou, Guyane, Legit Cl. Richard" handwritten by an unknown author (not Richard), and the stamp "Ex Herbario Musei Parisiensis." The specimen consists of a branch with numerous leaves, one flower bud, and a female flower in anthesis, and is very similar to the original specimens in P. This specimen is an isolectotype.

11. **COUSSAREA** Aubl., Hist. Pl. Guiane 98, 3: pl. 38. 1775.

FGT, vol. 40(1), p. 268:
"11-1. ***Coussarea contracta*** (Walp.) Benth. & Hook. f. ex Muell. Arg., Flora 58: 467. 1875; emend. Muell. Arg. in Mart., Fl. Bras. 6(5): 92. 1881. - *Faramea contracta* Walp., Nov. Actorum Acad. Caes. Leop.-Carol. Nat. Cur. 19, Suppl. 1: 351. 1843; Benth., Linnaea 23: 448. 1850. - *Coussarea contracta* (Walp.) Hook. f. in Benth. & Hook. f., *comb. inval.*, Gen. Pl. 2: 121. 1873. Tipo: Brasil, Rio de Janeiro, perto da cidade de Rio de Janeiro, *Meyen s.n.* (não encontrado; o herbário de Walpers foi vendido mas não se sabe por quem foi comprado e até agora não foi localizado)."

Accepted name: *Coussarea contracta* (Walp.) Benth. & Hook. f. ex Müll.Arg.

Type: BRAZIL. Rio de Janeiro: Near the city of Rio de Janeiro, s.d., "*Meyens*" [*F.J.F. Meyen*] *s.n.* (K [barcode K000432690], **lectotype here designated**).

Notes: Walpers (1843: 351–352) in the protologue of *Faramea contracta* Walp. cited the material studied as "Brasilia: prope Rio de Janeiro, (v. s.)", meaning that he saw herbarium specimen(s) collected in Rio de Janeiro, without citing the herbarium of deposit. According to Stafleu and Cowan (1988: 45) "Walper's own herbarium containing many of the types of his new taxa, was sold after his death. This herbarium contained about 3000 species in 53 portfolio's "fast ungeordnet". […] All these collections were offered for sale, but their present location is unknown." At K there is a specimen with barcode K000432690. It has a label with the handwritten annotation (author unknown) "Faramea contracta Walpers, proxima F. latifolia DC. Brasilia. Prof. Dr. Meyens legit (Walpers)." Most likely, both Walpers' original citation and the label of this specimen refer to a collection made by the Prussian Franz Julius Ferdinand Meyen (1804–1840), who was on a tour around the World during 1830–1832, as Physician and Botanist, and collected in Brazil (Vegter, 1976). The K specimen consists of a branch with numerous leaves and several inflorescences and is here designated the lectotype of *Faramea contracta* Walp.

FGT, vol. 40(1), p. 273:
"11-2. ***Coussarea hydrangeifolia*** (Benth.) Benth. & Hook. f. ex Muell. Arg., Flora 58: 467. 1875, emend. in Mart., Fl. Bras. 6(5): 94. 1881. - *Faramea hydrangeaefolia* Benth., Linnaea 23: 451. 1850. Tipo: Brasil, Goiás, *Gardner 3219* (lectótipo, K, selecionado por Gomes, 2003, foto em RB). Parátipos: Brasil, Minas Gerais e Goiás, *Claussen s.n., Gardner 3222*, *Pohl s.n., Sello s.n.*"

Accepted name: *Coussarea hydrangeifolia* (Benth.) Benth. & Hook. f. ex Müll.Arg.

Type: BRAZIL. Goiás: without locality ["roads Natividade"], s.d. [1841], *G. Gardner 3219* (K [barcode K000432692] **lectotype here designated**;

isolectotypes, E [barcode E00505332], G [barcode G00389957], GH [barcode 00375788], K [barcode K000432693], NY [3 sheets, barcodes 00131344, 00131345, 00131346], P [3 sheets, barcodes P00836881 ("Prov. de Goyas"), P00836882 ("Prov. de Goyaz"), P00836883 ("Province de Piauhy")]).

Notes: Bentham (1850: 451) cited the material studied of *Faramea hydrangeaefolia* Benth. as "Prov. Minas Geraës et Goyaz, Sello, Pohl, Claussen, Gardner n. 3219 et 3222." Gomes (2003: 452) cited the lectotype of *Faramea hydrangeaefolia* Benth. as "Tipo: Brasil, Goiás, Gardner 3.219 (*Lectotypus* K! foto RB!)." However, as Gomes' citation was published after 1 January 2001, his lectotype citation should have been accompanied by "here designated" or a similar expression, therefore it is not valid. In addition, there are two specimens of *Gardner 3219* at K.

The K specimen with barcode K000432692 has a label with the annotation "3219. Rubiaceae – A shrub about 10 feet high with white flowers, roads Natividad, Oct. 1839" handwritten by Gardner. The sheet also has the annotation "Gardner, Goyaz" handwritten directly on the sheet, and the stamp "Herbarium Hookerianum, 1867." This specimen consists of a branch with several fully expanded leaves and two inflorescences with flowers in anthesis. This specimen is here designated the lectotype of *Faramea hydrangeaefolia*.

The K specimen with barcode K000432693 has a label with the printed text "Gardner, Piauhy, Goyaz, &c. Coll. 1837-41. Brazil" and the handwritten collection number "3219." On the sheet are mounted two branches with several leaves and inflorescences with flowers in anthesis. This specimen is an isolectotype.

FGT, vol. 40(1), p. 287:
"11-3. ***Coussarea platyphylla*** Muell. Arg., Flora 58: 465, 475. 1875. Sintipos: Brasil, Goiás, ad flumen S. Marcos, prope Caretão, *Pohl 1690* (G), prope S. Rita, *Pohl 895* (G)."

Accepted name: *Coussarea platyphylla* Müll. Arg.

Type: BRAZIL. Goiás: Santa Rita, s.d. [1818–1820], *J.B.E. Pohl 555 (Diary No. 895)* (W [Acc. No. W0074514], **lectotype here designated**).

Notes: In the protologue of *Coussarea platyphylla* Müll. Arg., Müller Argoviensis (1875: 466, 475) cited two collections from the state of Goiás as "Goyaz: Pohl n. 1690, S. Rita: Pohl n. 895." After a search for original material of *C. platyphylla*, three specimens were found and are discussed below.

A sheet in G, with barcode G00392501, has an envelope affixed on it, with the annotation "Coussarea [written above "Faramea" stroked through] platyphylla Müll. Arg., S. Rita et Caratao in Goyaz: Pohl" handwritten by Müller Argoviensis. A label affixed below the envelope has the printed annotation "Herbier de Candolle – Donné en 1921 à la ville de Genève par M^{me} Augustin de Candolle et ses enfants. […] réunies à la collection générale de l'Herbier Delessert à partir de 1924." In the envelope is included a loose leaf and a portion of an inflorescence with flowers in anthesis and flower buds. Because on the envelope are annotated two collection localities and no collection number, it is impossible to know the origin of each piece in the envelope. This sheet was annotated by Müller Argoviensis. In conclusion, because the lectotype at W is *Pohl 895* (see below), which was collected in Santa Rita, Goiás, and the material contained in the envelope in G has the annotation "S. Rita et Caratao" without a collection number, it is here treated as a mixed collection and as a dubious isolectotype. Cabral and Salas (2022c: 247) cited the type of of *Coussarea platyphylla* as "TIPO. Brasil. Goiás. "Ad flumen S. Marcos, prope Caretão", *J. B. E. Pohl 1690* (lectotipo, G!, aqui designado)." The sole specimen in G with this colection locality is that with barcode G00392501, which is a mixed collection because on the envelope are annotated the two localities "S. Rita et Caratao". Therefore, Cabral and Salas (2022c: 247) lectotype designation is here superseded.

The specimen at W with Acc. No. W 0074514 has a label handwritten by Pohl with the annotation "555. Hb. Bras., Ad S. Rita, (895.d.), Pohl." This annotation means that the specimen corresponds with Pohl's collection No. 555, and Pohl's Diary No. 895. A second label affixed on the specimens has the annotation "Coussarea platyphylla Müll. Arg." handwritten by Müller Argoviensis. This specimen is composed by a small branch with two mature leaves, a juvenile leaf subtending the inflorescence and a terminal inflorescence with numerous flower buds and a few flowers in anthesis. This specimen is here designated the lectotype of *Coussarea platyphylla* (*Pohl 895*: *https://www.jacq.org/detail.php?ID=1098669*).

The second specimen at W with Acc. No. W 0072111 has a label with the annotation "1690. Hb. Bras., Caratao, Pohl." handwritten by Pohl. The annotation means that this specimen is Pohl's collection No. 1690. The specimen consists of a sterile branch with three mature leaves (*Pohl 1690*: *https://www.jacq.org/detail.php?ID=1052496*).

12. **COUTAREA** Aubl., Hist. Pl. Guiane 314, pl. 122. 1775.

FGT, vol. 40(1), p. 295:
"12-1. ***Coutarea hexandra*** (Jacq.) K. Schum. in Mart., Fl. Bras. 6(6): 196. 1889. - *Portlandia hexandra* Jacq., Enum. Pl. Carib. 16. 1760; Jacq. Sel. Stirp. Am. pl. 182, fig. 20. 1763. Tipo: Guiana Francesa, *Aublet s.n.* (lectótipo P, aqui escolhido)."

Accepted name: ***Coutarea hexandra*** (Jacq.) K.Schum.

Type: COLOMBIA. Bolívar: Vicinity of Cartagena, s.d., *N.J. Jacquin s.n.* (BM [barcode 000081660, with one flower] lectotype designated by Delprete (1999b: 47)).

Notes: Jacquin (1760: 16) described *Portlandia hexandra* Jacq. as only "floribus hexandris" without indicating a gathering or herbarium of deposit. The original material of this name was collected by him on the Caribbean Coast of Colombia.

D'Arcy (1970) stated "today there is no single "Jacquin Herbarium" but his specimens are to be found at Vienna [W], the Linnaean Herbarium [LINN], in the British Museum [BM], and some are dispersed in other European herbaria." According to Stafleu and Cowan (1979: 407) "Sir Joseph Banks acquired Jacquin material. This is often referred to in literature as the Jacquin herbarium. […] It is difficult to find West Indian material collected by him. It is doubtful whether Jacquin brought home from the West Indies sizeable collections of dried plants. J.E. Dandy informed us that the Jacquin material from the West Indies in the Banks herbarium (now BM) is rare and consists of scraps or small specimens."

Steyermark (1972: 297) cited the type of *Portlandia hexandra* as "Type. Cartagena, Colombia" without citing any herbarium of deposit.

Delprete (1999b, in Harling & Andersson, 1999: 47) cited the type of *Portlandia hexandra* as "Type: Jacquin s.n.; Colombia, Dept. Bolívar, vicinity of Cartagena (BM, one flower!)." This citation is an inadvertent typification of the BM specimen. Although the BM specimen is only a single flower in anthesis, it presents sufficient diagnostic characters for this species, and the designation of an epitype is not necessary.

Delprete (2010a: 295) erroneously cited the lectotype of *Portlandia hexandra* as a specimen collected by Aublet in French Guiana. As indicated by Delprete (2015), the specimen collected by Aublet in French Guiana is the type of *Coutarea speciosa* Aubl., a synonym of *Portlandia hexandra*, and the neotype of this name was designated by Delprete (2015: 603) as "*Aublet s.n.* (P-JU No. 9927a! [branch with flowers]; isoneotype, P-JU No. 9927b! [fruits and seeds])."

Ochoterena (2012: 70) cited the type of *Portlandia hexandra* as "Holotipo: Colombia, *Jacquin s.n.* (BM!)," but that specimen was previously designated as the lectotype by Delprete (1999b: 47).

Searching for additional original material of *Portlandia hexandra*, there is a specimen in B-W, barcode B-W 03931-01 0, with the handwritten label "Coutarea speciosa, Coutarea Aubl., Guyane (Richard)" and "Richard. W." handwritten directly on the sheet, indicating that it is part of the Willdenow Herbarium (B-W). Because that specimen was collected by L.C.M. Richard in French Guiana it is not original material, as the original collection was made by Jacquin in Colombia.

13. **DECLIEUXIA** Kunth in Humb. & Bonpl., Nov. Gen. Sp.: 3: 275 (folio), tab. 281. 1819 ("1818"); 3: 35 (quarto ed.), tab. 281. 1820.

FGT, vol. 40(1), p. 304:
"13-1. ***Declieuxia aspalathoides*** Muell. Arg., Flora 59: 438. 1876. Tipo: Brasil, Bahia, "editis montanis ad Villa de Rio das Contas", s.d., *Martius 1972* (holótipo M, isótipo M, frag-M em G)."

Accepted name: ***Declieuxia aspalathoides*** Müll. Arg.

Type: BRAZIL. Bahia: "editis montanis ad Villa de Rio das Contas", s.d., *C.F.P. Martius 1972* (holotype M [barcode M-0187221]; possible isotype (without collection number, without locality) M [barcode M-0187220]; isotype fragment G [ex M, barcode G00177986]).

FGT, vol. 40(1), p. 307:
"13-2a. ***Declieuxia cordigera*** Mart. & Zucc. ex Schult. & Schult. var. ***cordigera***, Mantissa …Syst. Veg. 3: 112. 1827. Tipo: Brasil, Minas Gerais, Cachoeira do Campo, IV/1839, *Martius 1059* (lectótipo BR, escolhido por Kirkbride, 1976; isolectótipo LE; foto-BR em NY)."

Accepted name: ***Declieuxia cordigera*** Mart. & Zucc. ex Schult. & Schult. var. ***cordigera***

Type: BRAZIL. Minas Gerais: Cachoeira do Campo, Apr. 1839, *C.F.P. Martius 1059* (BR n.v., lectotype

designated by Kirkbride (1976: 34); isolectotype LE n.v.; photo-BR in NY).

Declieuxia cacuminis Müll. Arg. var. ***tocantinensis*** Delprete & J.H.Kirkbr., J. Bot. Res. Inst. Texas 6(2): 394, figs. 1–2. 2012.

Type: BRAZIL. Tocantins: Mun. Porto Alegre do Tocantins, bacia do Rio Tocantins, sub-bacia do Rio Balsas (T-9, 9 Km da area 3, Ponto 20), estrada para Ponte Alta, entrada apos Cachoeira da Fumaça, 546 m, 11°05'26"S, 46°52'00"W, solo argilo-arenoso-avermelhado, quartzo, afloramento calcario, relevo plano a ondulado (morro), campo sujo/cerrado ralo (savana gramineo-lenhosa), cerrado sobre o morro, 4 Jul. 2009, *M.L. Fonseca*, *F.C.A. Oliveira*, *A.P. Silva Filho* & *V.C. Oliveira 6086* (holotype, IBGE [Acc. No. 69961]; isotypes, HUTO [Acc. No. 3302], RB [barcode 00598105, Acc. No. 502575]).

Notes: *Declieuxia cacuminis* var. *tocantinensis* Delprete & J.H.Kirkbr. was described by Kirkbride and Delprete (2012), after Delprete (2010a) published his Rubiaceae treatment for the Flora of Goiás and Tocantinas. This variety is only known from the type locality and is the only record of *D. cacuminis* in the states of Goiás and Tocantins.

FGT, vol. 40(1), p. 313:
"13-3. ***Declieuxia dasyphylla*** K. Schum. ex Steyerm., Los Angeles County Mus. Contr. Sci. 21: 24. 1958. Tipo: Brasil, Goiás, "entre Tocantins et Os Porcos", 3/I/1895, *Glaziou 21502* (holótipo F [ex frag-B]; isótipos BR, C, F, LE, R; foto-B em NY)."

Type: BRAZIL. Goiás**:** "entre Tocantins et Os Porcos", 3 Jan. 1895, *A.F.M. Glaziou 21502* (B†; holotype F [frag. ex B; Acc. No. 606557]; isotypes BR [barcode 000000530647], C [barcode C10018107], F [Acc. No. 970588], G [barcode G00436010], K [barcode K000432972], LE n.v., P [2 sheets, barcodes P02285264, P02285265], R [barcode R000038880], S [Acc. No. S-R-7796]; photo-B [F0BN000703] in F, NY).

FGT, vol. 40(1), p. 317:
"13-4. ***Declieuxia fruticosa*** (Willd. ex Roem. & Schult.) Kuntze, Rev. Gen. Pl. 1: 279. 1891. - *Houstonia fruticosa* Willd. ex Roem. & Schult., Syst. Veg. 3: 527. 1818. Tipo: Venezuela, Monagas, Caripe, Vendémiaire, IX-X/1790, *A. Humboldt & A. Bonpland 223* (holótipo B-Willd; isótipo P)."

Accepted name: *Declieuxia fruticosa* (Willd.) Kuntze

Type: VENEZUELA. Monagas: Caripe, Vendémiaire an 8, [23 Sep.–Oct. 1799], *A. Bonpland & A. Humboldt 223* (holotype B-W [barcode B -W 02688 -01 0]; isotypes, HAL [barcode HAL0114302], P [barcode P00135082]).

Declieuxia chiococcoides Kunth in Humboldt et al., Nov. Gen. Sp. 3: 354 (ed. quarto), 276 (ed. folio). 21 Nov. 1819, *nom. illeg. superfl.*

(≡) *Houstonia fruticosa* Willd. in Roemer & Schultes, Syst. Veg. 3: 527. Apr.–Jul. 1818.

Notes: For additional information regarding the types of *Declieuxia fruticosa* and *D. chiococcoides*, see Kirkbride and Wiersema (2020).

FGT, vol. 40(1), p. 333:
"13-5. ***Declieuxia lancifolia*** J.H. Kirkbr., Mem. New York Bot. Gard. 28: 31. 1976. Tipo: Brasil, **Goiás**, ca. 25 km S de Niquelândia, 1000 m, 21/I/1972, *Irwin, Anderson, Stieber & Lee 34660* (holótipo UB; isótipos BR, C, F, G, K, LE, LIL, NY, RB, UB, US)."

Accepted name: *Declieuxia lancifolia* J.H.Kirkbr.

Type: BRAZIL. Goiás: ca. 25 km S de Niquelândia, 1000 m, 21 Jan. 1972, *H.S. Irwin, W.R. Anderson, M. Stieber & E.Y.-T. Lee 34660* (holotype, UB [barcode UB0040288, Acc. No. 50823]; isotypes BR [barcode 000000530615], C n.v, F [Acc. No. 1817340], G [barcode G00389988], K [barcode K000432973], LE [barcode LE 00007892], LIL [barcode LIL001548], NY [3 sheets, barcodes 00129779, 00131224, 00131225], RB [barcode 00543543, Acc. No. 225512], UB [lost or destroyed], US [barcode 00129779]).

Notes: Kirkbride (1976: 31) for *Declieuxia lancifolia* J.H.Kirkbr. cited the holotype and one of the isotypes at UB. The holotype specimen is at UB, and has barcode UB0040288. But, after exhaustive serches, it was concluded that the UB isotype is not there.

FGT, vol. 40(1), p. 336:
"13-6. ***Declieuxia lysimachioides*** Mart. & Zucc. ex Schult. & Schult., Mantissa … Syst. Veg. 3: 112. 1827. Tipo: Brasil, Minas Gerais, Serro Frio, *Martius 634* (holótipo, M; frag-M em G)."

Accepted name and correct authority: *Declieuxia lysimachioides* Zucc. in Schult. & Schult. f., Mantissa … Syst. Veg. 3: 112. 1827

Type: BRAZIL. Minas Gerais: Serro Frio, s.d., *C.F.P. Martius 634* (holotype, M [barcode M-0187396]; isotype G [fragment ex M; barcode G00177991]).

FGT, vol. 40(1), p. 340:
"13-7. ***Declieuxia oenanthioides*** Mart. & Zucc. ex Schult. & Schult. f., Mantissa … Syst. Veg. 3: 112. 1827. Tipo: Brasil, São Paulo, "prope Jundiahy", I/1818, *Martius 984* (lectótipo M, escolhido por Kirkbride, 1976; isolectótipo M; fotos em NY)."

Accepted name: *Declieuxia oenanthoides* Zucc. ex Schult. & Schult. f.

Correct name and authority: *Declieuxia oenanthoides* Zucc. in Schult. & Schult. f., Mantissa … Syst. Veg. 3: 112. 1827.

Type: BRAZIL. São Paulo: "prope Jundiahy", Jan. 1818, *C.F.P. Martius 984* (M [barcode M0187392], neotype designated by Kirkbride (1976: 42); isoneotype M [barcode M0187391]; photos-M in NY).

Notes: Schultes and Schultes (1827: 111–113.) published 16 new species of *Declieuxia* from Brazil; they attributed the names of nine of them to Martius, and the other seven to Zuccarini. In the protologue of *D. oenanthoides* Mart. ex Zucc., it is stated "n. 6. Declieuxia *oenanthoides* Mart.; herbacea, glabra; caule subsimplici; foliis quaternis, remotis, lineari-lanceolatis, acutis; racemis bifidis, paniculato-terminalibus. *Zucc. in litt.*" No locality, no collector, and no specimen are cited. At the end of each new species protologue, is the statement "Zucc. in Litt.", which signifies that the new species protologues were supplied by Zuccarini in a letter. Kirkbride (1976: 42) gave the authorship of *D. oenanthoides* as "Mart. & Zucc. ex Schult. & Schult." but this is not correct according to the current code. The authorship of the nine species attributed to Martius should be "Mart.", and the seven names attributed to Zuccarini should be "Zucc." (Art. 46.3 Ex. 15).

Schultes and Schultes did not see specimens of their new species. Therefore, the Schultes and Schultes herbarium at KW (Kyiv, Ukraine) has no bearing on the typification of these new *Declieuxia* names, and there cannot be any original material in KW of their *Declieuxia* names. Kirkbride (1976: 42) cited the type of *D. oenanthoides* as "lectotype M, fragment G; isotype M". Since there is no original material, Kirkbride citation is here corrected to a designation of a neotype and an isoneotype at M, and an isoneotype fragment at G. Those specimens did not have barcode numbers when Kirkbride studied them. The specimen at M annotated by him as holotype, which is the neotype, has barcode number M0187392, and that at M annotated by him as isotype, which is an isoneotype, has barcode number M0187391.

FGT, vol. 40(1), p. 349:
"13-8. ***Declieuxia pruinosa*** Pohl ex DC., Prodr. 4: 481. 1830. - *Psyllocarpus pruinosus* Pohl ex DC., *in syn*., Prodr. 4: 481. 1830. Tipo: Brasil, Minas Gerais, "inter Rio Jequitinhonha et Columbis", *Pohl 3147* (holótipo G-DC; isótipos NY, W)."

Accepted name: *Declieuxia pruinosa* DC. (Art. 46.4).

Type: BRAZIL. Minas Gerais: "inter Rio Jequitinhonha et Columbis", s.d., *J.B.E. Pohl 3147* (*861d*) (holotype G-DC [barcode G00666586]; isotypes NY [barcode 00131226], W [Acc. No. W0074506]).

Notes: Candolle (1830: 481) cited *Declieuxia pruinosa* Pohl ex DC. as "D. pruinosa (Pohl! in litt. sub Psyllocarpo)" and the material studied as "ℨ in Brasiliâ legit cl. Pohl. (v.s.)." The expression "v.s." (*vidi siccum*) means that he saw a specimen in his own herbarium (now G-DC). In G-DC there is a sole specimen associated with this name, with barcode 00666586. On the lower right corner of the sheet is pinned a label with the annotation "Psyllocarpus pruinosus Pohl!, Declieuxia--------- [pruinosa] DC." handwritten by Candolle. The specimen consists of a branch with several leaves and a terminal inflorescence, and next to it there is a small portion of a branch with two leaf pairs. At the base of these two branches is affixed a label with the annotation "Psyllocarpus pruinosus – Brésil, m. Pohl 1828" handwritten by an unknown author. This specimen is the holotype of *D. pruinosa*.

FGT, vol. 40(1), p. 351:
"13-9. ***Declieuxia verticillata*** Muell. Arg., Flora 59(28): 438. 1876. Tipo: Brasil, Mato Grosso, in campis arenosis, Rio Pardo, X/1826, *Riedel 599* (holótipo BR, fragmento em G; isótipo, LE)."

Accepted name: ***Declieuxia verticillata*** Müll. Arg.

Type: BRAZIL. Mato Grosso: in campis arenosis, Rio Pardo, Oct. 1826, *L. Riedel 599* (BR [barcode 000000681315], lectotype designated by Kirkbride (1976: 75); isolectotype LE n.v.; isolectotype fragment G [ex BR; barcode G00177998]).

Notes: Müller Argoviensis (1876a: 438) cited the material studied of *Declieuxia verticillata* Müll. Arg. as "St. Paul, ad Rio Pardo: Riedel n. 599" without citing the herbarium of deposit. Kirkbride (1976: 75) cited the type of this name as "*Riedel 599* (holotype BR, fragment G; isotype LE)." According to the current *Code*, Kirkbride's citation should be treated as an inadvertent lectotype designation of the BR specimen. The BR specimen, barcode 000000681315, has a label with the heading "Ex herbario horti Petropolitani" and the handwritten annotation "111. No. 599. In campis arenosis R. Pardo. Octobr. 1826. Brasilia. Riedel" and the stamp "Herb. Hort. bruxell. – Coll. MARTII." Another label on this sheet has the annotation "Declieuxia verticillata Müll. Arg." handwritten by Müller Argoviensis.

14. **DIALYPETALANTHUS** Kuhlmann, Arch. Jard. Bot. Rio de Janeiro 4: 363. 1925.

FGT, vol. 40(1), p. 354:
"14-1. ***Dialypetalanthus fuscescens*** Kuhlmann, Arch. Jard. Bot. Rio de Janeiro 4: 363. 1925. Sintipos: Brasil, Pará: Serra de Santarém, 18/VIII/1916 (fr), *Ducke s.n. (RB19038)* (RB); Rio Tapajós, supra Itaituba in vicinibus Barreirinhos, 26/V/1923, *Ducke s.n. (RB 17921)* (K, RB, US); Mato Grosso: Santa Cruz, alto Jamary, XII/1918, *Kuhlmann 2363 (RB 15487)*; Salto Augusto, Rio Tapajóz, I/1915, *Kuhmann 1514* (RB)."

Accepted name: ***Dialypetalanthus fuscescens*** Kuhlmann

Type: BRAZIL. Pará: Rio Tapajós, supra Itaituba in vicinibus Barreirinhos, "inter Itaituba et Villa Braga", "silva riparia non inundata, arvore pequena, petalas brancas, estames amarelos", 26 May 1923 (fl, fr), *A. Ducke s.n. (RB 17921)* (RB [2 sheets, barcodes 00538287, 00542242], **lectotype here designated**; isolectotypes, G [barcode G00357744], K [barcode K000173591], S [Acc. No. S05-1789], U [barcode U0001570], US [barcode 00624035]; photo-B [F0BN000954]).

Notes: In the protologue of of *Dialypetalanthus fuscescens* Kuhlmann, Kuhlmann (1925: 363–364) cited the material studied as "Habitat Serra de Santarém (nº 16.354 ex herb. Amaz.), Pará, legit A. Ducke, fructifer, 19.038 J. Bot. (18-VIII-1916); Rio Tapajós supra Itaituba in vicinibus Barreirinhos, Pará, legit A. Ducke, 17.921 (26-V-1923); Santa Cruz, alto Jamary, Matto Grosso, legit J.G. Kuhlmann (nº 2.363 Com. Rond.) 15.487 J. Bot., XII-1918; Salto Augusto, Tapajóz, legit J.G. Kuhmann, (1.514 Com. Rond.) Jan. 1915."

A search in Jstor Global Plants recovered the images of four original gatherings, which are below described and discussed.

A gathering from the state of Pará, Rio Tapajós, with the locality "inter Itaituba et Villa Braga", collected on 26 May 1923 (fl, fr), *Ducke s.n. (RB 17921)* (B†; G [barcode G00357744], K [barcode K000173591], RB [2 sheets, barcodes 00538287 (specimen label annotated by Kuhlmann), 00542242 (without specimen label)], S [Acc. No. S05-1789], U [barcode U0001570], US [barcode 00624035]; photo-B [F0BN000954]).

A gathering from the state of Pará, Serra de Santarém, collected on 18 August 1916 (fr), *Ducke s.n. (RB19038)* (*MG 16354*) (B†; RB [barcode 00538284]; fragment F [ex B, Acc. No. 606514]).

A gathering from the state of Mato Grosso, Santa Cruz, alto Jamary, collected on December 1918, *J.G. Kuhlmann 2363 (RB 15487)* (R [Acc. No. 14431, barcode R000014431], RB [Acc. No. RB15487, barcode 00538288]; fragment F [Acc. No. 654847]);

A gathering from the state of Mato Grosso, Salto Augusto, Rio Tapajóz, collected on January 1915, *J.G. Kuhlmann 1514* (RB [2 sheets, Acc. No. 89710, barcodes 00542240, 00538286]).

The gathering *Ducke s.n. (RB 17921)*, from the Rio Tapajós, is distributed in numerous herbaria and consists of complete flowering and fruiting material. At RB there are two sheets of *Ducke s.n. (RB 17921)*. The sheet with barcode 00538287 has a label handwritten by Ducke and annotated by J.G. Kuhlmann. The other RB sheet, with barcode 00542242 does not have a specimen label. As the two sheets are kept together in the same folder, and a label is present only on the first sheet, they are here treated as a single specimen with multiple preparations, which is here designated as the lectotype of *Dialypetalanthus fuscescens*. The duplicates of *Ducke s.n. (RB 17921)* present in other herbaria are isolectotypes.

In addition, two gatherings with duplicates distributed in several herbaria are labeled as types, but they were collected after *Dialypetalanthus fuscescens* was published. Those gatherings are not original material and are described below.

A gathering from the state of Pará, Serra de Santarém, 13 May 1927 (fl), *Ducke s.n. (RB21684)* (RB [3 sheets, Acc. No. RB21684, barcodes 00538285, 00542243, 00542244], S [Acc. No. S05-1787]).

A gathering from a plant cultivated in the Botanical Garden of Rio de Janeiro, "Culta in Horto Botanico Fluminis Januarii ex Pará ab A. Ducke traiecta", 28 Jan. 1947 (fl, fr), *P. Occhioni & C. Rizzini s.n. (RB57941)* (L [2 sheets, barcodes L0001579, L0001580], S [Acc. No. S05-1785], U [barcode U0001571]).

15. **DIODELLA** (Torrey & A. Gray) J. K. Small, Fl. Miami 177. 1913.
Hedyotis sect. *Diodella* J. Torrey & A. Gray, Fl. North Amer. 2: 41. 1841.

Accepted genus name: HEXASEPALUM Bartl. ex DC., Prodr. 4: 561. 1830.

Notes: Small (1913) segregated the genus *Diodella* Small from the genus *Diodia* L. and transferred only *Diodia rigida* Cham. & Schltdl. to *Diodella rigida* (Cham. & Schltdl.) Small. He distinguished *Diodella* from *Diodia* by the unbranched style, capitate and bilobed, and funnelform corollas, while in *Diodia* the styles are branched, with slender stigmatic lobes, and the corollas are salverform. The same year Small and Carter (1913) transferred another *Diodia* species to *Diodella*, with the new combination *Diodella teres* (Walter) Small. Bacigalupo and Cabral (1999) revised the species of *Diodia* and suggested that 16 *Diodia* species should be transferred to *Diodella*, but they did not publish the corresponding new combinations. Following their suggestion, Delprete (in Delprete et al. 2004; Delprete and Cortés-B. 2007; Delprete 2010a) transferred a few additional species from *Diodia* to *Diodella*. Cabaña Fader et al. (2016), after examining the type of *Hexasepalum angustifolium* Bartl. ex DC. concluded that it is synonymous with *Diodella crassifolia* (Benth.) Borhidi. They proposed that *Hexasepalum* and *H. angustifolium* be rejected to avoid the transfer of 11 names from *Diodella* to *Hexasepalum*. However, the nomenclature Committee of Vascular plants (Applequist 2013) did not recommend such a rejection. Kirkbride (2014) transferred *Diodella teres* (Walt.) Small to *Hexasepalum* and published the new combination *Hexasepalum teres* (Walt.) J.H.Kirkbr. A year later, Kirkbride and Delprete (2015) transferred 10 specific names from *Diodella* to *Hexasepalum*. The four species of *Hexasepalum* occurring in the States of Goiás and Tocantins are treated below.

FGT, vol. 40(1), p. 362:
"15-1. ***Diodella apiculata*** (Willd. ex Roem. & Schult.) Delprete in A. Reis (ed.), Fl. Ilustr. Catarinense RUBI, vol. 1: 169. 2004. - *Spermacoce apiculata* Willd. ex Roem. & Schult., Syst. Veg. 3: 531. 1818. - *Diodia apiculata* (Willd. ex Roem. & Schult.) K. Schum., Bot. Jahrb. 10: 313. 1888. Tipo: Brasil, sem localidade, *F.W. Sieber in Hoffmannsegg s.n.* (holótipo, B-W 2626)."

Accepted name: *Hexasepalum apiculatum* (Willd.) Delprete & J.H.Kirkbr., J. Bot. Res. Inst. Texas 9(1): 104. 2015.

Type: BRAZIL: Without locality, s.d. [1804], *F.W. Sieber in J.C. Hoffmannsegg s.n.* (holotype, B-W [barcode B -W 02626 -01 0]).

FGT, vol. 40(1), p. 367:
"15-2. ***Diodella radula*** (Willd. & Hoffmanns. ex Roem. & Schult.) Delprete in A. Reis (ed.), Fl. Ilustr. Catarinense RUBI, vol. 1: 174. 2004. - *Spermacoce radula* Willd. & Hoffmanns. ex Roem. & Schult., Syst. Veg. 3: 531. 1818. - non *Spermacoce radula* Spreng., *nom. superfl.*, Neue Entdeck. 2: 144. 1821.- *Diodia radula* (Willd. & Hoffmanns. ex Roem. & Schult.) Cham. & Schltdl., Linnaea 3: 342. 1828. Tipo: Brasil, Pará, [1801-1807], *F.W. Sieber in Hoffmannsegg s.n.* (holótipo, B-Willd)."

Accepted name: *Hexasepalum radulum* (Willd.) Delprete & J.H.Kirkbr., J. Bot. Res. Inst. Texas 9(1): 105. 2015.

Type: BRAZIL. Pará: Without locality, s.d. [1804], *F.W. Sieber in J.C. Hoffmannsegg s.n.* (holotype, B-W [barcode B –W 02625 -01 0]; possible isotype, HAL [barcode HAL0137348]).

Notes: A specimen at HAL, barcode HAL0137348, has a label with the handwritten annotation "Spermacoce radula e Bahia Brasilia, C. de Hoffmannsegg." This specimen is a possible isotype of this name.

FGT, vol. 40(1), p. 370:
"15-3. ***Diodella rosmarinifolia*** (Pohl ex DC.) Bacigalupo & E.L. Cabral in Delprete & R. Cortés-B., Rev. Biol. Neotr. 3: 34. "2006" [2007]. - *Diodia rosmarinifolia* Pohl ex DC., Prodr. 4: 564. 1830; emend. K. Schum. in Mart., Fl. Bras. 6(6): 18. 1888. Tipo: Brasil, sem localidade, *Pohl s.n.* (holótipo G-DC)."

Accepted name: ***Hexasepalum teres*** (Walt.) J.H. Kirkbr., J. Bot. Res. Inst. Texas 8(1): 17. 2014.

Type: BRAZIL: Without locality, s.d., *J.B.E. Pohl s.n.* (holotype, G-DC [barcode G00667314]).

Notes: In the protologue, Candolle (1830: 564) cited the name as "D. rosmarinifolia (Pohl! in litt.)" and the material studied as "in Brasiliâ detexit cl. Pohl […] (v.s.)." The expression "v.s." (*vidi siccum*) means that he saw material in his own herbarium. There is a sole sheet associated with this name in G-DC, with barcode G00667314. On the lower right corner of the sheet is pinned a label with the annotation "Diodia rosmarinifolia Pohl" handwritten by Candolle. On the base of the specimen is glued a label with the annotation "Spermacoce v. Diodia rosmarinifolia, Brésil, m. Pohl 1828." The specimen consists of a plant with numerous leaf pairs, and numerous axillary inflorescences, and is the holotype of *D. rosmarinifolia*.

Delprete and Kirkbride (2015) published the new combination *Hexasepalum rosmarinifolium* (Pohl ex DC.) Delprete & J.H.Kirkbr. On the holotype specimen of *Diodia rosmarinifolia* is pinned a label with the annotation "Diodia teres Walt., N. Bacigalupo" handwritten by Bacigalupo in 1995. I agree with Bacigalupo's determination, and that *D. rosmarinifolia* should be treated as a synonym of *Hexasepalum teres* (Walt.) J.H. Kirkbr. (see below).

FGT, vol. 40(1), p. 371:
"15-4. ***Diodella teres*** (Walt.) Small, Fl. Lancaster Co. 271. 1913. - *Diodia teres* Walt., Fl. Carol. 87. 1788. - *Spermacoce diodina* [Rich. in] Michx., Fl. Boreali Am. 1: 82. 1803. Tipo: USA: Carolina, "in aridis sabulosis Carolinae", s.d., *A. Michaux s.n.* (neótipo, P, escolhido por Fernald & Griscom, 1937)."

Accepted name: ***Hexasepalum teres*** (Walt.) J.H.Kirkbr., J. Bot. Res. Inst. Texas 8(1): 17. 2014.

Type: USA. South Carolina: Georgetown, old field, 24 Aug. 1939, *R.K. Godfrey & R.M. Tryon 1682* (GH [barcode GH00277018], neotype designated by Ward (2008: 467); isoneotypes NY [barcode 00116396], US [barcode 001838313]).

Notes: For further information about the neotype designation of *Diodia teres* Walt., see Ward (2008).

16. **DIODIA** L., Sp. Pl. 104. 1753.

FGT, vol. 40(1), p. 377:
"16-1. ***Diodia kuntzei*** K. Schum., Fl. Bras. 6(6): 15. 1888. Tipo: Paraguai, Rio Paraguai, Asumpción, III/1875, *Balansa 1750* (holótipo, B, destruído, foto em F; lectótipo, P, selecionado por Bacigalupo & Cabral, 1999, isolectótipo, BAF n.v.)."

Accepted name: ***Diodia kuntzei*** K.Schum.

Type: PARAGUAY: Bords du Rio Paraguay, à l'Assomption, Mar. 1875, *B. Balansa 1750* (B†; first-step lectotype designated by Bacigalupo and Cabral (1999: 155), P [barcode P02088885], second-step lectotype designated by Cabral and Cabaña Fader (2022: 254); isolectotypes, BAF n.v., BR [barcode 000000530586], K [barcode K000470247 (annotated by Schumann)], P [2 sheets, barcodes P01817752, P02273039]; isolectotype fragment F [ex S, Acc. No. 630727]; photo-B (F0BN000865) in F).

Notes: In the protologue of *Diodia kuntzei* K. Schum., Schumann (1888: 15–16) cited the gathering *Balansa 1750*. Schumann worked at B and the material that he studied in that institution was destroyed during WWII. Bacigalupo and Cabral (1999: 155) cited as lectotype of this name *Balansa 1750* at P. However, at P there are three specimens of *Balansa 1750*, which are discussed below.

Specimen with barcode P01817752, consists of several plants and numerous persistent or detached fruits. The specimen label has the heading "B. Balansa. – Pl. du Paraguay. –1874–1877" and the annotation "Nº. 1750, Tiges radicants. Fleurs blanches. Bords du Rio Paraguay à l'Assomption. Mars 1875" handwritten by Balansa.

Specimen with barcode P02273039 is composed by a large clump of several branches and/or individuals, with several fruits. The label of this specimen has the same heading and the Balansa's annotations as the specimen with barcode P01817752.

Specimen with barcode P02088885 is composed of a single plant with several sparse branches and several fruits. The label of this specimen has the same heading as the specimen with barcode P01817752. This specimen was designated by Cabral and Cabaña Fader (2022: 254) as the lectotype of *Diodia kuntzei*.

FGT, vol. 40(1), p. 381:
"16-2. ***Diodia macrophylla*** K. Schum., Fl. Bras. 6(6): 401. 1888. Tipo: Brasil, Tocantins, Natividade, "in arenosis

umbrosis humidis prov. Goyaz" I/1843 (fl, fr), *Gardner 3243* (holótipo B, destruído, foto F 863 em NY; lectótipo, BM, selecionado por Bacigalupo & Cabral, 1999, isolectótipos, G n.v., P)."

Accepted name: *Diodia macrophylla* K.Schum.

Type: BRAZIL. Tocantins: Natividade, "in arenosis umbrosis humidis prov. Goyaz", Jan. 1843 (fl, fr), *G. Gardner 3243* (holotype, B†; lectotype, BM [barcode 000053635, "Banks of streams near Natividade, Prov. of Goyaz, Jan. 1840"], designated by Bacigalupo and Cabral (1999: 157); isolectotypes, E [barcode E00504643], G [2 sheets, barcodes G00424910, G00424911], K [barcode K000470245], P [2 sheets, barcodes P01817868, P01817869], W [2 sheets, Acc. Nos. 113609, W0028726]; isolectotype fragment F [ex B, Acc. No. 605965]; photo-B (F 863) in F, NY).

17. **DUROIA** L. f., Suppl. 30, 209. 1782 *nom. cons.*

FGT, vol. 40(1), p. 385:
"17-1. ***Duroia prancei*** Steyerm., New York Bot. Gard. 23: 345. 1972. Tipo: Brasil, Mato Grosso, Serra do Roncador, Rio Sete de Setembro, várzea forest, 3 km from Garapu, 2/X/1964 (fl), *Prance et al. 59234* (holótipo, NY)."

Accepted name: *Duroia prancei* Steyerm.

Type: BRAZIL. Mato Grosso: Serra do Roncador, varzea forest beside Rio Sete de Setembro, 3 km from Garapu, 2 Oct. 1964 (fl), *G.T. Prance, N.T. Silva & J.M. Pires 59234* (holotype, NY [barcode 00131282]; isotypes COL [COL000004586], F [Acc. No. 1680812], GH [barcode 00092674], K [barcode K000424446], US [barcode 00138138], VEN [Acc. No. 80469]).

18. **EMMEORHIZA** Endl., Gen. Pl. 1: 565. 1838.

FGT, vol. 40(1), p. 390:
"18-1. ***Emmeorhiza umbellata*** (Spreng.) K. Schum. in Mart., Fl. Bras. 6(6): 408. 1888. - *Borreria umbellata* Spreng., Neue Entd. 2: 144. 1821. - *Endlichera umbellata* K. Schum. in Mart., Fl. Bras. 6(6): 38, pl. 74. 1888. Tipo: Brasil tropical, *Sellow s.n.* (holótipo B, destruído; lectótipo, K)."

Accepted name: *Emmeorhiza umbellata* (Spreng.) K.Schum.

Type: BRAZIL: "Bras. aeq.", s.d., *F. Sellow s.n.* (HAL [barcode HAL0113631], **lectotype here designated;** isolectotype K [barcode K000016365]).

Notes: Sprengel (1821: 144) described *Borreria umbellata* Spreng. and only cited "Habitat in Brasilia" without indicating the locality, collector, collection number or herbarium of deposit.

Delprete (2010a: 390) cited as lectotype a specimen of *Sellow s.n.* at K. Such lectotypification is not valid because after 2001 it should have been accompanied by "here designated" or a similar expression. According to Stafleu and Cowan (1985: 806) "Kurt Sprengel's considerable and rich herbarium came first to his son Anton. After the latter's death, in 1851, it was sold in parts. […] A certain number of families and genera were sold to specialists […] Even after this rigorous impoverishment a considerable portion remained and was acquired in 1853 by Karl Müller in Halle. The Müller-Sprengel herbarium (12.000 species) was bought by Berlin (B) in 1890, and is no longer extant. […]" According Stafleu and Cowan (1985: 806) "a certain number of specimens are at B-W, BP, FI, G, GOET (Lich.), H-Ach (lich.), L (mushi and algae), LD (200, herb. Retzius), LE, PH, PR." Several specimens are possible original material of *Borreria umbellata*, which are described and discussed below.

A specimen at MO, with Accession No. 124104, has a label with the annotation "Bahia, in fruticetis – Machaonia brasiliensis DC.!" handwritten by an unknown author. This specimen was collected by Philipp Salzmann, who collected in Brazil during 1827–1830. Therefore, this specimen cannot be original material, as it was gathered after the publication of *Borreria umbellata*.

A specimen at K, with barcode K000016365, has several labels. One label has the heading "isotype" and "Borreria umbellata Sprengel" handwritten by Steyermark. A printed label saying "Brasilia. Reliquiae d. Sello. and the stamp "15 Nov 1907". A second label with the heading "Ex Museo botanico Berolinensi", the printed text "Brasilia, leg. Sellow", the stamp "15 NOV 1907" and the handwritten text "Emmeorrhiza umbellata K. Schum." A fourth label has the annotation "Emmeorrhiza umbellata (Spr.) Schum. subsp. umbellata, det. Julian A. Steyermark 1968." Because Friedrich Sellow collected in Brazil during 1814–1831, this specimen could have been collected before the publication date of of *B. umbellata*.

A specimen at HBG, with barcode HBG-506629, also has several labels. A label with the heading "Herbarium Hamburgense, P. Magnus acc, Febr. 1918", the stamp "TYPUS" and the handwritten text "Borreria umbellata Spreng. ≡ Emmeorhiza umbellata (Spreng.) K. Schum., leg. P. Salzmann, Brazil." A second label has

the stamp "Université de Montpellier – Institut de Botanique", the watermark "ex herb. P. Magnus" and the handwritten text (author unknown) "Emeorhiza brasiliensis Walp., = Machaonia _____ Salzm. herb (et DC pro parte), Bahia (Brésil) in sepibus, Salzmann."

A specimen at HAL, with barcode HAL0113631, has a label with the handwritten annotation "Borreria umbellata Spr., Sellow, Bras. aeq." and the stamp "TYPUS". The specimen also has a recently printed label saying "Herbarium Universitatis Halensis, Borreria umbellata Spreng., Neue Entdeck. Pflanzenk. 2: 144 (1821), Brazil; Brasilia aeq., ex herb. Berol. leg. F. Sellow, am: 1814–1831."

Both K and HAL specimens are original material of *Borreria umbellata* because they were both collected by Sellow and were both transferred from B. The HAL specimen with barcode HAL0113631 is here designated the lectotype of this name.

19. **FARAMEA** Aubl., Hist. Pl. Guiane, 102, 3: pl. 40. 1775.

FGT, vol. 40(1), p. 398:
"19-1. ***Faramea bracteata*** Benth., Linnaea 23: 452. 1850. Tipo: Tocantins ["Goyaz"], Natividade, [X/1839 - II/1940], *Gardner 3220* (holótipo, K)."

Accepted name: ***Faramea bracteata*** Benth.

Type: BRAZIL. Tocantins**:** Near Natividade, Oct. 1839, *G. Gardner 3220* (K [barcode K000432789], **lectotype here designated**; isolectotypes BM [barcode BM000901257], G [barcode G00301049], K [barcode K000432790], P [barcode P00836803]; isotype frament F [ex G; Acc. No. 767094]).

Notes: Bentham (1850: 452) cited the material studied of *Faramea bracteata* Benth. as "Prov. Goyaz, Gardner n. 3220" but did not cite the herbarium of deposit. Bentham worked at K and also examined specimens from BM. Delprete (2010a: 398) cited the holotype of *Faramea bracteata* Benth. a specimen at K. However, three specimens of *Gardner 3220* are in BM and K, which are discussed below.

A BM specimen, with barcode BM000901257, has the handwritten label "Herb. Gardner". On the sheet is handwritten "3220. roads near Natividade, Province of Goyaz. Oct. 1839, a shrub 6 feet high."

One K specimen, with barcode K000432790, has the stamp "Herbarium Hookerianum, 1867" and handwritten on the sheet "Gardner, Goyaz". The specimen label has the handwritten annotation "3220. Rubiaceae. A shrub two m high, road Natividade, bracts pure white – Oct 1839." On the lower left corner are pencil sketches of the dissected ovary, the calyx, and lateral and dorsal views of the seeds.

The second K specimen, with barcode K000432789, has the stamp "Herbarium Benthamianum, 1854" and the label with the printed text "Prov. Goyaz, Brasilia tropica, Gardner, 1841." and the handwritten annotation "3220 Coffea?" This specimen is here designated the lectotype of *Faramea bracteata* Benth. The fact that the stamp "Herbarium Benthamianum" bears the date "1854", a date posterior to the publication of the name, only means that it was integrated in K that year, but it does not exclude that it was available to Bentham before the publication of the name.

FGT, vol. 40(1), p. 403:
"19-2. ***Faramea multiflora*** A. Rich. in DC., Prodr. 4: 497. IX/1830 [reimp. A. Rich., Mém. Fam. Rubiaceé. 96. XII/1830; reimpr. Mem. Soc. Hist. Nat. Paris 5: 176: 1834]. - *Coussarea multiflora* (A. Rich. in DC.) Lemée, Fl. Guy. Franç. 3: 542. 1953. Tipo: Guiana Francesa, *L.C.M. Richard s.n.* (holótipo, P, isótipo G-DC n.v., foto em MO)."

Accepted name: ***Faramea multiflora*** A.Rich. ex DC.

Type: FRENCH GUIANA: "in sylvis ad Montem Ynéri", s.d., *L.C.M. Richard s.n.* (P [barcode P00836846], lectotype designated Jardim in Taylor and Jardim (2020: 121); possible isolectotype P [barcode P00836845]).

Notes: The original specimen of *Faramea multiflora* A.Rich. ex DC. in P, with barcode P00836846, consists of a large branch with several leaves and a terminal infructescence with several mature fruits. On the sheet are affixed two labels on the bottom left corner. The lower one has the annotation "Coffea paniculata Aubl. t. 58." handwritten by an unknown author, and the remainder of the label has the annotation "frutex 4–6-ped. erectus, ramis oppos. patentib. remotis, cylindricis, levibus. – Panicula fructifera coerulescens. – Fructus immaturi subceruleoa-viridescentis, sub 2-dydimo-globosi – pericarpio exsucco, 1-locul. 1-spe. – Julio, in sylvis ad Montem Ynéri" probably handwritten by L.C.M. Richard. At the bottom of the label is handwritten in red ink "L. Cl. Richard Herbarium Guyanens-Antillanum." Another label, affixed above the previous annotation, has the following explanation "Il est evident que

ceci est: Faramea multiflora A. Rich. – Ce n'est nullement Coffea paniculata Aubl. t. 58, par contre la plante cadre parfaitement avec le peu de mots que A. Rich. en donne de son Far. ∞-flora [multiflora], in Mem. soc. h. n. Paris 5. p. 176. […]." (It is evident that this [specimen] is Faramea multiflora A. Rich. – It is not Coffea paniculata Aubl. t. 58, on the other hand the plant corresponds perfectly to the few words that A. Rich. offers for for his Far. ∞-flora [multiflora], in Mem. soc. h. n. Paris 5. p. 176. […].) On the lower right corner there is a label with the printed heading "Herb. Mus. Paris" and the lower portion also printed "Louis Claude Richard. Herbarium Guyanensis-Antillanum." In the middle of the label is handwritten "Faramea multiflora A. Rich. var. epedunculata Stey. – det. J.A. Steyermark, 1970." Above that label is another label with "Type" printed in red ink, and the handwritten annotation "Faramea multiflora A. Rich. ex DC. – ! J. Jardim, fev. 2007." This specimen was designated as the lectotype of *Faramea multiflora* by Jardim (in Taylor & Jardim 2020: 121).

A second specimen in P, with barcode P00836845, has four labels affixed on it. One of them has the annotation "Faramea multiflora Cl. Rich." handwritten by an unknown author. A second label has the annotation "L. Cl. Richard. Herb. Guyan.-Antillarum" and "coffea paniculata" handwritten in red ink, and "Faramea? frutex 3–6 pedalis – ramis oppos. patent. frictuis [?], fl. dilute caerulescentes, in opacis Sylvis Coutiantes [?]" handwritten in black ink. A third label, affixed on the lower right corner of the sheet, has the printed heading "Herb. Mus. Paris." and the printed annotation "Louis Claude Richard. Herbarium Guyanensi-Antillanum." On the third label is the annotation "Faramea multiflora A. Rich. var. epedunculata Stey. det. J.A. Steyermark 1970." On the sheet are affixed one flowering branch with several flowers and one fruiting branch with two fruits. Although Steyermark annotated this specimen as "var. epedunculata" the inflorescence and infructesce of the two branches are obviously pedunculate. The fourth label has the annotation "Faramea multiflora A. Rich. ex DC., ! J. Jardim, fev. 2007." This specimen is a possible isolectotype of *Faramea multiflora*.

There is no original material of *Faramea multiflora* in G-DC.

FGT, vol. 40(1), p. 409:
"19-3. ***Faramea nitida*** Benth., Linnaea 23: 454. 1850. Tipo: Brasil, Ceará, near Crato, *Gardner 1695* (lectótipo, K, aqui escolhido; isótipo K [ex herb. Hook.], foto em NY). Parátipo: Maranhão, *Gardner 6037* (K)."

Accepted name: *Faramea nitida* Benth.

Type: BRAZIL. Ceará: Road near Crato, Oct. 1838, *G. Gardner 1693* (first-step lectotype designated by Delprete (2010a: 409); K [barcode K000015387], **second-step lectotype here designated**; isolectotypes, BR [barcode 000000530596], F [Acc. No. 767842], G [2 sheets, barcode G00301030], GH [barcode 00092711], K [2 sheets, barcodes K000012327, K000012328], P [3 sheets, barcodes P00836869, P00836870, P00836871], S [Acc. No. S05-1560]).

Notes: Bentham (1850: 454) along with the description of *Faramea nitida* Benth., cited the material studied as "Prov. Cearà, Gardn. [Gardner] n. 1695, et ut videtur eadam Maranham, Gardn. [Gardner] n. 6037."

Delprete (2010a: 409) designated as lectotype of this name a specimen of *Gardner 1695* at K. He followed Bentham's citation as "*Gardner 1695*" but the original gathering of *Faramea nitida* studied by Bentham is *Gardner 1693* instead. According to Art. 9 of the *Code*, this is a correctable error. Also, Delprete cited one specimen of *Gardner 1693* (as "*1695*") at K as lectotype, and another specimen with the same collection number at K, with the stamp "Herb. Hook." as the isolectotype. At K there are three specimens of *Gardner 1693*, which are discussed below.

The K specimen with barcode K000015387, is composed of two flowering branches, with three labels, and is without any stamp indicating either Bentham's or Hooker's herbarium. The label at the bottom right corner has the handwritten number "1693" and the printed text "Gardner, Piahuy, Goyaz, &c., Coll. 1837-41, Brazil." The label has the penciled annotation "1686. Cinchonaceae" beside it. Above the two labels, there is another handwritten label bearing "Ceará, Gardner 1693, Type, Faramea nitida Benth., Det. Zappi, 9/1998."

The K specimen with barcode K000012328, is composed of two flowering branches, and the sheet bears the stamp "Herbarium Hookerianum, 1867." The annotation "Brazil, Gardner 1839" is handwritten directly on the sheet (author unknown). At the lower right corner is affixed a label handwritten by Gardner saying "1693. Cinchonaceae sp. […] a genus intermediate between Ixora and Faramea. A shrub about a foot high. Flowers pure white and highly odoriferous. […] road near Crato. Oct. 1838." This is the specimen cited by Delprete (2010a: 409) as the isolectotype (as "isótipo") at K.

The K specimen with barcode K000012327, is composed of a single sterile branch, and the sheet bears the stamp "Herbarium Benthamianum, 1854." This specimen has a label with the printed text "Brasilia tropica,

Gardner 1841." The text "Prov. Piauhy" where "Piauhy" was stroked through and replaced by "Ceará" and "1693" handwritten in black ink.

As Delprete (2010a: 409) did not specify which specimen of *Gardner 1693* at K is the lectotype, his citation should be interpreted as a first-step lectotypification. The specimen with barcode K000015387 is here designated as the second-step lectotype of *Faramea nitida*.

FGT, vol. 40(1), p. 413:
"19-4. ***Faramea occidentalis*** (L.) A. Rich. in DC., Prodr. 4: 497. IX/1830 [reimpr. A. Rich., Mém. Fam. Rubiacées 96, t. 7, f. 2. XII/1830; reimpr. Mem. Soc. Hist. Nat. Paris 5: 176: 1834]. - *Ixora occidentalis* L., Syst. Nat., ed. 10, 2: 893. 1759. - *Coffea occidentalis* (L.) Jacq., Enum. Pl. Carib. 16. 1760; *non Coffea occidentalis* Vell. (1825, 1831), *nom. illeg.*, *nec Faramea occidentalis* Muell. Arg. (1875), *nom. illeg.* Tipo: Jamaica, *P. Browne s.n.* (holótipo, BM-Linn; cf. Taylor, 1999b: 300)."

Accepted name: *Faramea occidentalis* (L.) A.Rich. ex DC.

Type: [icon] "*Pavetta? foliis oblongo-ovatis oppositis, stipulis setaceis petiolis interpositis*" in Browne, Civ. Nat. Hist. Jamaica, 142, tab. 6, fig. 2. 1756, lectotype (of *Ixora occidentalis* L.), designated by Howard in Fl. Lesser Antilles 6: 412 (1989).

Notes: Linnaeus (1759: 893) cited the material examined of *Ixora occidentalis* L. as "Plum. ic. 156. f. 2. Brown. jam. t. 6. f. 2." Howard (1989: 412) designated the type of *I. occidentalis* L. as "Jamaica, Browne, Jam. t. 6, f. 2." Taylor (1999: 300) cited the type of *I. occidentalis* L. as "Type: P. Browne s.n.; Jamaica (LINN holotype not seen)". The lectotype designated by Howard (1989) is here followed. Browne's Table 6 is reproduced on page 112 of Jarvis' (2007) *Order Out of Chaos*.

20. **FERDINANDUSA** Pohl, Pl. Brasil. 2: 8. 1828 ["1831"].

Notes: A proposal for a binding decision on whether *Ferdinanda* (*Compositae*) and *Ferdinandea* (*Rubiaceae*) are sufficiently alike to be confused was submitted by Kirkbride et al. (2012). The Nomenclature Committee for Vascular Plants: 65 (Applequist, 2013) evaluated that proposal and decided that those two names are sufficiently alike to be confused, hence the name to be used for this genus continues to be *Ferdinandusa*.

FGT, vol. 40(1), p. 424:
"20-2. ***Ferdinandusa elliptica*** Pohl, Pl. Brasil. 2: 9, tab. 106. "1828" [1831]. Tipo: Brasil, **Goiás**, Rio dos Índios, s.d., *Pohl s.n.* (B*)."

Accepted name: *Ferdinandusa elliptica* Pohl

Type: BRAZIL. Goiás: Rio dos Índios, s.d., *J.B.E. Pohl 2481* (W [2 sheets, Acc. Nos. W0000985, W0000986], **lectotype here designated**; isolectotype W [Acc. Nos. W0000984]).

Notes: Pohl (1828: 9–10) in the protologue of *Ferdinandusa elliptica* Pohl, cited a gathering collected by himself as "Habitat in uliginosis, ad Rio de Indios, Capitaniae Goyaz. Florentem legi mense Februario et Martio 1819." He did not indicate any collection number. According to Stafleu and Cowan (1983: 315), Pohl's herbarium and types are at W, with duplicates at LE and M, and additional specimens are at MICH, P, PR, PRC, and US.

At W there are three sheets of *Pohl 2481* with collection locality "Rio dos Indios". Sheet W0000986 is annotated as "Bogen 1 von 2" [sheet 1 of 2], and sheet W0000985 is annotated as "Bogen 2 von 2" [sheet 2 of 2]. W0000984 is not annotated and is a separate preparation. Hence, W0000986 and W0000985 represent a single specimen mounted on two sheets, and W0000984 is a separate duplicate. Sheet with Acc. No. W0000985, has five loose leaves, and three inflorescence fragments. On the bottom right corner of the sheet is affixed a label which is a photocopy of the specimen Acc. No. W0000986. Sheet with Acc. No. W0000986, has two loose leaves, two loose inflorescences, and one dehisced capsule. On the bottom right corner of sheet W0000986 is affixed a label with the handwritten text "2481. Ferdinandusa elliptica Pohl. Rio dos Indios. Pohl." Because sheets W0000986 and W0000985 are annotated as sheet 1 of 2 and sheet 2 of 2, respectively, and they are kept together, they are here treated as a single specimen with multiple preparations, which is here designated as the lectotype of *Ferdinandusa elliptica*.

The W sheet with Acc. No. W0000984, has three loose leaves, and three loose inflorescences, one of which has a few flower buds. On the bottom right corner of the sheet is affixed a label with the handwritten text "2481. Ferdinandusa elliptica Pohl. Rio dos Indios. Pohl." Another label has the heading "Instituto de Botanica (SP)" and the handwritten text "Isolectotype of Ferdinandusa elliptica Pohl, Det. E.A. Anunciação, 05/09/2003." The lectotypification by Anunciação is not valid, as is part of an unpublished doctoral thesis. Sheet

with Acc. No. W0000984 is an isolectotype of of *Ferdinandusa elliptica*.

In M, there is a sheet, with barcode M-0026505, associated with the name *Ferdinandusa elliptica* and collected by Johann Emanuel Pohl (1782–1834) in Brazil. It has one branch with an inflorescence with the flowers fallen off, and one separate leaf. On the separate leaf is attached a small label with the handwritten number "3361". On the bottom left corner of the sheet is a label with the heading "Herbarium Zuccarinii" and the handwritten annotations (author unknown) "Rubiacea, Tocoyena? Legit in Brasilia Dr. Pohl" and "Communicavit M. C. Vindob. anno 1839." Another label says "Ferdinandusa elliptica Pohl, Vgl. Pohl, Pl. Bras. II, t. 106. Determ. K. Suessenguth, München 1942." This is a specimen of *F. elliptica* Pohl.

Synonym:

FGT, vol. 40(1), p. 424:

"*Ferdinandusa ovalis* Pohl, Pl. Brasil. 2: 10, tab. 107. "1828" [1831]. Tipo: Brasil, Goiás, "ad Serra Manoel Gómez prope Capitalem" [Serra Dourada? perto da cidade de Goiás], *Pohl 1630* (B*, isótipo NY)."

Type: BRAZIL. Goiás: "ad Serra Manoel Gómez prope Capitalem" [Serra Dourada? near the town of Goiás], Mar.–Apr. 1820, *J.B.E. Pohl 1630* (W [Acc. No. W0053551], **lectotype here designated**; isolectotypes NY [barcode 00131399], W [Acc. No. W0001012]).

Notes: Pohl (1828: 10–11) along with the description of *Ferdinandusa ovalis* Pohl, cited a gathering collected by himself as "Habitat in montosis, ad Serra de Manoel Gomez, prope Cidade de Goyaz, Capitaniae ejusdem nominis. Floret mense Martio et Aprili –1820." He did not indicate any collection number. The mountain range near the town of Goiás, the first capital of the homonymous state, is todays called Serra Dourada. In W there are two sheets of *Pohl 1630* with that collection locality. One W specimen, with Accession No. W0053551, consists of a branch with several leaves and a terminal inflorescence with flower buds. On the bottom right corner of the sheet is affixed a label with the handwritten text "**1630**. Ferdinandusa ovata Pohl. Brasilia. Pohl." Another label has the heading "Instituto de Botanica (SP)" and the handwritten text "Ferdinandusa elliptica Pohl, Lectotype of Ferdinandusa ovata Pohl, Det. E.A. Anunciação, 05/09/2003." The proposed lectotypification by Anunciação is not valid, as it is part of an unpublished doctoral thesis. This specimen is here designated as the lectotype of *Ferdinandusa ovalis*.

The other W specimen, with Accession No. W0001012, consists of a branch with several leaves (some of them detached) and a terminal inflorescence with the flowers fallen off. On the bottom right corner of the sheet is affixed a label with the handwritten annotation "1630. Ferdinandusa ovata Pohl. Serra de Manoel Gomez. Pohl." This specimen is an isolectotype.

At NY, there is another sheet of *Pohl 1630*, with barcode 00131399, consisting of a branch with a few leaves and a terminal inflorescence. The specimen label has the heading "Herb. Musei Palat. Vindob." and reports the locality as "Serra de Manoel Gomez." This specimen is an isolectotype of *Ferdinandusa ovalis*.

FGT, vol. 40(1), p. 431:

"20-3. ***Ferdinandusa speciosa*** Pohl, Pl. Brasil. 2: 12, tab. 108. "1828" [1831]. Sintipos: Brasil, Minas Gerais: Serra de Spilon, s.d., *Pohl 650, 2827* (B*, NY); Goiás: Casa de Telha e Santa Cruz, s.d., *Martius s.n.* (B*)."

Accepted name: *Ferdinandusa speciosa* Pohl

Type: BRAZIL. Minas Gerais: "Serra de Spilons" [Serra dos Pilões], s.d., *J.B.E. Pohl Cat. no. 650, 2827* (W [Acc. No. W0018440], **lectotype here designated**; isolectotypes, BR [barcode 000000530665], NY [barcode 00131400], W [2 sheets, Acc. No. W0053549, W0053550]).

Notes: Pohl (1828: 12–13) along with the description of *Ferdinandusa speciosa* Pohl, cited several gatherings as "Habitat in montosis uliginosis; in "Serra de Spilons" [sic! Serra des Pilons; "Serra dos Pilões"], Capitaniae Minas Geraës; ad Caza de Telha, et S. Cruz, Capitaniae Goyaz. Legi florentem mense Majo et Novembri 1818 et 1820."

Schumann (1889: 207) cited the material examined of *Ferdinandusa speciosa* as "Habitat in montosis uliginosis ad Caza da Telha et S. Cruz: Martius, floret Novembri; ad Arrayas: Gardner n. 4167; inter urbem Goyaz et Cavalcante: Burchell n. 7381; in provincia Minas Geraës in Serra dos Pilooës: Pohl n. 2867" and commented on the latter locality as follows: "Cl. Pohl nomen loci natalis falso Serra de Pilons publici juris fecit. Icon et description Pohliana non plane cum natura congruit, quia lacinias corollas recurvatas et stigma bifidum pinxit descripsitque; fabrica tali modo, ut supra exposuimus, semper observatur."

At W are present three sheets of *Pohl Cat. no. 650, 2827*. The first W sheet, Acc. No. W0018440, has a branch with several leaves and terminal inflorescences

with flower buds and flowers in anthesis. On the lower right corner is a label with the heading "Herb. Musei Palat. Vindob." and the handwritten annotation "650, 2827, ad Serra de Spilon, Pohl." The second W sheet, Acc. No. W0053549, has a branch with several leaves and terminal inflorescences with flower buds and flowers in anthesis. On the lower right corner of the sheet is affixed a label without heading and the handwritten annotation "650, 2827, ad Serra de Spilon, Pohl." The third W sheet, Acc. No. W0053550, has a branch with several leaves and terminal inflorescences with flower buds and flowers in anthesis. On the lower right corner there is a label with the heading "Hrb. Musei Palat. Vindob." and the handwritten annotation "2827, Ferdinandusa speciosa Pohl. Ad Serra de Spilon in desertis ad aquas, ad S. Cruz, Pohl." The W specimen with Acc. No. W0018440 is the most complete and is here designated as the lectotype of *Ferdinandusa speciosa*.

In M, there is a specimen, with barcode M-0187463, consisting of a large branch with several inflorescences, flower buds and flowers in anthesis. On a lower branch of the specimen is attached a small label with the handwritten number "3083". On the bottom left of the sheet is a label with the heading "Herbarium Zuccarinii" and the handwritten text (author unknown) "Ferdinandusa elliptica Pohl, Legit in Brasilia Dr. Pohl" and "Communicavit M. C. Vindob. anno 1839." This specimen is possible original material of *Ferdinandusa speciosa* Pohl, as it was transferred from W to M in 1839.

Synonym:

FGT, vol. 40(1), p. 431:

"*Ferdinandusa pubescens* Wedd., Ann. Sci. Nat. IV, 1: 78. 1854. - *Ferdinandusa speciosa* Pohl f. *pubescens* (Wedd.) Steyerm., Mem. New York Bot. Gard. 23: 285. 1972. Tipo: Brasil, Goiás, "inter urbes Patrocínio et Goyaz", s.d., *Weddell 2535* (holótipo, P)."

Type: BRAZIL. Minas Gerais or Goiás: "inter urbes Patrocínio et Goyaz", 1844, *H.A. Weddell 2535* (P [barcode P01900520], **lectotype here designated**; isolectotypes P [2 sheets, barcodes P01900521, P01900522]).

Notes: Weddell (1854: 78) along with the description of *Ferdinandusa pubescens* Wedd. cited a gathering collected by himself as follows "In locis uliginosis sylvarum inter urbes Patrocinho et Goyaz Brasiliae mediae, Martio florentem ipse legi. (Cat. propr., nº 2535.)" At P there are three sheets of *Weddell 2535*. The first specimen, with barcode P01900520, consists of one branch with an inflorescence and several flowers in anthesis. The specimen label has the the heading "Herb. Mus. Paris." with the annotation handwritten by Weddell "Ferdinandusa pubescens Wedd. Brésil central, M.A. Weddell. 1844. Nº 2535."

The second P specimen, with barcode P01900521, consists of one branch with an inflorescence bearing several flowers in anthesis and a label with the heading "Herb. Mus. Paris." with the handwritten text "Ferdinandusa pubescens Wedd. (Weddell ser.)", the printed text "BRÉSIL central. 1844. M.A. Weddell." and the handwritten collection number "2535."

The third P specimen, with barcode P01900522, consists of two branches with inflorescences and numerous flowers in anthesis. Its label is the same as that of P01900521. Because the specimen with barcode P01900520 has the label handwritten by Weddell, it is here designated the lectotype of *Ferdinandusa pubescens*.

21. **GALIANTHE** Griseb., Symb. Fl. Argent. 24: 157. 1879.

FGT, vol. 40(1), p. 445:

"21-1. ***Galianthe angustifolia*** (Cham. & Schltdl.) E.L. Cabral, Bol. Soc. Argent. Bot. 27: 239. "1991" [1992]. - *Borreria angustifolia* Cham. & Schltdl., Linnaea 3: 330. 1829. Tipo: Brasil, "in Brasilia aequinocialis", *Sellow 498* (holótipo, B*, foto em NY)."

Accepted name: ***Galianthe angustifolia*** (Cham. & Schltdl.) E.L.Cabral

Type: BRAZIL: "in Brasilia aequinocialis", s.d., *F. Sellow 498* (B†; F [ex B, Acc. No. 607102], **lectotype here designated;** photo-B (F0BN000871) in F, NY). – BRAZIL. Minas Gerais: Poço de Caldas, Cristo Redentor, 14 Jan. 1980, *A. Krapovickas & C.L. Cristóbal 35308* (CTES [Acc. No. 64684, barcode CTES0013482], **epitype here designated**).

Notes: Chamisso and Schlechtendal (1829b: 330) cited the material studied of *Borreria angustifolia* Cham. & Schltdl. as "In Brasilia aequinotialis legit Sellow." The material at B studied by Chamisso & Schlechtendal was destroyed during WWII. A photograph of the B specimen (F0BN000871) shows that it was a gathering of *Sellow 498*. Cabral (1991: 239) cited only the photograph of the B specimen for *Galianthe angustifolia* (Cham. & Schltdl.) E.L. Cabral.

At F there is a sheet, Accession No. 607102, with a fragment of *Sellow 498* removed from the destroyed B specimen and a photograph of the B specimen (Neg.

No. 871). This specimen has two annotation labels "Galianthe angustifolia (Cham. et Schltdl.) Cabral, Det: E. Cabral 1993" and "Isotype of: Borreria angustifolia Cham. & Schltdl., Linnaea 3: 330. 1828."

Cabral (2009: 31) designated the specimen of *Krapovickas & Cristóbal 35308* at SP as the neotype of *Borreria angustifolia*, and the duplicate at CTES as the isoneotype. However, there is no such specimen in SP (M.C. Mamede, SP Herbarium Curator, pers. comm.). Article 9.19(a) of the *Code* states that the first neotype designation must be followed, but it is superseded if any of the original material exists. Therefore, Cabral's neotype designation based on the SP specimen is superseded by the F specimen, which is an isotype and is here designated the lectotype of *Borreria angustifolia*. The fragment of *Sellow 498* at F (Acc. No. 607102) has one node with axillary brachyblasts characteristic of this species. However, there are several species in *Galianthe* with axillary brachybasts, and flower and fruits are necessary to identify with certaintly the species in question. Therefore, it is necessary to designate an epitype to permanently fix the application of the name. The specimen *Krapovickas & Cristóbal 35308* at CTES (Acc. No. 64684, barcode CTES0013482; annotated by Cabral as "isotypo"), is composed of three branches with terminal inflorescences bearing flowers and fruits and is here designated the epitype of this name.

FGT, vol. 40(1), p. 448:
"21-2. ***Galianthe centranthoides*** (Cham. & Schltdl.) E.L. Cabral, Bol. Soc. Argent. Bot. 27: 240. "1991" [1992]. - *Borreria centranthoides* Cham. & Schltdl., Linnaea 3: 330. - *Spermacoce centranthoides* (Cham. & Schltdl.) Kuntze, Revis. Gen. pl. 3: 123. 1898. Tipo: Brasil, "in Brasilia meridionali", s.d., *Sellow s.n.* (holótipo B*; isótipo LE n.v.)."

Accepted name: *Galianthe centranthoides* (Cham. & Schltdl.) E.L.Cabral

Type: SOUTHERN BRAZIL. "In Brasilia meridionali", s.d., *F. Sellow s.n.* (B†; HBG [barcode HBG-521832], lectotype designated by Florentín et al. (2022: 31); isolectotypes G? n.v., HBG [barcode HBG-521833], LE n.v.; possible isolectotype K [barcode K000470274]).

Notes: Chamisso and Schlechtendal (1828: 328–329) cited the material studied of *Borreria centranthoides* Cham. & Schltdl. as "In Brasilia meridionali pluries lectam misit Sellow." In the following page, they described *B. centranthoides* var. β *angustifolia* Cham. & Schltdl. and cited the material studied as "In Brasilia aequinocialis legit Sellow. 2." According to Stafleu and Cowan (1976: 482; 1985: 190): "Chamisso's own herbarium was also acquired by LE." and Diederich Franz Leonard von Schlechtendal "Herbarium and types: HAL. Several of the types of his Berlin period were at B (mainly destroyed). – Plants for the botanical gardens of Berlin and Halle, and material from his herbarium (but collected by others) are e.g. at CAS, E, FI, G, L, M, MW, WAG." The original material at B was destroyed during WWII.

Cabral (1992: 240) cited the type of *Borreria centranthoides* Cham. & Schltdl. as "*In Brasilia meridionali pluries lectam misit Sellow* (isotipo LE!)." Later, Cabral (2009: 33) cited the type of this name as "Brasilia meridionali pluries lectam misit, 1829, *Sellow s.n.* (holotipo, HB no visto; isotipos, G!, LE!)." The code HB corresponds to the Herbarium Bradeanum in Rio de Janeiro. Cabral's 2009 citation of the holotype specimen present in HB is erroneous, because in that institution there only exists a photograph of the destroyed B specimen.

In HBG there are two sheets, with barcodes HBG-521832 and HBG-521833, collected by Sellow, and annotated by Schlechtendal as "Borreria centranthoides N. β angustifolia, Brasilia." These sheets are original material of this varietal name. Florentín et al. (2022: 31) designated the sheet with barcode HBG-521832 as the lectotype of *Borreria centranthoides*, and that with barcode HBG-521833 as an isolectotype.

At K there is a sheet with two different gatherings. The specimen on the right side of the sheet, with barcode K000470274, was annotated by Chamisso and is a possible isolectotype.

FGT, vol. 40(1), p. 451:
"21-3. ***Galianthe fastigiata*** Griseb., Goett. Abh. 24: 157. 1879. - *Borreria fastigiata* (Griseb.) K. Schum. in Mart., Fl. Bras. 6(6): 68. 1888. - *Spermacoce fastigiata* (Griseb.) Niederl., Bol. Mens. Mus. Prod. Argent. 3(31): 306. 1890. - *Spermacoce fastigiata* (Griseb.) Kuntze, Rev. Gen. 3(2): 123. 1898. Tipo: Argentina, Entre Ríos, Palmar Grande, 3/II/1876, *P.L. Lorentz 803* (holótipo, GOET; isótipo, CORD n.v.)."

Accepted name: *Galianthe fastigiata* Griseb.

Type: ARGENTINA. Entre Ríos: Palmar Grande, 3 Feb. 1876, *P.L. Lorentz 803* (GOET [barcode GOET010265] lectotype designated by Florentín et al. (2022: 32); isolectotypes, CORD [2 sheets, barcodes CORD00006245, CORD00006246], GOET [barcode GOET010266]).

Notes: Grisebach (1879: 157) cited the material studied of *Galianthe fastigiata* Griseb. as "E: Palmar grande." Cabral (1992 ["1991"]: 243) cited the type of this name as "E: Palmar grande. Argentina, Entre Rios, 3-II-1876, Lorentz 803 (isotipo CORD!)." Then, Cabral (2009: 37) cited the type of this name as "Tipo: Argentina. Entre Ríos: Palmar grande, 3 feb. 1876, *P.G. Lorentz 803* (holotipo, HB no visto; isotipo, CORD!)." Cabral's 2009 citation of the holotype specimen present in HB is erroneous, as in that institution, there only exists a photograph of the GOET specimen.

Delprete (2010a: 451) wrote that the holotype of *Galianthe fastigiata* is at GOET. In that institution there are two sheets of *Lorentz 803* annotated by Grisebach, with barcodes GOET010265 and GOET010266, which, according to the *Code*, could be treated as a single specimen with multiple preparations. Florentín et al. (2022: 31) designated the sheet with barcode GOET010265 as the lectotype, and that with barcode GOET010266 as an isolectotype.

FGT, vol. 40(1), p. 455:
"21-4. ***Galianthe grandifolia*** E.L. Cabral, Bonplandia 7: 14, fig. 6. 1993. Tipo: Brasil, Minas Gerais, Rio Bicudo, ca. 20 km W of Corinto, 325 m, 3/III/1970, *Irwin et al. 26820* (holótipo, RB; isótipo NY)."

Accepted name: ***Galianthe grandifolia*** E.L.Cabral

Type: BRAZIL. Minas Gerais: Rio Bicudo, ca. 20 km W of Corinto, 525 m, 3 Mar. 1970, *H.S. Irwin, S.F. da Fonseca, R. Souza, R. Reis dos Santos & J. Ramos 26820* (holotype, RB [Acc. No. RB152436, barcode 00543587]; isotypes, F [Acc. No. 1726934], IAN [barcode IAN138309], NY [barcode 00131414], UB [barcode UB0040310], US [barcode 00406425]).

FGT, vol. 40(1), p. 465:
"21-5. ***Galianthe lanceifolia*** E. L. Cabral, Bol. Soc. Argent. Bot. 29: 227, fig. 2. 1993. Tipo: Brasil, Mato Grosso, 1 km da BR-364, caminho a Águas Quentes, em cerrado, solo cascalhento, 30/I/1989, *A. Krapovickas & C. Cristóbal 43155* (holótipo, MBM; isótipo, CTES n.v.)."

Accepted name: ***Galianthe lanceifolia*** E.L.Cabral

Type: BRAZIL. Mato Grosso: 1 km da BR-364, caminho a Águas Quentes, em cerrado, solo cascalhento, 30 Jan. 1989, *A. Krapovickas & C. Cristóbal 43155* (holotype, MBM [barcode MBM 280276 (annotated as isotype)]; isotypes, CTES [2 sheets, barcodes CTES0013574, CTES0013575], SI [barcode 003186]).

FGT, vol. 40(1), p. 467:
"21-6. ***Galianthe laxa*** (Cham. & Schltdl.) E.L. Cabral, Bol. Soc. Argent. Bot. 27: 244. "1991" [1992]. - *Borreria laxa* Cham. & Schltdl., Linnaea 3: 337. 1828. - *Spermacoce laxa* (Cham. & Schltdl.) Kuntze, Revis. Gen. Pl. 3(2): 123. 1898. Tipo: Brasil meridional, localidade não indicada, s.d., *Sellow 1019* (holótipo, B, destruído, foto em F, NY, US)."

Accepted name: ***Galianthe laxa*** (Cham. & Schltdl.) E.L.Cabral

Type: SOUTHERN BRAZIL: "In Brasilia meridionali", without locality, s.d., *F. Sellow s.n.* [*1019?*] (B†; HAL [barcode HAL0098355 (without collection number)], lectotype designated by Florentín et al. (2022: 32); photo-B (F0BN000880) in F, NY, US).

Notes: Chamisso and Schlechtendal (1828: 337) cited the material studied of *Borreria laxa* Cham. & Schltdl. as "In Brasilia meridionali lectam transmisit Sellowius." The original material at B was destroyed during WWII. Cabral (1992: 244) cited the type of this name as "In Brasilia meridionali lectam transmisit Sellowius" Fot. F880 (B!)." Then, Cabral (2009: 53) cited the type of *B. laxa* as "In Brasilia meridionali lectam transmisit, Sellow s.n. (holotipo, B! foto F 880!)."

The holotype specimen at B was photographed by James Francis Macbride (1892–1976) and was destroyed during WWII. In the photograph it is possible see the handwritten annotation "Borreria laxa N.", the specimen label with the heading "Herb. Reg. Berolinense", the handwritten annotation "Borreria laxa Cham. & Schlecht." and the collection number "1019".

In HAL there is a specimen, barcode HAL0098355, with a handwritten label with the annotation "Borreria laxa N., Sellow. Brasilia meridionalis" and the stamp "scripsit: D.F.L. v. Schlechtendal". That specimen, which does not have Sellow's collection number, was designated as the lectotype of *Borreria laxa* by Florentín et al. (2022: 32).

FGT, vol. 40(1), p. 473:
"21-7. ***Galianthe liliifolia*** (Standl.) E.L. Cabral, Bol. Soc. Argent. Bot. 27: 245. "1991" [1992]. - *Borreria liliifolia*

Standl., Publ. Field Columbian Mus., Bot. Ser. 8: 392. 1931. Tipo: Brasil, São Paulo, Ypiranga, 31/XII/1911, *Brade 5266* (holótipo S, isótipo SP)."

Accepted name: *Galianthe liliifolia* (Standl.) E.L.Cabral

Type: BRAZIL. São Paulo: Ypiranga, 31 Dec. 1911, *A.C. Brade 5266* (holotype S [Acc. No. S05-1643], isotype SP [not there!]; isotype fragment F [ex S, Acc. No. 638797]).

Notes: Standley (1931: 392) along with the description of *Borreria liliifolia* Standl. cited the holotype specimen as "Brazil. Ypiranga, State of São Paulo, December 31, 1911, Alex. Curt Brade (Herb. Stockholm, type)." Cabral (2009: 41) cited the type of *B. liliifolia* as "Tipo: Brasil. São Paulo: Ipiranga, 31 dic. 1911, *Alex Brade 5266* (holotipo S!, isotipos, F!, SP!)." However, there is no specimen of *Brade 5266* at SP (M.C. Mamede, SP Herbarium Curator, pers. comm.).

FGT, vol. 40(1), p. 475:
"21-8. ***Galianthe longisepala*** E.L. Cabral, Bonplandia 13: 15. 2004. Tipo: Brasil, Goiás**,** Mun. Cristalina, Serra dos Cristais, 2 km de Cristalina, 1250 m, 2/III/1966, *H.S. Irwin, J.W. Grear Jr., R. Souza & R.R. dos Santos 13307* (holótipo, UB; isótipos, F n.v., MO, NY, RB, US)."

Accepted name: *Galianthe longisepala* E.L.Cabral

Type: BRAZIL. Goiás**:** Mun. Cristalina, Serra dos Cristais, 2 km de Cristalina, 1250 m, 2 Mar. 1966, *H.S. Irwin, J.W. Grear Jr., R. Souza & R.R. dos Santos 13307* (holotype, UB [barcode UB0040419]; isotypes, F [not there!], MO [not there!], NY [not there!], RB [not there!], US [barcode 01106441]).

Notes: Cabral (2004: 15) described *Galianthe longisepala* E.L. Cabral, and cited the holotype at UB and the isotypes at "F!, MO!, NY!, RB!, US!" However, there is no duplicate of *Irwin et al. 13307* in F, MO, NY and RB, as confirmed by the herbarium curators of those institutions.

FGT, vol. 40(1), p. 478:
"21-9. ***Galianthe macedoi*** E. L. Cabral, Bonplandia 10: 121, fig. 2. 2000. Tipo: Brasil, Goiás, Mun. Jataí, Fazenda Queixada, 10/XII/1948 (fl, fr), *A. Macedo 1468* (holótipo, SP; isótipos, CTES n.v., F n.v., IAC n.v., NY, SP)."

Accepted name: *Galianthe macedoi* E.L.Cabral

Type: BRAZIL. Goiás: Mun. Jataí, Fazenda Queixada, 10 Dec. 1948 (fl, fr), *A. Macedo 1468* (holotype, SP [barcode SP001549]; isotypes, CTES [barcode CTES0013531], F [not there!], IAC n.v. [not traced], NY n.v. [not traced], US [barcode 01106440]).

Notes: Cabral (2009: 43) cited the type of *Galianthe macedoi* E. L. Cabral as "Tipo: Brasil. Goiás: Jataí, Faz. Queixada, 10 dic. 1948, *A. Macedo 1468* (holótipo, SP!; isótipos, CTES!, F!, IAC 28270!, NY!, SP!)." There is no duplicate of *Macedo 1468* in F (Cristine Niezgoda, F Herbarium Curator, pers. comm., 22 Jun. 2022). Also, in SP, there is only one specimen of *Macedo 1468* (Maria Candida Mamede, SP Herbarium Curator, pers. comm. of 25 Jun. 2022), with barcode SP001549, which is the holotype of this name.

FGT, vol. 40(1), p. 481:
"21-10. ***Galianthe peruviana*** (Pers.) E.L. Cabral, Bonplandia 10: 121. 2000. - *Spermacoce peruviana* Pers., Syn. Pl. 1: 124. 1805 (*nom. nov.* para *Spermacoce corymbosa* Ruiz & Pav.) - *Spermacoce corymbosa* Ruiz & Pav., *nom. illeg.*, Fl. peruv. 1: 60, tab. 91, fig. a. 1798. - non *Spermacoce corymbosa* L., Sp. Pl. ed. 2, 1: 149. 1762. - *Borreria peruviana* (Pers.) L.B. Sm. & Downs, Sellowia 7: 78. 1956. Tipo: Peru, "in montibus ad Muna vicum, in ruderatis et runcationibus Cormilla et Rinconada", s.d., *Ruiz & Pavón s.n.* (holótipo, MA; isótipos, B-Willd., F; foto-B em NY)."

Accepted name: *Galianthe peruviana* (Pers.) E.L.Cabral

Type: PERU: "in montibus ad Muña vicum, in ruderatis et runcationibus Cormillâ et Rinconadâ", s.d., *H. Ruiz López & J.A. Pavón y Jiménez s.n.* (MA [barcode MA 815644], **lectotype here designated**; isolectotypes MA [barcode MA 817204], drawings MA AJB04-D-0198_001 and MA AJB04-D-01989_001; possible isolectotypes B-W [barcode B –W 02615 -00 0], BR [barcode 000000557825], F [Acc. No. 844771]).

Notes: Ruiz and Pavón (1798: 60) described the collection localities of *Spermacoce corymbosa* Ruiz & Pav., *nom. illeg.* (non *S. corymbosa* L. (1762: 149)), as "Habitat in Peruviae montibus ad Muña vicum, in ruderatis et runcationibus Cormillâ et Rinconadâ." Cabral (2009: 45) cited the type of *Spermacoce peruviana* Pers., a replace-

ment name for *Spermacoce corymbosa* Ruiz & Pav., as "Perú. In peruviae montibus ad Muña vicum, in ruderatis et runcationibus Cormillâ et Rinconadâ", *Ruiz & Pavón s.n.* (holotipo, MA; isotipos, B-W!, F!)." At MA, there are two specimens, two drawings, and a published illustration that are original material of *S. corymbosa* Ruiz & Pav. (Art. 9.4; Turland et al., 2018), which are described below.

The MA specimen with barcode MA817204 consists of three branches with terminal inflorescences. On the sheet are affixed two labels. A label with the printed text "Ex antiquo herbario generali, Herbarium Horti Botanici Matritensis, Plantae a "Ruiz et Pavón" in viceregno Peruviano et Chilensi lectae" and the typewritten text "Borreria corymbosa (R & P) DC." The other label is entirely handwritten (author unknown) and says "Spermacoce corymbosa Fl. Peruv. f. 7a 9f faa – Ex Herbario Fl. Peruv. anno 1828."

The MA specimen with barcode MA815644 consists of a complete plant with a basal taproot and numerous branches and inflorescences. On the sheet are affixed two labels. A label with the heading "Herbarium Peruvianum, Ruiz et Pavon", the handwritten number "1200", and the handwritten annotation "Borreria corymbosa (R. et P.) DC., det. K. Krause, XI/31." The other label has the annotation "Spermacoce corymbosa Sp. Pl. T. 1. Per. de Muña y Cuchero" handwritten by Hipólito Ruiz.

The drawing of *Spermacoce corymbosa* Ruiz & Pav. by José Brunete is one of the original drawings from Ruiz & Pavón's Expedition (1777–1816). This drawing has the name "Spermacoce corymbosa" written on the bottom of the sheet and the heading "XCI". In the drawing is depicted a plant with a central taproot and a ramified stem with several branches and terminal inflorescences. On the same sheet with the drawing, there is a label stating "REAL JARDÍN BOTÁNICO, CSIC, Real Expedición Botánica al Virreinato del Perú, AJB04-D-0198_001."

In the drawing by Isidro Gálvez, are depicted two *Spermacoce* species. This is another original drawing from Ruiz & Pavón's Expedition (1777–1816). On the left side of the drawing is depicted the distal portion of a *S. corymbosa* plant with terminal inflorescences. This drawing also has the heading "XCI". On the same sheet where the drawing is mounted, there is a label with the printed text "REAL JARDÍN BOTÁNICO, CSIC, Real Expedición Botánica al Virreinato del Perú, AJB04-D-01989_001."

All specimens and drawings described above represent excellent original material of *Spermacoce corymbosa*. Because specimen with barcode MA815644 has a label has with the annotation "Spermacoce corymbosa Sp. Pl. T. 1. Per. de Muña y Cuchero" handwritten by Hipólito Ruiz, it is here designated as the lectotype for this illegitimate name.

FGT, vol. 40(1), p. 484:
"21-11. ***Galianthe ramosa*** E. L. Cabral, Bol. Soc. Argent. Bot. 29: 225, fig. 1. 1993. Tipo: Brasil, Goiás, BR-040, 12 S de Luziânia, 1000 m, 1/II/1990 (fl, fr), *M. M. Arbo, R. Monteiro, A. Schinini & A. Furlan 3366* (holótipo, HRCB; isótipo, CTES n.v.)."

Accepted name: ***Galianthe ramosa*** E.L.Cabral

Type: BRAZIL. Goiás: BR-040, 12 km S de Luziânia, 1000 m, 1 Feb. 1990 (fl, fr), *M.M. Arbo, R. Monteiro, A. Schinini & A. Furlan 3366* (holotype, HRCB [Acc. No. 12756]; isotype, CTES [barcode CTES0013533]).

FGT, vol. 40(1), p. 491:
"21-12. ***Galianthe verbenoides*** (Cham. & Schltdl.) Griseb., Symb. Fl. Argent. 24: 157. 1879. - *Borreria verbenoides* Cham. & Schltdl. forma *prima* Cham. & Schltdl., Linnaea 3: 331. 1828. - *Spermacoce verbenoides* (Cham. & Schltdl.) Niederl., Bol. Mens. Mus. Prod. Argent. 3(31): 306. 1890. - *non Galianthe verbenoides* (Cham. & Schltdl.) Griseb., Symb. Fl. Argent. 24: 157. 1879. - *Spermacoce verbenoides* (Cham. & Schltdl.) Kuntze, *comb. superfl.*, Rev. Gen. 3: 123. 1898. - *Spermacoce verbenoides* (Cham. & Schltdl.) Herter, *comb. superfl.*, Rev. Sudamer. Bot. 4: 196. 1937. Tipo: "Brasilia meridionali", *Sellow s.n.* (holótipo B, destruído, isótipo LE, n.v. foto em F)."

Accepted name: ***Galianthe verbenoides*** (Cham. & Schltdl.) Griseb.

Type: SOUTHERN BRAZIL: "Brasilia meridionali", s.d., *F. Sellow s.n.* (B†; LE n.v., lectotype designated by Cabral (2009: 56); isolectotypes E [barcode E00505292], HAL [2 sheets, barcodes HAL0098356 & HAL0098356 (both det. Schlechtendal)], HBG [barcode HBG-521820 (det. Schlechtendal)]; isolectotype fragment F [(ex B) Acc. No. 605931]).

Notes: In the protologue of *Borreria verbenoides* Cham. & Schltdl., Chamisso and Schlechtendal (1828) cited the studied material as "In Brasilia meridionali legit *Sellow*." Cabral (1992 ["1991"]) cited the type of this name as "In Brasilia meridionali, legit Sellow", isotipo LE! Foto F 890 (B!)." Cabral (2009: 56) designated the type of this name as "TIPO: Brasil. In Brasilia meridionali legit Sellow (lectótipo, designado aquí, LE!)."

Borreria verbenoides Cham. & Schltdl. forma *prima* Cham. & Schltdl. is not a name. It is only the first of the five forms listed by Chamisso and Schlechtendal (1828). See Art. 24.2, Art. 23.6(b) Ex. 15–18 (Turland et al., 2018).

22. **GALIUM** L., Sp. pl. ed. 1, 105. 1753.

FGT, vol. 40(1), p. 501:
"22-1. ***Galium hypocarpium*** (L.) Endl. ex Griseb., Fl. Brit. W. I. 4: 351. 1861. *Valantia hypocarpia* L., Syst. Nat. ed. 10: 1307. 1759. - *Rubia hypocarpia* (L.) DC., Prodr. 4: 591. 1830. – *Relbunium hypocarpium* (L.) Hemsl., Biol. Centr.-Amer., Bot. 2: 63. 1881. - Tipo: Jamaica, middle mountain of Liguanee, s.d., *P. Browne 141* (holótipo, BM-LINN, microfiche em UC)."

Accepted name: *Galium hypocarpium* (L.) Endl. ex Griseb.

Type: [protologue]: "Jamaica, middle mountain of Liguanee", s.d., *P. Browne s.n.* (LINN Herb. Linn. No. 1219.13, lectotype designated by Dempster (1990: 306)).

Notes: In the protologue of *Valantia hypocarpia* L., Linnaeus (1759: 1307) made reference to page 141 of Patrick Browne's (1756) *Civil and Natural History of Jamaica*. On that page, Browne wrote "SPERMACOCE 5. *Scandens, floliis oblongis venis arcuatis refertis, floribus paucioribus conflipatis ad alas*." Browne reported the collection locality as "I found this plant in the middle mountains of *Liguanee*; it is very weakly, grows in tufts, and seldom rises above two or three feet from the root." According to Stafleu and Cowan (1976: 371), "Browne sold his Jamaican herbarium to Linnaeus in 1758 through Collison. It is now at LINN."

Ehrendorfer (1955: 536.) stated that "*Valantia hypocarpia* L. is based on *Rubia* I. of Browne, P.: Hist. Jamaic. 141 (1756) where this locality is cited; it will probably be necessary to choose a neotype from Jamaica because there is no specimen in the Linnean Herbarium."

Dempster (1990: 306) cited the type of *Valantia hypocarpia* as "Jamaica, middle mountain of Liguanee, s.d., *P. Browne 141* (LINN holotype, not seen, microfiche in UC)." However, "141" is not a collection number, but is the page with Browne's short description of "RUBIA I. Subhirsuta scandes…" Dempster's type citation according to the *Code* is an inadvertent lectotypification on the LINN specimen. In LINN, there is a specimen, with Linnaeus Herbarium No. 1219.13 and the name "Valantia hypocarpia" handwritten by Linnaeus. On the bottom of the sheet, it is written "Rubia subhirsuta scandens … Brown. Jam. 141. This specimen is the lectotype of this name, as designated by Dempster.

FGT, vol. 40(1), p. 508:
"22-2. ***Galium megapotamicum*** Spreng., Syst. Veg. 4: 39. 1827. - *Relbunium megapotamicum* (Spreng.) Ehrend., Bot. Jahrb. Syst. 76: 544. 1955. Tipo: Brasil, "Rio Grande" [Rio Grande do Sul], s.d., *Sellow s.n.* (holótipo B, destruído)."

Accepted name: *Galium megapotamicum* Spreng.

Correct bibliographic citation: *Galium megapotamicum* Spreng., Syst. Veg., ed. 16, 4 (2, Cur. Post.): 39. 1827.

Type: BRAZIL. Rio Grande do Sul: "Rio Grande" s.d., *F. Sellow s.n.* (K [barcode K000470356], **lectotype here designated**).

Notes: Sprengel (1827: 39) cited the material studied of *Galium megapotamicum* Spreng. as "*Rio Grande*. Sello." The original material of *G. megapotamicum* at B, where Sprengel worked, was destroyed during WWII. Searching for possible original material, a sheet at K has two specimens mounted on it, with different collectors and collection localities. The specimen on the right side of the sheet, with barcode K000470357, has the note handwritten directly on the sheet "Minas Gerais, Claussen", and therefore, is not original material. The specimen on the left side of the sheet, with barcode K000470356, has the following handwritten label "Galium hirtum Linn.! – G. megapotamicum Spr.! – Sellow, Brasilia"; this specimen is here designated as the lectotype of *G. megapotamicum*.

FGT, vol. 40(1), p. 511:
"22-3. ***Galium noxium*** (A. St. Hil.) Dempster, Allertonia 5(3): 292. 1990. - *Rubia noxia* A. St. Hil., Hist. Pl. Remarq. Brésil 229. 1824. - *Relbunium noxium* (A. St. Hil.) K. Schum. in Mart., Fl. Bras. 6(6): 110. 1888. Tipo: Brasil, Minas Gerais, s.d., *A. Saint-Hilaire 556* (holótipo, P)."

Accepted name: *Galium noxium* (A.St.Hil.) Dempster

Type: BRAZIL. Minas Gerais: "Bois à Itapuera paroisse de St Miguel de Mato Dentro", s.d., *A. Saint-*

Hilaire 556 (first-step lectotype designated by Dempster (1990: 292); P [barcode P00723673], **second-step lectotype here designated**).

Note: Auguste de Saint-Hilaire (1824: 229) cited the collection locality of the material studied of *Rubia noxia* A. St. Hil. as "Crescit in sylvis primaevis provinciae Minas Gerais. Floret Februario-Martio" and did not cite the collection number. Dempster (1990: 292) cited the type of *R. noxia* as "Brazil: Minas Gerais, *St. Hilaire 556* (B holotype, destroyed, photos at F, GH)." It is unknown to me why she cited as holotype a specimen at B that was destroyed during WWII, as she certainly knew that Saint-Hilaire's original material is at P. It is possible that her citation is a typographical error, as she wrote "B" but she probably intended to write "P". However, this seems to be unlikely because, as she stated that it was destroyed, which indicates that she intended to write that the specimen was at B. Therefore, Dempster's citation can only be interpreted as a first-step inadvertent lectotypification because she cited *Saint-Hilaire 556* as type.

Auguste de Saint-Hilaire worked at P, hence this is the institution where his original specimens should be found. Delprete (2010a: 511) cited as holotype a specimen of *Saint Hilaire 556* at P. Such citation cannot be interpreted as a second-step lectotypification because after 2001 it should have been accompanied by "here designated" or a similar expression. At P there are several original specimens of *Rubia noxia* collected by A. Saint-Hilaire in Brazil, and only one of them has collection number *556*. That specimen, with barcode P00723673, consists of several branches with flowers and fruits. On the bottom left corner of the sheet is affixed a label with the annotation "Rubia noxia Aug. de S^{t} Hil. – Bois à Itapuera paroisse de St Miguel de Mato Dentro (A. de St. Hilaire Script.)" handwritten by Saint-Hilaire. On the upper left corner of the sheet there is a label with the heading "Herbarium Musei Parisiensis" and the penciled annotation "Type = St. Hilaire 556, n. date, Minas Gerais." That specimen is here designated the second-step lectotype of *Rubia noxia*.

23. **GARDENIA** J. Ellis, *nom. cons*., Philos. Trans. 51: 935, pl. 23. 1761.

FGT, vol. 40(1), p. 519:
"23-1. ***Gardenia augusta*** (L.) Merrill, Int. Herb. Amb. 485. 1917. - *Varneria augusta* L., Amoen. Acad. 4: 136. 1759. Tipo: Cultivada no jardim do Sr. Richard Warner, em Woodfoot Race (Perto de Londres), trazida pelo Capitão Hutchinson desde o Cabo de Boa Esperança [daí a origem do nome comum da planta] (holótipo, BM-LINN)."

Accepted name: ***Gardenia jasminoides*** J. Ellis, Philos. Trans. 51: 935, pl. 23. 1761.

Correct citation: ***Gardenia augusta*** (L.) E.D. Merrill, *nom. illeg. superfl*., Int. Herb. Amb. 485. 1917. - *Varneria augusta* L., *nom. illeg*., Amoen. Acad. 4: 136. 1759.

Type: [icon]: Rumphius, Herb. Amboin. 7: 26, tab. 14, fig. 2, "Catsjopiri". 1755, lectotype designated by Smith in Amer. J. Bot. 61: 113. 1974.

Notes: Jarvis (2007: 914), regarding *Varneria augusta* L., presented the following explanation "This name is invalid because the genus *Varneria* was given no separate generic description. Under Art. 42.1 [now Art. 38.5 (Turland et al. 2018)], the names of a genus and a species may not be simultaneously validated by a reference to an earlier description or diagnosis, as occurred here. However, some authors (e.g. Merrill 1917: 486) have treated this as the basionym of *G.* [*Gardenia*] *augusta* (L.) Merrill, wrongly interpreted as the correct name for the species otherwise known as *G. jasminoides* J. Ellis (1761)."

24. **GENIPA** L., Syst. Nat. ed. 10, 2: 931. 1759.

FGT, vol. 40(1), p. 524:
"24-1. ***Genipa americana*** L., Syst. Nat. ed. 10, 2: 931. 1759. Tipo: Brasil, Pernambuco, Rio São Francisco, "Mboacica" [provavelmente Boa Cica], J. Marcgrave, Hist. Nat. Bras. 92. 1642 (lectótipo, designado por Howard, 1989)."

Accepted name: ***Genipa americana*** L.

Type: [icon] "Ianipaba Brasiliensibus, seu ut Lusitani efferunt Ienipapo: figura convenit Fago", Piso & Marcggraf, Hist. Rer. Nat. Bras., p. 92. 1648, lectotype designated by Howard in Fl. Lesser Antilles 6: 413. 1989.

Notes: The lectotype designated by Howard (1989) is here followed. Piso and Marcggraf's table of "Ianipaba Brasiliensibus…" is reproduced on page 148 of Jarvis' (2007) *Order Out of Chaos.*

FGT, vol. 40(1), p. 531:
"24-2. ***Genipa spruceana*** Steyerm., Mem. New York Bot. Gard. 23: 353. 1972. Tipo: Brasil, Amapá, Lago Cujumbim, 10/VIII/1962 (fl, fr), *J. Murça Pires & P. Cavalcante 52451* (holótipo, NY; isótipo, K n.v.)."

Accepted name: *Genipa spruceana* Steyerm.

Type: BRAZIL. Amapá: Lago Cujumbim, 10 Aug. 1962 (fl, fr), *J. Murça Pires & P. Cavalcante 52451* (holotype, NY [without barcode (on loan to GB)]; isotypes, COL [COL000004605], K [2 sheets, barcodes K000424492, K000424488], US [barcode 00138106]).

25. **GEOPHILA** D. Don, Prodr. Fl. Nepal 136. 1825, *nom. cons.*

FGT, vol. 40(1), p. 536:
"25-1. ***Geophila repens*** (L.) I. M. Johnst., Sargentia 8: 281. 1949. - *Rondeletia repens* L., Syst. 928. 1759. - *Carinta repens* (L.) Smith & Downs, Sellowia 7: 65, fig. 22 g-j. 1956. - Tipo: Jamaica (Violae folio baccifera repens, flore albo pentapetaloide, fructu dispermo) Sloane, Jam. Cat. 115. 1696 and Hist. 1: 243, n. 42 (BM-LINN)."

Accepted name: *Geophila repens* (L.) I.M.Johnst.

Type: Sloane Herb. vol. 4: 111 (BM [barcode 000589966]), lectotype designated by Howard in Fl. Lesser Antilles 6: 416. 1989).

26. **GONZALAGUNIA** Ruiz & Pav., Prodr. 12. 1794.

FGT, vol. 40(1), p. 542:
"26-1. ***Gonzalagunia dicocca*** Cham. & Schltdl., Linnaea 4: 194. 1829. - *Gonzalea dicocca* (Cham. & Schltdl.) Steud., Nom. ed. 2, 1: 701. 1840. - *Gonzalagunia hirsuta* (Jacq.) K. Schum. var. *dicocca* (Cham. & Schltdl.) K. Schum. in Mart., Fl. Bras. 6(6): 292, t. 131. 1889. Tipo: Brasil, Rio de Janeiro, *Sellow s.n.* (holótipo B, destruído)."

Accepted name: *Gonzalagunia dicocca* Cham. & Schltdl.

Type: BRAZIL. Rio de Janeiro: s.d., *F. Sellow s.n.* (K [barcode K000424262], **neotype here designated**).

Notes: In the protologue of *Gonzalagunia dicocca* Cham. & Schltdl., Chamisso and Schlechtendal (1829b: 194) cited the material studied as "E Brasilia aequinotialis misit Sellow; in vicinis urbis Rio de Janeiro lectam." The original material at B was destroyed during WWII, and apparently there is no extant specimen in any herbarium that have been studied by the original authors. There is a specimen at K, barcode K000424262, which has been annotated by Bertil Ståhl as possible original material of this name. On the sheet it is handwritten "Sello. Brazil" in ink, and "Gonzalea" in pencil. That specimen is here designated as the neotype of *G. dicocca*.

27. **GUETTARDA** L., Sp. Pl. 991. 1773.

FGT, vol. 40(1), p. 548:
"27-1. ***Guettarda burchelliana*** Muell. Arg., Flora 58: 450, 456. 1875. - Sintipos: Goiás**,** *Burchell 6453* (G n.v.); Minas Gerais, Uberaba, *Regnell 103* (G n.v.)."

Accepted name: *Guettarda pohliana* Müll. Arg.

Type: BRAZIL. Minas Gerais: Uberaba, 18 Sep. 1848, *A.F. Regnell III.103* (BR [barcode 000000530542], **lectotype here designated**; isolectotypes BR [barcode 000000552316], G [barcode G00413560], R [barcode R000140146], S [Acc. No. S10-27705], S [Acc. No. S10-27713]; isolectotype fragments F [(ex C) Acc. Nos. 656026, 606865]).

Notes: In the protologue of *Guettarda burchelliana* Müll. Arg., Müller Argoviensis (1875: 450, 456) cited two gatherings as "Goyaz: Burchell n. 6453, [Minas Gerais] Uberaba: Regnell n. 103." The gathering that has duplicates in more herbaria is *Regnell III.103*, which are described and discussed below.

A specimen at BR, with barcode 000000530542, has three labels. One label has the annotation "III.103. Ad Uberaba. In Minas Gerais, Brasiliae. Leg. Novbr "Arnhequer" [?], Incolis: veludo do vermelho [vernacular name: red velvet, referring to the texture and color of the fruits]" with the stamp "Herb. Hort. Bruxell. Coll. Martii." Another label has the printed text "Brasiliae prov. Minarum ad Uberaba (with "Caldas" stroke through), Communic. Andr. Frid. Regnell 1867, sub No. III.103" and has the stamps "Herb. Hort. Bruxell. Coll. Martii" and "Mueller d'Argovie determ." A third label has the handwritten annotation "Guettarda burchelliana Müll-Arg." The specimen consists of a ramified branch with several leaves and several inflorescences, and a smaller branch with several inflorescences. This specimen, with the stamp confirming that was examined by Müller

Argoviensis, is here designated the lectotype of *Guettarda burchelliana*.

A sheet at F with Accession No. 656026, has an envelope with the typewritten annotation "Guettarda Burchelliana Müll. Brazil: Uberaba, Minas Geraes, A. F. Regnell III.103, Sept. 1848, Ex. hb. Copenh." In the envelope are included one leaf and one inflorescence. This specimen is an isolectotype of *Guettarda burchelliana*.

A second sheet at F, with Accession No. 606865, has an envelope with the handwritten annotation "Guettarda Burchelliana Müll. Arg. α nitens M. Arg., Uberaba, Minas Geraes, Brazil, Regnell 103." In the envelope are included two leaves and a few young flower buds. This specimen is an isolectotype of *Guettarda burchelliana*.

The S specimen with Accession No. S10-27705, has a label with the heading "Ex herb. Brasil. Regnellian. Musei bot. Stockholm" and the annotation "No. III 103, Guettarda, Prov. Minas Geraes, Uberaba, 18/9/48. A.F. Regnell." The specimen consists of a ramified branch with many leaves and numerous inflorescences. It was annotated as *Guettarda pohliana* by M.R. Barbosa in 2010 and is an isolectotype of *Guettarda burchelliana*.

The second S specimen, with Accession No. S10-27713, has a label with the heading "Mus. Bot. Holm. Herb. Brasil. Regnelli" and the annotation "No. III 103, Guettarda Burchellliana Müll. (Velludo do vermelho incolar.), Prov. Minas Geraes, Uberaba, 18/9/48. R. [Regnell]" The specimen is constituted by a branch with many leaves and numerous inflorescences. The sheet was annotated by M.R. Barbosa in 2010 as *Guettarda pohliana*, and is an isolectotype of *Guettarda burchelliana*.

A specimen in R, with barcode R000140146, has a label with the heading "Ex herb. Brasil. Regnellian. Musei bot. Stockholm" and the annotation "No. III 103, Guettarda, Prov. Minas Geraes, Uberaba, 18/9/48. A.F. Regnell." The specimen consists of several branches and inflorescence with flowers in anthesis and flower buds. This specimen is an isolectotype of *Guettarda burchelliana*.

In G there is a sheet with a small envelope with the annotation "Guettarda Burchelliana Müll. Arg. α nitens, Goyaz: Burch. n. 6453. Ramus major: Uberaba: Regnell 103" handwritten by Müller Argoviensis. That envelope originally contained two collections. The portion with a branch with flowers, *Regnell 103*, collected in Uberaba, have remained in that envelope and was assigned barcode G00413560, and is an isolectotype. The two leaves and the fruit that were included in the original envelope were separated from it and included in another envelope, which is now affixed on the sheet with barcode G00413561.

Barbosa (2007: 347) treated *Guettarda burchelliana* Müll. Arg. as a synonym of *G. pohliana* Müll. Arg., without explanation. Delprete (2010a: 548), maintained the two species as distinct, using corolla and fruit size as diagnostic characters. As a result of a morphological comparison of specimens from throughout their geographic range, I concluded that Barbosa was correct in treating these two names are synonymous, and the name to be used for this species is *G. pohliana*.

FGT, vol. 40(1), p. 549:

Synonym:

"*Guettarda burchelliana* Muell. Arg. var. *nitens* Muell. Arg. in Mart., Fl. Bras. 6(5): 25. 1881, **syn. nov.** Sintipos: Goiás**,** *Burchell 6453* (G n.v.); São Paulo, "Villa de Batataes", *Regnell 103** (G n.v.); Minas Gerais, Uberaba, *Regnell 103* (G n.v.)."

Accepted name: *Guettarda pohliana* Müll. Arg.

Notes: Müller Argoviensis (1881: 25) for *Guettarda burchelliana* Müll. Arg. var. *nitens* Müll. Arg. cited several syntypes "Habitat prope urbem Goyaz: Burchell n. 6453; in prov. S. Paulo ad villa de Batataes: Regnell n. 103*; in prov. Minas Geraës prope Uberaba: Regnell n. 103."

This varietal name is invalid because according to Art. 26.2 of the *Code* "A name of an infraspecific taxon that includes the type (i.e. the holotype or all syntypes or the previously designated type) of the adopted, legitimate name of the species to which it is assigned is not validly published unless its final epithet repeats the specific epithet unaltered." Because *Regnell III.103*, from Uberaba, Minas Gerais, was cited among the original specimens of *Guettarda burchelliana* Müll.Arg., this varietal name is invalid, and it does not have a type.

A BR sheets, with barcode 000000552316, has one label with the annotation "III.103^{X} Nº. 1 Batataes – Prov. St. Pauli" handwritten by Regnell. On the same sheet is affixed a second label with the stamp "Herb. Hort. Bruxell. – Coll. Martii", the stamp "Mueller d'Argovie determ.", and the annotations "Brasiliae prov. S. Pauli, Villa Batataes [with "Minarum ad Caldas" stroke through], Communic. Andr. Frid. Regnell 1867, sub. Nº III^{X}." Because *Regnell III.103^{X}* is from Batataes, state of São Paulo, a locality not reported for *Guettarda burchelliana* Müll. Arg., this specimen is original material of the invalid name *G. burchelliana* var. *nitens*.

FGT, vol. 40(1), p. 549:

Synonym:

"*Guettarda burchelliana* Muell. Arg. var. *opaca* Muell. Arg. in Mart., Fl. Bras. 6(5): 25. 1881, **syn. nov**. Tipo:

Goiás, "prope urbem Goyaz" [agora cidade de Goiás], *Burchell 6447* (G n.v.)."

Accepted name: *Guettarda pohliana* Müll.Arg.

Type: BRAZIL. Goiás: Town of Goiás, s.d., *W.J. Burchell 6447* (BR [barcode 000000530477], **lectotype here designated**; isolectotypes G [barcode G00413562], K [barcode K000424803]).

Notes: Müller Argoviensis (1881: 25) for *Guettarda burchelliana* Müll. Arg. var. *opaca* Müll. Arg. cited a single gathering as "Habitat prope urbem Goyaz: Burchell n. 6447." I was able trace three specimens of *Burchell 6447*, which are discussed below.

A BR sheet, with barcode 000000530477, has a label with the annotation "Guettarda burchelliana β opaca Müll. Arg." handwritten by Müller Argoviensis. The specimen consists of one branch with two leaves and several inflorescences and is here designated the lectotype of *Guettarda burchelliana* var. *opaca*.

On a sheet at K, with barcode K000424803, not annotated by Müller Argoviensis, is affixed a specimen of *Burchell 6447* that consists of one branch with several leaves and several inflorescences, which is an isolectotype. On the same sheet is mounted a specimen of *Burchell 6453*, with barcode K000424804.

On a G sheet, with barcode G00413562, is affixed an envelope containing a loose inflorescence, several loose flower buds, and one leaf. On the envelope is the annotation "Guettarda Burchelliana β opaca Müll. Arg., Goyaz: Burchell n. 6447" handwritten by Müller Argoviensis. This specimen is an isolectotype.

FGT, vol. 40(1), p. 552:
"27-2. ***Guettarda pohliana*** Muell. Arg., Flora 58: 450, 456. 1875. - Sintipos: Brasil, Goiás, "Goyaz, Vila Boa" [agora cidade de Goiás], 1818-1819, *Pohl 883* (G, K, foto-K em NY), *Pohl 2048* (G)."

Accepted name: *Guettarda pohliana* Müll.Arg.

Type: BRAZIL. Goiás: "Villa Boa, Corallinho" [now the town of Goiás, locality Corralinho], s.d., [1818–1819], *J.B.E. Pohl 2048 (833d)* (W [2 sheets, Acc. Nos. W0004205, W0004206], **lectotype here designated**; isolectotypes K [2 sheets, barcodes K000424805, K000424806], NY [barcode 00131685]; dubious isolectotype G [barcode G00642009]).

Notes: Müller Argoviensis (1881: 25) described *Guettarda pohliana* Müll.Arg. as "7. Folia 7—13 cm lg., 4--6½ cm. lt., oblongo-ovata, subtus adpresso- et renitenti-vestita. Corolla 15—18 mm. lg., lobi 5—8." and cited the gathering "Goyaz: Pohl 2048, 883", where "2048" is the collection number, and "883" is the number in Pohl's diary.

A sheet in W, Accession No. W0004205, has the annotation "Bogen 1 von 2". On this sheet are affixed three labels. The label at the bottom right corner of the sheet has the handwritten annotations "2048, Hb. Bras., Villa Boa. Corallinho, (883d), Pohl." Just above that label, is affixed another label with the annotation "Guettarda Pohliana Müll.-Arg." handwritten by Müller Argoviensis. Above those two label is the annotation "type of Guettarda pohliana Müll. Arg., 21/VII/2005, det./rev. M. Regina Barbosa" handwritten by Barbosa. A second sheet in W, Accession No. W0004206, has the annotation "Bogen 2 von 2". On the second sheet are affixed three labels, with the same information of the other sheet. As these two sheets are kept together and are annotated as "1 of 2" and "2 of 2", they are here treated as a single specimen with multiple preparations. In addition, the number "2048" represent Pohl's collection number, and the number "883d" refers to Pohl's Diary No. 883. Therefore, Pohl's numbers *2048* and *883d* refer to the same gathering. This specimen, mounted on two sheets, is here designated the lectotype of *Guettarda pohliana*.

A specimen in NY, with barcode 00131685, has a label with the heading "Dupl. ex Herb. Musei Natur. Vindob." and the handwritten annotation "Guettarda Pohliana Müll. Arg. Villa Boa. Corallinho, (883d) Pohl" and the stamp "Duplum ex Herb. Mus. Hist. Nat. Vindobon." The specimen consists of a ramified branch with numerous leaves and inflorescences with flower buds and flowers in anthesis.

A specimen in K, with barcode K000424805, consists of a ramified branch with numerous leaves and inflorescences with flower buds and flowers in anthesis. At the base of the stem is affixed a small label with the annotation "Brazil. Herb. Mus. Vind." handwritten directly on the sheet by an unknown author, and a small label with the number "883". The specimen is ramified branch with numerous leaves and inflorescences with flower buds and flowers in anthesis.

A second K specimen, with barcode K000424806, consists of a ramified branch with numerous leaves and inflorescences with flower buds and flowers in anthesis. At the base of the stem is affixed a small label with the annotation "Nº 883, Brasilia, Herb. Mus. Vind. 1837".

A sheet in G, with barcode G00642009, has an envelope affixed on it, containing a few loose leaves and inflorescences, one of them with flowers in anthesis.

On the envelope is the annotation "Guettarda pohliana Müll. Arg., Pohl" handwritten by Müller Argoviensis. Because the collection number is not specified, this specimen is dubious original material.

FGT, vol. 40(1), p. 560:
"27-3. ***Guettarda viburnoides*** Cham. & Schltdl., Linnaea 4: 182. 1829. Tipo: Brasil tropical, s.d., *Sellow s.n.* (B, destruído; foto em NY; lectótipo, P (ex B), aqui escolhido)."

Accepted name: *Guettarda viburnoides* Cham. & Schltdl.

Type: BRAZIL: "Brasilia tropica", without locality, s.d., *F. Sellow s.n.* (B†; P [ex B; barcode P00836586], lectotype designated by Delprete (2010a: 560); possible isolectotype G [barcode G00642010]; photo-B (F0BN000393) at NY).

Notes: Chamisso and Schlechtendal (1829b: 182) cited the material studied of *Guettarda viburnoides* Cham. & Schltdl. as "E Brasilia tropica misit Sellowius." The original material in B was destroyed during WWII. The photograph (negative No. F0BN000393) of the destroyed B specimen shows a label with the annotation "Guettarda viburnoides N. Linn. 4. p. 182. Sellow. Brasilia." Delprete (2010a: 560) designated as lectotype of this name a specimen at P (ex B). That specimen, with barcode P00836586, has a label with the heading "Ex Museu botanico Berolinensi", the handwritten annotation "Guettarda viburnoides Ch. & Schl.", the stamp "determ. C. Schumann", and the printed note "Brasilia, Leg. Sellow."

In G there is a sheet, with barcode G00642010, on which is affixed an envelope containing two loose leaves and an inflorescence with flower buds. The envelope has the annotation "Guettarda viburnoides Cham. & Schlechtdl." handwritten by Müller Argoviensis. This specimen is a possible isolectotype of *Guettarda viburnoides*.

FGT, vol. 40(1), p. 560:
Synonym:
"*Guettarda viburnoides* Muell. Arg. var. *pannosa* Muell. Arg. in Mart., Fl. Bras. 6(5): 17. 1881, **syn. nov**. Sintipos: Rio de Janeiro […]; Minas Gerais […]; Goiás, "inter Rio Paranahyba et urbem Goyaz" [entre Rio Paranaíba e cidade de Goiás], s.d., *Burchell 6251* (G n.v.)."

Type: BRAZIL. Minas Gerais: Without locality, s.d., *P. Claussen s.n.* (G [barcode G00642012] **lectotype here designated**; isolectotypes G [G00642013, G00642014]).

Notes: Müller Argoviensis (1881: 17) described *Guettarda viburnoides* var. *pannosa* Müll. Arg. and cited several gatherings from different Brazilian states. In G there is no original specimen associated with this varietal name. Delprete (2010a: 560) cited an unseen specimen of *Burchell 6210* in G, but such a specimen is not there.

In G there are three sheets, with barcodes G00642012, G00642013 and G00642014. Those sheets have a label with the printed text "BRÉSIL. Minas Geraes. P. Claussen. *1^er^ envoi reçu en mars 1839*." and the annotation "Guettarda viburnoides Ch. & Schlecht. var. pannosa Müll. Arg." handwritten by Müller Argoviensis. The specimen with barcode G00642012 is here designated as the lectotype of this varietal name.

FGT, vol. 40(1), p. 560:
Synonym:
"*Guettarda viburnoides* Muell. Arg. var. *genuina* Muell. Arg. in Mart., Fl. Bras. 6(5): 18. 1881, **syn. nov**. Sintipos: Rio de Janeiro […]; Minas Gerais […]; Bahia […]; Tocantins, "Porto Real" [Porto Nacional], s.d., *Burchell 8669* (G n.v.); sem localidade, s.d., *Gardner 3216* (G n.v.)."

Type: BRAZIL. Rio de Janeiro: Without locality, s.d., *Collector Unknown s.n.* (G [barcode G00642011], **lectotype here designated**).

Notes: Müller Argoviensis (1881: 18) described *Guettarda viburnoides* var. *genuina* Müll.Arg. citing numerous gatherings from several Brazilian states. In G there is a sheet with barcode G00642011 on which is affixed an envelope containing several loose leaves, a loose inflorescence, several flowers in anthesis, and one fruit. On the envelope is the annotation "Guettarda viburnoides β genuina Müll. Arg., Rio de Janeiro" handwritten by Müller Argoviensis. On the lower portion of the sheet is affixed a label with the annotation "G. viburnoides β genuina Müll. Arg.!" handwritten by Müller Argoviensis. This specimen is original material of *Guettarda viburnoides* var. *genuina*, and is here designated as the lectotype of this varietal name. However, *G. viburnoides* var. *genuina* is not a valid name (Art. 24.3, Turland et al., 2018).

FGT, vol. 40(1), p. 560:
Synonym:
"*Guettarda viburnoides* Muell. Arg. var. *rhombifolia* Muell. Arg. in Mart., Fl. Bras. 6(5): 18. 1881, **syn. nov**.

Sintipos: Rio de Janeiro […]; Ceará […]; Tocantins, "inter Conceição et Natividade" [entre Conceição do Tocantins e Natividade], s.d., *Burchell 8229* (G n.v.)."

Type: BRAZIL. Tocantins**:** "inter Conceicao et Natividade" [between the towns of Natividade and Conceição do Tocantins], s.d., *J.W. Burchell 8229* (BR [barcode 000000531620], **lectotype here designated**).

Notes: Müller Argoviensis (1881: 18) described *Guettarda viburnoides* var. *rhombifolia* Müll. Arg. and cited the material studied as "*Habitat in prov. Ceara: Gardner n. 1696; inter Conceicao et Natividade: Burchell n. 8229; prope Rio de Janeiro: Widgren n. 1038, Glaziou n. 711, 4021, Sello*."

A specimen in BR, barcode 000000531620, has a label with the stamp "Herb. Hort. Bruxell." and the handwritten annotation "Brasilia: inter Conceicao et Natividade, prov. Goyaz, communic. H. Kewense 1864, Burchell nº 8229." On the sheet is affixed a second label with the annotation "Guettarda viburnoides Ch. & Schl. α [r]hombifolia" handwritten by Müller Argoviensis. The specimen consists of a sterile branch with several leaves and a fertile branch with numerous leaves and inflorescences with flower buds and flower in anthesis. This specimen is here designated the lectotype of this varietal name.

No original specimen associated with this name could be found in G.

28. **HAMELIA** Jacq., Enum. Pl. Carib. 2, 16. 1760.

FGT, vol. 40(1), p. 577:
"28-1. ***Hamelia patens*** Jacq., Enum. Pl. Carib. 16. 1760. Tipo: Republica Dominicana, s.d., *Jacquin s.n.* (P? W? cf. Elias 1976:102)."

Accepted name: *Hamelia patens* Jacq.

Type: DOMINICAN REPUBLIC. La Romana: La Uvita, S of town of Cumayasa, km 10, on Mar Caribe coast, marine coral limestone, 18º24'N, 69º3'W, less than 10 m, 24 Nov. 1980 (fl, fr), *M. Mejía & T. Zanoni 9390* (NY [barcode 01326210], **neotype here designated**).

Notes: Nikolaus Joseph Jacquin (1760: 16) published *Hamelia patens* Jacq. with the sole description "racemis patentibus" without citing any locality or specimen. Elias (1976) indicated and discussed the possible original material of *H. patens* as "Type. Domingo (Dominican Republic), Jacquin s.n. P? There is apparently some confusion as to the type locality. Standley in North American Flora cites the type locality as forests near Cartagena, Colombia." The initial description was made as a result of a voyage to the Greater Antilles and Colombia. Three years after *H. patens* was first published, Jacquin (1763: 72) published a lengthy description of this species and cited the following "Habitat in Domingo…" It appears that the type locality is the Dominican Republic rather than Colombia. A Cuban specimen labeled *H. patens* and collected by Jacquin was examined: Cuba, without exact locality, Jacquin s.n. (F fra.! ex Vienna)." (Elias, 1976: 81).

D'Arcy (1970) discussed in detail the fate of the Jacquin Herbarium and explained the difficulty of finding original material. He stated that "today there is no single "Jacquin Herbarium" but his specimens are to be found at Vienna [W], the Linnaean Herbarium [LINN], in the British Museum [BM], and some are dispersed in other European herbaria." According to Stafleu and Cowan (1979: 407) "Sir Joseph Banks acquired Jacquin material. This is often referred in literature as the Jacquin herbarium. […] It is difficult to find West Indian material collected by him. It is doubtful whether Jacquin brought home from the West Indies sizeable collections of dried plants. J.E. Dandy informed us that the Jacquin material from the West Indies in the Banks herbarium (now BM) is rare and consists of scraps or small specimens." See discussion also under *Coutarea hexandra*.

Delprete (2010a: 577), following Elias (1976), indicated that possible original material might be present in P or W. After an exhaustive search in both herbaria, no specimen of *Hamelia patens* attributable to Jacquin was found. Additional extensive searches were also conducted in the herbaria indicated by D'Arcy (1970), Elias (1976), and Stafleu and Cowan (1979), but no original specimen of *H. patens* was found. Therefore, a neotype needs to be selected for this name. The specimen *Mejía & Zanoni 9390* at NY, with barcode 01326210, collected in the Dominican Republic, has inflorescences with flowers and fruits, and is here designated the neotype of this name.

Cabral and Salas (2022d: 301) cited the type of *Hamelia patens* as "TIPO. Républica Dominicana [Santo Domingo], *N. J. Jacquin s. n.* (holotipo, P)," but there is no such specimen in P.

Synonym:
(=) *Schoenleinia thyrsoidea* Miers, Proc. Roy. Hort. Soc. 4: 186. 1864.

Type: COLOMBIA: Río Magdalena, s.d., *J. Weir 26* (holotype BM [barcode BM001008877]).

Notes: In the protologue of *Schoenleinia thyrsoidea* Miers, Miers (1864: 186) cited the material studied as "Rio Magdalena. – Weir 26." and stated that "this plant approaches nearest to the genus *Schoenlinia* of Klotzsch, the type of which is *Exostemma cuspidata* St. Hil.; I find no species among the *Cinchona* group hitherto described, to which it can be referred." At BM there is a specimen, with barcode BM001008877, and the label "HERB. JOHN MIERS. Bequeathed 1879." On the same sheet are affixed three additional labels, with blue paper. One small label has the annotation "Schoenlinia thyrsoidea nob." handwritten by Miers. On the second label with blue paper is handwritten "Rio Magdalena, N. Grenada, Weir 26." On a third label with blue paper is present a long species description, handwritten by Miers, corresponding to that of his publication. This specimen is the holotype of this name.

29. **IXORA** L., Sp. Pl. 110. 1753.

FGT, vol. 40(2), p. 584:
"29-1. ***Ixora araguaiensis*** Delprete, J. Bot. Res. Inst. Texas 2(1): 456, fig. 2. 2008. Tipo: Brasil, Tocantins, Mun. Pium, Ilha do Bananal, Parque Nacional do Araguaia, Posto de fiscalização do Projeto Quelônios da Amazônia, 09°50'57"S, 50°11'31"W, 190 m, 26/III/1999 (fl), *M.A. da Silva, R.C. Mendonça, E. Cardoso, A.D. dos Santos, N.G. Sousa, N.R. Oliveira & J.T. dos Santos 4164* (holótipo, IBGE; isótipo, NY)."

Accepted name: ***Ixora araguaiensis*** Delprete

Type: BRAZIL. Tocantins: Mun. Pium, Ilha do Bananal, Parque Nacional do Araguaia, Posto de fiscalização do Projeto Quelônios da Amazônia, 9°50'57"S, 50°11'31"W, 190 m, 26 Mar. 1999 (fl), *M.A. da Silva, R.C. Mendonça, E. Cardoso, A.D. dos Santos, N.G. Sousa, N.R. Oliveira & J.T. dos Santos 4164* (holotype, IBGE [Acc. No. 046569]; isotype, NY [barcode 01085900]).

FGT, vol. 40(2), p. 589:
"29-2. ***Ixora brevifolia*** Benth., Linnaea 23: 448. 1850. Tipo: Brasil, Minas Gerais, sem localidade, 1845-1846 (fl), *Widgren 1119* (lectótipo, UPS V-134607, selecionado por Delprete, 2003; isolectótipo UPS V-102640)."

Accepted name: ***Ixora brevifolia*** Benth.

Type: BRAZIL. Minas Gerais: Without locality, "skogstrakter" [forest tracts], 1845–1846, *J.F. Widgren 1119* (UPS V-134607, lectotype designated by Delprete (2003: 1472); isolectotype UPS V-102640; isolectotype fragment NY [barcode 00688209; ex UPS V-134607]).

Notes: For synonyms and types see Delprete (2003).

FGT, vol. 40(2), p. 593:
"29-3. ***Ixora casei*** Hance in Walp., Ann. Bot. Syst. 2: 754. 1852. - Tipo: Ilhas Carolinas ("Strong Island"), s.d., *Q.W. Case s.n.* (holótipo, K)."

Accepted name: ***Ixora casei*** Hance in Walp.

Type: CAROLINE ISLANDS: Strong Island, s.d., *Q.W. Case s.n.* (holotype, K [barcode K000763383]).

For synonyms see Delprete (2010b: 593).

Notes: Hance (in Walpers 1852: 754) in the protologue of *Ixora casei* Hance cited the collection locality of the material studied as "in insulis Carolis ad "Strong's Island." In K, there are two specimens reporting that locality associated with this name.

The K specimen with barcode K000763379 has the annotations "Type specimen of Bot. Mag. t. 685" and "Ixora macrothyrsa J. & B.) I. duffii Veitch! See Fl. & Pom. 1878, p. 76 with woodcut) Ualan on Strong Island, Caroline Group, Kew Gardens Sept. 18, 1884" handwritten directly on the sheet. A third annotation says "Not I. macrothyrsa of Malaysia! See Bremekamp in Bull. Jard. Bot. Buit. sér. 3, 14, 278 (1937)" handwritten by Bremekamp directly on the sheet. The specimen consists of three loose leaves and two inflorescences. This specimen is not original material, because it was gathered from a plant cultivated in the Kew Gardens in 1884, reproduced from material collected in Strong's Island.

The K specimen with barcode K000763383 has the the annotation "Ixora casei Hance in Walpers Ann. Vol. II, p. 754. Strong Island (Caroline Islands) An S. N. Case" handwritten in pencil directly on the sheet. This specimen is the holotype of *I. casei*.

FGT, vol. 40(2), p. 595:
"29-4. ***Ixora chinensis*** Lam., Encycl. Meth. 3: 344. 1789. - Tipo: China, "communicated by Sonnerat" (holótipo, P-Lam.)."

Accepted name: *Ixora chinensis* Lam.

Type: CHINA. Without locality, s.d., *P. Sonnerat s.n.* (first-step lectotype designated by Fosberg & Sachet (1989a: 77); P-LA [barcode P00308523], **second-step lectotype here designated**).

For synonyms see Delprete (2010b: 595).

Notes: In the protologue of *Ixora chinensis* Lam., Lamarck (1789: 344) cited "*Flamma sylvarum peregrina*, Rumph. Amb. 4. p. 107, t. 47." and stated "Je ne vois pas pourquoi Linné a associé le *Flamma sylvarum* de Rumphe avec le *Pavetta* de Rhéede, dont je traiterai après cette espèce. A la verité, ces deux plantes sont du même genre; mais elles sont très-distinctes l'une de l'autre, comme l'examen m'en a convaincu, les possedant toutes deux dans mon herbier." ("I don't see why Linnaeus associated *Flamma sylvarum* of Rumphius with *Pavetta* of Rhéede, which I will treat after this species. To the truth, these two plants belong to the same genus; but they are very distinct from each other, as the examination convinced me, both of them being present in my herbarium). He described the material studied of *I. chinensis* as "Cette espèce nous a été communiqué par M. Sonnerat, comme provenant de la Chine; elle croit aussi dans l'Isle de Java. (v.s.)." ("This plant was communicated by Mr. Sonnerat, as originated from China; it grows also in the Island of Java"). The abbreviation "v.s." (vidi siccum) means that he saw a specimen in his own herbarium. Therefore, original material of this name is a specimen collected by Sonnerat present in the Lamarck herbarium (P-Lam.) in Paris and plate 47 "*Flamma sylvarum peregrina*" of Rumphius's *Herbarium amboinense*, vol. 4 (1743). The geographic region studied in this publication is "Amboina" or "Amboyna", nowadays called Ambon Island, which is part of the Maluku Islands of Indonesia.

On Rumphius's plate 47 is depicted a branch with numerous leaves and an inflorescence with flower buds and flowers in anthesis. The leaves are depicted as short-petiolated, with blades acute at base and obtuse-subacute at apex, and with 6–8 secondary veins on each side of the midrib. The flower buds are depicted as acute at the apex. The corollas are drawn has having a long-narrow tube and short lobes round at the apex. On page 107, Rumphius described the provenance of the plant as "Elegans *Flammae silvarum* species circa annum 1675 in Amboinam fuit delata sub nomine floris Japanensis mirabilis, proquo & per decem annos istum habui, tandem vero a diversis Europaeis, qui diu in ista regione versati fuere, intellexi, hanc arborem sese non in Japana, sed in Java aliisque Malayensibus regionibus vidisse, unde & hanc tanquam peregrinam species *Flammae silvarum* describam." The description that follows that statement is quite detailed and corresponds to all features depicted on plate 47.

Fosberg and Sachet (1989a: 77) cited the type of *Ixora chinensis* Lam. as "Type: China. "communicated by Sonnerat" (P-Herb. Lam. Not seen by us)." As their type citation was published before 2001, it should be treated as an inadvertent first-step lectotypification, because in P-LA there is a sheet with two different gatherings. On the right side of the sheet are affixed a small branch with one leaf and a terminal inflorescence, and two loose leaves, with barcode number P00308523. On the stem is affixed a label with the annotation "ixora chinensis lam. dict." The corollas have broadly ovate to almost round lobes, obtuse at the apex. This specimen, with barcode number P00308523, is here designated as the second-step lectotype of *Ixora chinensis*.

FGT, vol. 40(2), p. 598:
"29-5. ***Ixora coccinea*** L., Sp. Pl. 110. 1753; L., Gen. Pl., ed. 5, 48. 1754. - Tipo: "Habitat in Índia" (BM-LINN)."

Accepted name: *Ixora coccinea* L.

Type: [icon] "*Schetti*" in Rheede, Hort. Malab. 2: 17, tab. 13. 1679, lectotype designated by Fosberg and Sachet in Taxon 38: 488. 1989.

For synonyms see Delprete (2010b: 598–599).

Notes: Fosberg and Sachet (1989b: 486–489) showed that the various potential typifications of *Ixora coccinea* L. were either inadequate or invalid (Bremekamp, 1937: 198; Corner, 1941: 185; respectively). They concluded that, to maintain the traditional usage of the name for the species they designated Table 13 of Rheede's (1679) second volume of *Hortus Indicus Malabaricus* as the lectotype of this name. Jarvis (2007: 598) cited Fosberg and Sachet's discussion and typification, and accepted Rheede's plate as lectotype.

FGT, vol. 40(2), p. 601:
"29-6. ***Ixora congestiflora*** Delprete, J. Bot. Res. Inst. Texas 2(1): 456, fig. 1. 2008. Tipo: Brasil, Tocantins, Mun. Caseara, Parque Estadual do Cantão, transecto 11, floresta estacional semidecídua, 09°18'00"S, 50°01'57"W, 15/I/2000 (fl), *P.E. Nogueira & M. Richter 692* (holótipo, IBGE; isótipo, NY)."

Accepted name: ***Ixora congestiflora*** Delprete

Type: BRAZIL. Tocantins: Mun. Caseara, Parque Estadual do Cantão, transecto 11, floresta estacional semidecídua, 9°18'0"S, 50°1'57"W, 15 Jan. 2000 (fl), *P.E. Nogueira & M. Richter 692* (holotype, IBGE [Acc. No. 047624]; isotype, NY [barcode 01085899]).

FGT, vol. 40(2), p. 604:
"29-7. ***Ixora finlaysoniana*** Wall. ex G. Don, Gen. Hist. 3: 572. 1834. Tipo: Indias Orientais (holótipo, BM)."

Type: "EAST INDIES". Without locality, s.d. [1821–1823], *G. Finlayson s.n.* (holotype, K [barcode K001123205, Wallich Cat. No. 6166]; isotype, LE [barcode LE00017478]).

Notes: George Don (1834: 572) published *Ixora finlaysoniana* Wall. ex G. Don and cited "Wall. cat. no. 6166" and "Native of the East Indies." Delprete (2010b: 604) cited the holotype at BM, but apparently there is no original material associated with this name in that institution. At K there is a specimen, with barcode K001123205, with the handwritten label "6166 Ixora Finlaysoniana Wall. M. Finlayson." This specimen is the holotype of this name.

FGT, vol. 40(2), p. 605:
"29-8. ***Ixora irwinii*** Delprete, J. Bot. Res. Inst. Texas 2(1): 459, fig. 3. 2008. Tipo: Brasil, Tocantins, 1 km S de Araguaina, Rio das Lontras, 300 m, 15/III/1968 (fr), *H.S. Irwin, H. Maxwell & D.C. Wasshausen 21221* (holótipo, UB; isótipo, NY)."

Accepted name: ***Ixora irwinii*** Delprete

Type: BRAZIL. Tocantins: 1 km S de Araguaina, Rio das Lontras, 300 m, 15 Mar. 1968 (fr), *H.S. Irwin, H. Maxwell & D.C. Wasshausen 21221* (holotype, UB [barcode UB0040430]; isotypes, NY [barcode 01085901], US [barcode US02508907]).

FGT, vol. 40(2), p. 609:
"29-9. ***Ixora pubescens*** Willd. in Schult. & Schult. f., Mant. 3: 126. 1818 [sic! 1827]. - *Faramea vaginata* Benth., *nom. nud*., Linnaea 23: 454. 1850; non Griseb. (1866, *nom. superfl*.). Tipo: Brasil, Pará [provavelmente perto de Belém], s.d., *F.W. Sieber s.n.* (holótipo B-W 2807 [*dedit Hoffmannsegg*])."

Accepted name: ***Ixora pubescens*** Willd. in Schult. & Schult. f., Mant. 3: 126. 1827.

Type: BRAZIL. Pará: [probably Belém], s.d., *F.W. Sieber in J.C. Hoffmannsegg s.n.* (holotype B-W [barcode B –W 02807 -01 0]; isotype frag. G [barcode G00634186]).

Notes: Joseph A. Schultes and Julius H. Schultes (1827: 126) published *Ixora pubescens* Willd. in Schult. & Schult. f. (Art. 46.3, Ex. 15) and cited the material studied as "*In Para Brasiliae*, com. a *Hoffmannsegg*." That material was collected by Sieber, and Hoffmannsegg never set foot in Brazil. In B-W there is a specimen, with barcode B –W 02807 -01 0, with the handwritten label "arbuste rbr. gull. (Sieber)" affixed on the bottom right corner of the sheet. The annotation "Ix. pubescens" is handwritten directly on the the upper right corner of that sheet. This is the specimen of *Ixora pubescens* studied by Willdenow and is the holotype.

In G there is a sheet, barcode G00634186, with an envelope containing one leaf and the fragment of an inflorescence. On the envelope is handwritten "Ixora pubescens Willd., Pará: Hoffmannsegg, fol. numis & flor." This is an isotype fragment of this name.

FGT, vol. 40(2), p. 609:
Synonym:
"*Ixora pubescens* var. *glabrifolia* Muell. Arg. in Mart., Fl. Bras. 6(5): 62. 1881. Tipo: Brasil, Pará, "in vicinibus Pará" [agora Belém], *Spruce 328* (lectótipo G, aqui selecionado, isolectótipos G, K, foto-G [lectótipo] em US, foto-G [isolectótipo] em NY, foto-K em NY)."

Type: BRAZIL. Pará: "in vicinibus Pará" [near Belém], s.d. [Jul.–Aug. 1849], *R. Spruce 328* (first-step lectotype designated by Delprete (2010b: 609); G [barcode G00634184], **second-step lectotype here designated**; isolectotypes, FI [barcode FI004824], G [barcode G00634185], K [barcode K000424499], M [barcode M-0187733]; photo-G [F neg. No. 25677] in NY; photo-K in NY).

Notes: Müller Argoviensis (1881: 62) cited the gatherings *Spruce 328*, *Burchell 9456*, and *Burchell* 9270 for *Ixora pubescens* var. *glabrifolia* Müll. Arg., without citing the herbarium of deposit. In G, there are two specimens of *Spruce 328*. Therefore, Delprete's (2010b: 609) statement "lectótipo G, aqui selecionado" should be treated as first-step lectotypification. The specimen with the annotation "I. pubescens β glabrifolia, scripsit Müll.-

Arg.!", with barcode G00634184, is here designated the second-step lectotype of this name.

FGT, vol. 40(2), p. 611:
"29-10. ***Ixora undulata*** Roxb. in Carey & Wall. (Eds.), Fl. Indica ou escr. Indian Pl. 1: 395. 1820. Tipo: Bangladesh/India, "nativo das florestas de Bengala", s.d., *Roxburg s.n.* (não visto)."

Accepted name: *Ixora undulata* Roxb. ex Sm.

Correct author and bibliographic citation: *Ixora undulata* Roxb. ex Sm. in Rees, Cycl. 19: Ixora No. 7. 1814.

Type: "EAST INDIES": Without locality, 1808, *Lord Valentia s.n.*, Herb. Smith No. 189.9 (LINN [barcode unknown], lectotype designated by I.M. Turner (2021: 397)).

Synonym:
Ixora undulata Roth in Roemer & Schultes, Syst. Veg. 3: 178. 1818, *nom. illeg.*, non Roxb. ex Sm. 1814 ["Ixora undulata B.Heyne ex Roth", Nov. Pl. Sp.: 91. 1821, isonym].

Type: [INDIA]: Without locality, s.d., *W. Roxburgh s.n.* (B-W [barcode B -W 02809 -01 0], neotype designated by Turner (2021: 397)).

Ixora undulata Roxb., Fl. Ind. 1: 385. 1820, *nom. illeg.*, non Roxb. ex Sm. 1814, nec Roth 1818.

Type: [INDIA]: Without locality, s.d., *W. Roxburgh s.n.* (K n.v. [barcode unknown], lectotype designated by Husain and Paul in J. Econ. Taxon. Bot., Addit. Ser. 6: 178. 1989).

Notes: Ian M. Turner (2021: 397) explained the lectotypification of *Ixora undulata* Roxb. ex Sm. and its synonyms as follows: "This is another case where the same name was published by different authors over a relatively short period. In this case they all concern the same species. No specimens likely to have been seen by Roth have been found. The species is confined to North India, so it is likely that Heyne was sent a specimen by Roxburgh, or received one when he visited Roxburgh in Calcutta in late 1811, before his departure from India on leave (Heyne, 1814). Therefore, selecting a Roxburgh specimen as neotype for Roth's name seems acceptable. The earliest validation of *Ixora undulata* was by Smith. There is a specimen from Roxburgh in Smith's herbarium in LINN, which is here designated as lectotype for Smith's name. There is more than one Roxburgh specimen of this species in K, so I am not currently able to state which specimen is the lectotype of *Ixora undulata* Roxb."

30. **LADENBERGIA** Klotzsch in Hayne, Getr. Darst. Gew. 14: tab. 15. 1846.

FGT, vol. 40(2), p. 614:
"30-1. ***Ladenbergia cujabensis*** Klotzsch in Hayne, Getr. Darst. Gew. 14: tab. 15. 1846. - *Remijia cujabensis* (Klotzsch) Wedd., Ann. Sci. Nat., Sér. 3, 10: 13. 1848. - *Cinchona cujabensis* Manso ex Klotzsch in Hayne, *pro syn.*, Getr. Darst. Gew. 14: tab. 15. 1846. - Tipo: Brasil, Mato Grosso, perto de Cuiabá, s.d., *Manso & Lhotsky 20* (holótipo, B, destruído, foto em NY; lectótipo, F, aqui escolhido, isolectótipo, G)."

Accepted name: *Ladenbergia cujabensis* Klotzsch ex Walp.

Type: BRAZIL. Mato Grosso: Near Cuiabá, 1832, *P.A.L. da Silva Manso & J. Lhotsky 20* (F [Acc. No. 768356], **lectotype here designated**; isolectotypes, B†, BR [barcode 00000552387, without collection number], F [Acc. No. 686819], G [(2 sheets) barcode G00405218]).

Notes: There are three citations of *Cinchona cujabensis* Manso prior or contemporary to the publication of *Ladenbergia cujabensis* Klotzsch ex Walp. (Walpers, 1846): Fürnrohr (1832: 26), Martius (1843: 57), and Mérat (1846: 614). However, those three publications cite *C. cujabensis* as a *nomen nudum*. Hence, the combinations based on *C. cujabensis* are invalid, because the basionym is a *nomen nudum*.

Ladenbergia cujabensis Klotzsch ex Walp. was first validly published by Walpers (1846: 67), who was the first author to provide a description of this species and attributed the name to Klotzsch.

Weddell (1848: 13) published the combination *Remijia cujabensis* (Klotzsch ex Walp.) Wedd. His citation was "8. R. Cujabensis. — Ladenbergia Cujabensis Kltzsch. l. c." This is an indirect reference to *Ladenbergia cujabensis*, the basionym, because he cited Klotzsch.

Andersson (1997: 276) cited the authority of *Ladenbergia cujabensis* as "*Ladenbergia cujabensis* Klotzsch in Hayne, Getreue Darstell. Gew.] 14 t. 15. 1846." Hayne's (1846) publication consists of a series of

plates accompanied by an unpaginated text. The text of plate 14, on line 22, says "8) L. (Casc.) cujabensis Kl. (Cinchona cujabensis Manso) Brasilia." On line 22, there is no description, but a basionym is cited, *C. cujabensis*. Andersson (1997: 276) cited the type of *L. cujabensis* as "Type: *Manso & Lhotsky 20*; Brazil, Mato Grosso, vicinity of Cuiabá (B holotype, destroyed, photo F-155; F, G isotypes)," Andersson's "holotype" cannot be corrected to "lectotype" because the B specimens was destroyed during WWII.

Delprete (2010b: 614) followed Andersson's citation of the authority of this name, by citing *Ladenbergia cujabensis* Klotzsch in Hayne. Delprete (2010b: 614) designated the lectotype of this name as a specimen at F. However, at F there are two sheets of *Manso & Lhotsky 20*, both consisting of fragments removed from material in G. Hence, a lectotype needs to be designated.

The F specimen with Acc. No. 686819 is a fragment with one loose leaf and an infructescence with open capsules. The other specimen at F, Acc. No. 768356, has a label with the heading "Herbier de Candolle" on which is handwritten "No. 20" and "M. da Silva Manso" and another label with the handwritten annotation "20. Ladenbergia cuyabensis Kl. Cujabae. fl. nov. – leg. M. da Silva Manso 1832." The F specimen with Acc. No. 768356 consists of a small branch with three leaves and an infructescence with open capsules and is here designated the lectotype of this name.

In G there are two sheets, with barcode G00405218, that are original material associated with this name. On the first sheet is affixed a label with the annotation "M. da Silva Manso 1832, 20, Cinchona Cuyabensis Manso, […] Cuyaba, fl. Nov." On both sheets are affixed branches with several leaves and inflorescences with dehisced capsules. This specimen, mounted on two sheets, is an isolectotype of *Ladenbergia cujabensis*.

31. **LIMNOSIPANEA** Hook. f., Hooker's Icon. Pl. 11: 38. 1868.

FGT, vol. 40(2), p. 621:
"31-1. ***Limnosipanea erythreoides*** (Cham.) K. Schum. in Mart., Fl. Bras. 6(6): 253, tab. 123. 1889. - *Sipanea erythraeoides* Cham., Linnaea 9: 242. 1834. Tipo: "Brasilia inter tropicos", s.d., *Sellow s.n.* (holótipo B, destruído)."

Accepted name: ***Limnosipanea erythraeoides*** (Cham.) K. Schum.

Type: BRAZIL. Goiás: Near Caiapônia, "in arenosis humidiusque, Aldeia dos Cayapos" [sandy humid savanna, near the indigenous village of the Cayapos (now the town of Caiapônia, ca. 16º57'S, 51º48'W)], Aug. 1826 (fl), *L. Riedel 409* (BR [barcode 00000824532], neotype designated by Delprete (2022: 54); isoneotypes BM [barcode BM000614341], FI [barcode FI018882], P [barcode P00729267], US [Acc. No. 254488]).

FGT, vol. 40(2), p. 624:
"31-2. ***Limnosipanea palustris*** (Seem.) Hook. f. in Hook., Ic. Pl. 11: 38, pl. 1050. 1868. - *Sipania palustris* Seem., Bot. Voy. Herald 136. 1854; non *Sipanea palustris* (A. Rich.) J.H. Kirkbr., nom. superfl. [= *Sipanea wilsonbrownei* R.S. Cowan]. Tipo: Panamá, perto da cidade de Panamá, *Seeman 347* (holótipo, K; isótipo, K, fotos em NY)."

Accepted name: ***Limnosipanea palustris*** (Seem.) Hook. f.

Correct citation: *Limnosipanea palustris* (Seem.) Hook. f., Ic. pl. 11: 38. 1868. - *Sipanea* [as "*Sipania*"] *palustris* Seem., Bot. Voy. Herald 136. 1854; non *Sipanea palustris* (A. Rich.) J.H. Kirkbr., Brittonia 49: 360. 1997, *comb. illeg. superfl.* (= *Sipanea wilsonbrownei* R.S. Cowan); non *Bertiera palustris* A. Rich. ex DC. (Sep. 1830: 392).

Type: PANAMA: Near Panama City, swamps, s.d. [1846–1849], *B.C. Seemann 347* (BM [barcode BM 000614301]), lectotype designated by Delprete (2022: 57); isolectotype K [without barcode]; photo-BM at BM, MO, NY, US).

FGT, vol. 40(2), p. 624:
Synonym:
"*Limnosipanea schomburgkii* Hook. f. in Hook., Icon. Pl. 1050. 1868."

Correct citation: *Limnosipanea palustris* (Seem.) Hook. f., Ic. pl. 11: 38. 1868.

Type: GUYANA. ["Roraima", sic!], Rovuma River, s.d. [1842–1843], *R.H. Schomburgk ser. II, 464 (= M.R. Schomburgk 744)*, (BM) [BM000614338] lectotype designated by Delprete (2022: 57); isolectotypes F [Acc. No. 766892], G [2 sheets, barcodes G00379139, G00379140], K [without barcode], P [barcode P00729461], US [barcode 00588519]; photo-P at NY; photo-G at F [Neg. No. 25681]).

Limnosipanea schomburgkii var. *robustior* Pilg. in Bot. Jahrb. Syst. 30: 198. 1901 [title page of the volume reports "1902" but the third page of the same volume reports that "Heft 2 (pp. 129–288)" was published in "2 July 1901"].

Type: BRAZIL. Mato Grosso: Near Cuiabá "gesellig in kleinen Complexen auf trockner Wiese bei Cuyabá," Apr. 1899 (fl), *R. Pilger 400* (holotype B [barcode B 10 0673663]).

FGT, vol. 40(2), p. 627:
"31-3. ***Limnosipanea spruceana*** Hook. f. in Hook., Icon. Pl. 11: 38, pl. 1050. 1868. Tipo: Brasil. Pará: Amazon River, marshy and sandy places near Pará [Belem], Spruce (1851). "*Sipanea limnophila* Spruce," *in herb.*, *R. Spruce 1027* (lectótipo, K, aqui selecionado; isolectótipo, RB). [parátipo: "Vicinibus Santarem, Prov. Pará, Brazil, VIII/1850, *R. Spruce 677*" citado por Steyermark (1967: 283) como o tipo desta espécie]."

Accepted name: ***Limnosipanea spruceana*** Hook. f.

Type: BRAZIL. Pará: Amazon River, marshy and sandy places near Pará [Belem], *R. Spruce 1027*, (K [without barcode], lectotype designated by Delprete (2010b: 627); isolectotypes P [barcode 00729466], RB [ex P, barcode 00543629]; possible isolectotypes (without collection number) BM [barcode BM000614344], E [2 sheets, barcodes E00499997, E00499998], F [2 sheets, Acc. Nos. 768300 and 971288], FI-Webb [barcode FI004806], MPU [barcode MPU 021333], P [barcode 00729465]; S [Acc. No. S05-474]; photo-B and photo-K at NY).

32. **MACHAONIA** Bonpl. in Humb. & Bonpl., Pl. Aequin. 1: 101, tab. 29. 1806 ["1808"].

FGT, vol. 40(2), p. 631:
"32-1. ***Machaonia acuminata*** Bonpl. in Humb. & Bonpl., Pl. Aequin. 1: 101, pl. 29. 1806 ["1808"]; emend. K. Schum. in Mart., Fl. Bras. 6(6): 100, tab. 89, fig. 1. 1888. Tipo: Ecuador, Guayaquil, s.d., *Humboldt & Bonpland 3828* (lectótipo, P, aqui selecionado)."

Accepted name: ***Machaonia acuminata*** Bonpl.

Type: ECUADOR: Guayaquil, s.d., *A. Bonpland & A. Humboldt 3828* (P [barcode P00135075] lectotype designated by Delprete (2010b: 631); isolectotype P [barcode P00135076]).

33. **MALANEA** Aubl., Hist. Pl. Guiane 1: 106, pl. 49. 1775.

FGT, vol. 40(2), p. 640:
"33-1. ***Malanea macrophylla*** Bartl. ex Griseb., Fl. Brit. W. Ind. 337. 1861. - *Malanea macrophylla* Bartl. in M.R. Schomburgk, Faun. & Fl. Brit. Gui. 947. 1848. Tipo: Guiana, Morocco River, s.d. *Rich. Schomburgk s.n.* (holótipo, BM)."

Accepted name: ***Malanea macrophylla*** Bartl. ex Griseb.

Type: GUYANA: Morocco River, s.d. *M. Rich. Schomburgk 1484* (GOET [barcode GOET008943], **lectotype here designated**).

Notes: The name *Malanea macrophylla* Bartl. was first published by Moritz Richard Schomburgk (1848: 947) as a *nomen nudum*. In the protologue of *Malanea macrophylla* Bartl. ex Griseb., Grisebach (1861: 337) cited "*MS in Rich. Schom. Fl. Guian. p.* 947" and the gatherings "Hab. S. Vincent! *Guild.*; Trinidad!, *Cr.*, as S. Anns; [Guiana!]."

Delprete (2010b: 640) cited as holotype of *M. macrophylla* a specimen at BM from Guyana, Morocco River, collected by Moritz Richard Schomburgk, without collection number. As Delprete's citation was published after 2001, it cannot be treated as an inadvertent lectotypification, because it is not accompanied "here designated" or a similar expression.

At GOET, where Grisebach worked, there is a sheet, with barcode GOET008943, on which are affixed two labels. The label at the lower left corner of the sheet has the handwritten annotation "Malanea macrophylla Bartl. – In Guyana Anglica, ad fl. Morocco leg. Rich. Schomburgk n. 1484, Acc. 1848." Just above that label, there is another label with the annotation "1484, Malanea … fl. Marocco, Britt. Gujana Richard Schomburgk, Sept. 1843" probably handwritten by Schomburgk. This specimen consists of a branch with one leaf, two axillary inflorescences, and well-developped apical stipules, and a loose leaf, and is here designated the lectotype of *M. macrophylla*.

34. **MANETTIA** Mutis ex L., Mant. 2: 553, 558. 1771, *nom. cons.*

FGT, vol. 40(2), p. 648:
"34-1. ***Manettia cordifolia*** Mart., Königl. Akad. Wiss. Königl. Gen.-Conserv. Wiss. Saaml. München 9: 95, pl. 7. 1824. - *Manettia ignita* var. *cordifolia* (Mart.) K. Schum. in Mart., Fl. Bras. 6(6): 170. 1889. - Tipo: Brasil, Minas Gerais, Villa Rica [agora Ouro Preto], s.d., *Martius s.n.* (holótipo M)."

Accepted name: *Manettia cordifolia* Mart.

Type: BRAZIL. Minas Gerais: "Villa Rica" [now the town of Ouro Preto], "habitat in sepibus, locis camporibus ad Villam Ricam etc. Provinciae Min. Geraes, Apr.", s.d. [Apr. 1818], *C.F.P. Martius s.n.* (M [barcode M-0198125], lectotype designated by Gauto et al. (2022: 430)).

Notes: Martius (1824: 96) cited the locality of *Manettia cordifolia* Mart., from material collected by himself, as "Habitat in sepibus et inter virgulta nec non in sylvarum prope Villam Ricam et alibi in Provincia Minarum […]." At M there are seven specimens with this name, collected by Martius in Minas Gerais. On the stem of each specimen is attached a small tag with a number handwritten by Töpfer in the 1900s (for reference see Fleischmann & Gonella, 2020). Those specimens are described below.

Specimen with barcode M-0198125: label without heading, with the handwritten annotation "Nacibea cordifolia Mart., habitat in sepibus, locis camporibus ad Villam Ricam etc. Provinciae Min. Geraes, Apr." and the printed text "Dr. Martius Iter Brasil." A second label, handwritten by K. Schumann says "Manettia ignita M. var. cordifolia m" and the stamp "det Schumann in Fl. Bras." The specimen has a small tag attached to the stem with the number "3015" handwritten by Töpfer. This specimen consists of a significant plant portion with numerous leaves, numerous flower buds, and numerous flowers in anthesis. In addition, it has a label saying that it was collected in an open field near Villa Rica, now the town of Ouro Preto, Minas Gerais. This specimen was designated as the lectotype of *Manettia cordifolia* by Gauto et al. (2022: 430).

Specimen with barcode M-0198128: label without heading, with the handwritten annotation "Manettia, habitat in sylvis ad Mariana et V.R.[a] [Villa Rica], Provinciae M. G., Apr." and the printed text "Dr. Martius Iter Brasil." A second label, handwritten by K. Schumann says "Manettia ignita m. var. cordifolia m" and the stamp "det. Schumann in Fl. Bras." On the specimen stem is attached a small tag with the number "3034" handwritten by Töpfer.

Specimen with barcode M-0198129: label without heading, with the handwritten annotation "Nacibea punicea Mart., Habitat in Campis ad Grão Magor Montem [Grão Mogol Mountain], Proviciae Min. Geraes, Aug." and the printed text "Dr. Martius Iter Brasil." A second label, handwritten by K. Schumann says "Manettia ignita m. var. cordifolia m" and the stamp "det Schumann in Fl. Bras." On the specimen stem is attached a small tag with the number "3026" handwritten by Töpfer.

Specimen with barcode M-0198130: label with heading "Herbarium Regium Monacense" and the handwritten annotation "Manettia, Martius Iter Brasiliense." A second label, printed, says "Manettia [ignita K. Schum. var. cordifolia K. Schum]." On the specimen stem is attached a small tag with the number "3012" handwritten by Töpfer.

Specimen with barcode M-0198131: label with heading "Herbarium Regium Monacense" and the handwritten annotation "Manettia, Martius Iter Brasiliense." A second label has the printed text "Manettia [ignita K. Schum. var. cordifolia K. Schum]." On the specimen stem is attached a small tag with the number "3011" handwritten by Töpfer.

Specimen with barcode M-0198132: label with heading "Herbarium Regium Monacense" and the handwritten annotation "Manettia, Martius Iter Brasiliense." A second label has the printed text "Manettia [ignita K. Schum. var. cordifolia K. Schum]." On the specimen stem is attached a small tag with the number "3010" handwritten by Töpfer.

Specimen with barcode M-0198134: label without heading, and the handwritten annotation "Sabicea acuminata Mart., Mart. Obs. 638., Habitat in campestribus, prope Villam Ricam, Provinciae Min. Geraes, Apr." and the printed text ""Dr. Martius Iter Brasil." A second label, handwritten by K. Schumann says "Manettia ignita M. an M. gracilis Ch. et Schl. exempl. minimi imperfectum" and the stamp "det Schumann in Fl. Bras." On the specimen stem is attached a small tag with the number "3007" handwritten by Töpfer.

FGT, vol. 40(2), p. 656:
"34-2. ***Manettia irwinii*** Steyerm., Brittonia 30: 36. 1978. - Tipo: Brasil. Goiás: Serra dos Pireneus, Valley of Rio Corumbá, steep rocky slope 15 km N of Corumbá de Goiás, on road to Niquelândia, 1150 m, 17/I/1968 (fl), *H.S. Irwin, H. Maxwell & D. Wasshausen 18688* (holótipo, UB; isótipos, K n.v., MBM, NY, VEN)."

Accepted name: *Manettia irwinii* Steyerm.

Type: BRAZIL. Goiás: Serra dos Pireneus, Valley of Rio Corumbá, steep rocky slope 15 km N of Corumbá de Goiás, on road to Niquelândia, 1150 m, 17 Jan. 1968 (fl), *H.S. Irwin, H. Maxwell & D. Washausen 18688* (holotype, UB [barcode UB0040326]; isotypes, K [barcode K000173773], MBM [barcode MBM068350], MO [Acc. No. 2817602], NY [barcode 00132193], US [barcode 00130538], VEN [Acc. No. 103020]).

FGT, vol. 40(2), p. 659:
"34-3. ***Manettia luteo-rubra*** (Vell.) Benth., Linnaea 23: 445. 1850. - *Guagnebina luteo-rubra* Vell., Fl. Flum. 46. 1825; Icon. 1: 121. 1831. Tipo: Brasil, coletor desconhecido, s.d., in Vellozo, Fl. Flum. Icon. 1: 121. 1831 (lectótipo)."

Accepted name: *Manettia luteorubra* (Vell.) Benth.

Type: BRAZIL. [State of Rio de Janeiro or São Paulo] [illustration]: Original parchment plate of *Florae Fluminensis* in the Manuscript Section of the Biblioteca Nacional of Rio de Janeiro [Catalogue No. mss1095062_125]), **lectotype here designated**.

Notes: Frei José Mariano da Conceição Vellozo (1742–1811) worked on the flora of the state of Rio de Janeiro and contiguous areas in the state of Sao Paulo and commended the drawings of the species to be published in his publication. According to Borgmeier (1937) and Carauta (1973), the text of *Florae Fluminensis* was printed in 1825 and distributed in 1829; and the illustrations in *Florae Fluminensis Icones* were edited in 1827 and published 1831. As Plate 121 of Vellozo's *Icones* was published two years after the publication of *Guagnebina luteorubra*, it cannot be treated as original material. An original drawing on parchment of *G. luteorubra* is kept in the Manuscript Section of the National Library in Rio de Janeiro. The original drawing prepared for Vellozo has the heading "Tetrand. Monog. GUAGNEBINA luteo rubra" printed at the top-center of the drawing, and the number "125" handwritten on the upper right corner. On the drawing is depicted a voluble branch with several solitary flowers. The original plate of *G. luteorubra*, with Catalogue No. mss1095062_125, is here designated the lectotype of this name.

35. **MITRACARPUS** Zucc. ex Schult. & Schult. f., Syst. Veg., Mant. 3: 210, 399. 1827.

FGT, vol. 40(2), p. 668:
"35-1. ***Mitracarpus baturitensis*** Sucre, Rodriguésia 26(38): 255. 1971. Tipo: Brasil, Ceará [Serra de Baturité], s.d., *A. Loefgren 898* (holótipo, RB)."

Accepted name: *Mitracarpus baturitensis* Sucre

Type: BRAZIL. Ceará: [Serra de Baturité], s.d., *A. Loefgren 898* (holotype, RB [Acc. No. 3899, barcode 00285709]).

FGT, vol. 40(2), p. 672:
"35-2. ***Mitracarpus eritrichoides*** Standl., Publ. Field Mus. Nat. Hist., Bot. 11: 223. 1936. Tipo: Brasil, Mato Grosso, Diamantino, nascente do Rio Paraguai, XII/1844 (fl, fr), *H.A. Weddell 3090* (holótipo, P)."

Accepted name: *Mitracarpus eritrichoides* Standl.

Type: BRAZIL. Mato Grosso: Diamantino, nascente do Rio Paraguai, Dec. 1844 (fl, fr), *H.A. Weddell 3090* (holotype, P [barcode P01090381], isotype fragment, F [ex P; Acc. No. 654376 barcode V0069777F]).

Notes: Standley (1936: 223–224) cited the type of *Mitracarpus eritrichoides* Standl. the specimen *Weddell 3090* at P, which is the holotype (Souza and Cabral, 2010; Souza et al., 2010).

FGT, vol. 40(2), p. 676:
"35-3. ***Mitracarpus hirtus*** (L.) DC., Prodr. 4: 572. 1830. - *Spermacoce hirta* L., Sp. Pl. ed. 2. 148. 1762. Tipo: Jamaica, s.l., s.d., *Coletor Desconhecido s.n.* (holótipo, LINN 125.4, foto!)."

Accepted name: *Mitracarpus hirtus* (L.) DC.

Type: JAMAICA. Without locality, s.d. [1746–1755], *P. Browne s.n.* (holotype, LINN-HL 125.8).

Notes: Linnaeus (1762: 148) described *Spermacoce hirta* L. as "erecta subirsuta, folia elliptica, lineata, subtus pubescentia […] verticilli multiflori" and cited "Brown. jam. 141. Habitat in Jamaica." Five years later, Linnaeus (1767: 115) re-described *S. hirta* as "scabra, fol. oblongis […] Folia elliptica, lineata, scabra utrique (subtus vero imprimis nervis), non villosa, subpetiolata petiolis connexis membrana multiseta. Flores albi, tubulosi, laterales. Stamina fauce longiora. Antherae

violaceae" and did not cite any specimen or collection locality.

The specimen LINN-HL 125.8 is annotated as "Spermacoce 3. Brown" by Solander, and "Spermacoce 3 hispida" by Linnaeus. Two other annotations are present: "villosa? Swartz" and "villosa? Swartz, non hispida", both handwritten in pencil by J.E. Smith. On the sheet are two branches with flowers and fruits. At the bottom of the lower branch Linnaeus wrote "Br", which confirms that this specimen was collected by Patrick Brown in Jamaica.

The specimen LINN-HL 125.4 is annotated as "hirta" by Linnaeus. No annotation by Linnaeus regarding the collector is present on the sheet. This is the specimen that he used to describe *Spermacoce hirta* in 1767. This specimen consists of a sterile branch. Nicolson (1977: 572) wrote that "The description of flower and anther color strongly suggests that Linnaeus prepared his description from living material and pressed the flowering specimen for his herbarium (now 125.4)." This specimen is not a species of *Mitracarpus*.

Verdcourt (1975: 317–322) provided a long discussion about the complex nomenclatural history and identity of this species, and stated that "the earliest name bestowed on the plant is *Spermacoce hirta* L., Sp. Pl. ed. 2, 1: 148 (1762) […] The Brown reference (Civil and Nat. Hist. Jamaica: 141 (1756) is to SPERMACOCE 3. Erecta subirsuta, foliis oblongis venis arcuatis refertis, superioribus majoribus appropinquatus, floribus constipatis ad alas […]" and "The actual Browne specimen referred to is still in existence and is preserved in the Linnean Herbarium as number 125.8. This specimen is undoubtedly to be taken as the holotype of *Spermacoce hirta* L. and is undoubtedly the same plant as *Mitracarpus villosus* (Sw.) DC." (Verdcourt, 1975: 318–319).

Nicolson (1977) reconsidered the application of the names *Mitracarpus hirtus* (L.) DC. vs. *M. villosus* (Sw.) DC, and agreed with Verdcourt (1975) that LINN-HL 125.8 is the holotype of *Spermacoce hirta* L. (Linnaeus 1762: 148). Also, regarding *S. hirta* he stated that "I grant that there is implicit exclusion of the type of *S. hirta* Linnaeus (1762) from *S. hirta* Linnaeus (1767), since the taxa circumscribed are clearly different, by modern standards. However, there seems to be sufficient evidence that Linnaeus (1767) explicitly excluded the type of his 1762 name. By modern standards it appears that Linnaeus simply misidentified his new material, 125.4, with his earlier material, 125.8. Hence, *S. hirta* Linnaeus (1767) is not a later homonym of *S. hirta* Linnaeus (1762), although the taxon to which he applied the name is different." (Nicolson 1977: 572).

Dwyer (1980: 284), Souza and Cabral (in Delprete 2010b: 676) and Souza et al. (2010: 334) erroneously cited the specimen LINN 125.4 as the holotype of *Spermacoce hirta*.

Jarvis (2007: 868) regarding *Spermacoce hirta* L. wrote "Lectotype (Verdcourt in Kew Bull. 30: 318. 1975): Herb. Linn. No. 125.8 (LINN). […] *Note:* See discussion by Verdcourt, and Nicholson (in *Taxon* 26: 572. 1977) and Howard (*Fl. Less. Antilles* 6: 434. 1989)." It is clear that the sole original specimen of *S. hirta* L. (Linnaeus 1762: 148) is LINN 125.8, which is the holotype.

FGT, vol. 40(2), p. 683:
"35-4. ***Mitracarpus microspermus*** K. Schum. in Mart., Fl. Bras. 6(6): 83. 1888. Tipo: Brasil: [Roraima?], "ad fluvium Rio Branco", 1840 (fl, fr), *Schomburgk 856 pro parte* (holótipo B, destruido; lectótipo BM, selecionado por E.B. Souza et al., 2010)."

Accepted name: *Mitracarpus microspermus* K. Schum.

Type: BRAZIL. [Roraima?], "ad fluvium Rio Branco", Jul. 1840 (fl, fr), *Rob. H. Schomburgk ser. I, 856 pro parte* (B†, photo F [F0BN000914]; BM [barcode BM014124066], lectotype designated by Souza et al. (Apr.–Jun. 2010: 338)).

Notes: Schumann (1888: 83–84) for *Mitracarpus microspermus* K. Schum. cited the gatherings "*Habitat in Guiana Anglica ad fluvium Rio Branco: Rob. Schomburgk n. 856 ex p.; in Guiana Batava: hb. Petropol.; in republica Guatemalensi ad Mniogalpa: Friedrichstal*" and cited "*M. scabrellum* Benth. in J. Bot. 3: 238 ex p. (Bentham, 1841)" as a synonym of *M. microspermus*.

Souza et al. (Apr.–Jun. 2010: 338) designated as lectotype of *Mitracarpus microspermus* the specimen *Rob. Schomburgk ser. I, 856 pro parte* at BM. That specimen has barcode BM014124066, and has a label with the handwritten annotation "On the Rio Branco. In Guiana Anglica, legit Schomburgk No. 856!, VII 1840." On the same label is handwritten "Mitracarpus scabrellum Benth! in Hook. Journ. III. p. 238." However, there is no evidence on that sheet that it was studied by Schumann.

FGT, vol. 40(2), p. 683:
Synonym:
Mitracarpus minutiflorus K. Schum. in Mart., Fl. Bras. 6(6): 80. 1888. Tipo: Brasil, Goiás, "*inter urbem Goiaz et Cavalcante*", 1828-1830 (fl, fr), *Burchell 7820* (holótipo B, destruído; lectótipo BR, selecionado por E.B. Souza et al. 2010; isolectótipo K)."

Type: BRAZIL. Goiás: "*inter urbem Goiaz et Cavalcante*", 1828–1830 (fl, fr), *W.J. Burchell 7820* (B†; BR [barcode 000000574153], lectotype designated by Souza et al. (Apr.–Jun. 2010: 338); isolectotypes GH [barcode 01154967], K [barcode K000447056]).

FGT, vol. 40(2), p. 688:
"35-5. ***Mitracarpus parvulus*** K. Schum. in Mart., Fl. Bras. 6(6): 84. 1888. Tipo: Tocantins, "ad Porto Real" [agora Porto Nacional], 1828-1830 (fl), *Burchell 8674* (holótipo B, destruído; lectótipo BR, selecionado por E.B. Souza et al. 2010; isolectótipos K, P). Paratipos (sintipos citados por K. Schumann): Brasil, Mato Grosso, "in siccis graminosis provinciae Goyas prope Cuyabá", III/1827 (fl, fr), *Riedel 870* (B, destruído, BR); Tocantins, "ad Porto Real" [agora Porto Nacional], 1828-1830 (fl), *Burchell 8658* (B, BR, K, P), "in Brasilia occidentali", *Tamberlik s.n.* (não localizado)."

Accepted name: ***Mitracarpus parvulus*** K.Schum.

Type: BRAZIL. Tocantins: "ad Porto Real" [now Porto Nacional], 1828–1830 (fl), *W.J. Burchell 8674* (B†; BR [barcode 000000558758], lectotype designated by Souza et al. (Apr.–Jun. 2010: 340); isolectotypes K [barcode K000174166], P [barcode P03911661]).

FGT, vol. 40(2), p. 690:
"35-6. ***Mitracarpus recurvatus*** Standl., Publ. Field Mus., Bot. 8: 384. 1931. Tipo: Brasil, Minas Gerais ["Goyaz"], Paracatu, "prés de porto" [?], 1894 (fl, fr), *A. Glaziou 21511* (holótipo, K; isótipos, G, P)."

Accepted name: ***Mitracarpus recurvatus*** Standl.

Type: BRAZIL. Minas Gerais ["Brazil. Chiefly Province of Goyaz"]: Paracatu, "prés de Porto", 1894 (fl, fr), *A.F.M. Glaziou 21511* (holotype, K [barcode K000174497]; isotypes, F [fragment from K, Acc. No. 630505], G [barcode G00436966], P [not traced]).

FGT, vol. 40(2), p. 694:
"35-7. ***Mitracarpus robustus*** E.B. Souza & E.L. Cabral, Rodriguésia 61: 345, fig. 8 A-G. 2010. Tipo: Brasil, Ceará, Mun Porteiras, Chapada do Araripe, 7º28'S, 39º08'W, 930 m, 30/III/2000 (fl), *P.G. Delprete, E.B. Souza, F.S. Cavalcanti & L.W. Lima-Verde 7316* (holótipo, EAC; isótipos, HUEFS, NY)."

Accepted name: ***Mitracarpus polygonifolius*** (A.St. Hil.) R.M.Salas & E.B.Souza, Rodriguésia 66(3): 921. 2015.

Type: BRAZIL. Ceará: Mun Porteiras, Chapada do Araripe, 7º28'S, 39º08'W, 930 m, 30 Mar. 2000 (fl), *P.G. Delprete, E.B. Souza, F.S. Cavalcanti & L.W. Lima-Verde 7316* (holotype, EAC [2 sheets, Acc. No. 28985]; isotypes, HUEFS [barcode HUEFS0080844], NY [barcode unknown]).

Mitracarpus polygonifolius (A.St.Hil.) R.M.Salas & E.B.Souza, Rodriguésia 66(3): 921. 2015. – *Spermacoce polygonifolia* A. St. Hil., Voy. Distr. Diam. 1: 381. 1833.

Type: BRAZIL. Minas Gerais: "Villa Rica" [now Ouro Preto], s.d., *A. de Saint-Hilaire s.n.* (P [barcode P03818586], **lectotype here designated**; isolectotype, MPU [barcode MPU022474]).

Notes: Souza and Cabral in Souza et al. (Apr.–Jun. 2010: 345) proposed *Mitracarpus robustus* E.B. Souza & E.L. Cabral as a new name for *Mitracarpus frigidus* var. *humboldtianus*, which is not a valid name. They cited the holotype of *M. robustus* as the specimen *Delprete et al. 7316* at EAC. The EAC specimen is mounted on two sheets, both with Accession No. 28985. According to Art. 8.3 of the *Code* (Turland et al. 2018), the two sheets are treated as a single specimen with multiple preparations.

Salas et al. (2015) concluded that *Spermacoce polygonifolia* A.St.Hil. is synonymous with *Mitracarpus robustus* E.B.Souza & E.L.Cabral. Because Saint Hilaire's name has nomenclatural priority, they published the new combination *Mitracarpus polygonifolius* (A.St.Hil.) R.M.Salas & E.B.Souza, which is the name to be used for this species.

Saint-Hilaire (1833: 381-383) published *Spermacoce polygonifolia* with a detailed description and comparison with several species of *Borreria* and *Spermacoce*, but did not cite any material examined or the herbarium of deposit. Two original specimens annotated as *S. polygonifolia* by Saint-Hilaire are found at P and MPU. Salas et al. (2015) cited the specimen at P as the holotype. However, because Saint-Hilaire did not cite any specimen or herbarium of deposit, the P specimen cannot be treated as the holotype. Also, Salas et al.'s citation cannot be treated as an inadvertent lectotypification, because, according to the Code, it should have been accompanied by "here designated" or a similar expression. Hence the specimen at P, with barcode P03818586, is here designated the lectotype of this name.

FGT, vol. 40(2), p. 697:
"35-8. ***Mitracarpus schininianus*** E.L. Cabral, W.A. Medina & E.B. Souza, Candollea 64: 154. 2009 – *Mitracarpus frigidus* var. *glaberrimus* Chodat & Hassl., Bull. Herb. Boissier ser. 2, 4: 191. 1904. Tipo: Paraguai, Canindeyú, "Iter ad Yerbales, montium Sierra de Maracayú", s.d. (fl, fr), *E. Hassler 5027* (lectótipo, G, selecionado por Cabral et al., 2009)."

Accepted name: *Mitracarpus schininianus* E.L.Cabral, W.A.Medina & E.B.Souza

Type: PARAGUAY. Canindeyú: "In sylva Ipé hú Sierra Maracayú", Nov. 1898–1899 (fl, fr), *E. Hassler 5027* (G [G001166094], lectotype designated by Cabral et al. (2009: 154); isolectotypes G [2 sheets, barcodes G001166095, G001166096]).

FGT, vol. 40(2), p. 699:
"35-9. ***Mitracarpus steyermarkii*** E.L. Cabral & Bacigalupo, Acta Bot. Bras. 11(1): 50. 1997. Tipo: Brasil, Bahia, Barreiras, 7 km S of Rio Piau, ca. 150 km SW of Barreiras, 850 m, 13/IV/1966 (fl), *H.S. Irwin, J.W. Grear Jr., R. Souza & R. Reis dos Santos 14690* (holótipo K; isótipo NY)."

Accepted name: *Mitracarpus steyermarkii* E.L.Cabral & Bacigalupo

Type: BRAZIL. Bahia: Barreiras, 7 km S of Rio Piau, ca. 150 km SW of Barreiras, 850 m, 13 Apr. 1966 (fl), *H.S. Irwin, J.W. Grear Jr., R. Souza & R. Reis dos Santos 14690* (holotype K [barcode K000016261]; isotypes CTES [barcode CTES0013507], F [Acc. No. 1784171], NY [barcode 00132260]).

37. **OLDENLANDIA** L., Sp. Pl. 119. 1753.

FGT, vol. 40(2), p. 712:
"37-1. ***Oldenlandia corymbosa*** L., Sp. Pl. 119. 1753. - *Hedyotis corymbosa* (L.) Lam., Tabl. Encycl. 1: 272. 1792. - Tipo: Não citado (holótipo, LINN)."

Accepted name: *Oldenlandia corymbosa* L.

Type: [icon] Plumier, Nov. Pl. Amer. tab. 36. 1703 (lower portion of Tab. 36, fruits and flowers of "Oldenlandia"), lectotype designated by Verdcourt (1976: 308).

Notes: Linnaeus (1753: 119) published *Oldenlandia corymbosa* L. and added the annotation "Oldenlandia pedunculis multifloris, foliis lineari-lanceolatis. + Oldenlandia humilis hyssopifolia. *Plum. gen. 42. Erhet. pict. t.* 4. *f.* I. - *Habitat in* America *meridionali*."

Verdcourt (1976: 308) designated as lectotype the fruits and flowers of "Oldenlandia" depicted on the lower portion of Table 36 of Plumier (1703). According to The Linnaean Plant Name Typification Project (https://data.nhm.ac.uk/dataset/the-linnaean-plant-name-typification-project) "Verdcourt's choice of type appears to be the earliest."

FGT, vol. 40(2), p. 716:
"37-2. ***Oldenlandia lancifolia*** (Schumach.) DC., Prodr. 4: 425. 1830. - *Hedyotis lancifolia* Schumach. in Schumach. & Thonn, Beskr. Guin. Pl. 92. 1828. - *Oldenlandia herbacea* sensu Bremek. in Pulle, Fl. Surinam 4: 126. 1934. Tipo: Africa, Gana, Valley of Aquapim, *Thonning 210* (lectótipo C, selecionado por Verdcourt, 1976, isolectótipo, S n.v.)."

Accepted name: *Oldenlandia lancifolia* (Schumach.) DC.

Type: GHANA: Valley of Aquapim, *P. Thonning 210* (C [barcode C10003933], lectotype designated by Verdcourt (1976: 292); isolectotype, S [Acc. No. S-G-3012]; possible isolectotype C [barcode C10003937, "legit Thonning in Guinea", without collection number]).

FGT, vol. 40(2), p. 717:
"37-3. ***Oldenlandia salzmannii*** (DC.) Hook. f. in Benth. & Hook. f., Gen. Pl. 2: 58. 1873. - *Anotis salzmannii* DC., Prodr. 4: 433. 1830. - *Hedyotis salzmannii* (DC.) Steud., Nom. Bot., ed. 2, 1: 728. 1841. - Tipo: Brasil, Bahia, s.d., *Salzmann s.n.* (holótipo G-DC)."

Accepted name: *Oldenlandia salzmannii* (DC.) Hook. f.

Type: BRAZIL. Bahia: "circà Bahiam frequentes" [near Salvador], s.d. [1827–1831], *P. Salzmann s.n.* (holotype G-DC [barcode G00666349]; isotypes E [barcode E00500000], HAL [2 sheets, barcodes HAL0114263, HAL0114264], K [barcode K000015898], MO [Acc. No. 4213062], MPU [barcode MPU021483]).

Notes: Candolle (1830: 433) cited the original material of *Anotis salzmannii* DC. as "circà Bahiam frequentes. Mediainter priorem et sequentem. Cor. carnea. (v.s. comm. à cl. Salzman.)." In G-DC there is a specimen, with barcode G00666349, with two labels. One of them has the annotation "Anotis Salzmanni DC." handwritten by Candolle. The other label has the annotation "Rubiaceae. 4. cor. pallida. Bahia, in humidis, Mr. Salzmann, 1830" probably handwritten by Salzmann. That specimen is the holotype of this name.

38. **PAEDERIA** L., Mant. Pl. 1: 7, 52. 1767.

FGT, vol. 40(2), p. 723:
"38-1. ***Paederia brasiliensis*** (Hook. f.) Puff, Opera Bot. Belg. 3: 328. 1991. - *Ligodisodea brasiliensis* Hook. f., J. Bot. (London) 2: 25, tab. 2. 1840. - Tipo: Brasil, Ceará, Serra do Araripe, 1838, *Gardner 1698* (holótipo, K, foto at IPA 41369; isótipo, BM)."

Accepted name: ***Paederia brasiliensis*** (Hook. f.) Puff

Type: BRAZIL. Ceará: Serra do Araripe, Oct. 1838, *G. Gardner 1698* (holotype, K [barcode K000016022]; isotypes, BM [barcode BM001009097], BR [barcode 000000531735]; photo-K at IPA 41369).

FGT, vol. 40(2), p. 723:
Synonym:
"*Paederia gardneri* Hook. f. in Benth. & Hook. f., Gen. Pl. 2: 134. 1873. - *Honbesseion gardneri* (Hook. f.) Kuntze, Rev. Gen. Pl. 1: 285. 1891. Tipo: Brasil, Tocantins ["Goyáz"], Arraias [ca. 12°58'S, 46°53'W, 27 Feb-4 May] 1840, *Gardner 3768* (holótipo, K, fotos em IPA 41368 e NY)."

Type: BRAZIL. Tocantins ["Goyáz"]: Arraias [ca. 12°58'S, 46°53'W], [27 Feb–4 May] 1840, *G. Gardner 3768*, holotype (K [barcode K000432990], photo in IPA 41368 and NY).

New Record for the state of Goiás: In 2010, when the Rubiaceae of the FGT were published, *Paederia brasiliensis* (Hook. f.) Puff was known to me in the area studied only by the holotype of *Paederia gardneri* Hook. f., collected in 1840 near the town of Arraias, located near the southern border of the state of Tocantins. When the gathering *Gardner 3768* was collected, the state of Goiás included what is now the state of Tocantins. A gathering of this species was collected in 2000, in a nearby area, in the municipality of Monte Alegre de Goiás, a locality near the northern border of the state of Goiás, and is the sole collection of this species in that state. I had the occasion to study a duplicate of this gathering in 2012, in IBGE. The data of that gathering is here presented.

BRAZIL. **Goiás:** Mun. Monte Alegre de Goiás, estrada próxima ao povoado de Prata em direçao à balsa do Rio Paranã, trepadeira heliófila cobrindo arbusto próxima ao córrego, corola exbranquisada, cálice e botões florais esverdeados, folhas discolores verdes; planta com cheiro muito desagradável, mata de galeria alterada na margem da estrada de terra, solo claro, 13º27'9"S, 46º49'35"W, alt. 675 m, 13 Apr. 2000 (fl), *M.A. da Silva, M.L. Fonseca, R.C. Mendonça & E. Cardoso 4387* (CEN [barcode 00036393], IBGE [barcode IBGE00048196], NY [barcode 00950510], RB [Acc. No. 426610, barcode 00410327], UEC [barcode UEC082449], HUVA [not there, E.B. Souza, pers. comm. 2022], US [barcode 02367649]).

The specimen of *M.A. da Silva et al. 4387* at CEN had been erroneously identified as *Condylocarpon isthmicum* (Vell.) A. DC. by P.A. Messias in November 2018, but is a member of *Paederia brasiliensis* instead.

39. **PAGAMEA** Aubl., Hist. Pl. Guiane 1: 112, fig. 44. 1775.

FGT, vol. 40(2), p. 729:
"39-1. ***Pagamea plicata*** Spruce ex Benth., J. Linn. Soc., Bot. 1: 109. 1857. Tipo: Brasil, Amazonas, Rio Negro, São Gabriel da Cachoeira, 1852, *R. Spruce 2342* (holótipo, BM)."

Accepted name: ***Pagamea plicata*** Spruce ex Benth.

Type: BRAZIL. Amazonas: Rio Negro, São Gabriel da Cachoeira, [Jan.–Aug.] 1852, *R. Spruce 2342* (K [barcode K000265553], **lectotype here designated**; isolectotypes, B†, BM [barcode BM000649989], BR [barcode 000000552323], E [barcode E00504632], F [3 sheets, Acc. No. 768230, Acc. No. 607213 (fragment and photo of the B specimen), Acc. No. 871636 (fragment ex B)], GH [barcode 00094820], GOET [barcode GOET010417], LD [Acc. No. 1819681], NY [barcode 00132426, with same locality but with collection number "2243"], P [2 sheets, barcodes P02285069 (with collection date June 1852), P02285070 (with collection date Jan.–Aug. 1852)], RB [2 sheets, Acc. No. 1106, barcodes 00543643, 00560025]).

Note: Bentham (1857: 109) cited the material studied of *Pagamea plicata* Spruce ex Benth. a gathering collected by Richard Spruce near São Gabriel da Cachoeira, Rio Negro, Amazonas, Brazil, without indicating the collection number or the herbarium of deposit. Bentham regularly studied specimens in both K and BM herbaria. The original gathering corresponds to *Spruce 2342*, which has duplicates in numerous herbaria. Delprete (2010b: 729) cited the BM specimen as the holotype. As Delprete's citation was published after 1 January 2001, according to the *Code* it cannot be interpreted as an inadvertent lectotypification. The K specimen with the stamp "Herbarium Benthamianum" and barcode K000265553, is here designated the lectotype of this name.

FGT, vol. 40(2), p. 732:
"39-2. ***Pagamea guianensis*** Aubl., Hist. Pl. Guiane 1: 113, fig. 44. 1775. - Tipo: Guiana Francesa, "prope e supra montem Serpent et a l´abitacion appellée Gallion", s.d., *J.B.C.F. Aublet s.n.* (holótipo BM, foto em NY)."

Accepted name: *Pagamea guianensis* Aubl.

Type: FRENCH GUIANA: Montagne Serpent [a series of hills parallel to the road between the town of Gallion and the bridge on the Comté River], "habitat propè & supra montem *Serpent* dictum" and "cet arbrisseau étoit en fleur et en fruit dans le mois d'Aout. […] au sommet de la montagne Serpent & à l'abitation appellée Gallion", s.d. [1762–1764], *J.B.C.F. Aublet s.n.* (P-JJR 4: 143), lectotype designated by Lanjouw and Uittien (1940: 155); isolectotypes BM [barcode BM000624228], LINN-SM [No. 340.8]).

Notes: For additional information regarding the typification of *Pagamea guianensis* Aubl. see Delprete (2015).

40. **PALICOUREA Aubl.**, Hist. Pl. Guiane 172. 1775.

FGT, vol. 40(2), p. 739:
"40-1. ***Palicourea coriacea*** (Cham.) K. Schum. in Engl. & Prantl, Nat. Pflanzenfam. 4(4): 115. 1891. - *Patabea coriacea* Cham., Linnaea 9: 234. 1834. - Tipo: Brasil, sem localidade, s.d., *Sellow s.n.* (holótipo, B, destruído; foto em NY)."

Accepted name: *Palicourea coriacea* (Cham.) K.Schum.

Type: BRAZIL. Goiás: Mun. Cocalzinho, Parque Estadual dos Pireneus, trilha que segue do portal da Fazenda Capitão do Mato em direção do Morro do Cabeludo, vegetação de cerrado rupestre com áreas de campos encharcados, arbustinho multicaule, com geopódio basal lenhoso, caule de 40-60 cm, ráquis e brácteas amarelo vivo, 15°48'23-24"S, 48°49'20-29"W, alt. 1150 m, 19 Nov. 2006 (fl), *Delprete et al. 9947* (RB [Acc. No. 494074, barcode 00584026], **neotype here designated**; isoneotypes NY [barcode 01146630], SPF [barcode SPF 189601], UFG [Acc. No. 43349]).

Notes: Chamisso (1834: 234–235) cited the material studied of *Patabea coriacea* Cham. as "E Brasilia misit Sellowius." The original material at B was destroyed during WWII. No other specimens associated with this name, collected by Sellow, could be found in any herbarium. Therefore, a neotype needs to be designated. The specimen *Delprete et al. 9947* at RB is here designated the neotype of *Patabea coriacea* Cham. [≡ *Palicourea coriacea* (Cham.) K.Schum.], and the duplicates of this gathering, present in other herbaria, are isoneotypes.

FGT, vol. 40(2), p. 751:
"40-2. ***Palicourea crocea*** (Sw.) Roem. & Schult., Syst. Veg. 5: 193. 1819. - *Psychotria crocea* Sw., Prodr. Veg. Ind. Occ. 44. 1788. - Tipo: "Jamaica et Hispaniola", s.d., *Swartz s.n.* (holótipo, S n.v.)."

Accepted name: *Palicourea crocea* (Sw.) Roem. & Schult.

Type: JAMAICA. Without locality, s.d., *O. Swartz s.n.* (S [Acc. No. S-R-5316], **lectotype here designated**; isolectotypes LD [Acc. No. 1255937], M [barcode M-0198314], S [Acc. No. S-R-5317], SBT [barcode SBT13385]).

Notes: Olof Swartz (1788: 44) described *Psychotria crocea* Sw. as "[…] panicula erecta terminali crocea, pedunculis coloratis, Psychotrophium 2. *Brown. jam.* 160. t. 13. f. 2, I. *Jamaica, Hispaniola*" without citing any specimen. He wrongly cited the figure in Browne's publication. The plate associated with this name is Table 13, Figure 1, and not Figure 2 as cited by Swartz.

Under *Psychotria crocea*, Swartz cited "Psychotrophum 2", which was described and illustrated in Patrick Browne's (1756) *Civil and Natural History of Jamaica*. Browne (1756: 169) published the polynomial "Psychotrophum 2. Fructiculosum, foliis amplioribus ovatis,

stipulosis rigidis interpostis, ramulis crassioribus, racemis umbellatis, sustentaculis ternato-ternatis. Tab. 17. f. 2" However, his Psychotrophum 2 is on Table 13, figure 1 (on Table 17, Figure 2 is depicted a species of *Chione*). To this species he assigned the English vernacular name "The smaller succulent Psychotrophum", which was followed by a detailed description of the species. On Table 13, figure 1 of Browne's publication is depicted an inflorescence with flower buds, flowers in anthesis, and fruits. At the bottom of the branch are drawn a flower bud, a flower in anthesis, a dissected corolla, several representations of the hypanthium and style, and a mature fruit crowned by the persistent calyx. This drawing is original material of *Psychotria crocea*.

According to Stafleu and Cowan (1986: 116), the main set of Swartz's herbarium is at S, and the "West-Indian collections (1748–1786) at S, are not complete". They also indicated that additional Swartz specimens can be found in numerous herbaria.

Taylor (1989: 31) and Andersson (1992: 157) wrote that the holotype of *Psychotria crocea* [≡ *Palicourea crocea* (Sw.) Roem. & Schult.] is at BM. Taylor (1999a: 154) cited the type of this name as "Type: Jamaica, without locality, without date, O. Swartz s.n. (S holotype, photo JBSD)." Then, Taylor (2012b: 170) reverted her citation, and wrote that holotype of this name is at BM. After exhaustive search, no specimen collected by Swartz associated with this name was found in BM.

Delprete (2010b: 751) cited the holotype of this name as "holótipo, S n.v." This citation can not be interpreted as inadvertent lectotypification, because it is not accompanied by "here designated" or a similar expression. Searching for possible original material associated with this name, there are two specimens at S and specimens at SBT, M and LD collected by Swartz that should be considered as possible original material and are discussed below.

Two specimens associated with this name and collected by Swartz are present in S. The specimen with Accession No. S-R-5316 has the annotation "Ind. Occ. Swartz" handwritten by an unknown author on the bottom left corner of the sheet. The sheet also has the annotations "Palicourea crocea De Cand., Psychotria crocea Sw." handwritten by an unknown author on the bottom right corner. This specimen consists of two branches with leaves and terminal inflorescences with flower buds, a small branch with a terminal infructescence with mature fruits, and the distal portion of an inflorescence with flower buds. Considering the ample material present on this sheet, this specimen, with Accession No. S-R-5316, collected by Swartz in Jamaica, is here designated the lectotype of *Psychotria crocea* Sw.

The other S specimen, with Accession No. S-R-5317, is mounted on a smaller sheet glued onto a larger supporting sheet. On the smaller sheet is affixed a single branch with a fastigiate inflorescence with the corollas fallen off, and a loose fruit. On the smaller sheet, there is the handwritten annotation "Psychotria crocea Sw.! Palicourea crocea DC. – Jamaica: Ol. Swartz!" The annotation "Ol. Swartz!" means that this specimen was collected and studied by Swartz. On the bottom of the larger sheet are affixed two labels with the annotations "Psychotria crocea Swartz, Prodr. 44. 1788. […] det. C.M. Taylor XI 1988" and "= Palicourea crocea (Sw.) R. & S. – det. C.M. Taylor XI 1988." This specimen is an isolectotype.

The SBT specimen, with barcode SBT13385, consists of a branch with numerous leaves and a terminal inflorescence with flower buds and flowers in anthesis. On the back of the sheet is handwritten in ink "Jamaica, Swartz. Palicourea crocea De Cand., 6 Psychotria Swartz crocea." This specimen is an isolectotype.

The M specimen with barcode M-0198314 has a label with the upper heading "Herbarium Regium Monacense" and the lower heading "Herbar. Schreberianum." The label has the handwritten annotation "Psychotria crocea Sw., Palicourea crocea R. & Schult., (nec De Cand., qui cum aliis confundere), Jamaica, Ol. Swartz." The specimen, collected by Swartz in Jamaica, is composed of a single branch with numerous leaves and a terminal inflorescence with flower buds. This specimen is an isolectotype.

The LD specimen, with Acc. No. 1255937, has the stamp "Museum Acharianum". It has two annotations handwritten directly on the sheet "Jamaica. Swartz" and "P. crocea", both by different unknown authors, not Swartz. The specimen, collected by Swartz in Jamaica, consists of a single branch with several leaves, and a terminal infructescence with three fruits. This specimen is an isolectotype.

FGT, vol. 40(2), p. 760:
"40-3. ***Palicourea guianensis*** Aubl., Hist. Pl. Guiane 1: 173. 1775. - *Psychotria guianensis* (Aubl.) Rusby, Mem. Torrey Bot. Club 3: 48. 1893. - Tipo: Guiana Francesa, Forêts d'Orapu, s.d., *J.B.C.F. Aublet s. n.* (holótipo, P)."

Accepted name: *Palicourea guianensis* Aubl.

Type: FRENCH GUIANA: Kaw Mountains, "in sylvis territorii Caux" and "arbrisseau en fleur dans les forêts de Caux, au mois de Février", s.d. [Feb–Mar 1764], *J.B.C.F. Aublet s.n.* (P-JJR 8: 268, lecto-

type designated by Lanjouw and Uittien (1940: 155); isolectotype BM [barcode BM000058138]).

Notes: For additional information regarding the typification of *Palicourea guianensis* Aubl., see Delprete (2015).

FGT, vol. 40(2), p. 765:
"40-4. ***Palicourea macrobotrys*** (Ruiz & Pav.) Roem. & Schult., Syst. Veg. 5: 194. 1819. - *Psychotria macrobotrys* Ruiz & Pav., Fl. Peruv. 2: 57, pl. 203, fig. a. 1799. Tipo: Perú, Huánuco, "in Andium nemoribus ad Cuchero et Chinchao", s.d., *Tafalla & Manzanilla [in Herb. Ruiz & Pavón] s.n.* (holótipo, MA; isótipo, MPU)."

Accepted name: ***Palicourea macrobotrys*** (Ruiz & Pav.) DC.

Correction of authority: *Palicourea macrobotrys* (Ruiz & Pav.) DC., Prodr. 4: 527. 1830. – "*Palicourea macrobotrys* (Ruiz & Pav.) Roem. & Schult.", Syst. Veg. 5: 194. 1819, name cited as a *Psychotria* species.

Type: PERU. Huánuco. [Protologue: "Habitat in *Andium* nemoribus imis ad *Cuchero* et *Chinchao* tractus"], "Cuchero", s.d. *J.J. Tafalla & J.A. Manzanilla [in Herb. H. Ruiz López & J.A. Pavón y Jiménez] s.n.* (MA [barcode MA 815923], **lectotype here designated**; isolectotypes K [barcode K000471538], MA [2 sheets, barcodes MA 815921, MA 815922], MPU [barcode MPU022082], drawing by Isidro Gálvez in Herbarium Archives of the Royal Botanical Expedition to the Viceroyalty of Peru [Acc. No. AJB04-D-0415_001]; isolectotype fragment F [Accession No. 591760]).

Notes: In the protologue of *Psychotria macrobotrys* Ruiz & Pav., Ruiz and Pavón (1799: 57) cited the collection locality as "Habitat in *Andium* nemoribus imis ad *Cuchero* et *Chinchao* tractus." Taylor (1999a: 232) cited the type of *P. macrobotrys* as "Habitat in Andium nemoribus ad Cuchero et Chinchao, Jul.–Aug., Ruiz and Pavón s.n. (MA holotype, n.v.)." Because there are several original specimens at MA, Taylor's type citation cannot be treated as a lectotypification. According to the *Code* (Turland et al., 2018), original material is "The set of specimens and illustrations from which a lectotype may be chosen (Art. 9.4, Notes 2 and 3, Art. F. 3.9, and Note 2 for details), or the holotype (Art. 9.1)." At MA, there are one original drawing and several original specimens, which are described and discussed below.

The original drawing of *Psychotria macrobotrys* made by Isidro Gálvez is preserved in the Herbarium Archives of the Royal Botanical Expedition to the Viceroyalty of Peru made by Hipólito Ruiz & José Pavón. On the colored drawing, two species of *Psychotria* are represented. On the left side is depicted a branch with an inflorescence with flowers and fruits of *Psychotria macrobotrys*, on the lower portion are drawn a dissected corolla, a stamen, hypanthium and style, a fruit, and two pyrenes. On the right side of the drawing is depicted a branch with an inflorescence with flowers and fruits of *Psychotria amethystina*, and just below are drawn a dissected corolla, a stamen, a hypanthium and style, a fruit, and two pyrenes. On the upper margin of the drawing is the handwritten number "203". Above the drawing is a label with the heading "REAL JARDÍN BOTÁNICO, CSIC – ARCHIVO, Real Expedición Botánica al Virreinado del Perú, AJB04-D-0415_001."

The MA specimen with barcode MA815921 has two labels. One label has the annotation "Palicourea macrobotrys D.C., Psychotria macrobotrys Fl. Per." handwritten by an unknown author. Just above that label is affixed another label, with the annotation "Psychotria macrobotrys Fl. P." handwritten by Hipólito Ruiz. On the sheet, are mounted two branches with several leaves and terminal inflorescences with flowers and young fruits.

The MA specimen with barcode MA815922 has a label with the annotation "Psychotria lutea, Cochero insi locis [?] et Julio, Psychotria macrobotrys Fl. P. vol. 2. p. 57. t. 203.f.a." handwritten by Hipólito Ruiz. On the sheet are mounted two branches with several leaves and terminal inflorescences with flowers and young fruits.

On the MA specimen with barcode MA815923, is glued a small sheet of paper with a detailed description of *Psychotria macrobotrys*, handwritten by Joseph Dombey, which is very similar to the description published by Ruiz and Pavón (1799: 57). Above that label is another label with the annotation "Psychotria macrobotryx Sp. Pl. Fl. Per. de Cuchero" handwritten by Hipólito Ruiz. On the sheet, are mounted two branches with several leaves and terminal inflorescences with flowers and young fruits. This specimen is here designated the lectotype of this name.

At K there is a sheet with barcode K000471538, and a small handwritten label (author unknown) with the annotation "Psychotria, Ex Herb de R et P., Lima." On the lower margin is handwritten "Palicourea macrobotrys (R. & P.) R. & S., PCS [Paul Carpenter Standley]". On the sheet, is mounted a branch with several leaves and a terminal inflorescence with numerous flower buds.

At MPU there is a sheet with barcode MPU022082 and with a handwritten label (author unknown) saying

"Psychotria macrobotrys Fl. Per., Pérou. dedit Pavon." On the lower right corner is a second label with the heading "Institut de Botanique de Montpellier" and the handwritten annotation "Palicourea macrobotrys Roem & Sch., Psychotria _____ Ruiz & Pav." On the sheet is mounted a branch with several leaves and a terminal infructescence.

At F there is a sheet, Accession No. 591760, on which is mounted an envelope containing a few flower buds and a leaf fragment. On the envelope is typewritten "Palicourea macrobotrys (R. & P.) R. & S., Peru, Ruiz & Pavón."

FGT, vol. 40(2), p. 769:
"40-5. ***Palicourea marcgravii*** A. St. Hil., Pl. Rem. Brés. 231, tab. 22, fig. A. 1824. - *Psychotria marcgravii* (A. St. Hil.) Spreng., Syst. Cur. Post. 79. 1827. - Tipo: Brasil, "cucilli entre Rossinha da Negra e Varge, route de Rio de Janeiro à Minas Gerais", s.d. (fl), *A. Saint-Hilaire 2209* (holótipo, P)."

Accepted name: *Palicourea marcgravii* A.St.Hil.

Type: [icon] Saint-Hilaire, Hist. Pl. Remarq. Bresil, Tab. 22, fig. A. 1824, **lectotype here designated.**

Notes: Augustin de Saint-Hilaire (1824: 231–232) provided a detailed description of *Palicourea marcgravii* A. St. Hil. and, among many other characters, stated that is a shrub 5–6 feet tall, with opposite leaves that are puberulous below when young or glabrous below when mature, terminal multiflorous cymes with puberulous rachis, corollas 5–7 lines [10.5–15 mm] long, gibbous at base, basally yellow and distally purple, 2-locular ovary, and ascending ovules. Above the description he cited "Galvania sp. 2da (Erva do rato) *Vell. Mss.* – Erva do rato *Marcg. Bras.* 60, *fig.* 2 (1). – *N. Vulg.* Erva do rato", and represented this species in Table 22, fig. A.

Delprete (2010b: 765) cited the type of *Palicourea marcgravii* as "*A. Saint-Hilaire 2209* (holótipo, P)." The specimen cited by Delprete, which now has barcode P00852566, cannot be treated as a holotype because Saint-Hilaire in the protologue did not cite any of his own collections.

Saint-Hilaire's (1824) Table 22, Figure A, of *Histoire des plantes les plus remarquables du Bresil et du Paraguay* well represents this species and is consistent with Saint-Hilaire's accurate description. Aside from a branch with numerous leaf pairs and two terminal inflorescences, at the base of the plate are depicted a longitudinally dissected corolla, an anther, a style with two short lobes, and a hypanthium topped by the calyx and exceeding nectariferous disk. Hence, Saint-Hilaire's Table 22, fig. A is here designated the lectotype of *Palicourea marcgravii*.

FGT, vol. 40(2), p. 769:
Synonym:
Palicourea marcgravii A. St. Hil. var. *β, pubescens* A.St.Hil., Pl. Rem. Brés. 232. 1824.

Type: [icon] Saint-Hilaire, Hist. Pl. Remarq. Bresil, Tab. 22, fig. A. 1824, **lectotype here designated.**

Notes: Saint-Hilaire (1824: 232) described *Palicourea marcgravii* var. *pubescens* A. St. Hil. as "V. *β, pubescens*; foliis subtùs pubescentibus aut puberulis." and cited the areas of occurrence as "Frequens in provinciis *Minas Geraes* et *Pernambuco* (Marcg.), ad margines sylvarum primaevarum et in sylvis caeduis. Floret Decembre–Martio." Because in the original publication he described the leaves of *P. marcgravii* as puberulous below when young or glabrous below when mature, the morphological characters of var. *pubescens* fit within the variation of the species, and Saint-Hilaire's Table 22, fig. A is here designated the lectotype of *P. marcgravii* var. *pubescens*.

FGT, vol. 40(2), p. 783:
"40-6. ***Palicourea officinalis*** Mart. in Spix & Mart., Reise Bras. 2: 544. 1828. - *Psychotria medica* Muell. Arg. in Mart., Fl. Bras. 6(5): 232. 1881, *nom. nov. superfl.* Tipo: Brasil, Minas Gerais, "in arenosis siccis campestribus deserti ad flumen S. Francisco", 1818 (fl), *C.F.P. Martius s.n.* (holótipo, M)."

Accepted name: *Palicourea officinalis* Mart.

Type: BRAZIL. Minas Gerais: "campis editis Serro Frio", s.d. (fl), *C.F.P. Martius s.n.* (holotype, M [barcode M-0198485]).

Notes: Martius in Spix and Martius (1828: 544) did not cite the collection locality of *Palicourea officinalis* Mart. or the herbarium of deposit. At M there is a specimen with barcode M-0198485 and a label specifying "Dr. Martius Iter Brasil." On the label is annotated the name *Palicourea officinalis*, a short description, and the locality "campis editis Serro Frio" handwritten by Martius. This specimen is the holotype of this name.

FGT, vol. 40(2), p. 794:
"40-7. ***Palicourea rigida*** Kunth in Humb. & Bonpl., Nov. Gen. Sp. 3: 370 (quarto ed.). 1819. - *Psychotria rigida* var. *genuina* Muell. Arg. in Mart., Fl. Bras. 6(5): 230. 1881. Tipo: Venezuela, Sucre, "prope Quetepe et in Monte Cocollar", s.d., *Humboldt & Bonpland s.n.* (holótipo, P-Bonpl; isótipo, B-Willd)."

Accepted name: *Palicourea rigida* Kunth

Type: VENEZUELA. Sucre: "prope Quetepe et in Monte Cocollar", s.d., *J.A. Bonpland & F.W.H.A. Humboldt 246* (holotype, P-Bonpl [barcode P00671115]; isotype B-W [barcode B-W 04106-02 0]).

FGT, vol. 40(2), p. 809:
"40-8. ***Palicourea triphylla*** DC., Prodr. 4: 526. 1830. - *Psychotria triphylla* (DC.) Muell. Arg. in Mart., Fl. Bras. 6(5): 233. 1881. Tipo: Guiana Francesa, sem localidade, s.d., *Patris s.n.* (holótipo, G-DC)."

Accepted name: *Palicourea triphylla* DC.

Type: FRENCH GUIANA: Without locality, s.d., *J.B. Patris s.n.* (holotype, G-DC [2 sheets, barcodes G00667830, G00667831]).

Notes: In G-DC there are two sheets associated with this name, which are kept together in the same folder and numbered as 1 and 2. Sheet number 1, with barcode G00667830, has one labed with the annotation "Cayenne" handwritten by Candolle, and one infructescence. Sheet number 2, barcode G00667831, has the labels with "Cayenne" and "Palicourea triphylla DC." handwritten by Candolle, and branch with a few leaves and an inflorescence, and a separate node with a leaf pair. Because the two sheets are numbered consecutively and kept together, they are treated as one specimen, which is the holotype of *Palicourea triphylla* DC.

FGT, vol. 40(2), p. 813:
"40-9. ***Palicourea urbaniana*** Standl., Publ. Field Columbian Mus., Bot. Ser. 8: 219. 1930. - Tipo: Brasil, Goiás, sem localidade, 1894-1895 (fl, fr), *A. Glaziou 21533* (holótipo, B, destruído)."

Accepted name: *Palicourea urbaniana* Standl.

Type: BRAZIL. Goiás: Capelinha de Santo Antonio, 1894–1895 ["25 Dec. 1894"] (fl, fr), *A.F.M. Glaziou 21533* (K [barcode K000471481], **lectotype here designated**; isolectotypes P [barcode P00837027] fragment F [Acc. No. 611912 barcode V0070103F]).

Notes: The original material of *Palicourea urbaniana* Standl. at B was destroyed during WWII. Three specimens associated with this name are at F, K and P, which are discussed below. On the F sheet with Acc. No. 611912 is affixed an envelope in which are included fragments from B, consisting of two leaves and a distal portion of a branchlet with a few flower buds. On the envelope is typewritten "Palicourea urbaniana Standl. – Brazil: Capelinha de Santo Antonio, Goyaz, A. Glaziou 21533 – 1894-95. From type in hb. Berol." On the same sheet is mounted a photograph of the destroyed B specimen. Above the photograph is annotated "C.N.H.M. negative number 49964."

On the K sheet with barcode K000471481 are affixed two flowering branches and a label with the heading "Brazil: Chiefly Province of Goyaz" and printed at the bottom "Comm. Dr. A. Glaziou, 1896." On the label is handwritten (author unknown) "21533. Palicourea sp." Below the two branches is the annotation "Palicourea Urbaniana Standl! det. P.C.S." handwritten directly on the sheet by Paul Standley. This specimen is here designated the lectotype of *Palicourea urbaniana*.

The P specimen, with barcode P00837027, has a label with the heading "HERB. MUS. PARIS", the printed text "BRÉSIL, …, Herbier de A. GLAZIOU, donné par Mme SIMART, sa fille, en 1907", and the handwritten annotation "Psychotria Crulsiana Glaz. n. sp., (Goyaz) Capelinha de Sto. Antonio, 25 décembre 1894, Arbuste, n. 21533." At the lower left corner of the sheet there is a label with the annotation "Capelinha de S^{to} Antonio, le 25 decembre 1894, Crulsiana Glaz. n. sp. Arbuste" handwritten in pencil by Glaziou. *Psychotria crulsiana* Glaziou, published by Glaziou (1909b: 350) is a nomen nudum because it was listed with the sole description "Arbuste, fl. jaunes", which is insufficient for distinguishing this taxon from numerous other yellow-flowered *Palicourea* species. The specimen P00837027 consists of a branch with numerous leaves and inflorescences and is an isolectotype of *Palicourea urbaniana*.

41. **PENTAS** Benth. in Hook., Bot. Mag. 70: pl. 4086. 1844.

FGT, vol. 40(2), p. 817:
"41-1. ***Pentas lanceolata*** (Forssk.) Deflers, Voy. Yemen, 142. 1889. - *Ophiorrhiza lanceolata* Forssk., Fl. Aegypt. Arab. 42. 1775. - *Manettia lanceolata* (Forssk.) Vahl.,

Symb. Bot. 1: 12. 1790. - *Neurocarpaea lanceolata* (Forssk.) R. Br. in Salt., Voy. Abyss. App. 4: 64. 1814. - *Pseudomussaenda lanceolata* (Forssk.) Wernham, J. Bot. 54: 298. 1916. - Tipo: Africa, Yemen, Hadie Mts., *Forsskål s.n.* (holótipo, C; isótipo, BM)."

Accepted name: *Pentas lanceolata* (Forssk.) Deflers

Type: YEMEN. Hadie Mountains, "In montibus altioribus *Hadie*, alibique", s.d. [1763], *Forsskål s.n.* (first-step lectotype designated by Verdcourt (1976: 208); C [barcode C10002685, *Addit no. 1526*], **second-step lectotype here designated**; dubious isolectotypes, BM [barcode BM000945087], C [barcodes C10002684, C10002686], S [Acc. Nos. S05-9977, S05-9978]).

Notes: Forsskål (1775: 42–43) along with the description of *Ophiorrhiza lanceolata* Forssk. cited material collected by himself in the locality "montibus altioribus *Hadie*, alibique" but did not cite any collection number. Verdcourt (1976: 208) cited the type of *O. lanceolata* as "Type: Yemen, Hadie Mts., *Forsskål* (C, holo.!, BM, iso.!). Verdcourt's citation is an inadvertent first-step lectotypification, because at C there are three specimens with this name collected by Forsskål, which are below discussed.

The specimen *Forsskål s.n.* [*Addit no. 1525*] at C, with barcode C10002684, has the stamp "Reinserted in the Herb. Forskalii from the General Herbarium at C, and recorded as Addit. No. 1525 [number handwritten]." On the upper corner of the sheet is the label "IDC microfiche foto Forsskål nr. 74I, 5-6 [numbers handwritten]." This specimen is a distal portion of a branch, with three leaf pairs and two inflorescences with flowers in anthesis and flower buds, and the base of the inflorescences there is an infructescence with mature capsules. On the the reverse side of the sheet, on the upper right corner is handwritten (author unknown) "Coll. Forsskål." On the same side of the sheet is glued a piece of paper with the handwritten text "This plant has had a very chequered nomenclatural history & I am writing it of in the Kew Bulletin. The exact details will appear in my thesis. D.C. & Wernham both treated it as a synonym of Mussaenda luteola Dec & Wernham erected the genus & name Pseudomussaenda lanceolata (Forssk.) Wernham. He was quite wrong since this plant on the sheet is clearly a Pentas & the correct combination is Pentas lanceolata (Forssk.) Deflers. The other plant must now be called Pseudomussaenda flava Verdcourt ined. nom. nov. Pentas lanceolata is not at all equal to the cultivated P. carnea Benth. as has always been supposed. Also Pentas lanceolata (Forssk.) K. Schum. is a misidentification since K. Schumann had P. bussei Krause (= P. coccinea Stapf) in mind. B.V." (Names underlined by Verdcourt). On that piece of paper is glued a smaller piece of paper with the handwritten date "28/12/50" and the printed annotation "Det. by Bernard Verdcourt".

The C specimen *Forsskål s.n.* [*Addit no. 1526*], with barcode C10002685, has the stamp "Reinserted in the Herb. Forskalii from the General Herbarium at C and recorded as Addit. No. 1527 [number handwritten]. At one time in the private "Herb. Leibmann [last word handwritten]." On the upper margin of the sheet is the label "IDC microfiche foto Forsskål nr. 74I, 7-8 [numbers handwritten]." On this sheet are present the distal portion of a branch with a few leaf pairs and one flower in anthesis, an inflorescence subtended by one leaf, with one flower in anthesis, and a branch with seven leaf pairs and a terminal infructescence with immature fruits. On the bottom of the sheet, it is handwritten by Vahl "Manettia lanceolata. Ophiorrhyza" [lanceolata] Forsk !"

The C specimen *Forsskål s.n.* [*Addit no. 1527*], with barcode C10002686, has the stamp "Reinserted in the Herb. Forskalii from the General Herbarium at C and recorded as Addit. No. 1527 [number handwritten]. At one time in the private "Herb. Leibmann [last word handwritten]." This is a small specimen with a few leaf pairs and two flowers in anthesis.

As the three above described specimens were collected by Forsskål, they represent original material of *Ophiorrhiza lanceolata*. However, there is no indication on those sheets that they belong to the same gathering. Specimen with barcode C10002685 is the most complete and is here designated the second-step lectotype of this name.

At BM there is a sheet with two different gatherings of *Pentas lanceolata* affixed on it. The specimen with number "1" and barcode BM000945087, has the annotation "Yemen: Mts. of Hadie, Forsskål, march 1763" penciled directly on the sheet by an unknown author (not Forsskål). This annotation was certainly added after the specimen was mounted on the sheet. A label affixed on the sheet has the annotation "1. Ex Oriente Forsskål." This is the specimen cited by Verdcourt (1976: 208) as "isotype" as it has been annotated by him as "Type of Pentas lanceolata (Forssk.) K. Schum. = Ophiorrhiza lanceolata Forssk., Det. BV, 1951, duplic. of Forsskål sp. in Copenhagen." Because this specimen has not been annotated by Forsskål, it is a dubious isolectotype.

Two specimens collected by Forsskål are at S. Specimen with Accession No. S05-9977 does not report the collection locality, is not annotated by him, and has

the annotation "Possible type of Ophiorrhiza lanceolata Forssk." handwritten in pencil by an unknown author directly on the sheet. The specimen consists of a branch with numerous leaves and a terminal inflorescence. Specimen with No. S05-9978 does not report the collection locality, is not annotated by him, and has the annotation "Possible type of Ophiorrhiza lanceolata Forssk." handwritten by the same unknown author in pencil directly on the sheet. The specimen consists of a small branch with a few leaves and a terminal inflorescence, mounted on a smaller sheet glued on a larger sheet. On the smaller sheet, below the small branch, is handwritten "Mussaenda luteola Delile" in black ink, by an uknown author. The two S specimens are here treated as dubious isolectotypes of *Ophiorrhiza lanceolata*.

42. **PERAMA** Aubl., Pl. Guian. Franc. 1: 54, pl. 18. 1775.

FGT, vol. 40(2), p. 822:
"42-1. ***Perama hirsuta*** Aubl., Hist. Pl. Guiane 54, pl. 18. 1775. - *Mattuschkea hirsuta* (Aubl.) Vahl, Symb. 3: 11. 1794. - Tipo: Guiana Francesa: "In locis humidis & arenosis Aurora & Orapu", VII/[1762-1764] (fl), *J.B.C.F. Aublet s.n.* (holótipo, BM, foto em NY)."

Accepted name: ***Perama hirsuta*** Aubl.

Type: FRENCH GUIANA: Near Roura and near the Orapu River, moist open fields with sandy soil, "in locis humidis & arenosis Aroura & Orapu" and "dans les lieux humides & sablonneux des quartiers d'Aroura & d'Orapu", s.d. [Apr, Sep 1763, Mar 1764], *J.B.C.F. Aublet s.n.* (P-JJR 3: 117), lectotype designated by Lanjouw and Uittien (1940: 155); isolectotype, BM [barcode BM001009065]).

Notes: For further information about the typification of *Perama hirsuta* Aubl., see Delprete (2015).

43. **POSOQUERIA** Aubl., Hist. Pl. Guiane 133. 1775.

FGT, vol. 40(2), p. 831:
"43-1. ***Posoqueria latifolia*** (Rudge) Roem. & Schult., Syst. Pl. 5: 227. 1819. - *Solena latifolia* Rudge, Pl. Guian. 1: 26, tab. 40. 1806. - Tipo: Guiana Francesa, Rudge, Pl. Guian., pl. 40. 1806 (lectótipo)."

Accepted name: ***Posoqueria latifolia*** (Rudge) Roem. & Schult.

Correct bibliographic citation: *Posoqueria latifolia* (Rudge) Roem. & Schult., Syst. Pl. 5: 227. 1819. – *Solena latifolia* Rudge, Pl. Guian. 1: 26. 1805; tab. 40. 1806 (the plate is not original material because it was published after the publication of the name). – *Tocoyena latifolia* (Rudge) Poir., Tabl. Encycl. 2(5): 259. 1819. [on page 259 for *Tocoyena latifolia* (Rudge) Poir. is cited "Tab. 163, fig. 2"; Plate 163 has the title "Tocoyena" and in the plate are present two different taxa; on fig. 2 is depicted a species of *Posoqueria*, while on fig. 1 is depicted a species of *Tocoyena*].

Type: FRENCH GUIANA: Without locality, s.d., *J. Martin s.n.* (BM [barcode BM001008912], **lectotype here designated**; isolectotypes BM [barcode BM001008911], FI-W [2 sheets, barcodes FI067338, FI067339]).

Notes: According to Stafleu and Cowan (1983: 972), the description of *Solena latifolia* is in part 3 of Rudge's (1805) *Plantarum Guianae*, which was published on June 1805, while Plate 40 is in part 4, which was published on April–May 1806. Therefore Plate 40 is not original material. The material used by Rudge to describe the taxa in his *Plantarum Guianae Rariorum Icones et Descriptiones* was collected by Joseph Martin in French Guiana. The fate of Martin's specimens was described by Stearn and Williams (1957) and summarized by Stafleu and Cowan (1983: 971–972). Succinctly, in 1803, France and England were at war, and the specimens collected by Joseph Martin in French Guiana, originally intended for the Museum of Natural History of Paris, were confiscated by two British privateers and brought to London. About 400 of these specimens were bought by the British Museum (BM), and 772 were bought by Edward Rudge (1763–1846) and included in his own herbarium (Stafleu & Cowan, 1983: 971–972). Also, Rudge gave a partial set of those specimens to Banks, whose herbarium became the founding collection of BM. After Rudge's death, his widow donated his herbarium to BM in 1847. Therefore, most of Martin's collections converged to BM, although some of his specimens are also reported to be at FI or FI-Webb (Stafleu & Cowan, 1983: 971–972). Those specimens have the handwritten information "Guiana. Martin", which may give the false impression that they were collected in modern day Guyana, but they actually came from French Guiana.

Rudge (1805: 27) below the description of *Solena latifolia* added the following observation "OBS. In figurâ Prosoquerieae [sic! Posoqueriae] apud Aublet, limbus regularis depingitur, nihilominus valde suspicor irregularem esse: in ejus specimine, nunc in Herbario

Banksiano conservato, Antherae, quae persingulares, certe similes sunt: itaque hanc stirpem congenerem esse judicavi." (Translation: "In the figure of *Posoqueria* by Aublet, the limb margin is depicted as regular, it does not seem irregular at all: in his [Aublet's] specimen, preserved in Banks' herbarium, the Anthers are peculiar, certainly similar: therefore, I judge this species as congeneric"). In Rudge's observation, he compared his new taxon with an Aublet specimen of *Posoqueria longiflora* Aubl. [see Delprete (2015: 613) for discussion of that specimen] present in Bank's herbarium (now integrated in BM), but he did not cite where the material of *S. latifolia* that he studied is kept. Taylor (2012c: 191) cited the type of *Solena latifolia* as "Holotipo: Guayana Francesa, *Martin s.n.* (BM)" without citing the barcode number(s).

In BM there are two sheets collected by Martin in French Guiana annotated with this name. The BM sheet with barcode BM001008912, on the upper left corner has a small handwritten label with the annotation "Guiana, Martin". On the bottom of the sheet is penciled "Posoqueria latifolia Rom. & Sch., Solena latifolia Rudge Ic." At the lower right corner is penciled "2". This specimen consists of a branch with several leaves and an inflorescence with numerous flower buds at different stages of development and three flowers in anthesis. No annotation by Rudge is also present on this sheet. This specimen is here designated the lectotype of *Solena latifolia*.

The BM sheet with barcode BM001008911, on the upper left corner has a small label with the handwritten annotation "Guiana, Martin". On the bottom of the sheet is penciled "Posoqueria latifolia Rom. & Sch., Solena latifolia Rudge Ic." At the lower right corner is penciled "2". The specimen is a branch with several leaves and an inflorescence with four flower buds and two flowers in anthesis. This sheet also does not have any annotation by Rudge and is an isolectotype of *Solena latifolia*.

In FI-W there are three specimens annotated as "*Tocoyena latifolia*" that were integrated in the Webb Herbarium from the Desfontaine herbarium, as indicated by the labels present on those sheets. Those specimens need to be evaluated as possible original material of *Solena latifolia*, and are discussed below.

The FI-W specimen with barcode FI067338 has a label with the annotation "Cayenne, Martin". A second label has the printed text "Herb. Webbianum" and "Ex Herb. Desfontaines", and "Tocoyena latifolia Poir." handwritten in pencil by an unknown author. The specimen consists of a branch with several leaves and two terminal inflorescences. It is part of the original gathering by Martin in French Guiana. Although it does not have any annotation by Rudge, it is here treated as original material, and is an isolectotype of *Solena latifolia*.

The FI-W specimen with barcode FI067339 has a handwritten label with "Posoqueria" stroke through and the annotation "Tocoyena latifolia Poiret, decrit dans les actes de la societé d'histoire nat. par M. Richard. Cayenne. Martin." A second label has the headings "Herb. Webbianum" and "Ex Herb. Desfontaines". This specimen, consisting of a branch with several leaves and a terminal inflorescence, is part of the original gathering by Martin in French Guiana. Although it does not have any annotation by Rudge, it is here treated as original material, and is an isolectotype of *Solena latifolia*.

The FI-W specimen with barcode FI067340 has the handwritten annotation "Tocoyena species nova, Confer. Posoqueria Aublet, Cayenne, Martin." On the sheet is affixed a second label with the printed heading "Herb. Webbianum" and "Ex Herb. Desfontaines". The specimen consists of several loose leaves and one flower in anthesis. Because of the actinomorphic corolla with acute lobes, this specimen belongs to the genus *Tocoyena*, and is not original material of *Solena latifolia*.

FGT, vol. 40(2), p. 837:
"43-2. ***Posoqueria longiflora*** Aubl., Hist. Pl. Guiane 1: 134, tab. 51. 1775; non Roxb. (1824). - *Solena longiflora* Willd., Sp. Pl. 1: 961. 1798. - *Kyrtanthus longiflorus* (Aubl.) Gmel., Syst. Nat. 2(1): 362. 1791. Tipo: Guiana Francesa, "sur le bords de grands riviers de la Guiane", *Aublet s.n.* (holótipo, BM)."

Accepted name: *Posoqueria longiflora* Aubl.

Type: FRENCH GUIANA: Margins of great rivers, "Floret Novembri; fructum sert Januario […] ad ripas fluviorum" and "sur les bords des grandes rivieres de la Guiane […] en fleur dans le mois de Novembre & en fruit au mois de Janvier", s.d. [1762–1764], *J.B.C.F. Aublet s.n.* (P-JJR (P-JJR 6: 199), lectotype designated by Lanjouw and Uittien (1940: 156); isolectotype, BM [barcode BM001008904]).

Notes: For further information about the typification of *Posoqueria longiflora* Aubl., see Delprete (2015).

44. **PSYCHOTRIA** L., Syst. Nat., ed. 10, 929, 1364. 1759, *nom. cons.*

FGT, vol. 40(2), p. 851:
"44-1. ***Psychotria anceps*** Kunth in Humb. & Bonpl., Nov. Gen. Sp. 3: 360. 1819. Tipo: Colômbia, Rio Tequen-

dama, s.d., *Humbold & Bonpland s.n.* (holótipo P-Bonpl., isótipo, B destruído). [Subg. Psychotria]."

Accepted name: *Psychotria anceps* Kunth

Original material: Colombia. Cundinamarca: Bogotá River, Tequendama Falls, "Crescit in temperatis subfrigidis Regni Novo-Granatensis, juxta cataractam Tequendamae, alt. 1300 hex. Floret Augusto", s.d., *A. Bonpland & F.W.H.A. Humbold s.n.* (lost).

Type: COLOMBIA. Boyacá: Canada Castero, 20 km de Sta. Elena, piste Mani-Sta. Elena, 25 Feb. 1971 (fl), *C. Sastre 862* (P [barcode P04579979], **neotype here designated**; isoneotype COL [Acc. No. 140074, barcode COL000157756]).

Notes: The fate of the botanical specimens gathered by Bonpland and Humboldt has been discussed by several authors (Delprete 2001; Hiepko 2006; Kirkbride and Wiersema 2020; Lack 2004a, 2004b, 2009, 2018; Stauffer et al. 2012). After his return to Paris, Humboldt divided those collections in several sets, to be studied by different specialists. The main set, although incomplete, is currently kept in the Bonpland Herbarium (P-Bonpl.), in the Museum of Natural History in Paris. Bonpland was initially in charge of writing the descriptions for the *Nova genera et species plantarum*, but after several months he renounced the task. Then, Humboldt invited Carl Ludwig Willdenow (1765–1812) to take up this huge task, to whom he sent a set in Berlin, but he died shortly after. Then, Humboldt invited Carl Sigismund Kunth (1788–1850), who was in Berlin, to take up this enormous work. Kunth arrived in Paris in 1813 and started immediately to write the descriptions for the *Nova genera*. In 1816, Bonpland emigrated from France to Argentina, with his personal herbarium, which was a third, incomplete set of the collections that he made with Humboldt. Therefore, Kunth and Bonpland where both in Paris from 1813 to 1816, and it is possible that Kunth was able to study the specimens in Bonpland's personal herbarium during that period. Kunth went to La Rochelle, just before Bonpland's departure, to convince him to leave his personal set and his field books in France, but he was only able to obtain Bonpland's field books ("*Journal Botanique*"). Bonpland eventually returned his personal herbarium from Argentina in 1832, which arrived in Paris in 1833, and was then integrated in the P general herbarium in 1837. Those specimens have the label "Herbier de l'Amérique équatoriale, donné par M. A. Bonpland" and Kunth's Rubiaceae names were published before 1833, therefore they cannot be treated as original material.

Kunth studied the specimens collected by Bonpland and Humboldt in Paris. For many names published by Kunth, no specimens are found in the herbaria where Bonpland and Humboldt's collections are deposited. This is not surprising, as the absence of original specimens in P-Bonpl. has puzzled many botanists (e.g., Stauffer et al. 2012). For example, out of the about 350 monocotyledon names described by Kunth, Stauffer et al. (2012) reported that 235 original specimens are not present in P-Bonpl. After an exhaustive search in P and P-Bonpl. no original specimen of *Psychotria anceps* was found. Jurai Paule (B herbarium curator) confirmed the absence of original material *P. anceps* in B-W. Because no original specimen associated with this name could be found, it is therefore necessary to designate a neotype. The specimen *Sastre 862* at P with barcode P04579979 is here designated the neotype of this name, and the duplicate at COL is an isoneotype.

FGT, vol. 40(2), p. 856:
"44-2. ***Psychotria bracteocardia*** (DC.) Muell. Arg., in Mart., Fl. Bras. 6(5): 362. 1881. - *Cephaelis bracteocardia* DC., Prodr. 4: 534. 1830. - *Uragoga bracteocardia* (DC.) Kuntze, Rev. Gen. 2: 959. 1891. Tipo: Brasil, Bahia, *Salzmann s.n.* (holótipo, G-DC; isótipos, MPU [2]). [Subg. Heteropsychotria]."

Accepted name: *Palicourea bracteocardia* (DC.) Delprete & J.H.Kirkbr., J. Bot. Res. Inst. Texas 10(2): 414. 2016.

Type: BRAZIL. Bahia: ["in collibus umbrosis"], s.d. [1827–1830], *P. Salzmann s.n.* (first-step lectotype designated by Steyermark (1972: 689); G-DC [barcode G00300922], second-step lectotype designated by Delprete and J.H. Kirkbride (2016: 414); isolectotypes, MPU [4 sheets, barcodes MPU022236, MPU022237, MPU022238, MPU022239]).

FGT, vol. 40(2), p. 860:
"44-3. ***Psychotria capitata*** Ruiz & Pav., Fl. Peruv. 2: 59, pl. 206, fig. a. 1709. Tipo: Peru, Dept. Huánuco, Chinchao, s.d., *Ruiz & Pavón s.n.* (holótipo, MA). [Subg. Heteropsychotria]."

Accepted name: *Palicourea violacea* (Aubl.) A.Rich., Mem. Fam. Rubiac. 95. 1830.

Type: PERU. Huánuco: Chinchao, "in Andium montibus nemorosis per Chinchao runcationes," s.d., *H.*

Ruiz López & J.A. Pavón y Jiménez s.n. (MA [barcode MA815948]), lectotype designated by Delprete and Kirkbride (2016: 435). – PERU. Junín: Schunke Hacienda, above San Ramon, 1300–1700 m, dense forest, Aug.–Sep. 1923, *C. Schunke A19* (US [Acc. No. 1470372], epitype designated by Delprete and Kirkbride (2016: 435)).

FGT, vol. 40(2), p. 866:
"44-4. ***Psychotria carthagenensis*** Jacq., Enum. Pl. Carib. 16. 1760. Tipo: Colômbia, Bolívar, Cartagena, s.d., *Jacquin s.n.* (LE?, W?). [Subg. Psychotria]."

Accepted name: *Psychotria carthagenensis* Jacq.

Original material: Colombia. Bolívar: "habitat Carthagenae", Aug., *N.J. Jacquin s.n.* (not traced).

Type: [Icon] "Psychotria carthagenensis" in Jacquin, Select. Stirp. Amer. Hist. tab. 174, fig. 22. 1763, neotype designated by Taylor in Taylor et al. (2020: 6. e-publication). – COLOMBIA. Magdalena: Santa Marta, 200 ft. [ca. 60 m], Mar. 1898–1901, *H.H. Smith 1802* (MO [Acc. No. 124263, barcode MO-1765070], epitype designated by Taylor in Taylor et al. (2020: 6, e-publication); isoepitype US [Acc. No. 533747, barcode 02518872]).

Notes: In the protologue of *Psychotria carthagenensis* Jacq., Jacquin (1760: 16) did not cite any locality or herbarium specimen. No original specimen associated with this name is present at LE, P or W. Because of absence of original specimens, Taylor et al. (2020) designated as lectotype table 174, figure 22 of Jacquin's (1763) *Selectarum Stirpium Americanarum Historia*. In that figure, *P. carthagenensis* is represented only by one leaf, one flower, and one fruit, with features that could apply to numerous species of *Psychotria* and are insufficient to fix the application of the name. Also, as table 174, figure 22 was published three years after the publication of the name, it is not original material. Hence, Taylor's lectotype citation, according to Art. 9.10 of the *Code*, can be corrected to a neotype designation. The epitype specimen designated by Taylor, *H.H. Smith 1802* at MO, is valid and is here followed, and an isoepitype specimen is present in US.

FGT, vol. 40(2), p. 877:
"44-5. ***Psychotria colorata*** (Willd. ex Roem. & Schult.) Muell. Arg. in Mart., Fl. Bras. 6(5): 372. 1881. - *Cephaelis colorata* Willd. ex Roem. & Schult., Syst. Veg. 5: 214. 1819. Tipo: Brasil, s.d., *Sieber s.n.* (B-Willd 4149). [Subg. Heteropsychotria]."

Accepted name: *Palicourea colorata* (Hoffmanns. ex Willd.) Delprete & J.H.Kirkbr., J. Bot. Res. Inst. Texas 10(2): 416. 2016.

Type: BRAZIL: [Amazon Basin], without locality, s.d., *F.W. Sieber s.n. [dedit J.C. Hoffmansegg]* (holotype: B-W 04149-01(a) B-W 04149-02(b)).

Notes: For additional synonyms and types of *Palicourea colorata* (Hoffmanns. ex Roem. & Schult.) Delprete & Kirkbr., see Delprete and Kirkbride (2016).

FGT, vol. 40(2), p. 877:
Synonym:
"*Psychotria megapontica* Muell. Arg. in Mart., Fl. Bras. 6(5): 362. 1881. *Uragoga megapontica* (Muell. Arg.) Kuntze, Revis. Gen. Pl. 2: 961. 1891. - *Psychotria colorata* (Willd. ex Roem. & Schult.) Muell. Arg. ssp. *megapontica* (Muell. Arg.) Steyerm., Mem. New York Bot. Gard. 23: 685. 1972. Tipo: Brasil, Goiás, "Megaponte" [sic! "Meia Ponte" agora Pirenópolis], s.d., *Pohl 976* (holótipo G; sintipo B, destruído; foto-B em NY)."

Type: BRAZIL. Goiás: "Megaponte" [sic! "Meia Ponte," now town of Pirenopolis], s.d., *J.E. Pohl 976* (G [barcode G 00301215], lectotype designated by Delprete and Kirkbride (2016: 416)).

Notes: Müller Argoviensis (1881: 362) for *Psychotria megapontica* Müll. Arg. cited the only gathering *Pohl 976* without citing the herbarium of deposit. Delprete (2010b: 877) cited the specimen at G as the holotype. According to the *Code*, Delprete's citation cannot be corrected as a lectotype designation because it lacks "here designated" or a similar expression. Delprete & Kirkbride (2016: 416) designated the same specimen as lectotype.

FGT, vol. 40(2), p. 886:
"44-6. ***Psychotria deflexa*** DC., Prodr. 4: 510. 1830. Tipo: Guiana Francesa, s.d., *Patris s.n.* (holótipo, G-DC). [Subg. Heteropsychotria]."

Accepted name: *Palicourea deflexa* (DC.) Borhidi, Acta Bot. Hung. 53: 243. 2012 ["2011"].

Type: FRENCH GUIANA: Without locality, s.d., *J.B. Patris s.n.* (first-step lectotype designated by

Steyermark (1972: 502); G-DC [barcode G00478847 barcode, sheet No. 4, with two flowering branches, annotated as "Psychotria deflea DC." by Candolle], second-step lectotype designated by Delprete and Kirkbride (2016: 418); isolectotypes, G-DC [barcode G00478847, sheet No. 3, with flower buds)]).

Notes. In G-DC, inside the folder annotated as "Psychotria deflexa DC., De Cand. prodr. 4 p. 510 n. 57", aside from the two preparations designated by Delprete and Kirkbride (2016: 418) as lectotype and isolectotype, there are two additional specimens, both with barcode G00478849, on sheet No. 1 (sterile) and sheet No. 2 (with flower buds). Those two additional specimens were annotated by Delprete in 2013 as "dubious isolectotypes G-DC, probably not the same species." The two specimens with barcode G00478849 were identified by A. Berger in 2022 as *Palicourea octocuspis* Müll. Arg.

FGT, vol. 40(2), p. 890:
"44-7. ***Psychotria goyazensis*** Muell. Arg., Flora 59: 548, 551. 1876. Tipo: Brasil, Goiás, "prope urbem Goyaz" [cidade de Goiás], s.d., *Burchell 6723* (holótipo, G). [Subg. Heteropsychotria]."

Accepted name: *Palicourea brevicollis* (Müll. Arg.) C.M. Taylor in Taylor and Hollowel, Novon 25(1): 85–86. 2016.

Notes: For a clarification of the species delimitation, full synonymy and typification of *Palicourea brevicollis* (Müll. Arg.) C.M.Taylor is presented below. Additional information is provided by Taylor in Taylor and Hollowell (2016: 85–86).

Synonymy:

Palicourea brevicollis (Müll. Arg.) C.M.Taylor in C.M.Taylor and Hollowell, Novon 25(1): 85. 2016. - *Psychotria brevicollis* Müll. Arg., Flora 59: 548, 552. 1876c. – *Uragoga brachytere* Kuntze, Revis. Gen. Pl. 2: 955. 1891, replacement name, not *Uragoga brevicollis* (Müll. Arg.) Kuntze (based on *Mapouria brevicollis* Müll. Arg., 1876b). Type: Brazil. Minas Gerais: Caldas, s.d., *A.F. Regnell III.116 p.p.* (lectotype BR [barcode BR000000531615], designated by C.M. Taylor in Taylor and Hollowell (2016: 85).

Psychotria regnellii Müll. Arg., Flora 548, 552. 1876. - *Uragoga regnellii* (Müll. Arg.) Kuntze, Revis. Gen. Pl. 2: 952. 1891.

Type: BRAZIL. Minas Gerais: Caldas, s.d., *A.F. Regnell III.116 p.p.* (BR [barcode BR000000531569], lectotype designated by C.M.Taylor in Taylor and Hollowell (2016: 85)).

Psychotria goyazensis Müll. Arg., Flora 59: 548, 551. 1876. - *Palicourea goyazensis* (Müll. Arg.) Borhidi, Acta Bot. Hung. 59(1-2): 34. 2017.

Type: BRAZIL. Goiás**:** "prope urbem Goyaz" [town of Goiás], s.d., *W.J. Burchell 6723* (BR [BR000000531632], **lectotype here designated**; isolectotype K [barcode K000174296]; isolectotype fragment G [barcode G00096064]).

Notes: In the protologue of *Psychotria goyazensis* Müll.Arg., Müller Argoviensis (1876c: 548, 551) cited the gathering *Burchell 6723* collected in the town of Goiás, the first capital of the homonymous state. In BR there is a specimen from the Martius Herbarium, with barcode BR000000531632, annotated by Müller Argoviensis. The specimen label has the annotation "Brasilia: Prope urbem Goyaz, 1861, Burchell no. 6723" and is here designated as the lectotype of this name. Fragments consisting of a few fruits and a leaf portion of *Burchell 6723* are in an envelope in G annotated by Müller Argoviensis, and represent an isolectotype. A duplicate of *Burchell 6723* in K, not annotated by him, is another isolectotype.

FGT, vol. 40(2), p. 895:
"44-8. ***Psychotria gracilenta*** Muell. Arg., Flora 59: 542, 545. 1876. Tipo: Brasil, Bahia, sem localidade, s.d., *Blanchet 1590* (holótipo, G). [Subg. Heteropsychotria]."

Accepted name: *Palicourea gracilenta* (Müll.Arg.) Delprete & J.H.Kirkbr., J. Bot. Res. Inst. Texas 10(2): 421. 2016.

Notes: Clarification of the species delimitation, full synonymy and typification of *Palicourea gracilenta* (Müll. Arg.) Delprete & J.H.Kirkbr. is presented below.

Palicourea gracilenta (Müll.Arg.) Delprete & J.H.Kirkbr., J. Bot. Res. Inst. Texas 10(2): 421. 2016. - *Psychotria gracilenta* Müll. Arg., Flora 59:542, 545. 1876.

Type: BRAZIL. Bahia: without locality, s.d. [1834], *J.S. Blanchet 1590* (G [barcode G00300770], lectotype designated by Delprete and Kirkbride (2016: 421); isolectotype BM [barcode BM000624171]).

Psychotria brachybotrya Müll.Arg. in Martius, Fl. Bras. 6(5):327. 1881.

Type: BRAZIL. Amazonas: Rio Negro, Sao Gabriel da Cachoeira, Mar. 1852, *R. Spruce 2190* (first-step lectotype designated by Steyermark (1972: 609); P [barcode P00836988], second-step lectotype designated by Delprete and Kirkbride (2016: 421); isolectotypes, K [2 sheets, barcodes K000173545, K00173546], P [barcode P00836988], W [barcode 1889-0014256]).

Psychotria iquitosensis Standl., Publ. Columbian Mus., Bot. Ser. 8:195. 1930.

Type: PERU. Loreto: Near Iquitos, 14 Jul. 1929, *Ll. Williams 1391* (holotype (F [Acc. No. 604636 barcode V0041058F]; isotypes fragm. G [barcode G00300771], S [Acc. No. S05-1086]).

FGT, vol. 40(2), p. 898:
"44-9. ***Psychotria hoffmannseggiana*** (Willd. ex Roem. & Schult.) Muell.Arg. in Mart., Fl. Bras 6(5): 336. 1881. - *Cephaelis hoffmannseggiana* Willd. ex Roem. & Schult., Syst. Veg. 5: 214. 1819. Tipo: Brasil, Pará, s.d., *Sieber s.n.* (holótipo B-W 4155 [dedit Hoffmannsegg], foto em NY) [Subg. Heteropsychotria]."

Accepted name: ***Palicourea hoffmannseggiana*** (Roem. & Schult.) Borhidi

FGT vol. 40(2), fig. 86 (page 926): Figure 86 is labeled as *Psychotria officinalis* (Aubl.) Sandwith, but is *Palicourea hoffmannseggiana* (Roem. & Schult.) Borhidi.

Notes: The species delimitation of *Psychotria hoffmannseggiana* (Roem. & Schult.) Müll. Arg. presented by Delprete (2010b: 898–904) was incorrect. To clarify the delimitation of this species, as here recognized, full synonymy and typification is presented below.

Palicourea hoffmannseggiana (Roem. & Schult.) Borhidi, Acta Bot. Hung. 53: 245. 2012 ["2011"]. - *Cephaelis hoffmannseggiana* Roem. & Schult., Syst. Veg. 5: 214. 1819. - *Psychotria hoffmannseggiana* (Roem. & Schult.) Müll. Arg. in Martius, Fl. Bras. 6(5):336. 1881.

Type: BRAZIL. Pará: without locality, s.d., *F.W. Sieber s.n.* [dedit *J.C. Hoffmanssegg*] (holotype B-W [barcode B-W 04155 01 0], photo at NY).

Cephaelis rubra Hoffmanns. ex Roem. & Schult., Syst. Veg. 5: 214. 1819. - *Psychotria rubra* (Hoffmanns. ex Roem. & Schult.) Müll.Arg. in Martius, Fl. Bras. 6(5): 336. 1881.

Type: BRAZIL. [Amazon Basin]: without locality, s.d., *F.W. Sieber s.n.* [dedit *J.C. Hoffmansegg*] (holotype B-W [barcode B-W 04150 -01 0]).

Psychotria barbiflora DC., Prodr. 4: 509. 1830.

Type: BRAZIL. Bahia: without locality, 1831, *P. Salzmann s.n.* (first-step lectotype designated by Steyermark (1972: 602); G [barcode G00300780] second-step lectotype designated by Delprete and Kirkbride (2016: 422); possible isolectotypes, MPU [2 sheets, MPU022106, MPU022107], P [barcode P00836992]).

Carapichea patrisii DC., Prodr. 4: 536. 1830. *Cephaelis patrisii* (DC.) D. Dietr., Syn. Pl. 1: 773. 1839. - *Uragoga carapichea* (DC.) Kuntze, Revis. Gen. Pl. 2:955. 1891; non *Uragoga patrisii* (DC.) Kuntze (1891).

Type: FRENCH GUIANA: Without locality, s.d., *J.B. Patris s.n.* (G-DC) [without barcode, sheet N. 4], lectotype designated by Delprete and Kirkbride (2016: 422); possible isolectotypes, G-DC [without barcode, sheets N. 1, 2 and 3]).

Psychotria furcata DC., Prodr. 4: 512. 1830.

Type: PANAMA: Without locality, s.d., *T. Haenke s.n.* (holotype: G-DC [barcode G00478835]).

Psychotria heterocephala Müll.Arg. in Martius, Fl. Bras. 6(5): 333. 1881.

Type: BRAZIL. [State unknown]: Rio São João, s.d., *A.C.V. Schott 5301* (G [barcode G00300784], lectotype designated by Delprete and Kirkbride (2016: 422)).

Psychotria bahiensis Müll.Arg. in Martius, Fl. Bras. 6(5): 338. 1881, *nom. illeg.* [non *Psychotria bahiensis* DC. 1830].

Type: BRAZIL. Bahia: without locality, s.d., *J.S. Blanchet 1815* (G [barcode G00301031], lectotype designated by Delprete and Kirkbride (2016: 422); isolectotypes, F [Acc. No. 734074], P [barcode P00836959]).

Psychotria flavicans Müll.Arg. in Martius, Fl. Bras. 6(5): 339. 1881.

Type: BRAZIL. Bahia: Igreja Velha, 1841, *J.S. Blanchet 3246* (G [barcode G00300761, sheet No. 1], lectotype designated by Delprete and Kirkbride (2016: 422); isolectotypes, BM [barcode BM000624170], F [2 sheets, Acc. Nos. 520907, 734075], G [barcode G00300761, sheet No. 2], NY [barcode 00132671], P [2 sheets, barcodes P00837029, P00837030], U [barcode U0006199]).

Psychotria hoffmannseggiana f. *pubescens* Steyerm., Mem. New York Bot. Gard. 23: 607. 1972.

Type: GUYANA: Kaieteur Plateau, vicinity of Kaieteur Falls, along W rim of Potaro River, ca. 1400 ft [= 426 m], 18 Feb. 1962, *R.S. Cowan & T.R. Soderstrom 1897* (holotype VEN [Acc. No. 78483]; isotypes MICH [barcode 1108255], US [barcode 00138792]).

FGT, vol. 40(2), p. 905:
"44-10. ***Psychotria leiocarpa*** Cham. & Schltdl., Linnaea 4: 22. 1829. Tipo: Brasil, "E. Brasilia tropica, varietaremque vicinus meridionalibus", s.d., *Sellow s.n.* (holótipo B, destruído). [Subg. Heteropsychotria]."

Accepted name: *Palicourea leiocarpa* (Cham. & Schltdl.) Delprete, **comb. nov.**

Type: BRAZIL: Without locality, s.d., *F. Sellow s.n.* (K [barcode K000174314], **neotype here designated**).

Notes: In the protologue of *Psychotria leiocarpa* Cham. & Schltdl., Chamisso and Schlechtendal (1829a: 22) cited material collected by Sellow in Brazil. The material at B studied by those authors was destroyed during WWII. The sole specimen associated with this name that could be found is at K, and has the handwritten annotation "Brazil, Sello." That specimen, with barcode K000174314, is a branch with numerous inflorescences with flower buds and flowers in anthesis and has the penciled annotation (author unknown) "Psychotria leiocarpa Cham. et Schl." Because there is no evidence on the specimen that it was studied by Chamisso and Schlechtendal, it is here designated the neotype of this name.

Chamisso and Schlechtendal (1829a: 22-23) described two varieties under *Psychotria leiocarpa*: var. *tropica* Cham. & Schltdl. and var. *extratropica* Cham. & Schltdl. Müller Argoviensis (1881: 281) described two additional varieties under *Psy. leiocarpa*, var. *constricta* Müll.Arg. and var. *intermedia* Müll.Arg. These four varieties have been treated as synonymous, and no infraspecific rank is here recognized for this species. The typification of these varietal names is beyond the scope of the present study.

FGT, vol. 40(2), p. 909:
"44-11. ***Psychotria lupulina*** Benth., Hook. J. Bot. 3: 230. 1841. Tipo: Guyana, s.d., *Rob. Schomburgk 26* (holótipo, K, isótipo, BM; foto-K em NY) [Subg. Heteropsychotria]."

Accepted name: *Palicourea justicifolia* (Rugde) Delprete & J.H.Kirkbr., J. Bot. Res. Inst. Texas 10(2): 424. 2016.

Type: GUYANA: Without locality, s.d. [1836], *Rob. H. Schomburgk, Ser. I, 26 pro parte* "in the later sets" (BM [barcode BM001008948], lectotype designated by Delprete and Kirkbride (2016: 424); isolectotypes, BR [barcode 00000531573], E [2 sheets, barcodes E00285066, E00505324], F [Acc. No. 734131], G [2 sheets, barcodes G00300487, G00300593], GH [barcode 00095189], TCD [barcode TCD0005769], U [barcode U0006214]).

Notes: Full synonymy and typification of this species is presented in Delprete and Kirkbride (2016).

FGT, vol. 40(2), p. 914:
"44-12. ***Psychotria mapourioides*** DC., Prodr. 4: 509. 1830. Tipo: Guiana Francesa, Rio Sinnamary, s.d., *J.B.C.F. Aublet s.n.* (holótipo, BM). [Subg. Psychotria]."

Accepted name: *Psychotria pedunculosa* Rich., Actes Soc. Hist. Nat. Paris 1: 107. 1792.

Notes: In the protologue of *Psychotria mapourioides* DC., Candolle (1830: 509) cited the material studied as "In Guianâ Gallicâ legit cl. Patris." Delprete's (2010b: 914) citation of the type specimen as collected by Aublet and present in BM is a typographical error, as the original material of this name was collected by Patris and is in G-DC. This species has traditionally been known as *P. mapourioides* and is the name that was used in FGT. A recent article by Taylor et al. (2020) established that the corrected name for this species is *P. pedunculosa* Rich., which predates the name traditionally used. For further discussion about the delimitation this species and details on the typification of synonyms, see Taylor et al. (2020). For a clarification of the species as presently recognized, full synonymy and typification is presented below.

Psychotria pedunculosa Rich., Actes Soc. Hist. Nat. Paris 1: 107. 1792. - *Palicourea pedunculosa* (Rich.) DC., Prodr. 4: 526. 1830. - *Uragoga pedunculosa* (Rich.) Kuntze, Revis. Gen. Pl. 2: 962. 1891.

Type: FRENCH GUIANA: Without locality, 1792, *J.B. Leblond 319* (holotype G [barcode G00341845], photo-G [F neg. #25821] in MO).

Psychotria mapourioides DC., Prodr. 4: 509. 1830.

Type: FRENCH GUIANA: Without locality, s.d., *J.B. Patris s.n.* (holotype, G-DC [barcode G00667347], photo-G [F neg. #6674] in MO).

Palicourea chionantha DC., Prodr. 4: 526. 1830. - *Mapouria chionantha* (DC.) Müll. Arg. in Martius, Fl. Bras. 6(5): 387. 1881. - *Uragoga chionantha* (DC.) Kuntze, Revis. Gen. Pl. 2: 959. 1891. - *Psychotria chionantha* (DC.) Britton, Bull. Torrey Bot. Club 18: 109. 1891. - *Psychotria mapourioides* var. *chionantha* (DC.) Steyerm., Mem. New York Bot. Gard. 23: 462. 1972.

Type: BRAZIL. Bahia: Without locality, 1830, *P. Salzmann s.n.* (holotype, G-DC [barcode G00667829], photo-G [F neg. #6666]; isotype, MO [Acc. No. 124067, barcode MO-1768543]).

FGT, vol. 40(2), p. 921:
"44-13. ***Psychotria nemorosa*** Gardner, London J. Bot. 4: 109. 1845. Tipo: Brasil, Rio de Janeiro, Serra dos Órgãos, in virgin forest, /I/1837 (fl), *Gardner 454* (holótipo K, foto em NY). [Subg. Heteropsychotria]."

> **Accepted name: *Palicourea nemorosa*** (Gardner) Delprete, **comb. nov.**
>
> Type: BRAZIL. Rio de Janeiro: Serra dos Orgãos, in virgin forest, Jan. 1837 (fl), *G. Gardner 454* (holotype K [barcode K000174321]; isotype fragment G [barcode G00300277]; photo-K in NY).

FGT, vol. 40(2), p. 924:
"44-14. ***Psychotria officinalis*** (Aubl.) Raeusch. ex Sandwith, Kew Bull. 1931: 473. 1931. - *Nonatelia officinalis* Aubl., Hist. Pl. Guiane 1: 182, t. 70, f. 1. 1775. - *Oribasia officinalis* (Aubl.) Gmel., Syst. Nat. 367. 1791. - *Psychotria officinalis* (Aubl.) Raeusch., Nom. Bot. 55. 1797, comb. inval. - *Psychotria involucrata* Sw., Fl. Ind. Occ. 1: 413. 1797; *non Cephaelis involucrata* Willd. (1798), *nom. superfl.*, *nec Psychotria involucrata* Willd. ex DC. (1830). Tipo: Guiana Francesa, Cayenne, s.d., *J.B.C.F. Aublet s.n.* (holótipo, BM). [Subg. Heteropsychotria]."

> **Accepted name: *Palicourea tenerior*** (Cham.) Delprete & J.H.Kirkbr., J. Bot. Res. Inst. Texas 10(2): 432. 2016.
>
> Type: FRENCH GUIANA: Trail margins of Cayenne and French Guiana, "habitat Caïenne in locis sterilibus" and "au bord des sentiers de Caïenne & de la Guyane […] en fleur & en fruit dans le mois d'Aoút", s.d. [1762–1764], *J.B.C.F. Aublet s.n.* (P-JJR 8: 271A), lectotype designated by Lanjouw and Uittien (1940: 154)). For further information, see Delprete (2015).

Notes: The application of the name *Nonatelia officinalis* Aubl. (≡ *Psychotria officinalis* (Aubl.) Raeusch. ex Sandwith) in FGT (Delprete, 2010b: 924) is erroneous. Also, Figure 86 (p. 926) of FGT, labeled as "*Psychotria officinalis*" is instead *Psychotria hoffmannseggiana* (Roem. & Schult.) Müll. Arg. [≡ *Palicourea hoffmannseggiana* (Roem. & Schult.) Borhidi]. The correct application of the name was realized when I was able to examine the lectotype specimen of *Nonatelia officinalis* Aubl. in P-JJR.

The name to be used for this species is *Palicourea tenerior* (Cham.) Delprete & J.H. Kirkbr. For a clarification of the species delimitation of *Pal. tenerior* (incl. *Psy. officinalis*) as presently recognized, a complete synonymy is presented below (reproduced from Delprete and Kirkbride, 2016). The new lectotypification of *Psychotria villosa* Vell. is also presented below.

Patabea tenerior Cham., Linnaea 9: 236. 1834. - *Psychotria tenerior* (Cham.) Müll. Arg. in Martius, Fl. Bras. 6(5): 331. 1881. - *Palicourea tenerior* (Cham.) Delprete & J.H.Kirkbr., J. Bot. Res. Inst. Texas 10(2): 2016.

Type: BRAZIL: without locality, s.d., *F. Sellow s.n.* (B†; K [K000015435], lectotype designated by Delprete and Kirkbride (2016: 432); probable isolectotype G [barcode G00439809]).

Nonatelia officinalis Aubl., Hist. Pl. Guiane 1: 182, t. 70, f. 1. 1775, non *Palicourea officinalis* Mart. in Spix & Mart. (1828). - *Oribasia officinalis* (Aubl.) J.F.Gmel., Syst. Nat. 367. 1791. - *Psychotria officinalis* (Aubl.) Raeusch., Nomencl. Bot. 55. 1797, *nom. nud.* -*Psychotria involucrata* Sw. (1797), *nom. superfl.*, non *Cephaelis involucrata* Willd. (1798), *nom. superfl., nec Psychotria involucrata* Willd. ex DC. (1830). - *Psychotria officinalis* (Aubl.)

Raeusch. ex Sandwith, Kew Bull. 1931: 473. 1931. - *Palicourea swartziana* Borhidi, Acta Bot. Hung. 53: 247. 2012 ["2011"].

Type: FRENCH GUIANA: [Protologue: "habitat Caienne in locis sterilibus"], s.d. [1762–1764], *J.B.C.F. Aublet s.n.* (P-JJR 8: 271A, lectotype designated by Lanjouw and Uittien (1940:154)).

"*Psychotria villosa* Vell., Fl. Flum. 67. 1825, *nom. illeg.*, Icon. 2: f. 33. 1831 [*non Psychotria villosa* Ruiz & Pav. (1799)."

Type: BRAZIL. [Rio de Janeiro: Paratí]: "*Habitat silvis maritimis Pharmacopolitanis*": [illustration] an original drawing on parchment for the *Florae Fluminensis* in the Manuscript Section of the Biblioteca Nacional, Rio de Janeiro [Catalogue No. mss1198651_036], **lectotype designated here.**

Notes: Delprete (2010b: 924) listed the illegitimate name *Psychotria villosa* Vell. among the synonyms of *Psy. officinalis* (Aubl.) Raeusch. ex Sandwith, without citing the type. Delprete and Kirkbride (2016: 432) cited as lectotype of *P. villosa*, plate 33 of the second volume of *Florae Fluminensis Icones*. The *Icones* were published two years after the the text of *Florae Fluminensis*, therefore the plates published in the *Icones* are not original material. Hence, Delprete & Kirkbride's lectotypification is not valid. An original drawing on parchment of *P. villosa* is in the Manuscript Section of the National Library in Rio de Janeiro, Catalogue No. mss1198651_036. The parchment plate has the heading "Pentand. Monog. PSYCHOTRIA *villosa*" and the handwritten number "33" on the upper right corner. On this drawing (as in Plate 33 of the *Icones*) is depicted a ramified branch with numerous leaves and three nodding, capitate inflorescences. Two leaf blades are drawn as elliptic or ovate with 9–10 secondary veins on each side of the midrib, and on the other leaves the secondary venation is not drawn. On the lower right portion of the drawing on parchment, are depicted a flower in anthesis, a longitudinally dissected corolla, and a pistil with reflexed style lobes.

The drawing on parchment of *C. sessilis*, Catalogue No. mss1198651_036, preserved in the Manuscript Section of the National Library in Rio de Janeiro, is here designated the lectotype of *P. villosa*.

Cephaelis microcephala Miq., Linnaea 18: 748. 1845 ["1844"], *nom. illeg., non Cephaelis microcephala* Humb. & Bonpl. ex Roem. & Schult. (1819).

Psychotria microcephala Miq., Stirp. Surinam Select. 180. 1851, *non Psychotria microcephala* Müll. Arg. (1881), *nom. illeg.*

Type: SURINAME: Paramaribo, Mar–Apr 1844, *A. Kappler 1562* (first-step lectotype designated by Steyermark (1972: 605); second-step lectotype U [barcode U0006198], designated by Delprete and Kirkbride (2016: 432); isolectotype MO [Acc. No. 124059]).

Psychotria erythrophylla Müll.Arg., Flora 59: 542, 546. 1876. - *Psychotria hoffmannseggiana* var. *erythrophylla* (Müll.Arg.) Steyerm., Mem. New York Bot. Gard. 23: 607. 1972.

Type: VENEZUELA. Amazonas: "Rio Casiquiari, Rio Vasiva and Rio Pacimoni" [In Vasiva ripis], Jan 1854, *R. Spruce 3439* (K [barcode K000432844], lectotype designated by Steyermark (1972: 608); isolectotypes, BR [barcode 00000531613], G [barcode G00300757], frag NY [barcode 00132666]).

Psychotria barbiflora var. *amazonica* Müll.Arg. in Martius, Fl. Bras. 6(5): 330. 1881.

Type: BRAZIL. Pará: near Santarem, May 1850 (fr), *R. Spruce 630* (first-step lectotype designated by Steyermark (1972: 606); second-step lectotype, K [barcode K000174364] designated by Delprete and Kirkbride (2016: 432)).

Psychotria officinalis subsp. *wilhelminensis* Steyerm., Mem. New York Bot. Gard. 23: 615. 1972.

Type: SURINAME: Wilhelmina Geberte, Juliana Top, 3°36–41'N, 56°30–34'W, 1200 m, 2 Aug. 1963, *B. Maguire, J.P. Schultz, T.R. Soderstrom & N. Holmgren 54440* (holotype, NY [barcode 00132755]; isotype, U [barcode U0006228]).

New identification of specimens cited as "*Psychotria officinalis*" in FGT. Several specimens cited under *Psychotria officinalis* in FGT (Delprete, 2010b: 928–930) are here re-identified as *Palicourea hoffmannseggiana* (Roem. & Schult.) Borhidi. Those specimens are cited below.

BRAZIL. **Goiás:** Mun. Aparecida do Rio Doce, PCH Irara, 18°04'S, 51°11'W, borda de mata estacional, 18 Dec. 2007 (fl), *F.A.G. Guilherme et al. 985* (UFG); Campo Belo e São Domingo, 24 Oct. 1965 (fl), *E. Pereira & A.P. Duarte 10401* (HB, UFG); Mun. Goiânia, Morro dos Lobos, 4 Sep. 1968 (fl-fr), *J.A. Rizzo & A.M. Barbo-*

sa 2108 (UFG); Mun. Goiânia, rod. Goiânia-Leopoldo de Bulhões, 18 km de Goiânia, 30 Dec. 1968 (fr), *J.A. Rizzo & A.M. Barbosa 3202* (UB, UFG). **Tocantins:** Mun. Pedro Afonso, Fazenda Lagomar, Nov. 1979 (fl), *H.D. Ferreira 299* (UFG), *300* (UFG); 80 km do entroncamento da Belém-Brasília (BR-153) com a Transamazônica, direção Araguatins, 16 Mar. 1972 (fr), *J.A. Rizzo 7838* (UB, UFG); rod. Pequizero-Couto de Magalhães, 30 km antes de Couto de Magalhães, 8 Sep. 1973 (fl), *J.A. Rizzo 9252* (UB, UFG); rod. para Tupiratins, 6 km antes da cidade, 12 Nov. 1973 (fl), *J.A. Rizzo 9430* (UB, UFG); rod. Porto Nacional-Ponte Alta do Norte, 20 km de Ponte Alta do Norte [Ponte Alta do Tocantins], 7 Dec. 1973 (fl), *J.A. Rizzo 9449* (UB, UFG).

FGT, vol. 40(2), p. 930:
"44-15. ***Psychotria platypoda*** DC., Prodr. 4: 510. 1830. Tipo: Guiana Francesa, s.d., *Patris s.n.* (holótipo, G-DC). [Subg. Heteropsychotria]."

Accepted name: *Palicourea dichotoma* (Rudge) Delprete & J.H.Kirkbr., J. Bot. Res. Inst. Texas 10(2): 418. 2016.

Notes: A clarification of the species delimitation, full synonymy and typification are presented below, with a few corrections to the typifications published by Delprete and Kirkbride (2016) and see additional notes below.

Palicourea dichotoma (Rudge) Delprete & J.H.Kirkbr., J. Bot. Res. Inst. Texas 10(2): 418. 2016. - *Cephaelis dichotoma* Rudge, Pl. Guian. 29, t. 44. 1805. - *Psychotria dichotoma* Rudge) Bremek., Recueil Trav. Bot. Neerl. 31: 301. 1934, *nom. illeg.*, non *Psychotria dichotoma* Humb. & Bonpl. ex Roem. & Schult. (1819).

Type: FRENCH GUIANA: Cayenne, s.d., *J. Martin s.n.* (BM [barcode BM000611038], lectotype designated by Delprete and Kirkbride (2016: 418); isolectotypes: B† (photo-B No. 721 at G, NY), BM [barcode BM000611037]).

Psychotria platypoda DC., Prodr. 4: 510. 1830.

Type: FRENCH GUIANA: "Cayenne", without locality, s.d., *J.B. Patris s.n.* (holotype, G-DC [barcode G00667406]).

Psychotria martiana Müll.Arg. in Martius, Fl. Bras. 6(5): 339, t. 51. 1881.

Type: BRAZIL. Rio de Janeiro: Serra de Macacu, s.d., *A.C.V. Schott 5302 (799.d)* (first step lectotype designated by Steyermark (1972: 600); NY [barcode 00132735], second-step lectotype designated by Delprete and Kirkbride (2016: 418); isolectotype fragment F [Acc. No. 870290]).

Notes: Candolle (1830: 510) in the protologue of *Psychotria platypoda* DC. cited the material studied as "in Guianâ Gallicâ legit cl. Patris. […] Species distinctissima! (v.s. sine fl.)." Delprete and Kirkbride (2016: 418) cited the type of *P. platypoda* as "French Guiana: without locality, s.d., *J.B. Patris s.n.* (lectotype, here designated: G-DC! [no barcode]; isolectotype G! [barcode unknown])." However, after exhaustive search made in 2023, I was unable to find the sheet in G; hence, most likely this was an erroneous citation and presumably such specimen never existed in G.

The G-DC sheet corresponding with this name has the annotation "Psychotria platypoda DC." handwritten by Candolle. Delprete examined and annotated it as the holotype of *P. platypoda* in 2013. All the material on that sheet was designated as the lectotype by Delprete and Kirkbride (2016), citing a duplicate in G as the isolectotype. However, a detailed re-examination of the sheet in G-DC supports a different conclusion. On that sheet are affixed two specimens that after Delprete's examination were assigned two different barcodes, because they belong to two different gatherings. The specimen on the upper portion of the sheet, with barcode G00667343, is a branch with several leaf pairs and two infructescences. At the base of the upper specimen is affixed a label with the annotation "Cayenne ou Guyane françoise, Museum de Paris 1821" handwritten by an unknown author, most likely a person of the curatorial staff of the Natural History Museum in Paris in 1821. This also proves that specimen with barcode G00667343 was not collected by Patris, as Patris' specimens were integrated in G-DC through L'Heritier Herbarium, hence this specimen is not original material.

The specimen on the lower portion of the G-DC sheet, with barcode G00667406, consists of a branch with two leaf pairs and a small infructescence. At the base of the lower specimen, is pinned a label with "Cayenne" handwritten by Candolle. Candolle was aware that this specimen was collected by Patris in French Guiana, as he wrote that information in the protologue (Candolle, 1830: 510), but did not add that information on the specimen label. In conclusion, the specimen with barcode G00667406 is the holotype of *Psychotria platypoda*.

Delprete and Kirkbride (2016: 418) listed *Psychotria brevipes* DC. as a synonym of *Palicourea dichotoma* (Rudge) Delprete & J.H. Kirkbr. [incl. *Psychotria platypoda*] and designated the lectotype of *P. brevipes*

a specimen in G-DC, which at that time, did not have a barcode. That specimen was later assigned barcode G00667340. Delprete in 2013 annotated that specimen as the holotype of *P. brevipes*, and affixed an additional label with the annotation "Psychotria sp., not P. platypoda DC." However, Delprete's note about the identity of *P. brevipes* was overlooked by Delprete and Kirkbride (2016), who listed that name as one of the synonyms of *P. platypoda*. The identity of this name needs to be further studied. The specimen has strongly costate fruits, as characterized by Candolle in the original description, and is not synonymous with *P. platypoda*.

Another specimen in G, with barcode G00300388, was cited as isolectotype of *Psychotria brevipes* by Delprete and Kirkbride (2016: 418). That specimen has a label with the annotation "Cayenne, leg. Patris, Comm. De Candolle et L'Heritier." It is not conspecific with the lectotype of *P. brevipes* in G-DC, which has barcode G00667340 (see above).

FGT, vol. 40(2), p. 934:
"44-16. ***Psychotria poeppigiana*** Muell. Arg. in Mart., Fl. Bras. 6(5): 370, tab. 57, fig. 1. 1881. Sintipos: Brasil, Amazonas, "Ega" [agora cidade de Tefé], *Poeppig 3065* (G), *Martius s.n.* (G); "in silvis Japurensibus ad Maribi" [Rio Japuré], *Martius s.n.* (G); Rio Negro, "ad Uauanaca et S. Gabriel" [entre Uauanaca e São Gabriel da Cachoeira], *Spruce 1892* (G, K); "prope Barra do Rio Negro", *Martius s.n.* (G); "in silvis ad Nogueira", *Martius s.n.* (G). [Subg. Heteropsychotria]."

Accepted name: *Palicourea tomentosa* (Aubl.) Borhidi, Acta Bot. Hung. 53: 248. 2012 ["2011"].

Notes: For a clarification of the species delimitation, full synonymy and typification is presented below. For further details, see Delprete and Kirkbride (2016).

Palicourea tomentosa (Aubl.) Borhidi, Acta Bot. Hung. 53: 248. 2012 ["2011"]. - *Tapogomea tomentosa* Aubl., Hist. Pl. Guiane 1: 160, t. 61. 1775, non *Psychotria tomentosa* (Oerst.) Hemsl. (Apr 1881). - *Callicocca tomentosa* (Aubl.) J.F.Gmel., Syst. Nat. 1: 371. 1791. - *Cephaelis tomentosa* (Aubl.) Vahl, Eclog. Amer. 1: 19. 1796. - *Psychotria tomentosa* (Aubl.) Müll. Arg. in Martius, Fl. Bras. 6(5): 370. Jul 1881, *nom. illeg.* - *Uragoga tomentosa* (Aubl.) K.Schum. in Engl. & Prantl, Nat. Pflanzenfam. 4(4):120. 1891.

Type: FRENCH GUIANA: Without locality, s.d. [1762–1764], *J.B.C.F. Aublet s.n.* (P-JJR 8: 265D (lower portion of the sheet), lectotype designated by Lanjouw and Uittien (1940: 159); isolectotype, BM [barcode BM001008942]).

Cephaelis hirsuta M.Martens & Galeotti, Bull. Acad. Roy. Sci. Bruxelles 11(1): 135. 1844, non *Psychotria hirsuta* Sw. (1797).

Type: MEXICO. Oaxaca: Without locality, s.d., *G.H. Galeotti 7185* (BR [000005316045], lectotype designated by Delprete and Kirkbride (2016: 433); isolectotypes, BR [2 sheets, 000005315710, 000005315833]).

Psychotria poeppigiana Müll.Arg. in Martius, Fl. Bras. 6(5): 370, t. 57, f. 1. 1881. - *Uragoga poeppigiana* (Müll. Arg.) Kuntze, Revis. Gen. Pl. 2: 962. 1891.

Type: BRAZIL. Amazonas: "prope Ega" [now Tefé], 1834, *E.F. Poeppig 3065* (first-step lectotype designated by Steyermark (1972: 680), second-step lectotype, G [barcode G00418072], designated by Delprete and Kirkbride (2016: 433); isolectotypes, W [Acc. No. W104833], fragment F [Acc. No. 766938]; possible isolectotypes, G [barcode G00418071], W [2 sheets, Acc. Nos. W0053537, W111261]).

Psychotria barcellana Müll. Arg. in Martius, Fl. Bras. 6(5): 369. 1881. - *Cephaelis barcellana* (Müll. Arg.) Standl., Publ. Field Columbian Mus., Bot. Ser. 8: 184. 1930. - *Psychotria poeppigiana* subsp. *barcellana* (Müll. Arg.) Steyerm., Mem. New York Bot. Gard. 23: 680. 1972.

Type: BRAZIL. Amazonas: Rio Negro, Arião, Nov 1851, *R. Spruce 1852 (or 1892), pro parte* (first-step lectotype designated by Steyermark (1972: 680); second-step lectotype K [barcode K000174426], designated by Delprete and Kirkbride (2016: 433)).

FGT, vol. 40(2), p. 937:
"44-17. ***Psychotria prunifolia*** (Kunth) Steyerm., Mem. New York Bot. Gard. 23: 655. 1972. - *Cephaelis prunifolia* Kunth in Humb. & Bonpl., Nov. Gen. Sp. 3: 377. 1819. Tipo: Venezuela, Amazonas, Río Orinoco, Rápidas de Maypures, s.d., *Humboldt & Bonpland 757* (holótipo, P-Bonp.). [Subg. Heteropsychotria]."

Accepted name: *Palicourea prunifolia* (Kunth) Borhidi, Acta Bot. Hung. 53: 248. 2012 ["2011"].

Type: VENEZUELA. Amazonas: Río Orinoco, Rápidas de Maypures, s.d., *A. Bonpland & A. Humboldt 757* (holotype, P-Bonp. [barcode P00671120]); pos-

sible isotype (without collection number) B-W [barcode B-W 04152-01 0]).

FGT, vol. 40(2), p. 937:

Synonyms:

"*Cephaelis microcephala* Willd. ex Roem. & Schult., Syst. Veg. 5: 214. 1819. - *Psychotria microcephala* (Willd ex Roem. & Schult.) Muell. Arg., in Mart., Fl. Bras. 6(5): 351. 1881; *Non Psychotria microcephala* Miq. (1850)."

Type: VENEZUELA: Orinoco, s.d., *A.J.A.G. Bonpland & F.W.H.A. Humboldt s.n.* (holotype B-W [barcode B-W 04152-01 0]; possible isotype P-Bonp. [barcode P00671120])

Psychotria microcephala (Willd. ex Roem. & Schult.) Muell. Arg. var. *tripotamica* Muell. Arg., in Mart., Fl. Bras. 6(5): 352. 1881.

Type: VENEZUELA: "habitat ad fluminis tria Casiquiari, Vasiva et Pacimoni regionis superioris Rio Negro" 1853–8154, *R. Spruce 3169* (G [barcode G00300400], **lectotype here designated**; isolectotypes, BM [barcode BM000624163], BR [barcode 000000531649], K [barcode K000432847], MO [Acc. No. 1620599], P [barcode P01817899], TCD [barcode TCD0005751]).

Notes: Müller Argoviensis (1881: 352) along with the description of *Psychotria microcephala* var. *tripotamica* Müll.Arg., cited the gathering *Spruce 3169*, without indicating the herbarium of deposit. Duplicates of this gathering are present in several herbaria. The specimen in G, with barcode G00300400, has two handwritten labels. One of them has the annotation "3169. Cephaelis (Patabea). Ad flumen Casiquiari, Vasiva et Pacimoni, coll. R. Spruce, 1853-4" handwritten by Spruce, and the other has the annotation "P. microcephala v. tripotamica Müll.-Arg., scripsit Müll.-Arg.!" The specimen with barcode G00300400 is here designated the lectotype of this name.

FGT, vol. 40(2), p. 938:

Synonym:

"*Psychotria xanthocephala* Muell. Arg., in Mart., Fl. Bras. 6(5): 351, tab. 53, fig. 1. 1881. Síntipos: Brasil, Goiás: Serra do Caretão, s.d. [1818-1819], *Pohl 808* (G, K, foto-K em NY) e *1694* (G); Tocantins: "Porto Imperial" [agora Porto Nacional], s.d. [1828-1829], *Burchell 8408* (G)."

Type: BRAZIL. Goiás: Serra do Carretão, s.d. [1818–1819], *J.B.E. Pohl 1694* (G [barcode G00300401], **lectotype designated here**).

Notes: In the protologue of *Psychotria xanthocephala* Müll. Arg., Müller Argoviensis (1881: 351) cited several gatherings from the Brazilian states of Goiás, Tocantins, and Mato Grosso. At G there is a specimen, with barcode G00300401, with the annotation "P. xanthophylla Müll. Arg., scripsit Müll.-Arg.! – Serra do Caretão, Pohl n. 1694" handwritten by Müller Argoviensis. This specimen, consisting of one branch with several infructescences, is here designated the lectotype of this name.

FGT, vol. 40(2), p. 944:

"44-18. ***Psychotria racemosa*** Rich., Actes Soc. Hist. Nat. Paris 1: 107. 1792. - Tipo: Guiana Francesa, s.d., *L.C.M. Richard s.n.* (neótipo, P, escolhido por Kirkbride, 1997) [Subg. Heteropsychotria]."

Accepted name: *Palicourea racemosa* (Aubl.) G.Nicholson, Ill. Dict. Gard. 3: 8. 1886.
Non *Palicourea racemosa* (Aubl.) Borhidi, Acta Bot. Hung. 53: 247. 2012 ["2011"], *isonym, nom. superfl.*

Notes: For a clarification regarding the delimitation of this species, full synonymy and typification is presented below. For further details, see Delprete and Kirkbride (2016).

Palicourea racemosa (Aubl.) G.Nicholson, Ill. Dict. Gard. 3: 8. 1886. - *Palicourea racemosa* (Aubl.) Borhidi, Acta Bot. Hung. 53: 247. 2012 ["2011"], *isonym, nom. superfl.* - *Nonatelia racemosa* Aubl., Hist. Pl. Guiane 1:186, t. 72. 1775, emend A.Rich., Mem. Fam. Rubiac. 127. 1830. - *Oribasia racemosa* (Aubl.) J.F.Gmel., Syst. Nat. 367. 1791. - *Psychotria racemosa* (Aubl.) Raeusch., Nomencl. Bot., ed. 3, 56. 1797, *nom. illeg.*, non *Psychotria racemosa* Rich. (1792:107).

Type: FRENCH GUIANA: Forest between Kaw and the Orapu River, "in sylvis Orapu," s.d. [1762–1764], *J.B.C.F. Aublet s.n.* (P-JJR 8: 271C, lectotype designated by Lanjouw and Uittien (1940: 154)).

Psychotria racemosa Rich., Actes Soc. Hist. Nat. Paris 1: 107. 1792.

Type: FRENCH GUIANA: Without locality, s.d., *L.C.M. Richard s.n.* (neotype, P, lost, designated by Kirkbride (1997: 370, figs. 7–8).

Type: FRENCH GUIANA: Without locality, s.d., *L.C.M. Richard s.n.* (P [barcode P03824095], **lectotype designated here**).

Psychotria longistipula Benth., J. Bot. (Hooker) 3: 227. 1841.

Type: BRAZIL. Amazonas: Rio Negro, [Barcelos], s.d. [Dec 1839], *Rob. H. Schomburgk, ser. I, 945* (first-step lectotype designated by Steyermark (1972: 543); second-step lectotype K [K000174266], designated by Delprete and Kirkbride (2016: 428); isolectotype, BM n.v.).

Psychotria quinquecuspis Müll. Arg., Flora 59: 549, 552. 1876.

Type: BRAZIL. Minas Gerais: Lagoa Santa, 21 Jan. 1864, *E. Warming s.n.* (holotype G [barcode G00300406]).

Notes: Kirkbride (1997: 370) designated as neotype of *Psychotria racemosa* Rich. a specimen in P, which was photographed and published in figures 7 and 8 of his article. The neotype specimen illustrated in fig. 7 and 8 was recently searched for in P several times by Kirkbride and the present author, and we are now certain that the specimen was lost. Therefore, a new lectotype specimen needs to be designated from original material. In P there is another specimen collected by L.C.M. Richard, with barcode P03824095, and the annotation "Nonatelia racemosa Aublet, t. 72, Guyana, Dedit Richard" handwritten by an unknown author. That specimen has another label, with the heading "HERB. MUS. PARIS" and the annotation "Guyane, donné par M. A. Richard" handwritten by an unknown author. The specimen with with barcode P03824095 is original material. It consists of a branch with three leaf pairs and a terminal infructescence and is here designated as the lectotype of *Psychotria racemosa* Rich.

FGT, vol. 40(2), p. 951:
"44-19. ***Psychotria rupestris*** Muell. Arg., Flora 59: 542, 546. 1976. Tipo: Brasil, Minas Gerais, Tejuco, s.d., *Riedel 1241* (holótipo, G). [Subg. Heteropsychotria]."

Accepted name: ***Palicourea rupestris*** (Müll. Arg.) Delprete, **comb. nov.**

Type: BRAZIL. Minas Gerais: "in rupibus prope Tejuco", Dec. 1824, *L. Riedel 1241* (G [barcode G00300417], **lectotype here designated**; isolectotype BR [barcode 000000532581]).

Notes: In the protologue of *Psychotria rupestris* Müll.Arg., Müller Argoviensis (1881: 332) cited the gathering *Riedel 1241*, without indicating the herbarium of deposit. I was able to find two original specimens at G and BR annotated by Müller Argoviensis with this name. The specimen at G, barcode G00300417, has few branchlets with inflorescences, and is here designated as the lectotype of this name.

FGT, vol. 40(2), p. 954:
"44-20. ***Psychotria stachyoides*** Benth., Linnaea 23: 464. 1850. Tipo: Brasil, Minas Gerais, Caldas, s.d., *Regnell I 170* (holótipo K; isótipo C; foto-C em NY). [Subg. Heteropsychotria]."

Accepted name: ***Palicourea stachyoides*** (Benth.) Delprete, **comb. nov.**

Type: BRAZIL. Minas Gerais: Caldas, 24 Oct. 1864, *A.F. Regnell ser. I n. 170* (K [barcode K000002237], **lectotype here designated**; isolectotypes, BR [2 sheets; barcodes 000000532619 and 000000532586], C n.v. [photo in NY], US [barcode 00138993]; fragment F [ex B; Acc. No. 612131]).

Notes: Bentham (1850: 464) cited the gathering *Regnell Ser. 1, n. 170* for *Psychotria stachyoides* Benth. without citing the herbarium of deposit. As Bentham regularly studied specimens at BM and K, and duplicates of *Regnell Ser. 1, n.* 170 are also present at BR, C, F, and US, a lectotype needs to be designated. At K there is a sheet with two original specimens of *P. stachyoides*. On the upper right corner of the sheet with barcode K000002237, is affixed a label with the annotation "Provinciae Minas G., 1 Ser. N. 170" handwritten by Regnell, and the annotation "Psychotria stachyoides, Benth." handwritten by Bentham. That specimen consists of a branch with several inflorescences with numerous flowers in anthesis. Near the branch there is the stamp "Herbarium Benthamianum." Specimen with barcode K000002237 is here designated as the lectotype of this name.

FGT, vol. 40(2), p. 957:
"44-21. ***Psychotria stipulosa*** Muell. Arg. in Mart., Fl. Bras. 6(5): 334. 1881. - *Cephaelis stipulosa* (Muell. Arg.) Standl., Publ. Field Columbian Mus., Bot. Ser. 7: 430. 1931. - Tipo: Venezuela, Amazonas, s.d., *Spruce 3382* (holótipo, G; isótipo, BR). [Subg. Heteropsychotria]."

Accepted name: ***Palicourea stipulosa*** (Müll.Arg.) Borhidi, Acta Bot. Hung. 59: 47. 2017.

Type: VENEZUELA. Amazonas: "Habitat in regione fluminis Negro secus Casiquiari, Vasiva et Pacimoni", 1853–1854, *R. Spruce 3382* (G [2 sheets, barcode G00300489], **lectotype here designated**; isolectotypes, BM [barcode BM000624156], BR [barcode 000000532587], E [barcode E00285075], GH [barcode 00095218], K [barcode K000174369, "Ad pedem montis Imei fluvii Pacimonis, locis humidis, Feb/54"], NY [barcode 00132835], P [barcodes P00837161, P00837162 "Fl. Pacimoni, Feb. 1854"]; isolectotype fragment F [ex G, Acc. No. 767118]).

Notes: In the protologue of *Psychotria stipulosa* Müll. Arg., Müller Argoviensis (1881: 334–335) cited the gathering *Spruce 3382* with the localities "Habitat in regione fluminis Negro secus Casiquiari, Vasiva et Pacimoni" and did not cite an herbarium of deposit. Borhidi (2017: 47) did not designate a lectotype for the new combination *Palicourea stipulosa* (Müll. Arg.) Borhidi. At G there are two sheets, which are kept together in the same folder. On the first sheet, with barcode G00300489, is affixed a label with the annotation "3382 Cephaelis, Ad fluminis Casiquiari, Vasiva et Pacimoni, Coll. R. Spruce, 1853-4" handwritten by Spruce, and a label with the annotation "P. stipulosa Müll. Arg., scripsit Müll.-Arg.!" handwritten by Müller Argoviensis. On the second sheet at G, without barcode, is affixed a label with the heading "Herbier Delessert, Collection Générale" and the annotation "Spruce n. 3382" handwritten by an unknown author. According to Art. 8.3 of the *Code* "A specimen may be mounted as more than one preparation, as long as the parts are clearly labelled as being part of that same specimen, or bear a single, original label in common. Multiple preparations from a single gathering that are not clearly labelled as being part of a single specimen are duplicates, irrespective of whether the source was one individual or more than one." And specifically, Art. 8.3 Ex. 9 states that "In the Geneva herbaria, a single specimen is often prepared on two or more sheets, which are not therefore duplicates. Although the individual sheets are usually not labelled as being part of the same specimen, they are physically kept together in their own specimen folder and bear a single, original label in common." Therefore, the two sheets of *Spruce 3382* at G are treated as a single specimen with multiple preparations. Specimen with barcode G00300489, mounted on two sheets, is here designated as the lectotype of *Psychotria stipulosa*.

FGT, vol. 40(2), p. 959:
"44-22. ***Psychotria subtriflora*** Muell. Arg., Flora 59: 550, 553. 1876. Tipo: Brasil, sem localidade, s.d., *Sellow s.n.* (holótipo, G). [Subg. Heteropsychotria]."

Accepted name: ***Palicourea subtriflora*** (Müll.Arg.) Delprete, **comb. nov**.

Type: BRAZIL: Without locality, s.d., *F. Sellow s.n.* (G [barcode G00402252], **lectotype here designated**).

Notes: Müller Argoviensis (1876: 550, 553) cited the material studied of *Psychotria subtriflora* Müll. Arg. as "Brasilia: Sello" without citing the herbarium of deposit. Searching for original specimens associated with this name, only one specimen at G was found. The G specimen, with barcode G00402252, consists of a few branch fragments kept in an envelope, which are sufficient for the application of the name. The envelope is annotated by Müller Argoviensis as "P. subtriflora Müll. Arg. scripsit Müll. Arg." and "Psychotria subtriflora Müll. Arg. Brasil. Sello." This specimen is here designated the lectotype of *Psychotria subtriflora*.

New synonym:
Psychotria schuechiana Müll.Arg. in Mart., Fl. Bras. 6(5): 348. 1881. – *Uragoga schuechiana* (Müll. Arg.) Kuntze, Revis. Gen. Pl. 2: 952. 1891. – *Margaritopsis schuechiana* (Müll. Arg.) C.M. Taylor, Syst. Geogr. Pl. 75(2): 176. 2005.

Type: BRAZIL. Rio de Janeiro: Without locality, s.d., *G. Schüch 5314* (G [barcode G00300187], **lectotype here designated**; isolectotypes NY [barcode 00132814], W [2 sheets, barcodes W0067425, W0067426]).

Notes: Müller Argoviensis (1881: 348) described *Psychotria schuechiana* Müll. Arg. as a plant with small, narrowly triangular stipules, leaves narrowly elliptic with 6–7 secondary veins on each side, sessile flowering heads distally dichotomous, with 8–10 flowers, bracts oblong-triangular about as long as the fruits, bracteoles lanceolate, calyx with 5 lanceolate lobes, drupes ellipsoid, and pyrenes ventrally sulcate. He also wrote that it is very similar to *P. subtriflora* Müll. Arg., from which it differs by the stems distally pubescent, dichotomous, multiflorous capitula, and the smaller fruits. He cited the material studied of *P. schuechiana* as "Habitat in prov. Rio de Janeiro: Schüch n. 5314" without citing the herbarium of deposit.

Taylor (2005: 176) transferred *Psychotria schuechiana* Müll. Arg. to *Margaritopsis* (= *Eumachia*) and cited the type as "Brazil, in prov. Rio de Janeiro, *Schüch 5314* [M n.v. holo-; G-DC n.v., photo (F neg. #25827) MO iso-]." The M specimen cited by Taylor cannot be treated as a holotype because Müller Argoviensis did not cite

the herbarium of deposit. Also, Taylor's citation cannot be treated as an inadvertent lectotypification because, according to the *Code*, it should have been accompanied by "here designated" or a similar expression. In addition, according to Andreas Fleischmann (pers. comm., 6 Nov. 2023), M Curator, after an exhaustive search, no original specimen of *Psychotria schuechiana* was located in M, and such specimen probably never existed in that herbarium, because there is no folder with such name at M. Hence, Taylor's holotype citation is superseded, and a lectotype for this name needs to be designated. Original specimens of *Psychotria schuechiana* have been found in G, NY, and W, and are below discussed.

The G specimen, with barcode G00300187, consists of two branches with fruits, and has a label with the annotation "P. Schuechiana Müll. Arg. – scripsit Müll. Arg." handwritten by Müller Agoviensis. However, the specimen does not have a label reporting collector and collector number. Because this specimen is annotated by Müller Agoviensis, it is here designated as the lectotype of this name.

The NY specimen, barcode 00132814, has a label with the heading "Duplum ex Herb. Mus. Hist. Nat. Vindobon." and the handwritten text "Psychotria schuechiana Müll. Arg., Brasilia, 5314 Schüch". The specimen consists of a branch without flowers. This specimen is an isolectotype.

There are two sheets of *Schüch 5314* at W, with barcodes W0067425 and W0067426, which are isolectotypes.

Taylor et al. (2017: 300) stated that "*Psychotria schuechiana* Müll. Arg. was treated as a species of *Margaritopsis* by Taylor (2005), but further study shows that it does not belong to *Eumachia* and is not separable from *P. subtriflora* Müll. Arg." Accordingly, this taxon is here treated as a synonym of *Palicourea subtriflora* (Müll. Arg.) Delprete.

FGT, vol. 40(2), p. 961:
"44-23. ***Psychotria trichophora*** Muell. Arg., Flora 59: 541, 545. 1876. Tipo: Brasil, Goiás, Rio Maranhão, s.d. [1818-1819], *Pohl 2053* (holótipo, G). [Subg. Heteropsychotria]."

Accepted name: ***Palicourea trichophora*** (Müll.Arg.) Delprete & J.H.Kirkbr., J. Bot. Res. Inst. Texas 10(2): 434. 2016.

Notes: For clarification of the species delimitation, full synonymy and typification is presented below:

Palicourea trichophora (Müll.Arg.) Delprete & J.H.Kirkbr., J. Bot. Res. Inst. Texas 10(2): 434. 2016. - *Psychotria trichophora* Müll. Arg., Flora 59: 541, 545. 1876.

Type: BRAZIL. Goiás: Rio Maranhao, s.d. [1818–1819], *J.B.E. Pohl 2053* (G [barcode G00300454], lectotype designated by Delprete and Kirkbride (2016: 434)).

Psychotria trichophoroides Müll.Arg., Flora 59: 541, 545. 1876 (cited as syn. of *P. trichophora* in Taylor 2007). - *Cephaelis trichophoroides* (Müll.Arg.) Standl., Publ. Field Columbian Mus., Bot. Ser. 8: 183. 1930. - *Petagomoa trichophoroides* (Müll.Arg.) Bremek., Recueil Trav. Bot. Neerl. 31: 295. 1934.

Type: BRAZIL. Rio de Janeiro ["Goiás" sic!], Serra Tingua, s.d., *J.B.E. Pohl 5306* (first-step lectotype designated by Steyermark (1972: 642); G [barcode G00300455] second-step lectotype designated by Delprete and Kirkbride (2016: 434); isolectotype, NY [00133508]; possible isolectotype, BR [barcode 00000531499, without collection number]).

Psychotria sciaphila S.Moore, Trans. Linn. Soc. London, ser. 2, 4: 379. 1896.

Type: BRAZIL. Mato Grosso: "in sylvis juxta ripas fl. Paraguay inter Santa Cruz et Diamantino," s.d. [1891–1892], *S.M. Moore 643* (first-step lectotype designated by Steyermark (1972: 641); BM [barcode BM000611028], second-step lectotype designated by Delprete and Kirkbride (2016: 434); isolectotypes, K [barcode K000174411], NY [barcode 00132815]; photo-BM at NY).

Petagomoa nigricans Bremek., Recueil Trav. Bot. Neerl. 31: 295. 1934.

Type: SURINAME: Forest Reserve Brownsberg, 6 Sep. 1915, *G. Stahel & J.W. Gonggrijp 123* (*B.W. 632*) (U [barcode U0006253], lectotype designated by Delprete and Kirkbride (2016: 434)).

Psychotria sciaphila subsp. *longicalyx* Steyerm., Mem. New York Bot. Gard. 23:641. 1972.

Type: BRAZIL. Distrito Federal: Parque Municipal do Gama, 25 km S of Brasilia, 1150 m, 10 Nov. 1965, *H.S. Irwin, R. Souza & R. Reis dos Santos 10161* (holotype, NY [barcode 00132816]; isotypes, F [Acc. No. 1726870], NY [barcode 01005486], US [barcode 00479212]).

FGT, vol. 40(2), p. 969:
"44-24. ***Psychotria vellosiana*** Benth., Linnaea 23: 464. 1850 - *Coffea sessilis* Vell., Fl. Flum. 64. 1825; Icon. 2: pl. 20. 1831. - *Psychotria sessilis* (Vell.) Muell. Arg. in Mart., Fl. Bras. 6(5): 358. 1881, *nomen. superfl., non Psychotria sessilis* Vell., Fl. Flum. 65. 1825; Icon. 2: pl. 26. 1831 [= *Rudgea sessilis* (Vell.) Muell. Arg. in Mart., Fl. Bras. 6(5): 182. 1881]. - *Psychotria sessilis* (Vell.) Muell. Arg. var. *genuina* Muell. Arg. in Mart., Fl. Bras. 6(5): 358. 1881. Tipo: Fl. Flum. Icon. 2: pl. 20. 1831 (holótipo). [Subg. Heteropsychotria]."

Accepted name: *Palicourea sessilis* (Vell.) C.M.Taylor, Novon 24: 90. 2015.

Type: BRAZIL. [Rio de Janeiro or São Paulo]: [icon] "*Coffea sessilis*" Original drawing on parchment for the *Florae Fluminensis* in the Manuscript Section of the Biblioteca Nacional, Rio de Janeiro [Catalogue No. mss1198651_023], **lectotype here designated**.

Notes: Full synonymy and typification of this species is available in Taylor (2015a) and Delprete and Kirkbride (2016).

Frei José Mariano da Conceição Vellozo (1742–1811) wrote the *Florae Fluminensis*, a floristic study of the state of Rio de Janeiro and contiguous areas in the state of São Paulo (Pastore et al. 2021). The text of this multi-volume work was published posthumously in 1829, although the frontispiece reports "1825" as the publication date. And the *Icones*, the volumes with the illustrations were published in 1831, although the frontispiece reports "1827" as the publication date (Carauta 1969, 1973; Knapp et al. 2015; Pellegrini et al. 2015). Therefore, the plates published in the *Icones* are not original material. In addition, Vellozo's herbarium is probably lost. Some authors have suggested that Vellozo's herbarium was sent from Rio de Janeiro to Lisbon in 1798 and possibly carried from there to Paris by Geffroy de Saint-Hilaire during the Napoleonic invasion of Portugal (Borgmeier, 1961; Lima, 1995; Pellegrini et al. 2015). But these are just suppositions, and no specimen that can be associated to Vellozo's names has been found in P or LISU.

Taylor (2015a: 90) and Delprete and Kirkbride (2016: 434) cited as lectotype of *Coffea sessilis* plate 20 of the second volume of *Florae Fluminensis Icones*. However, as explained above, the *Icones* were published two years after the description of the species, and they are not original material. Hence, Taylor's and Delprete & Kirkbride's lectotypifications of *C. sessilis* are not valid and should be superseded.

An original parchment plate of *Coffea sessilis* is kept in the Manuscript Section of the National Library in Rio de Janeiro, Catalogue No. mss1198651_023. The drawing has the heading "Pentand. Monog. COFFEA sessilis" and the handwritten number "20" on the upper right corner. On this drawing, as in Plate 20 of the *Icones*, is depicted a ramified branch with numerous leaves. The distal portion of the branchlets are depicted as antrorsely pubescent. The leaf blades are drawn as narrowly lanceolate with 24–26 secondary veins on each side of the midrib, although in some of them the secondary venation is not drawn. The inflorescences are axillary and sessile, with a few sessile flowers, some of them in anthesis. On the lower right portion of the drawing are depicted a flower in anthesis, a longitudinally dissected corolla, and a pistil with reflexed style lobes. The drawings on parchment of *C. sessilis*, with Catalogue No. mss1198651_023, preserved in the Manuscript Section of the National Library in Rio de Janeiro, is here designated the lectotype of *C. sessilis*.

FGT, vol. 40(2), p. 975:
"44-25. ***Psychotria viridis*** Ruiz & Pav., Fl. Peruv. 2: 61, tab. 210, fig. b. 1799. Tipo: Peru, Cuchero et Chinchao, s.d., *Ruiz & Pavón s.n.* (holótipo, MA). [cultivada] [Subg. Psychotria]."

Accepted name: *Psychotria viridis* Ruiz & Pav.

Type: [PERU]: [protologue]: "Habitat in *Peruviae Andium* montibus imis nemorosis per *Chinchao* et *Macora* tractus." [icon]: "*Psychotria viridis*", original drawing of the Royal Botanical Expedition to the Viceroyalty of Peru, the preserved in the CSIC Archives of the National Museum of Natural History of Madrid, cat. no. AJB04-D-0425_001, **lectotype here designated**.

Notes: As explained in Material and Methods, the collections made by Ruiz & Pavón in the localities of Chinchao, Acomayo, Pillao and Muña, were lost in a shipwreck along the coast of Portugal. Ruiz and Pavón returned to Spain in 1788, leaving the two botanists Juan José Tafalla and Juan A. Manzanilla to recollect, during 1793–1797, in the sites of the collections lost by their predecessors (Estrella, 1991; Tepe, 2018). Tafalla and Manzanilla sent their collections to Spain, where they were integrated in the Herbarium Peruvianum by Ruiz & Pavón and included in *Flora Peruviana et Chilensis*.

Ruiz and Pavón (1799: 61) described inflorescence and flowers of *Psychotria viridis* Ruiz & Pav. as "Racemi

terminales, subpaniculati, sesquipalmares. Pedunculi brachiati, tetragoni, compressiusculi. Flores parvi, sessilis, congesti" and cited the collection locality on the path between the Peruvian towns of Chinchao and Macora.

Andersson (1992: 171) cited the type of *P. viridis* as "Type: Ruiz & Pavón; Peru, Cuchero and Chinchao" without citing any herbarium of deposit. Delprete (2010b: 975) wrote that the holotype of *Psychotria viridis* Ruiz & Pav. is at MA. Taylor (2012d: 217) also cited the type of *P. viridis* as "Holotipo: Perú, Ruiz y Pavón s.n. (MA)." Searching for original material of *P. viridis*, two specimens, one original drawing, and the published plate are below described and discussed.

A specimen at MA with barcode MA815975, has a label with the annotation "Psychotria viridis Sp. Pl. Fl. Per." probably handwritten by Pavón. Another label has the heading "Herbarium Peruvianum Ruiz et Pavon" and the handwritten annotation "Psychotria viridis R. et Pav., nº 6/94, det. K. Krause." The specimen consists of a branch with several leaf pairs and a laxly branched inflorescence with numerous flower buds. Because of the laxly branched inflorescence, with terete peduncle and rachis, and the pedicellate flowers, this specimen does not correspond with Ruiz & Pavón's description and is not *Psychotria viridis*.

An original, colored drawing of the Royal Botanical Expedition to the Viceroyalty of Peru, by José Brunete is glued on a larger sheet. On the top of the larger sheet is affixed a printed label with the text "REAL JARDÍN BOTÁNICO, CSIC ARCHIVO – *Real Expedición Botánica al Virreinado del Perú*, AJB04-D-0425_001." On the drawing is depicted a branch with numerous leaf pairs, and large, oblong-obovate stipules. The stem, peduncle and rachis are quadrangular, and the flowers are sessile. At the lower right corner of the drawing are depicted a flower in anthesis, a dissected corolla with included stamens, and a pistil with a bifid style. At the lower left corner, inside the frame of the drawing is written "Brunete". At the bottom of the sheet, outside the frame of the drawing, at the bottom left corner is handwritten the number "14", and at the middle is handwritten "Psychotria viridis." All the features depicted on this drawing correspond entirely with Ruiz & Pavón's description.

Table 210, Figure b, of Ruiz & Pavón's (1799) *Flora Peruviana et Chilensis* is nearly identical to the original drawing by José Brunete, described above. *Psychotria viridis* is depicted in the lower portion of the plate, and differs from the original drawing in several features: A) the lower part of the branch is not depicted; B) the lateral branch depicted in the original drawing, with three leaf pairs and apical stipules, is missing; C) the leaves are drawn with secondary veins reaching the leaf margin, alternating with shorter veins reaching only half the width of leaf lamina. While in Brunete's drawing, the secondary veins are all the same length and reach the leaf margin, i.e., drawn as they are in nature.

In conclusion, Brunete's original drawing, made during the Royal Botanical Expedition to the Viceroyalty of Peru, kept in the CSIC Archives of the National Museum of Natural History of Madrid, with the code AJB04-D-0425_001, is here designated the lectotype of *Psychotria viridis* because it better corresponds to the description by the authors.

A specimen at G, with barcode G00300468, has a label with the printed text "Herbier Delessert – Collection Générale". On that label is glued a smaller label with the annotation "808 Psychotria sp. n." handwritten by an unknown author, and "Perou. – M. Pavon." probably handwritten by Pavón. The specimen consists of one branch with several leaf pairs, a large oblong-obovate stipule present at the node subtending the inflorescence, and an inflorescence with several flower buds. This specimen corresponds with Ruiz & Pavón's description.

45. **PSYLLOCARPUS** Mart. & Zucc., Flora 7(1), suppl. (4): 130. V-VI/1824; Nov. Gen. Sp. Pl. 1: 44. X/1824.

Accepted generic name: TAPANHUACANGA Vand., Fl. Lusit. Bras. Spec. 9. 1788.

Notes. Moraes (2018) in an article dealing with the plant names published by Vandelli (1788) concluded that *Tapanhuacanga* Vand. is synonymous with *Psyllocarpus* Mart. & Zucc. and published eleven new combinations in *Tapanhuacanga*. Carmo et al. (2019) submitted a well-supported proposal to conserve the name *Psyllocarpus* against *Tapanhuacanga*, to preserve taxonomic stability, and also indicated that the genus is probably not monophyletic. The Report of the Nomenclature Committee for Vascular Plants, lead by Applequist (2023), after considering the arguments offered by Carmo et al. (2019) to conserve *Psyllocarpus* against *Tapanhuacanga*, did not recommend the conservation. Therefore, *Tapanhuacanga* is the name to be used for this genus, and the new combinations published by Moraes (2018) are here followed.

Etymology: The name *Tapanhuacanga* originated from the Tupi language and its etymology was discussed by Moraes (2018: 50–51) as follows "According to Sampaio (1901: 58), *Tapanhuacanga* derives from *tupuyuna*, a negro, *acanga*, head, is the name given to the rocks described by Eschwege (1822) as "debris from angular, sharp edged fragments of iron luster and magnetic iron

bound by iron ocher, also mixed with talc and chlorite schist and chunks of itacolumite. The rock is very rich in gold […]." Alternatively, *Tapanhuacanga* sensu Vellozo de Miranda could also have been named after the Tapanhuacanga Mountains at Congonhas do Campo (Eschwege 1822), a place where he probably collected plants, about 57 km from Ouro Preto, where he lived."

FGT, vol. 40(2), p. 981:
"45-1. ***Psyllocarpus goiasensis*** J.H. Kirkbr., Smithsonian Contr. Bot. 41: 1–32. 1979. Tipo: Brasil, Goiás, ca. 10 km N de Alto Paraíso, 24/III/1971 (fl, fr), *H.S. Irwin, R.M. Harley & G.L. Smith 33082* (holótipo, UB; isótipos, NY, US; fotos-US em NY)."

Accepted name: ***Tapanhuacanga goiasensis*** (J.H.Kirkbr.) P.L.R.Moraes, Feddes Repert. 130: 51. 2018.

Type: BRAZIL. Goiás: ca. 10 km N de Alto Paraíso, ca. 1100 m, 24 Mar. 1971 (fl, fr), *H.S. Irwin, R.M. Harley & G.L. Smith 33082* (holotype, UB [barcode UB0040390]; isotypes, MO [Acc. No. 2575309], NY [barcode 00133029], US [barcode 00130113], WAG [barcode WAG0003052], WIS [barcode v0004269WIS]; photos-US in NY).

FGT, vol. 40(2), p. 985:
"45-2. ***Psyllocarpus phyllocephalus*** K. Schum., Bot. Jahrb. Syst. 25(3), suppl. (60): 17. 1898. Tipo: Brasil, Distrito Federal, "entre Paranuá e Rio Torto", 1895, *Glaziou 21504* (holótipo B, destruído; lectótipo, P, escolhido por Kirkbride, 1979; isolectótipos, BR, C, G, K. LE, S; foto-B em NY; fotos-P em NY)."

Accepted name: ***Tapanhuacanga phyllocephala*** (K.Schum.) P.L.R.Moraes, Feddes Repert. 130: 51. 2018.

Type: BRAZIL. [Distrito Federal]: "in civitate Goyaz inter Paranana et Rio Torto" [Goiás, between Rio Paranoá and Rio Torto; this region is now part of the Federal District], 12 Feb. 1895, *A.F.M. Glaziou 21504* (holotype B†; P [barcode P02285151], lectotype designated by Kirkbride (1979: 18); isolectotypes, BR [barcode 000000532833], C [barcode C10018338], G [2 sheets, barcode G0063403], K [barcode K000470419], LE n.v., P [barcode P02285152] S [Acc. No. S05-1675]; photo-B and photos-P in NY).

Notes: There are two specimens of *A.F.M. Glaziou 21504* in P. Specimen with barcode P02285151 was annotated as lectotype by Kirkbride in 1977. Specimen with barcode P02285152 was not annotated by Kirkbride and is an isolectotype.

FGT, vol. 40(2), p. 989:
"45-3. ***Psyllocarpus schwackei*** K. Schum., Bot. Jahrb. Syst. 25(3), suppl. (60): 18. 1898. Tipo: Brasil, Minas Gerais, Serra do Cipó, ca. 1125 m, 18/II/1972 (fl, fr), *W.R. Anderson, M. Stieber & J.H. Kirkbride 36254* (neótipo, US, escolhido por Kirkbride, 1979; isoneótipos, NY, UB; fotos-US em NY)."

Accepted name: ***Tapanhuacanga schwackei*** (K.Schum.) P.L.R.Moraes, Feddes Repert. 130: 52. 2018.

Type: BRAZIL. Minas Gerais: Serra do Cipó, ca. 1125 m, 18 Feb. 1972 (fl, fr), *W.R. Anderson, M. Stieber & J.H. Kirkbride Jr. 36254* (US [barcode 00130114], neotype designated by Kirkbride (1979: 19); isoneotypes, MO [Acc. No. 2817633], NY [barcode 00133030], R [barcode R000141010], UB [barcode UB0040392]; photos-US in NY).

46. **RANDIA** L., Sp. Pl. 1192. 1753.

FGT, vol. 40(2), p. 994:
"46-1. ***Randia calycina*** Cham., Linnaea 9: 246. 1834; emend. H. Karst., Fl. Columb. 2: 127, tab. 167, fig. 11. 1869. - *Basanacantha calycina* (Cham.) K. Schum. in Mart., Fl. Bras. 6(6): 375. 1889. - Tipo: Brasil, Bahia, Nazaré, s.d., *Sellow 163* (holótipo, B, destruído, foto em NY)."

Accepted name: ***Randia calycina*** Cham.

Type: BRAZIL. Bahia: prope Nazaré, s.d., *F. Sellow 163* (K [barcode K000265550], lectotype designated by Judkevich et al. (2015: 609); isolectotypes S [4 sheets, Acc. Nos. S08-13880, S08-13881, S08-13882, S08-13883]).

FGT, vol. 40(2), p. 999:
"46-2. ***Randia nitida*** (Kunth) DC., Prodr. 4: 437. 1830. - *Mussaenda nitida* Kunth in Humb. & Bonpl., Nov. Gen. Sp. 3: 410. 1818. - *Basanacantha spinosa* var. *nitida* (Kunth) K. Schum. in Mart., Fl. Bras. 6(6): 377. 1889.

- Tipo: Colombia, Turbaco, s.d., *Humboldt & Bonpland s.n.* (holótipo, P-Bonpl.)."

Accepted name: *Randia nitida* (Kunth) DC.

Type: COLOMBIA. Bolívar: Turbaco, "Crescit prope Turbaco Novo-Granatensium, alt. 180 hex. [324 m]", s.d., *A.J.A. Bonpland 1460* (P-Bonpl. [barcode P00671154], lectotype designated by Salas (2021: 587–588); isolectotypes P [barcodes P00836440, P00048237, P00048238]).

47. **RETINIPHYLLUM** Bonpl. in Humb. & Bonpl., Pl. Aequin. 1: 86, pl. 25. "1805" [1808].

FGT, vol. 40(2), p. 1008:
"47-1. ***Retiniphyllum kuhlmannii*** Standl., Publ. Field Columbian Mus., Bot. Ser. 8: 356. 1931. Tipo: Brasil, Mato Grosso, Rio Verde, Chapadão, IV/1918 (fl), *Kuhlmann 2343-K* (holótipo, B, destruído; isótipos F, R)."

Accepted name: *Retiniphyllum kuhlmannii* Standl.

Type. BRAZIL. Mato Grosso: Rio Verde, Chapadão, Apr. 1918 (fl), *J.G. Kuhlmann 2343-K* (F [Acc. No. 657017, barcode F0070821F], **lectotype here designated**; isolectotype, R [Acc. No. 53526, barcode R00005326]; isolectotype fragment, F [ex B, Acc. No. 638780, barcode V007082F]; photo-B at F [F0BN049937]).

48. **RICHARDIA** L., Sp. Pl. 330. 1753.

FGT, vol. 40(2), p. 1014:
"48-1. ***Richardia brasiliensis*** Gomes, Mem. Ipecacuanha Bras. 31, pl. 2. 1801. - *Richardsonia brasiliensis* (Gomes) Hayne, Getrene Darst. Arzn. Gewachse 8: pl. 21. 1822. - Tipo: Brasil, sem localidade, s.d., *Gomes s.n.* (holótipo LISU)."

Accepted name: *Richardia brasiliensis* Gomes

Type: [icon.] Gomes, Mem. Ipecacuanha Bras. pl. 2. 1801, **lectotype here designated**.
Epitype here designated: BRAZIL. Goiás: Mun. Goiânia, Conjunto Vila Itatiaia, Av. Esperança, em solo perturbado, na beira da estrada na frente do Restaurante Fogão Caipira, 16°36'7"S, 49°15'27"W, 710 m, 22 Dec. 2004 (fl, fr), *P.G. Delprete 9180* (RB [Acc. No. 484673, barcode 00569068]; isoepitypes, CAY [barcode CAY216477], HTO [Acc. No. 9976], NY [barcode 01182918], SPF [barcode SPF00189617], UB [barcode UB1237463], UFG [Acc. No. 40726]).

Notes: Bernardino Antonio Gomes (1801: 31) below the name *Richardia brasiliensis* Gomes cited the vernacular names and references as "*Poaia do campo* in Civitate Riojanaeria. *Ipecacoanha blanca*? Pis. Bras." The plant is depicted in Plate 2 of that publication. Lewis and Oliver (1974) cited the type of *R. brasiliensis* as "Type: Brazil: Gomes s.n. (LISU)." After exhaustive searches in LISU by Ana Isabel Correia (LISU Herbarium Curator), it was concluded that the specimen of *R. brasiliensis* cited as type by Lewis and Oliver (1974) is either lost or destroyed. According to the *Code*, original material is constituted by specimens and original illustrations associated with a given name. On plate 2 of Gomes's *Memoria* is depicted a plant with several terminal inflorescences, and nodes with the fimbriate stipules typical of *Richardia*. On the plate are also present details of flowers in anthesis, a style with three branches, a fruit, a 6-lobed calyx, mericarps in adaxial and abaxial view, and a minute seed. As no original specimen could be found, Plate 2 of Gomes's *Memoria* is here designated the lectotype of *R. brasiliensis*. According to Lewis & Oliver (1974) and Delprete (2010b), the most diagnostic character in the differentiation of species of *Richardia* is the morphology of the adaxial side of the mericarps. The mericarps of *R. brasiliensis* have a medial keel on the adaxial side, whereas those of *R. scabra* L. and *R. grandiflora* (Cham. & Schltl.) Steud. have a longitudinal groove on the adaxial side. Although on Gomes' Plate 2 mericarps are depicted, because the minute seeds are drawn to real size, it is impossible to see if on the adaxial side, there is a longitudinal keel or a longitudinal groove. Therefore, to definitively fix the application of the name, an epitype needs to be designated. The specimen *Delprete 9180* at RB is here designated the epitype of *R. brasiliensis*, and the duplicates of the same gathering present in other herbaria are isoepitypes.

FGT, vol. 40(2), p. 1019:
"48-2. ***Richardia grandiflora*** (Cham. & Schltdl.) Steud., Nom. Bot., ed. 2: 459. 1841. - *Richardsonia grandiflora* Cham. & Schltdl., Linnaea 3: 353. 1828. - Tipo: Brasil, sem localidade, s.d., *Sellow s.n.* (lectótipo, K, escolhido por Lewis & Oliver, 1974; foto em NY)."

Accepted name: *Richardia grandiflora* (Cham. & Schltdl.) Steud.

Type: SOUTHERN BRAZIL: "In campis Brasiliae meridionalis", s.d., *F. Sellow s.n.* [*3144*, in B photo-

graph] (HAL [barcode HAL0098298], **lectotype here designated**).

Notes: In the protologue of *Richardsonia grandiflora* Cham. & Schltdl., Chamisso and Schlechtendal (1828b: 351) cited the material studied as "In campis Brasiliae meridionalis pluribus locis variisque temporibus legit Sellow." The original specimen at B, was destroyed during WWII. In its photograph, F0BN000848, it is possible to see that it belongs to the gathering *Sellow 3144*. Lewis and Oliver (1974: 283) cited the type of *R. grandiflora* as "Lectotype: Brazil: Sellow s.n. (K! as photo NY)."

On the K sheet cited as lectotype of *Richardsonia grandiflora* by Lewis and Oliver are present two different gatherings. The outer specimen, with barcode K000016466, has a label with the annotation "Richardsonia grandiflora N., Brasilia" handwritten by Schlechtendal. By the side of the outer specimen is handwritten "Chamisso", meaning that this specimen was collected by Chamisso. Therefore, although specimen K000016466 was annotated as "Richardsonia grandiflora N." by Schlechtendal, it cannot be original material.

The inner specimen of the K sheet, with barcode K000016522, has a label with the heading "Herb. Reg. Berolinense", with "Richardsonia grandiflora Cham. & Schltdl." handwritten by an unknown author (not Schlechtendal), and "Brasilia. Sellow legit" printed at the bottom of the label. On the label of the specimen with barcode K000016522 there is also the stamp "Herbarium Hookerianum, 1867." This specimen was collected by Sellow, but it does not have any proof that it was examined by Chamisso and Schlechtendal.

As a result of the above analysis, the specimens with barcodes K000016466 and K000016522, mounted on the same sheet, cannot be treated as original material; therefore, Lewis and Oliver's lectotypification is here superseded.

At HAL there is a specimen with barcode HAL0098298, and the handwritten annotation "Richardsonia grandiflora, Sellow. Brasilia meridionalis" and the stamp "scripsit: D.F.L. v. Schlechtendal". This specimen is original material and consists of a plant with a perennial taproot and several branches with flowers and fruits. Although on this specimen Sellow's collection number is not present, and was not cited in Chamisso and Schlechtendal's publication, it is here designated the lectotype of *Richardsonia grandiflora*.

FGT, vol. 40(2), p. 1025:
"48-3. ***Richardia scabra*** L., Sp. Pl. 330. 1753. - *Richardsonia scabra* (L.) A. St. Hil., Pl. Us. Bras. 8: 1, tab. 8. 1824, pro parte; Mart., Sp. Mat. Med. Bras. 1: 10. 1824, *pro parte* (ambas descirções incluem *Richardia brasiliensis*). - Tipo: Mexico, Vera Cruz, sem localidade, s.d., *Coletor Desconhecido s.n.* (holótipo, LINN 451.1)."

Accepted name: ***Richardia scabra*** L.

Notes: No correction necessary.

49. **ROSENBERGIODENDRON** Fagerl., Svensk. Bot. Tidskr. 42: 150. 1948.

FGT, vol. 40(2), p. 1032:
"49-1. ***Rosenbergiodendron longiflorum*** (Ruiz. & Pav.) Fagerl., Svensk. Bot. Tidskr. 42: 148. 1948. - *Gardenia longiflora* Ruiz & Pav., Fl. Peruv. Chil. 2: 67, Icon. 219. 1799. - *Randia ruiziana* DC., Prodr. 4: 388. 1830 (baseado em *Gardenia longiflora* Ruiz & Pav.) - *Randia formosa* var. *longiflora* (Ruiz. Pav.) K. Schum. in Mart., Fl. Bras. 6(6): 343. 1889. - Tipo: Peru. Huánuco: Pozuzu, s.d., *Tafalla & Manzanilla [in Ruiz & Pavón] s.n.* (lectótipo, MA, escolhido por Gustafsson, 1998; isolectótipos, F, MA)."

Accepted name: ***Rosenbergiodendron longiflorum*** (Ruiz. & Pav.) Fagerl.

Type: PERU. Huánuco: ["Habitat in Andium nemoribus imis calidis ad *Pozuzo*"], s.d. [1793–1797], *H. Ruiz López & J.A. Pavón y Jimenez s.n.* (MA [barcode MA 815987], **lectotype here designated**; isolectotypes F [Acc. No. 844706], G [barcode G00436642], HAL [2 sheets, barcodes HAL01141104, HAL01141105], MA [barcodes MA 815982, MA 818834], MA carpological collection [accession No. MA-01-00781219], MPU [barcode MPU021522]).

Notes: Ruiz and Pavón (1799: 67) cited the original material of *Gardenia longiflora* Ruiz & Pav. as "Habitat in Andium nemoribus imis calidis ad *Pozuzo*" without citing the herbarium of deposit. They collected in the Spanish colonial territories of the Viceroyalty of Peru and Chile, during 1777–1788. Gustafsson (1998: 459) cited the type of *G. longiflora* as "Type. Peru. Hminucu: Pozuzu, *Ruiz & Pavón s.n.* (lectotype, here designated, MA; isolectotypes, F, MA; photo at F as neg. 311, with prints at E, GH, and NY)." He also stated "original lectotype, designated by Steyermark, 1972, B, destroyed". However, Steyermark (1972) only indicated that he saw a photo of the B specimen, which was destroyed during WWII, and did not designate that specimen as type. Gustafsson (1998: 459) cited a lectotype and an isolec-

totype in MA, but he did not specify which MA specimens is the lectotype, therefore, according to current standards, that lectotypification is not valid, and type annotations on specimens are not publications. In MA there are two drawings by Isidro Gálvez and José Gabriel Rivera, and several specimens of *Gardenia longiflora* collected by Ruiz and Pavón, which are below described and discussed.

The original plate drawn by Isidro Gálvez is fully colored and is affixed on a sheet with the printed label "REAL JARDÍN BOTÁNICO, CSIC ARCHIVO, Real Expedición Botánica al Virreinato del Perú, AJBD04-D-0442_001." At the top of the drawing is the number "219" and at the bottom of the drawing "Gardenia longiflora" in the center, and the number "18" on the left corner. In the drawing is depicted a branch with numerous leaves, three flowers in anthesis, a flower bud, and two mature fruits. On the left side of the drawing, there is a fruit transversally dissected and a seed.

The original plate drawn by José Gabriel Rivera is partially colored and affixed on a sheet with the printed label "REAL JARDÍN BOTÁNICO, CSIC ARCHIVO, Real Expedición Botánica al Virreinato del Perú, AJBD04-D-1900_001." At the bottom of the drawing is written "602. Gardenia." In the drawing is depicted a branch with numerous leaves, one flower bud, and a flower in anthesis. On the lower portion of the drawing are depicted a flower in anthesis, a hypanthium with a receptive style, and a corolla longitudinally dissected.

The MA specimen with barcode MA 815981 has a label with the annotation "Gardenia longiflora Sp. Peruv. Fl. Per." handwritten by Pavón. Below that label is affixed another label with the annotation "Pentandria monogynia, Mussaenda formosa Jacq.?, Vulgo Bisama de Castilla, F. H. D. 151. L. 602. Año oct. 800" handwritten by an unknown author. Ruiz and Pavón collected in the Spanish colonial territories of the Viceroyalty of Peru and Chile during 1777–1788, and published *Gardenia longiflora* in 1799. Hence this specimen is not original material. It consists of several branches with numerous leaves, several flower buds, and one flower in anthesis. It was annotated as isolectotype by Gustafsson but is not original material.

The MA specimen with barcode MA 815982 has a label with the heading "Herbarium Peruvianum Ruiz et Pavon, and the annotation "Randia formosa (Jacq.) K. Sch. var. longiflora (R. et Pav.) K. Sch. Nº 7/12 det. K. Krause, I.1931." A second label has the annotation "Gardenia longiflora Sp. Pl. Fl. Per." handwritten by Pavón. This specimen consists of three branches with numerous leaves, several flower buds, flowers in anthesis, and a portion of a fruit. This sheet does not have any information regarding the collection locality and was annotated as lectotype by Gustafsson. Because Gustafsson in his publication did not specify which MA specimen is the lectotype, and because annotations on specimens are not publications, Gustafsson's lectotype citation is not valid. This specimen is an isolectotype.

The MA specimen with barcode MA 815985 has several labels. On the lower right corner is a label with the heading "Herbarium Horti Botanici Matritensis, Plantae a «Ruiz et Pavón» in vice-regno Peruviano et Chilensis lectae. (1778-1788)", the stamp "Ex antiquo herbario generali", and the typewritten annotation "Randia formosa (Jacq.) Sch. v. longiflora (R & P) Sch." On the lower left corner is affixed a label with the annotation "Randia Ruiziana DC, Gardenia longiflora Fl. Peruv." handwritten by an unknown author. Above that label is affixed another label with the annotation "Gardenia longiflora Fl. Peruv.28a 219 fª a, Ex Herbario Fl. Peruv. anno 1828" handwritten by the same unknown author. Because this specimen does not have any proof that was seen by the authors, it cannot be treated as original material.

The MA specimen with barcode MA 815987 has a label with the heading "Herbarium Peruvianum Ruiz et Pavon, and the annotation "Randia formosa (Jacq.) K. Sch. var. longiflora (R. et Pav.) K. Sch. Nº 7/10 det. K. Krause, I.1931." A second label has the annotation "Gardenia longiflora Sp. Pl. Fl. Per. c. icone" handwritten by Pavón. This specimen consists of two branches with numerous leaves, several flower buds, and flowers in anthesis. This sheet does not have any information regarding the collection locality. Also, because this specimen has a label annotated by Pavón, is original material, and is here designated as the lectotype of *Gardenia longiflora*.

The MA specimen with barcode MA 818834 has a label with the heading "Herbarium Horti Botanici Matritensis, Plantae a «Ruiz et Pavón» in vice-regno Peruviano et Chilensis lectae. (1778-1788)", the stamp "Ex antiquo herbario generali", and the typewritten annotation "Randia formosa (Jacq.) Sch. v. longiflora (R & P) Sch." Above that label is affixed another label with the annotation "Gardenia longiflora Sp. Pl. Fl. Per." handwritten by Pavón. This specimen consists of three branches with numerous leaves and several flower buds. This sheet does not have any information regarding the collection locality. Because this specimen has a label annotated by Pavón, is original material and is an isolectotype.

In the carpological collection at MA there is a specimen with accession No. MA-01-00781219, which has a label with the recently printed annotation "Hortus Regius Matritensis (MA), Plantae a"Ruiz et Pavón" in vice-regno Peruviano et Chilensis lectae. (1778-1816), Rubi-

aceae, Gardenia longiflora, Perú. Pozuzo, 1785. Etiqueta: "Gardenia longiflora / Pozuzo 1785; llego sin sobre" Col. Carpológica Ruiz & Pav. nº 100274 (MA 781219)." On the sheet is affixed an envelope with the annotation "Gardenia longiflora, Pozuzo 1785" handwritten by Pavón. The envelope contains twelve cylindrical fruits, with the characteristic features of this species. Because the annotation is by Pavón, this specimen is original material and is an isolectotype.

Other specimens of *Gardenia longiflora* are at BC, F (2 sheets), G, HAL, and MPU. Those specimens where either sent to those herbaria as exchange material or sold by Pavón and are discussed below.

The F Sheet with Accession No. 844706 has three labels. One label has the heading "Herbarium Horti Botanici Matritensis, Plantae a «Ruiz et Pavón» in viceregno Peruviano et Chilensi lectae. (1778-1788)", the stamps "Ex antiquo herbario generali" and "EX DUPLA", and the typewritten annotation "Randia formosa (Jacq.) Sch. v. longiflora (R & P) Sch., Guayaquil." By the side of the label is the annotation "(a Tafalla coll.)" handwritten in pencil by an unknown author. On the lower left corner is affixed a label with the annotation "Gardenia longiflora Fl. Per." handwritten by Pavón. A second label is the annotation as lectotype by C. Gustafsson of 1998. The specimen consists of two branches with numerous leaves and three flower buds. The annotations "Guayaquil" and "(a Tafalla coll.)" are probably erroneous. This specimen is original material and is an isolectotype.

The F Sheet with Accession No. 712545 has two labels. One label has the heading "Herbarium Horti Botanici Matritensis, Plantae a «Ruiz et Pavón» in viceregno Peruviano et Chilensi lectae. (1778-1788)", and the annotation "Randia formosa (Jacq.) K. Sch. var. longiflora (R. et P.) K. Sch., [NUM.] 711" handwritten by an unknown author. The specimen consists of two branches, one sterile with several leaves, and the other with two flower buds and a few leaves. There is no evidence on the sheet that it was seen by the authors and cannot be treated as original material.

At MPU there is a sheet with barcode MPU021522, with several labels. On the lower left corner of the sheet is affixed a label with the annotation "Gardenia longiflora. Pérou, dedit Pavón." Just above is another label with "Gardenia longiflora" handwritten in ink by an unknown author, and "Randia Ruiziana DC" handwritten in pencil by another unknown author. The name *Randia ruiziana* DC. was published by Candolle (1830: 388) citing the collection locality indicated in Ruiz and Pavón's (1799: 67) protologue. The specimen consists of a small branch with several leaves and a flower in anthesis, and fous loose flowers in different developmental stages. Because the sheet has a label annotated as "Gardenia longiflora" by Pavón, this specimen is original material, and is an isolectotype.

In G there is a sheet with barcode G00436642 and the label "Gardenia longiflora, Perou. – M. Pavon." The specimen consists of a branch with several leaves and a flower with corolla lobes wrinkled up, probably postanthesis. This specimen is original material and is an isolectotype.

At HAL there are two sheets associated with this name. Specimen with barcode HAL01141104 has a label with the heading "Herb. Reg. Berolinense" and the printed annotations "Peruvia et Chili" and "Ruiz legit ex herbario Lamberti." On that label is annotated "Gardenia longiflora" handwritten in ink by an unknown author. The specimens consist of a ramified branc with numerous leaves and a flower bud. The other HAL specimen with barcode HAL01141105 has a label identical to that of the other HAL specimen. Those specimens represent original material and are isolectotypes.

On the sheet at BC with barcode "Ruiz & Pav. BC-872647" associated with this name are affixed three relevant labels. On the lower right corner is affixed a label with the annotation "Gardenia longiflora, Flora Peruana. Habitat in Andium nemoribus imis calidis ad Pozuzo. […]" handwritten by an unknown author. On the upper right corner is glued a label with the printed text "Herbari Ruiz & Pavón, cedit par la Real Acadèmia de Ciències i Arts de Barcelona al Departament de Botànica a proposta del Dr. Pius Font i Quer l'any 1925. N. intern: 149 [number handwritten]." On the center of the sheet is affixed a label with the annotation "Randia formosa (Jacq.) K. Sch. var. longiflora (R. et Pav.) K. Schum." handwritten by an uknown author (the name of the author is covered by one leaf of the specimen). This specimen does not display any proof that it was seen by the authors and is not original material.

50. **RUDGEA** Salisb., Trans. Linn. Soc. London. 327. 1807.

FGT, vol. 40(2), p. 1041:
"50-1. ***Rudgea burchelliana*** Muell. Arg., Flora 59: 453, 462. 1876. Tipo: Brasil, Goiás, "inter Rio Paranahyba et Urbem Goyaz" [entre o Rio Paranaíba e a cidade de Goiás], s.d. [1827], *Burchell 6372* (holótipo, G)."

Accepted name: *Rudgea burchelliana* Müll. Arg.

Type: BRAZIL. Goiás**:** "inter Rio Paranahyba et Urbem Goyaz" [between Rio Paranaíba and the

town of Goiás], s.d. [1827], *W.J. Burchell 6372* (BR [barcode 000000532776], **lectotype here designated**; isolectotypes G [barcode G00436613], K [1 sheet with barcodes K000843174 and K000843175]).

Notes: Müller Argoviensis (1876b: 462) described the material examined of *Rudgea burchelliana* Müll. Arg. as "Inter Rio Paranahyba et Urbem Goyaz: Burchell n. 6372" and did not cite the herbarium of deposit. In BR there is a sheet with barcode 000000532776. On the sheet are affixed two branches. Next to each of them there is a label with the printed text "Burchell. Catalogus Geographicus Plantarum *Brasiliae* Tropicae. No" and the handwritten number "6372". At the bottom right corner of the sheet is affixed a label with the heading "Herbarium Martii", the stamp "Herb. Hort. Bruxell. Coll. Martii", and the handwritten annotation "Brasilia: inter Riv. Paranahyba et urbem Goyaz. Communic. H. Kewense 1868, Burchell nº 6372." Just above that label, there is a label with the annotation "Rudgea Burchelliana Müll. Arg." handwritten by Müller Argoviensis, and the stamp "Mueller d'Argovie determ." Because this is a complete specimen annotated as *Rudgea burchelliana* by Müller Argoviensis, it is here designated as the lectotype of this name.

At K there is a sheet with two branches and the two barcodes K000843174 and K000843175. Each branch has a label with the printed text "Burchell. Catalogus Geographicus Plantarum *Brasiliae* Tropicae. Nº" and the handwritten number "6372". Both branches have numerous leaves and terminal inflorescences with several flowers in anthesis. On the sheet, it is handwritten in black ink by an unknown author (not Müller Argoviensis) "Rudgea Burchelliana, Müll. Arg., Flora '76 p. 462."

At G there is a sheet with barcode G00436613 on which is affixed an envelope with the annotation "Rudgea Burchelliana Müller Arg., Inter Riv. Paranahyba et urbem Goyaz: Burchell n. 6372" handwritten by Müller Argoviensis. In the envelope are preserved three loose leaves and a few flowers in anthesis. This specimen is an isolectotype.

FGT, vol. 40(2), p. 1044:
"50-2. ***Rudgea cornifolia*** (Kunth) Standl., Publ. Field Columbian Mus., Bot. Ser. 7: 432. 1931. - *Psychotria cornifolia* Kunth in Humb. & Bonpl., Nov. Gen. Sp. Pl. 3: 362 (quarto). XI/1819; *non Psychotria cornifolia* Humb. & Bonpl. ex Roem. & Schult., Syst. Veg. 5: 191. XII/1819 (homônimo posterior). Tipo: Venezuela, Amazonas, Rio Orinoco, Maipures, s.d., *Humboldt & Bonpland 893* (holótipo, P-Bonpl.)."

Accepted name: *Rudgea cornifolia* (Kunth) Standl.

Type: VENEZUELA. Amazonas: Río Orinoco, Maipures, s.d. [Apr–May 1800], *J.A. Bonpland & F.W.H.A. Humboldt 893* (holotype, P-Bonpl. [barcode P00671104]; isotype B-W [barcode B –W 04089 -01 0]; photo-B at F [F0BN000551]).

Notes: Kunth in Humb. & Bonpl. (Nov. Gen. Sp. Pl. 3: 362 (quarto ed.). Nov. 1819) cited the collection locality of *Psychotria cornifolia* Kunth as "*Crescit in Maypure Orinocensium. Fructificat Majo.*" The specimen studied by Kunth is at P-Bonpl. and is the holotype. The duplicate at B-W is an isotype.

FGT, vol. 40(2), p. 1048:
"50-3. ***Rudgea erioloba*** Benth., Linnaea 23: 459. 1850. Síntipos: Brasil, Goiás, *Gardner 3218* (G, BM, K, NY [2]; foto-G em NY); *Gardner 3221* (BM, K); *Pohl s.n.* (BM, K; foto-K em NY)."

Accepted name: *Rudgea erioloba* Benth.

Type: BRAZIL. Tocantins**:** "Prov. Goyaz, Woods Ripam ad Duro" [then São José do Duro, now Dianópolis; ca. 11º37'S, 46º49'W], [Sep.–Oct.] 1839, *G. Gardner 3218* (K [barcode K000005188], **lectotype here designated**; isolectotypes, F [ex G, Acc. No. 767775], G [3 sheets, barcodes G00436614, G00436615, G00436616], BM [barcode BM000832006], K [barcode K000005189], NY [2 sheets, barcodes 00133212, 00133213], P [2 sheets, barcodes P04008044, P04008045]; photo-G in NY).

Notes: In the protologue of *Rudgea erioloba* Benth., Bentham (1850: 459–460) cited three gatherings as "Prov. Goyaz, Gardner n. 3218, 3221. Pohl" and did not cite the herbarium of deposit. He routinely studied the specimens at K and BM. Of the three gatherings cited by Bentham, *Gardner 3218* is the one that has duplicates distributed in more herbaria. Two specimens in K and one in BM of *Gardner 3218* deserve special attention and are below discussed.

On one K sheet, there are two different gatherings. On the upper portion of the sheet is affixed a specimen, with barcode K000005188, and next to it there is a label with the printed text "Prov. Goyaz, Brasilia tropica, Gardner, 1841" and the handwritten annotation "3218 Coffea". Near that specimen there is also the stamp "Herbarium Benthamianum 1854". This specimen was collected by Gardner in 1839, as reported in the labels

of the BM and K sheets. The specimen with barcode K000005188 is a ramified branch with numerous leaves and several inflorescences with flowers in anthesis and flower buds, and is here designated as the lectotype of *Rudgea erioloba*.

On the second sheet at K, barcode K000005189, is affixed a label with the annotation "3218. Coffea. Rubiaceae. A shrub 8 feet high – fl. white odoriferous, Mission of Duro. Oct. 1839." The sheet has the stamp "Herbarium Hookerianum 1867." This specimen is a ramified branch with numerous leaves and several inflorescences with flowers in anthesis and is an isolectotype.

The sheet at BM, barcode BM000832006, has the annotation "3218. Woods Ripam ad Duro, Provinciae Goyaz, Set. 1839. A small tree" handwritten by Gardner. At the bottom of the sheet is the penciled annotation "Rudgea erioloba Benth. in Linn. 23, p. 459." The specimen is a ramified branch with numerous leaves and several inflorescences with flowers in anthesis. This specimen is an isolectotype.

The town of Duro, cited as the collection locality of *Gardner 3218*, has an interesting history. Initially it was an indigenous village of the Acroás ethnicity, in the state of Goiás. Then, when the Portuguese started to extract gold from the locality, it was renamed São José do Duro. The name "Duro" is a simplification of "D'ouro", meaning "of gold". In 1938, the town was renamed Dianópolis. In 1988, the state of Goiás was divided into two states, and the northern portion became the state of Tocantins. Hence, the town originally called "Duro" is now called Dianópolis and is in the state of Tocantins. The botanist Johan Emanuel Pohl also collected in Duro in 1818. An interesting account of an expedition to São José do Duro made in 1918 was recently re-printed by Coelho (2008).

FGT, vol. 40(2), p. 1048:

Synonym:

"*Rudgea jacobinensis* Muell. Arg., Flora 59: 453, 461. 1876, **syn. nov.** Síntipos: Bahia, Serra Jacobina, prope Moritiba, s.d. (fl), *Blanchet 3292* (B destruído, G-DC; foto-B em NY) e *3604* (G); Tamanduá, s.d. (fl), *Blanchet 3829* (B destruído, G; foto-B em NY)."

Type: BRAZIL. Bahia: Serra Jacobina, prope Moritiba, 1842, *J.S. Blanchet 3604* (G [barcode G00436698], **lectotype here designated**; isolectotypes, BR [barcode 000000532698 (annotated by Müller Argoviensis)], F [3 sheets, Acc. Nos. 520968 (ex K), 767768 (ex G), 974370 (ex P)], G [barcode G00436697], K [barcode K000005146]), MO [Acc. No. 1665887], P [3 sheets, barcodes P00582132, P00582133, P00582134], RB [ex P; Acc. No. 41969, barcode 00619165]; fragment F [ex G; Acc. No. 767023]).

Notes: In the protologue of *Rudgea jacobinensis* Müll.Arg., Müller Argoviensis (1876b: 453, 461–462) cited three gatherings as "Serra Jacobina in prov. Bahia: Blanchet n. 3992, 3604, ad Tamandua: Blanchet n. 3829" without citing an herbarium of deposit. The gathering that has duplicates distributed in more herbaria is *Blanchet 3604*. In the process of designating a lectotype, preference is usually given to the duplicates at G, where Müller Argoviensis worked. At G there are two specimens of *Blanchet 3604*. The specimen with barcode G00436697 is mounted on two sheets, and is annotated by Müller Argoviensis.

The second specimen of *Blanchet 3604* at G, with barcode G00436698, has two labels. One label has the handwritten annotation "3604 Rudgea, Jacobina, Muritiba, Bahia, Blanchet 1842" and the other has the annotation "R. jacobinensis Müll. Arg., scripsit Müll. Arg.!" The specimen consists of a ramified branch with numerous leaves and several inflorescences with flower buds and flowers in anthesis, and is here designated as the lectotype of *R. jacobinensis*.

FGT, vol. 40(2), p. 1056:

"50-4. ***Rudgea erythrocarpa*** Muell. Arg., Flora 59: 451, 461. 1876. Tipo: Brasil, Rio de Janeiro, Mandioca, 23/X/1850 (fl), *Riedel 347* (lectótipo, BR, designado por Zappi, 2003; isolectótipos, F, G, K)."

Accepted name: *Rudgea erythrocarpa* Müll. Arg.

Type: BRAZIL. Rio de Janeiro: Mandioca, 23 Oct. 1850 (fl), *L. Riedel 347* (BR [barcode 000000532842], lectotype designated by Zappi (2003: 555); isolectotypes, F [Acc. No. 617843], G [not traced], K [barcode K000090020], US [barcode 00406259]).

Notes: In the protologue of *Rudgea erythrocarpa* Müll.Arg., Müller Argoviensis (1876: 451, 461) cited two gatherings as "Porto Estrella: Riedel n. 346, Mondioca [!sic, Mandioca]: Riedel n. 347." Zappi (2003: 555) designated the lectotype for this name the specimen *Riedel 347* at BR.

Several specimens labeled "Riedel 347, Brasilia, Parahyba, June 1832" are original material of *Eugenia sericea* O. Berg. var. *robusta* O. Berg. (Myrtaceae) and are present in LE [2 sheets, barcodes LE00007500,

LE00007501], P [barcode P01902775], and S [Acc. No. S05-3033].

FGT, vol. 40(2), p. 1059:
"50-5. ***Rudgea goyazensis*** Muell. Arg., Flora 59: 450, 461. 1876. - *Uragoga goyazensis* (Muell. Arg.) Kuntze, Revis. Gen. Pl. 2: 960. 1891. Tipo: Brasil, Goiás, Cavalcante, s.d. [1828], *Burchell 7487* (holótipo, G; isótipo, K; foto-K em NY)."

Accepted name: *Rudgea goyazensis* Müll.Arg.

Type: BRAZIL. Goiás: "Inter Goyaz et Cavalcante" [between the towns of Goiás and Cavalcante], s.d. [1828], *W.J. Burchell 7487* (BR [barcode 000000561855], **lectotype here designated**; isolectotypes G [barcode G00436682], K [barcode K000275532]).

Notes: In the protologue of *Rudgea goyazensis* Müll. Arg., Müller Argoviensis (1876: 450, 461) cited a sole gathering as "In prov. Goyaz ad Cavalcante: Burchell n. 7487" without indicating the herbarium of deposit. Müller Argoviensis worked at G and studied material from several herbaria. Delprete (2010b: 1059) cited the G specimen as holotype. This citation cannot be corrected as an inadvertent lectotypification because it was published after 2001, it should have been accompanied by "here designated" or a similar expression.

Specimens of *Burchell 7487* annotated by Müller Argoviensis are present in G and BR. The G specimen, with barcode G00436682, consists of just a few fragments, a portion of a leaf, a depauperate inflorescence head, and a loose flower in anthesis, included in an envelope. On the envelope is drawn a flower bud, and the annotation "Rudgea goyazensis Müll. Arg., Inter Goyaz et Cavalcante: Burch. n. 7487" handwritten by Müller Argoviensis.

A specimen of *Burchell 7487* at BR, with barcode 000000561855, has two small branches, each of them with a leaf pair. One of them has a terminal vegetative bud and a well developed stipule. The other branch has a terminal inflorescence with several flower buds. The specimen has several labels. The label on the lower right corner has the heading "Herbarium Martii", the stamp "Herb. Hort. Bruxell. Coll. Martii", and the handwritten annotation (author unknown) "Brasilia: Inter urbem Goyaz et Cavalcante, Communic. H. Kewense 1867, Burchell nº. 7487." Above that label there is another label with the annotation "Rudgea goyazensis Müll. Arg" and the stamp "Mueller d'Argovie determ." That specimen is here designated the lectotype of *R. goyazensis*.

A specimen of *Burchell 7487* at K, barcode K000275532, consists of two branches, each of them with the label "Burchell. Catalogus Geographicus Plantarum Brasiliae Tropicae. No. 7487." One branch has a leaf pair and a terminal vegetative bud with a well developed stipule. The other branch has a terminal inflorescence with numerous flowers in anthesis and several flower buds. At the bottom of the sheet there is the annotation "Rudgea goyazensis Müll. Arg. Type collection. P.C.S." handwritten by Paul C. Standley. This specimen is an isolectotype of this name.

FGT, vol. 40(2), p. 1062:
"50-6. ***Rudgea longiflora*** Benth., Linnaea 23: 457. 1850. - *Mapouria aschersoniana* Kuntze, *nom. illeg.*, Revis. Gen. Pl. 2: 954. 1891. Tipo: Brasil, Tocantins [Prov. Goyaz"], s.d. [1839-1840], *Gardner 3215* (holótipo, K)."

Accepted name: *Rudgea longiflora* Benth.

Type: BRAZIL. Tocantins: [Prov. Goyaz"], "Mission of Doro" [Missão do Ouro, now Dianópolis], s.d. [Oct. 1839], *G. Gardner 3215* (K [barcode K000275527], **lectotype here designated**; isolectotype, K [barcode K000275526]).

Notes: Bentham (1850: 457), in the protologue of *Rudgea longiflora* Benth., cited the gathering "Prov. Goyaz, Gardner n. 3215" without citing the herbarium of deposit. Delprete (2010b: 1062) cited a specimen at K as holotype. However, there are two specimens of *Gardner 3215* at K. The specimen with barcode K000275526, has the stamp "Herbarium Hookerianum. 1867" and the handwritten annotation "3215. Rubiaceae. A shrub about 6 feet high. Shady road. Mission of Doro [town of Duro, now Dianópolis]. – Oct. 1839." (For the history of the town of Duro, see discussion under *Rudgea erioloba*). Just below that label is handwritten, directly on the sheet, "Gardner, Goyaz." The specimen consists of a branch with three leaves, nodes with fimbriate stipules, and a terminal inflorescence with several flowers in anthesis and flower buds at different stages of development.

The other K specimen, with barcode K000275527, has the stamp "Herbarium Benthamianum. 1854" and a label with the printed text "Prov. Goyaz, Brasilia tropica, Gardner, 1841" and handwritten "3215 Coffea?" This specimen consists of a branch with three leaves, nodes with fimbriate stipules, and a terminal inflorescence with numerous flower buds at different stages of development. This specimen is here designated the lectotype of *Rudgea longiflora*.

FGT, vol. 40(2), p. 1062:

Synonym:

Rudgea lacerostipula K.Schum. ex Glaziou, *nom. nud.*, Bull. Soc. Bot. France 56 (Mém. 3d): 357. 1909. Especimen citado: Brasil, Goiás, s.d. [1894-1895], *Glaziou 21486* (B, P, foto-B em NY)."

Original material cited: Type: BRAZIL. Tocantins: Rio Tocantins, au passage, s.d. [2 Jan. 1895], *A.F.M. Glaziou 21486* (B†; BR [barcode 00000579490], C [barcode C10018360], F [Acc. No. 974961], G [barcode G00436681], K [barcode K000275533], P [barcode P03985254]; fragment F [ex B (leaf portions & B photo, Acc. No. 606549]; photo-B [F0BN000670]).

Notes: Glaziou (1909b: 357) published *Rudgea lacerostipula* K.Schum. ex Glaziou as "281. R. lacerostipula K. Sch. n. sp? in herb Paris. [P], Berol. [B], Kew. [K], Havn. [C], etc. – Rio Tocantins, au passage, Goyaz, nº 21486. Arbuste, fl. blanches. Janvier-février. C." Glaziou published this name describing it only as a shrub with white flowers, and therefore is a *nomen nudum*. Zappi annotated the original specimens of *R. lacerostipula* as *R. longiflora* Benth., a synonymy with which I concur.

FGT, vol. 40(2), p. 1068:

"50-7. ***Rudgea myrsinifolia*** Benth., Linnaea 23: 455. 1850. Tipo: Brasil, Minas Gerais, s.d., *Regnell I.274* (holótipo, K; isótipos, BR, US, S; foto-K em NY)."

Accepted name: *Rudgea myrsinifolia* Benth.

Type: BRAZIL. Minas Gerais: Caldas, s.d., *A.F. Regnell Ser. I, No. 274* (BR [barcode 000000532703], **lectotype here designated**; isolectotypes, BR [barcode 000000532736], C n.v., G [barcode G00436687], S [Acc. No. S05-10793]).

Notes: Bentham (1850: 455) published *Rudgea myrsinifolia* Benth. (as "*myrsinaefolia*") and cited the sole gathering *Regnell Ser. 1. n. 274* without citing the collection locality or the herbarium of deposit. Several specimens of *Regnell Ser. I, n. 274bis* have been annotated as types of *Rudgea myrsiniifolia* (BR [barcode 000000532665], K [barcode K000843176], M [barcode M-0242135], P [barcode P00582116], US [barcode 00624012]), but the collection cited by Bentham is *Regnell Ser. I, n. 274*; therefore *Regnell Ser. I, n. 274bis* is not original material.

Zappi (2003: 521) cited the type of *Rudgea myrsinifolia* as "Lectotype (designated here): *Regnell* ser. I, n. 264 (K!; BR!, C!, UPS! isolectotypes); [original syntypes: Brazil, Minas Gerais, *Regnell* ser. I, n. 274, 274bis (BR!, C!, K!, S, UPS!)]." It is unknown why Zappi cited *Regnell ser. I, n. 264* at K as lectotype, and the duplicates at BR, C, UPS as isolectotypes, because Bentham clearly cited only *Regnell ser. I, 274* in the original publication. After a detailed search, I was unable to find the specimen *Regnell ser. I, 264* at K. Two specimens of *Regnell ser. II, 264* in S (Acc. Nos. S07-7724, S07-7728), collected in Caldas, Minas Gerais, are original material of *Eulophia arundinae* Rchb. f. [= *Cyanaeorchis arundinae* (Rchb. f.) Barb. Rodr., Orchidaceae].

Zappi (2003: 521) cited *Regnell Ser. I, 274* and *274bis* as "original syntypes." This citation cannot be interpreted as an inadvertent lectotypification or a neotypification. Because Zappi's lectotype citation is incorrect, it is here superseded. A lectotype needs be designated for this name by choosing among the duplicates of *Regnell Ser. I, No. 274* that are present in several herbaria, which are discussed below.

A specimen at BR, with barcode 000000532736, consists of two branches, one with infructescences with mature fruits, and the other with inflorescences with flower buds and flowers in anthesis. On the lower left corner is a label with the handwritten annotation "I. 274. Ad Caldas in Minas Gerais Brasilia legit A.F. Regnell" and the stamp "Herb. Hort. Bruxell. – Coll. Martii."

Another specimen at BR, with barcode 000000532703, consists of one branch with an inflorescence from which the corollas had fallen off. On the lower left corner is a label with the printed text "Brasiliae, prov. Minarum ad Caldas. Communic. Andr. Frid. Regnell 1867 sub Nº." and handwritten "I. 274." That label also has the stamp "Herb. Hort. Bruxell. – Coll. Martii." On the lower right corner of the sheet there is a handwritten label (author unknown) with the annotation "I.274 Ex speciminibus C. Bentham communic." The last sentence means that this specimen was sent by Bentham and represents original material. This specimen is here designated the lectotype of *Rudgea myrsinifolia*.

A specimen at G, with barcode G00436687, has on the lower portion of the sheet are two small branches, one with infructescences with mature fruits, and the other with inflorescences with flower buds and flowers in anthesis. These two branches each have the handwritten label "Rudgea myrsiniaefolia Benth., Caldas: Regnell I.274" and are original material of *Rudgea myrsinifolia*. On the upper portion of the sheet is an envelope containing one leaf, three loose fruits, and several loose flowers in anthesis. On the envelope it is handwritten (probably by Müller Argoviensis) "Rudgea myrsiniifolia Benth. Caldas: Regnell." As the material in the envelope

does not have the indication of Regnell's collection number, it cannot be treated as original material.

On a sheet in S, with Acc. No. S05-10793, are two different gatherings belonging to two different species. On the upper left side is a branch with an inflorescence without corollas, with Acc. No. S05-10793. By the side of this specimen is a handwritten label saying "Provincia Minas Gerais, 1 ser. No. 274. Faramea. Brasilien. Dr. Regnell." On the upper right corner is a label with the annotation "274. Exemplum typi. Rudgea myrsinifolia Benth. Det. C.S.B. Bremekamp, Utrecht 22 III 1937." Near the right margin, at the lower-middle portion is an inflorescence with flowers in anthesis, with "ad 274" written in pencil. That inflorescence is part of the specimen with Acc. No. S05-10793, is original material and is an isolectotype.

Zappi (2003: 521–527) treated *Rudgea myrsinifolia* Benth. as a synonym of *Rudgea jasminoides* (Cham.) Müll. Arg., explaining that "Müller-Argoviensis (1881) differentiated several entities (for example *R. major*, *R. myrsinifolia*, *R. clavipes*, *R. gaudichaudii*, *R. paniculata* and *R. langsdorfii*) at specific level based on characters that vary depending on several aspects of the collections upon which the names are based. The flowering stage of the specimens examined, i.e., specimens with young inflorescences and closed flower buds will present different ratios between corolla-tube and corolla-lobes to older inflorescences where corollas are open. Overall corolla length might have been affected by the same factors of maturity and also by heterostyly, which is present in all species observed so far. The number of pairs of secondary veins between 5–9 and 10 and above was considered different but there is considerable overlap between these categories once the sample studied becomes larger. The presence or absence of cornicula was used to differentiate between taxa, but there are intermediate stages and in the same population, making such categories not very clear-cut." Under *R. jasminoides*, Zappi recognized four subspecies, subsp. *jasminoides*, subsp. *corniculata* (Benth.) Zappi, subsp. *micrantha* Zappi, and subsp. *nervosa* Zappi & Anunciação. These four subspecies have distinct distributions, although overlapping in several instances." Delprete et al. (2005) and Delprete (2010b) preferred to maintain *R. myrsinifolia* and *R. jasminoides* as separate species, and distinguished *R. myrsinifolia* as having corollas 11–13 mm long, with tubes 6–7 mm long and lobes 5–7 mm long; whereas *R. jasminoides* has corollas 18–25 mm long, with tubes 8–11 mm long and lobes 8–11 mm long.

FGT, vol. 40(2), p. 1072:
"50-8. ***Rudgea tomentosa*** Rusby, Mem. Torrey Bot. Club. 3(3): 48. 1893. Tipo: Bolívia, Yungas, 1890 (fl), *M. Bang 367* (holótipo, NY; isótipos, NY [2])."

Accepted name: *Rudgea tomentosa* Rusby

Type: BOLIVIA. Yungas: 1890, *M. Bang 367* (NY [barcode 00133240], **lectotype here designated**; isolectotypes, BM [barcode 000043421], E [barcode E00085649], F [Acc. No. 163427 (annotated as *Rudgea tomentosa* by Standley)], K [barcode K000275081], MO [Acc. No. 124061], NY [barcode 00133241], PH [2 sheets, barcodes 00021600 (not annotated by Rusby), 00021601 (annotated as *Rudgea tomentosa* by Rusby)], US [barcode 00129760]).

Notes: Rusby (1893: 48), in the protologue of *Rudgea tomentosa* Rusby, cited the gathering *Bang 367*, without citing the herbarium of deposit. Rusby (1893: 48) described *R. tomentosa* in the article "On the Collections of Mr. Miguel Bang in Bolivia" in issue number 3 of volume 3 of the *Memoirs of the Torrey Botanical Club*. According to the table of contents presented in the volume, issue N. 3 was published on 28 April 1893. In the introduction to the article, Rusby wrote that Miguel Bang's Bolivian collections were distributed to more than 20 individuals and institutions. Three specimens of *Bang* 367 are annotated as *R. tomentosa* by Rusby, two of them are at NY and one at PH, which are below described and discussed.

The NY specimen with barcode 00133240 bears a label with the heading "PLANTAE BOLIVIANAE. A Miguel Bang Lectae. Herbario Collegii Columbiae, a N.L. Britton et H.H. Rusby distributae" and the printed text "Yungas. 1890." On the label is handwritten "Rudgea Hostmanniana Benth." Rusby stroked through "Hostmanniana Benth." and substituted it with "tomentosa, Rusby sp. nov." in black ink. On the sheet there is the stamp "Columbia College – Herbarium – New York." The specimen consists of a ramified branch with numerous leaves and two inflorescences with flower buds and flowers in anthesis. This specimen is here designated the lectotype of *R. tomentosa*.

The NY specimen with barcode 00133241 bears a label with the same heading of the other *Bang* 367 specimen at NY and the printed annotation "Yungas. 1890." On the label is handwritten "Rudgea Hostmanniana Benth." Rusby stroked through "Hostmanniana Benth." and substituted it with "tomentosa, Rusby sp. nov." in pencil. On the sheet there is the stamp "College of Farmacy Herbarium – Deposited 1948 in The New York Botanical Garden." As the other specimen at NY consists of a ramified branch with numerous leaves and two

inflorescences with flower buds and flowers in anthesis. This specimen is an isolectotype.

The PH specimen with barcode 00021601 has a label with the same heading of the NY specimens and the printed text "Yungas. 1890." On the label is handwritten "Rudgea Hostmanniana Benth." Rusby stroked trough "Hostmanniana Benth." and substituted it with "tomentosa, Rusby n. sp." in black ink. The specimen consists of a branch with a few leaf pairs and one terminal inflorescence. This specimen is an isolectotype.

Zappi identified several type specimens of *Rudgea tomentosa* as *R. viburnoides* (Cham.) Benth., but these two taxa are two distinct species. Rusby (1893: 48) described *R. tomentosa* from material collected in Bolivia. He described the leaf abaxial surface as "light gray-green, finely tomentose". However, on the abaxial side of leaves of the type specimens of *R. tomentosa*, the leaf lamina are either glabrous or sparsely, microscopically puberulous, and the veins are puberulous. Several gatherings collected in the states of Mato Grosso, Tocantins, Goiás and in the Federal District have been identified by Steyermark, Boom and Kirkbride as *R. tomentosa*, and the leaf vestiture corresponds to that of the type specimens. Such gatherings are similar to *R. viburnoides* in having leaf blades with lucid adaxial surface and paniculate inflorescences. *Rudgea tomentosa* can be differentiated from *R. viburnoides* in having leaf blades planar with abaxial side glabrous or puberulous; while in the latter the leaf blades are strongly bullate, with the abaxial side pubescent to tomentose. However, these vegetative differences might be the result of ecological adaptations. Further studies are necessary to confirm the separation of these two taxa. Meanwhile, I prefer to treat them as distinct species.

FGT, vol. 40(2), p. 1075:
"50-9. ***Rudgea viburnoides*** (Cham.) Benth., Linnaea 23: 458. 1850. - *Coffea viburnoides* Cham., Linnaea 9: 228. 1834. Tipo: Brasil, "Brasilia inter tropicos", s.d., *Sellow s.n.* (holótipo, B, destruido; lectótipo, K, designado por Zappi, 2003)."

Accepted name: *Rudgea viburnoides* (Cham.) Benth.

Type: BRAZIL. Without locality, s.d., *F. Sellow s.n.* (K [(ex B) barcode K000275064], lectotype designated by Zappi (2003: 580)).

Notes: In the protologue of *Coffea viburnoides* Cham., Chamisso (1834: 228) cited the material studied as "Brasilia inter tropicos. Sellow." Stafleu and Cowan (1976: 482) wrote, "Chamisso's own herbarium was also acquired by LE." Therefore, original material of *C. viburnoides* might be present in LE. Zappi (2003: 580), regarding the type of *C. viburnoides*, stated "Brasilia intertropica, *Sello* (B†). Lectotype (designated here): Type: *Sello* s.n. (K!)." At K there is a sole specimen of *C. viburnoides*, with barcode K000275064, with the annotation "lectotype of C. viburnoides Cham." handwritten by Zappi. The specimen label has the heading "Ex Museo botanico Berolinensi", with the printed text "Brasilia, leg. Sellow", the handwritten annotation "Rudgea viburnoides Bth." and the stamps "determ. C. Schumann" and "15 nov 1907". Also affixed to the sheet, there is a small label with the penciled annotation "Rel. Sell. [Reliquiae Sellow] 3.6.II." and the stamp "15 nov 1907". There is no evidence on the sheet that this specimen was studied by Chamisso. The specimen consists of a small branch with numerous leaves and a few infructescences. The rachis of the infructescences is strongly tomentose. The leaves are strongly bullate, with a lucid adaxial side, and the veins and lamina are strongly tomentose on the abaxial side.

51. **RUSTIA** Klotzsch in Hayne, Getreue Darstell. Gew. 14: tabs. 14, 15, 555. 1846.

FGT, vol. 40(2), p. 1090:
"51-1. ***Rustia formosa*** (Cham. & Schltdl. ex DC.) Klotzsch in Hayne, Getr. Darstell. Gew. 14: tab 15. 1846. - *Exostema formosum* Cham. & Schltdl. ex DC., Prodr. 4(4): 361. 1830. - *Exostema formosum* Cham. & Schltdl. var. β *laeve* Cham. & Schltdl. ex DC., *nom. inval.,* Prodr. 4(4): 361. 1830. - *Exostema formosum* Cham. & Schltdl., *nom. nud.,* Linnaea 4: 179. 1829. - *Exostema formosum* var. β *laeve* Cham. & Schltdl., *nom. inval.,* Linnaea 4: 179. 1829. - Tipo: Brasil, São Paulo, Estação Biológica Alto da Serra, 19/X/1931 (fl-fr), *C. Lemos 28678* (Neótipo NY, selecionado por Delprete, 1999; isoneótipos F, GH, US)."

Accepted name: *Rustia formosa* (Cham. & Schltdl. ex DC.) Klotzsch

Correct bibliographic citation: *Rustia formosa* (Cham. & Schltdl. ex DC.) Klotzsch in Hayne, Getr. Darstell. Gew. 14: tab. 15. 1846. - *Exostema formosum* Cham. & Schltdl. ex DC., Prodr. 4(4): 361. 1830. - *Exostema formosum* Cham. & Schltdl., *nom. inval.,* Linnaea 4: 179. 1829.

Type: BRAZIL. Without locality, s.d., *Collector Unknown s.n.* (G-DC [barcode G00665732], **lectotype here designated**).

Synonym:

Exostema formosum var. α *leprosum* DC., Prodr. 4(4): 361. 1830. - *Exostema formosum* forma β *laeve* Cham. & Schltdl., *nom. inval.,* Linnaea 4: 179. 1829.

Type: BRAZIL. Without locality, s.d., *F. Sellow s.n.* [*1814*] (HAL [barcode HAL097786], **neotype here designated**).

Synonym:

Exostema formosum var. β *laeve* DC., Prodr. 4(4): 361. 1830. - *Exostema formosum* forma α *leprosum* Cham. & Schltdl., *nom. inval.,* Linnaea 4: 179. 1829.

Type: BRAZIL. Without locality, s.d., *Collector Unknown s.n.* (G-DC [barcode G00665732], **lectotype here designated**; isolectotype HAL [HAL097787 (collected by Sellow)]).

Notes: Chamisso and Schlechtendal (1829b: 179) published *Exostema formosum* Cham. & Schltdl. without a description, and under that name described *E. formosum* f. *laeve* Cham. & Schltdl. and *E. formosum* f. *leprosum* Cham. & Schltdl. *Exostema formosum* Cham. & Schltdl., *E. formosum* f. *laeve* Cham. & Schltdl., and *E. formosum* f. *leprosum* Cham. & Schltdl. are legitimate names. *Exostema formosum* is not a valid name because there is no diagnosis or description for it (Art. 38.1). *Exostema formosum* f. *laeve* and *E. formosum* f. *leprosum* are also not valid names because *E. formosum* is not valid (Art. 35.1). These two infraspecific taxa are forms because Chamisso and Schlechtendal in the protologue stated "Utramque formam in Brasilia intratropica legit Sellowianus" [Sellow collected both forms in intertropical Brazil].

Candolle (1830: 361) described *Exostema formosum* Cham. & Schltdl. ex DC. and the forms α *leprosum* DC. and β *laeve* DC. He did not assign a rank to the two forms. Article 37.4 of the *Code* (Turland et al., 2018) states that "If in one whole publication (Art. 37.5), prior to 1 January 1890, only one infraspecific rank is admitted, it is considered to be that of variety unless this would be contrary to the author's statements in the same publication." Therefore, the rank to be assigned to Candolle's infraspecific taxa published in his *Prodromus* is variety. For *Exostema formosum*, he cited "in Brasilia intratropicali (V.s.)". The expression "V.s." (Vidi siccum) means that he saw a specimen in his herbarium. However, for the two varieties he did not cite any specimen.

There is a sole original specimen of *Exostema formosum* Cham. & Schltdl. ex DC. in G-DC, with barcode G00665732. That specimen has a label with the annotation "Exostemma formosum Ch. et S!" handwritten by Candolle. A second label is affixed on the sheet has the annotation "Exostemma formosum N. var. laeve, Brasilia, Mus. Roy. de Berlin 1830." That specimen is here designated the lectotype of *Exostema formosum*, and the neotype of this name designated by Delprete (1999a: 85) is here superseded.

Because the G-DC specimen with barcode G00665732 has a label with the annotation "Exostemma formosum N. var. laeve", it is here designated as the lectotype of *Exostema formosum* var. β *laeve* DC.

In HAL there is a specimen with barcode HAL097787 with a label bearing the annotation "Exostemma formosum N. var. laeve, Brasilia" handwritten by an unknown author. The specimen, collected by Sellow, consists of one branch with three leaves and a terminal inflorescence with flower buds and an inflorescence branch also with flower buds. This specimen is an isolectotype of *Exostema formosum* var. *laeve* DC.

Another specimen in HAL with barcode HAL097786 has a label with the handwritten annotation "Exostemma formosum N. var. leprosum, Brasilia". The specimen, collected by Sellow, consists of a single leaf. This specimen is here designated the neotype of *Exostema formosum* var. *leprosum* DC.

FGT, vol. 40(2), p. 1091:

Synonym:

"*Rustia sellowiana* Klotzch, in Hayne, Getr. Darstell. Gew. 14: tab 15. 1846. - *Exostema formosum* Cham. & Schltdl. var. α *leprosum* Cham. & Schltdl. ex DC., *nom. inval.,* Prodr. 4(4): 361. 1830. - *Exostema formosum* var. α *leprosum* Cham. & Schltdl., *nom. inval.,* Linnaea 4: 179. 1829. - Tipo: Brasil, Rio de Janeiro, Corcovado, Caminho de Laranjeiras, I/1834 (fl), *Luschnath 179* [*Martius H. Fl. Bras. 111*] (Neótipo BR, selecionado por Delprete, 1999)."

Type: BRAZIL. Rio de Janeiro: Corcovado, Caminho de Laranjeiras, Dec. 1834 (fl), *B. Luschnath 179* [*Martius H. Fl. Bras. 111*] (BR [barcode 000000532847], neotype designated by Delprete (1999a: 86)).

FGT, vol. 40(2), p. 1091:

Synonym:

"*Rustia pohliana* Klotzch in Hayne, Getr. Darstell. Gew. 14: Tab 15. 1846. - Tipo: Brasil, **Goiás**, Pouzo Alto a Caldas Novas, 1837 (fl), *Pohl 809* (lectótipo, W, selecionado por Delprete, 1999; isolectótipos, F, GH)."

Type: BRAZIL. Goiás: Pouzo Alto a Caldas Novas, 1837 (fl), *J.B.E. Pohl 809d* (W [Acc. No. 0072678],

lectotype designated by Delprete (1999a: 86); isolectotypes, F [Acc. No. 875060], GH [barcode 00057420]).

52. **SABICEA** Aubl., Hist. Pl. Guiane 192. 1775.

FGT, vol. 40(3), p. 1101:
"52-1. ***Sabicea brasiliensis*** Wernham, Monogr. Sabicea 51. 1914. Muitos síntipos: Brasil, Estados de Pernambuco, Bahia, Minas Gerais, Goiás: "*Burchell 5136*, *6532*, *7035*, *8061*, *8383*; *Gardner 3225*"; Bolívia, muitas coletas."

Accepted name: *Sabicea brasiliensis* Wernham

Type: BRAZIL. Goiás: town of Goiás, s.d., *W.J. Burchell 6532* (K [barcode K000172688], **lectotype here designated**; isolectotypes, BR [barcode 000000562057], GH [barcode 00312828]).

Notes: In the protologue of *Sabicea brasiliensis* Wernham, Wernham (1914) cited numerous gatherings from the Brazilian states of Pernambuco, Minas Gerais, Goiás, and from Bolivia, deposited at K, B, BR, G, G-DC, S, and P. On a sheet at K are mounted three branches belonging to two different gatherings, which are assigned two different barcodes. The two branches of *Burchell 6532* affixed on the left side and upper portion of sheet, have barcode K000172688. On the upper left corner is affixed a label with the annotation "Sabicea brasiliensis Wernham! non S. cana Hook., Determinavit Wernham 11.XII.12" handwritten by Wernham. Those two branches are here designated the lectotype of *Sabicea brasiliensis*.

On a sheet at BR with barcode 000000562057, are affixed two branches of *Burchell 6532*, and a label with the annotation "Brasilia: prope urbem Goyaz, Communic. H. Kewense 1867, Burchell nº 6532. This specimen is an isolectotype of *Sabicea brasiliensis*.

On a GH sheet are affixed two branches of two different gatherings. The branch on the left side of the sheet, with barcode 00312828, belong to the gathering *Burchell 6532*, and is an isolectotype.

FGT, vol. 40(3), p. 1113:
"52-2. ***Sabicea grisea*** Cham. & Schltdl., Linnaea 4: 192. 1829. Tipo: Brasil, *Sellow 328* (holótipo, B*, foto em NY)."

Accepted name: *Sabicea grisea* Cham. & Schltdl.

Type: BRAZIL. Without locality, s.d., *F. Sellow 328* (F [Acc. No. 607143, barcode F0071060], **lectotype here designated**).

Notes: In the protologue of *Sabicea grisea* Cham. & Schltdl., Chamisso and Schlechtendal (1829b: 192) cited the material studied as "In Brasilia aequinotiali legit Sellow" without citing the collection number. The original material at B was destroyed during WWII. A photograph of that specimen, negative F0BN000303, shows that its label had the annotation "328. Sabicea grisea N., Linnaea 4. p. 192. Sellow. Brasilia aequinotialis."

To my knowledge, the only extant specimen of *Sellow 328* is at F. On the F sheet, with accession No. 607143, an envelope is affixed containing fragments extracted from the original B specimen. In the envelope, is included a portion of a leaf, a portion of a stem, and a single loose fruit crowned by a permanent calyx. On the sheet, the photograph of the destroyed B specimen is also affixed. The fragments in the envelope are sufficient to clarify the application of the name due to the characteristic vestiture of the parts. That specimen is here designated the lectotype of this name.

FGT, vol. 40(3), p. 1117:
"52-3. ***Sabicea humilis*** S. Moore, Trans. Linn. Soc., ser. 2, 4: 369. 1893. Síntipos: Brasil, Mato Grosso, Santa Cruz [Barra do Bugres, ca. 15°04'S, 57°10'W, IX/1891], *S. Moore 472* (BM, K, NY), Santa Anna da Chapada, s.d., *Malme 2071* (BM, K, P); Minas Gerais, Quartel de Biribiry, s.d., *Glaziou 19420a* (BM, P)."

Accepted name: *Sabicea humilis* S.Moore

Type: BRAZIL. Mato Grosso: Santa Cruz, 1891–1892, *S. Moore 472* (holotype BM [barcode BM000827942]; isotypes, K [barcode K000424283], NY [barcode 00133263]),

Notes: Delprete's (2010c: 1117) citation of the publication year of *Sabicea humilis* S. Moore as "1893" is a typographical error, and the citation of other gatherings as syntypes is an error that stemmed from the additional gatherings cited by Wernham (1914: 39) in his *Sabicea* monograph, which are not original material. In the protologue of *S. humilis*, Moore (1895: 369) cited the sole gathering "Ad Santa Cruz floret mens. Nov. (N. 472)." According to Stafleu and Cowan (1981: 570) Moore's types are at BM. The specimen *Moore 472* at BM, barcode BM000827942, is the holotype of *Sabicea humilis*, and the duplicates in K and NY are isotypes.

FGT, vol. 40(3), p. 1117:

Synonym:

"*Sabicea humilis* S. Moore var. *lanceolata* Wernham, Monogr. Sabicea: 39. 1914, **syn. nov.** Síntipos: Brasil, Mato Grosso, Santa Cruz [Barra do Bugres, ca. 15º04'S, 57º10'W, IX/1891], *S. Moore 794* (BM, K); Cuiabá, *Malme 2684* (BM, K)."

Correct bibliographic reference: *Sabicea humilis* S. Moore var. *lanceolata* S. Moore, Trans. Linn. Soc., ser. 2, 4: 370. 1895.

Type: BRAZIL. Mato Grosso: Santa Cruz [now Barra do Bugres, ca. 15°04'S, 57°10'W], s.d. [Sep. 1891], *S. Moore 794* (BM [barcode BM000827941], **lectotype here designated**; isolectotype K n.v. [barcode unknown]).

Notes: In the protologue of *Sabicea humilis* var. *lanceolata* S. Moore, Moore (1895: 370) cited the gathering *Moore 794*. On a BM sheet are mounted two different gatherings, which are assigned two different barcodes. On the right side of the sheet are affixed two branches, with barcode BM000827941, that belong to the gathering *Moore 794*, near them is affixed a label with the annotation "No. 794 […] Sta. Cruz, December" handwritten by Moore. This specimen is here designated the lectotype of *S. humilis* var. *lanceolata*.

FGT, vol. 40(3), p. 1117:

Synonym:

"*Sabicea moorei* Wernham, Monogr. Sabicea: 39. 1914, **syn. nov.** Tipo: Brasil, Mato Grosso, Santa Anna da Chapada, *R. Sladen 687* (holótipo, BM; isótipo, K)."

Type: BRAZIL. Mato Grosso: Santa Anna da Chapada [Now the town of Chapada dos Guimarães], 2 Nov. 1902, *A. Robert 687* (BM [barcode BM000827934], **lectotype here designated**; isolectotype, K n.v. [barcode unknown]).

Notes: In the protologue of *Sabicea moorei* Wernham, Wernham (1914: 39) cited the gathering "Brasil: Matto Grosso, Santa Anna da Chapada, *Sladen 687*! Hbb. Mus. Brit., Kew." That gathering was not collected by "Sladen" as errouneously reported by Wernham, but was instead collected by A. Robert, hence that collection should be cited as *A. Robert 687*. On a specimen at BM, with barcode BM000827934, are affixed two branches, and a label with the printed text "Percy Sladen Expedition 1902-3, Central Brazil, Coll. A. Robert, Presented by Mrs. Sladen" and the handwritten annotation "Nº 687, S. Anna da Chapada, Matto Grosso, 2.11.02." At the bottom of the sheet is the penciled annotation "Sabicea Moorei Wernham!" handwritten by Wernham. That specimen is here designated the lectotype of this name.

FGT, vol. 40(3), p. 1120:

"52-4. ***Sabicea villosa*** Willd. ex Roem. & Schult., Syst. Veg. 5: 265. 1819. Tipo: Venezuela, Rio Orinoco, V/1800 (fl), *Humboldt & Bonpland s.n.* (holótipo, B-Willd.)."

Accepted name: ***Sabicea villosa*** Roem. & Schult.

Correct authority and type citation: *Sabicea villosa* Willd. in Roem. & Schult., Syst. Veg. 5: 265. 1819. Type: VENEZUELA: Río Orinoco, May 1800 (fl), *A.J.A.G. Bonpland & F.W.H.A. Humbold s.n.* (holotype, B-W [barcode B –W 04164 -00 0]).

Notes: The authority of *Sabicea villosa* has often been cited as "Willd. ex Roem. & Schult." In the original publication, under that binomial is cited the unpublished name "Schwenkfeldia villosa Willd." Therefore, the Willdenow authority should be excluded from this binomial.

The Swiss botanist Johann Jakob Roemer (1763–1819) died on 15 January 1819. Stafleu and Cowan (1983: 848), interpreted the sentence "Volumen quintum. Inceptum a Joanne Jacobo Roemer … post ejus obitum continuatum a Jos. Augusto Schultes…" in the title page of the fifth volume *Systema Vegatabilium* as an indication that Joseph August Schultes is the sole author of that volume. However, that sentence should be translated as "Fifth volume. Started by Johann Jakob Roemer … continued after his death by Joseph August Schultes." Therefore, as stated in that sentence, Roemer worked on the text of the fifth volume, and his authority is here maintained for the new names published in that volume.

Roemer and Schultes (1819: 265) cited the material studied of *Sabicea villosa* as "In America. Humb. et Bonpl." The holotype of *S. villosa* at B-W, barcode B –W 04164 -00 0, was annotated as "Schwenkfeldia cinerea (W.)" by Willdenow, and as "Sabicea hirsuta H.B.K." by Kunth, certainly after 1820, when he returned to Berlin. No information regarding the collection locality is present on the specimen. The specimen folder is also annotated as "Schwenkfeldia cinerea" by Willdenow. This specimen is also the isotype of *Sabicea hirsuta* Kunth (see below).

FGT, vol. 40(3), p. 1120:

Synonym:

"*Sabicea hirsuta* Kunth in Humb. & Bonpl., Nov.

Gen. & Sp. 3: 417. Mar. 1820. – *Schwenkfeldia hirsuta* (Kunth) Spreng., Syst. Veg. 1: 765. 1825."

Type: VENEZUELA: Río Orinoco, May 1800 (fl), *A.J.A.G. Bonpland & F.W.H.A. Humbold s.n.* (holotype, P-Bonpl. [barcode P00662764]; isotype B-W [barcode B –W 04164 -00 0]).

Notes: In the protologue of *Sabicea hirsuta* Kunth, Kunth (1820: 417) cited the collection locality of the material studied as "Crescit in ripa Orinoci fluminis. Floret Majo." The holotype specimen of this name is in P-Bonpl., with barcode P00662764, and is annotated as "Sabicea hirsuta mihi" by Kunth. No information regarding the collection locality is present on the sheet. Sprengel (1825: 765) published the new combination *Schwenkfeldia hirsuta* (Kunth) Spreng., and cited "Schwenkfeldia villosa W. herb., Sabicea hirsuta Kunth" as synonyms.

53. **SERISSA** Commers. ex A.L.Juss., Gen. 209. 1789.

Accepted generic name: BUCHOZIA L'Hér., *Buchozia* [unpaginated]. Jul.–Dec. 1788.

Notes: For further explanation regarding the priority of *Buchozia* L'Hér. over *Serissa* Commers. ex A.L.Juss. and the typificaton of *Lycium japonicum* Thunb., see Lack et al. (2021).

FGT, vol. 40(3), p. 1125:
"53-1. ***Serissa japonica*** (Thunb.) Thunb., Nov. Gen. Pl. 9: 132. 1798. - *Lycium japonicum* Thunb., Nov. Act. Roy. Soc. Sci. Upsal. 3: 207. 1780. Tipo: Japão, *Coletor Desconhecido* (holótipo LINN)."

Accepted name: *Buchozia japonica* (Thunb.) Callm. in Lack, Böhme & Callmander, Candollea 76(1): 162. 2021.

Type: JAPAN: "prope Nagasaki et alibi vulgare", s.d., *C.P. Thunberg s.n.* (UPS-THUNB nº 5316, lectotype designated by Callmander and Lack in Lack et al. (2021: 162); isolectotypes MPU [MPU014200], UPS-THUNB nº 5317, UPS-THUNB nº 5318).

54. **SIMIRA** Aubl., Hist. Pl. Guiane 1: 170, pl. 65. 1775.

FGT, vol. 40(3), p. 1130:
"54-1. ***Simira corumbensis*** (Standl.) Steyerm., Mem. New York. Bot. Gard. 23: 306. 1972. - *Sickingia corumbensis* Standl., Field Mus. Nat. Hist., Bot. Ser. 11: 270. 1936. Tipo: Brasil, Mato Grosso do Sul, Corumbá, "in silva subruderali clara", 20/XII/1902 (fl, fr), *G.O.A. Malme 2733* (holótipo, S)."

Accepted name: *Simira corumbensis* (Standl.) Steyerm.

Type: BRAZIL. Mato Grosso do Sul: Corumbá, "in silva subruderali clara," 20 Dec. 1902 (fl, fr), *G.O.A. Malme 2733* (holotype, S [Acc. No. S04-31]; isotype F [Acc. No. 646808]; isotype fragment F [ex S, Acc. No. 638799]).

FGT, vol. 40(3), p. 1130:
Synonym:
"*Simira pilosa* M.R. Barbosa & A.L. Peixoto, Acta Amazon. 19: 35, fig. 3. 1989, **syn. nov.** Tipo: Brasil, Mato Grosso, Cuiabá, estr. Cuiabá-Cuiabá de Larga, X/1914 (fl), *J.G. Kuhlman 1518* (holótipo, SP)."

Type: BRAZIL. Mato Grosso: Cuiabá, estr. Cuiabá-Cuiabá de Larga, Oct. 1914 (fl), *J.G. Kuhlmann* [*Herb. Com. Rondon*] *1518* [*SP Acc. No. 35110*] (holotype, SP [barcode SP002741]).

FGT, vol. 40(3), p. 1134:
"54-2. ***Simira rubescens*** (Benth.) Bremek. ex Steyerm., Mem. New York Bot. Gard. 23: 301. 1972. - *Sprucea rubescens* Benth., Hooker's J. Bot. Kew Gard. Misc. 5: 230. 1853. Tipo: Brasil, Amazonas, "ad oram meridionalem fl. Amazonum, ad ostium fl. Solimões, ad Gapó do Manaquiry", *Spruce 1601* (holótipo, K; isótipos, M n.v., NY; foto-M em NY)."

Accepted name: *Simira rubescens* (Benth.) Bremek. ex Steyerm.

Type: BRAZIL. Amazonas: Mouth of Rio Solimões [Amazon River], "Manaquiry-gapó, June 1851", *R. Spruce 1601* (K [barcode K000173875], **lectotype here designated**; isolectotypes, E [barcode E00265908], FI-Webb [barcode FI004802], G [2 sheets, barcodes G00436765, G00436766], GOET [barcode GOET010529], K [K000173876], M [barcode M-0189381], MO [Acc. No. 1606131], MPU [barcode MPU021288], NY [barcode 00133356], P [2 sheets, barcodes P02428078, P02428079], RB [2 sheets, barcodes RB00363995, RB00881032], S [Acc.

No. S 04-29], TCD [barcode TCD0005622]; isolectotype fragments F [Acc. Nos. 870939, 635088]).

Notes: Bentham (1853: 230), in the protologue of *Sprucea rubescens* Benth., cited the collection date and locality as "gathered in June, 1851, in the gapó at Manaquiry, on the south shore of the Amazon, at the mouth of the Solimões" and did not cite any specimen or herbarium of deposit. The original specimens associated with this name, present in numerous herbaria, show that the gathering examined by Bentham is *Spruce 1601*. At K, where Bentham worked, there are two original specimens of *Spruce 1601*. The K specimen with barcode K000173875 has the stamp "Herbarium Benthamianum, 1854", and a label with the plant description handwritten by Spruce, along with collection date of June 1851 and the locality "Manaquiry-gapó." On that same label is also present the annotation "Sprucea rubescens Benth. in Kew Journ." handwritten by Bentham. Specimen K000173875 is here designated the lectotype of *S. rubescens*.

The K specimen with barcode K000173876 has the stamp "Herbarium Hookerianum, 1867" and a label with the printed text "Ad oram meridionalem flum. Amazonum, ad ostium flum. Solimões, coll. R. Spruce, Jun. 1851" and the handwritten annotation "1601, Sprucea rubescens Benth. Gen. nov." That specimen is an isolectotype.

FGT, vol. 40(3), p. 1134:

Synonyms:

Macrocnemum tinctorium Willd. in Roemer & Schultes, Syst. Veg. 5: 6. Dec. 1819. - *Condaminea tinctoria* (Willd.) DC., Prodr. 4: 402. 1830. - *Sickingia tinctoria* (Willd.) K. Schum. in Martius et al., Fl. Bras. 6(6): 228. 1889, non *Simira tinctoria* Aubl., 1775.

Type: VENEZUELA. Orinoco, inter Encaramada et Carichana (Missiones del Orinoco), *A.J.A.G. Bonpland & F.W.H.A. Humboldt 826* (holotype B-W [barcode B -W 03925 -01 0]; isotype, P-Bonpl. [barcode P00671149]).

Macrocnemum tinctorium Kunth in Humboldt and Bonpland, Nov. Gen. Sp. 3: 399 (ed. quarto). 13 Mar. 1820, *nom. illeg. homon.*

Type: VENEZUELA. Orinoco, inter Encaramada et Carichana (Missiones del Orinoco), *A.J.A.G. Bonpland & F.W.H.A. Humboldt 826* (holotype, P-Bonpl. [barcode P00671149]; isotype, B-W [barcode B -W 03925 -01 0]).

Notes: For additional information about the types of *Macrocnemum tinctorium* Willd. and *M. tinctorium* Kunth, see Kirkbride and Wiersema (2020).

55. **SIPANEA** Aubl., Hist. Pl. Guiane 1: 147. 1775.

FGT, vol. 40(3), p. 1141:
"55-1. ***Sipanea hispida*** Benth. ex Wernham, J. Bot. 55: 173. 1917. Tipo: Brasil, Amazonas, Rio Negro, São Gabriel da Cachoeira, s.d., *R. Spruce 2051* (holótipo, BM)."

Accepted name: *Sipanea hispida* Benth. ex Wernham

Type: BRAZIL. Amazonas: Rio Negro, São Gabriel da Cachoeira, Jan.–Aug. 1852, *R. Spruce 2051* (first-step lectotype designated by Steyermark (1967: 279); BM [barcode 000614346], second-step lectotype designated by Delprete (2022: 129–130); isolectotypes, E [barcode E00505240], F [Acc. No. 767786], FI-Webb [barcode FI004807], G [2 sheets; G00436761, G00436762], K [without barcode], LD [barcode 1220003], M [barcode M-0189372], NY [barcode 00133313], P [barcode P00748149], RB [Acc. No. 17401, barcode 00543715]; frag F [Acc. No. 635362]; photo-K at NY).

FGT, vol. 40(3), p. 1141:

Synonyms:

Sipanea trianae Wernham in J. Bot. 55: 174. 1917.

Type: COLOMBIA. [Villavicencio, Susumuco, 400 m, 1000 m; see Kirkbride (1982: 305)], s.d. (fl, fr), *J.J. Triana 1776* (*3248.1*) (holotype BM [barcode 000614328]; isotypes COL [barcode COL000163865] E [barcode 00285373], P [barcode P00748116 "entre Susumuco y Villa Vicencio"], US [Acc. No. 1481047, barcode 00137730]; photo-US, photo-K and photo-BM at NY).

"*Sipanea brasiliensis* Wernham, J. Bot. 55: 174. 1917."

Type: BRAZIL. Minas Gerais: on a dry bank near Sabara, Sep. [1840] (fl, fr), *G. Gardner 5009* (holotype, BM [barcode 000614348]).

FGT, vol. 40(3), p. 1150:
"55-2. ***Sipanea veris*** S. Moore, Trans. Linn. Soc. II., 4: 368. 1895. Tipo: Brasil, Mato Grosso, Rio dos Bugres, "itaque ad confluentes fl. Paraguay et dos Bugres prope Santa Cruz", 1891-1892, *S. Moore 435* (holótipo, BM)."

Accepted name: *Sipanea veris* S.Moore

Type: BRAZIL. Mato Grosso: Rio dos Bugres, near the confluence with the Paraguay River, "in apertis arenosis ad ripas fl. dos Bugres, itaque ad confluentes fl. Paraguay et dos Bugres prope Santa Cruz," 1891–1892 (fl), *S. Moore 435* (BM [barcode 000614332], lectotype designated by Delprete (2022: 171); isolectotypes, K [without barcode], NY [barcode 01085914]; photo-BM at NY).

FGT, vol. 40(3), p. 1150:

Synonyms:

Sipanea acinifolia R. Spruce ex Sprague in Trans. Proc. Bot. Soc. Edinb. 22: 433. 1905.

Type: COLOMBIA. Vichada: Maipures, Río Orinoco [border between Colombia and Venezuela], "Prope Maypures, ad flumen Orenoco", Jun. 1854 (fl), *R. Spruce 3652* (*299*) (LD [Acc. No. 1219703], lectotype designated by Delprete (2022: 172); isolectotypes K [without barcode], MPU [barcode MPU021332], P [barcode P007294432, as "*3652* (*299*)"] RB [Acc. No. 15356, barcode 00364227]).

"*Sipanea spraguei* Wernham, J. Bot. 55: 172. 1917."

Type: VENEZUELA. Bolívar: Río Orinoco, Caicara, near a clump of moriche palms, Nov. 1898 (fl), *C.J. Sprague 7* (holotype BM [barcode 000614324]; isotype K [without barcode]).

56. **SPERMACOCE** L., Sp. Pl. 102. 1753.

FGT, vol. 40(3), p. 1167:

"56-1. ***Spermacoce alata*** Aubl., Hist. Pl. Guian. 1: 60, pl. 22, fig. 7. 1775. - *Borreria alata* (Aubl.) DC., Prodr. 4: 544. 1830; non *Diodia alata* Nees & Mart., Act. Soc. Nat. Cur. 12: 12. 1824; non *Dasycephala alata* (Nees & Mart.) Hook. f. in Benth. & Hook. f., Gen. Pl. 2: 144. 1873. Tipo: Guiana Francesa, "Bord de la Riviere d'Aurora, s.d., *Aublet s.n.* (lectótipo, P-JJR, aqui escolhido; isolectótipo, BM)."

Accepted name: *Spermacoce alata* Aubl.

Type: FRENCH GUIANA: Margins of the Oyak River (as "riviere d'Aroura" referring to the river that runs at the margin of the town of Roura), going towards the Comté de Gennes, "Il croît sur les bord de la riviere d'Aroura, en allant au Comté de Gêne", s.d. [Apr 1763], *J.B.C.F. Aublet s.n.* (P-JJR 3: 118A, lectotype designated by Lanjouw and Uittien (1940: 158)).

Notes: The identity of *Spermacoce alata* Aubl. and *S. latifolia* Aubl. became clear to me when when I was able examined their type specimens at P-JJR and MA, respectively. The types of these two names were cited by Delprete (2015). A detailed comparison of these two species was published by Wiersema et al. (2017), following a recent introduction of *S. latifolia* in Florida, USA. These two species have often been confused, and sometimes synonymized, but they are instead easily distinguished. *Spermacoce alata* is a perennial herb, trailing or prostate, rooting at most nodes, often forming dense, ground-covering thickets, with semi-fleshy leaf blades when fresh, commonly with a single, terminal flowering glomerule subtended by two unequal pairs of leaf-like bracts, campanulate corollas 7.5–12.5 mm long, stamens in two pairs of unequal length, two exserted and two included, and capsules 1.8–2 mm long. Whereas, *S. latifolia* is a perennial herb or subshrub, 0.6–2 m tall, commonly erect, or rarely decumbent or ascending, very rarely prostrate, with chartaceous leaf blades when fresh, with verticillate flowering branches with (3-)7–17(–21) flowering glomerules, infundibuliform corollas 3.5–5.5 mm long, stamens of equal length, inserted at the same height near the corolla mouth or at lobe sinuses, all exserted, and capsules 3–4 mm long.

Spermacoce alata occurs from southern Venezuela and the Guianas to the eastern Amazon Basin, north of the Amazon River, at 10–700 m altitude. It is a prostrate herb, rooting at nodes, often forming dense, ground-covering mats, mostly in shady or semi-shady exposure, usually found in the forest understory, open forests, and forest edges, sometimes seasonally inundated, frequently on the leaf litter over sandy soils. Rarely found in disturbed environments, such as abandoned lots and roadside vegetation. The filiform adventitious roots present at most nodes easily penetrate the organic matter of the leaf litter accumulating on the forest floor, facilitating vegetative reproduction.

Spermacoce latifolia is widely distributed in the New World from southern Mexico through Central America and throughout South America, ranging from Vera Cruz, Mexico, to Colombia, Venezuela, Guianas, and throughout Brazil, Bolivia, and Paraguay, with a preference for sunny exposures, often found in forest margins, secondary vegetation, road margins, in cultivated and abandoned fields, disturbed vegetation, and sometimes in seasonally flooded areas. It is naturalized in southern USA (Florida), the West Indies, southern Europe, Africa,

Madagascar, Asia, Australia, and Pacific islands. According to Kissmann and Groth (1995, p. 412–416) and Lorenzi (2000, p. 542), in Brazil this species is an aggressive weed, infesting annual crops, coffee plantations, orchards, and abandoned fields. It is usually on acidic soils and can even tolerate a certain degree of shading. Increasing soil pH with the addition of basic substances seems to alleviate the infestation. According to Lacerda (2003), this weed has a considerable resistance to high doses of glyphosate-based herbicides.

Based on the distinctions between the two species above presented, *Spermacoce alata* does not occur in the states of Goiás and Tocantins. The specimens cited under *S. alata* in FGT (Delprete, 2010c: 1170–1171), which are all gatherings of prostrate or ascending individuals, are instead *S. latifolia*. Those specimens are cited below.

BRAZIL. **Goiás:** Mun. Pirenópolis, Parque Estadual dos Pireneus, campo sujo com algumas manchas de cerrado, perto do portal do parque, 1150 m, 15º48'S, 48º53'W, 26 Nov. 2005 (fl, fr), *P.G. Delprete, V.L. Gomes-Klein & Estudantes 9280* (CAY, K, NY, RB, SPF, UB, UFG); Mun. São Domingos, Rod. GO-110, ca. 5 km N de São Domingos, em direção para Divinópolis de Goiás, campo limpo encharcado, com solo preto e rico em substancia orgânica, 670 m, 13°21'55"S, 46°20'09"W, 22 Feb. 2006 (fl), *P.G. Delprete, V.L. Gomes-Klein & I.M. Pereira 9476* (BR, CAY, NY, UB, UFG); Mun. Pirenópolis, Parque Estadual dos Pireneus, base do Morro do Cabeludo, solo orgânico perto do Córrego Cabeludo, 15°48'S, 48°49'W, 1200-1250 m, 18 Mar. 2006 (fl, fr), *P.G. Delprete et al. 9584* (CAY, UFG). **Distrito Federal:** Planaltina, C.P.A.C., 980 m, 15°35'S, 47°42'W, 30 Oct. 1979 (fl, fr), *J.C.S. Silva 184* (CEN). **Tocantins:** Mun. Lagoa da Confusão, Ilha do Bananal, Parque Nacional do Araguaia, 10°27'W, 50°27'S, 190 m, 23 Mar. 1999 (fl, fr), *R.C. Mendonça, M.A. da Silva, E. Cardoso, N.R. Oliveira & N. Goulard Souza 3992* (IBGE, NY).

FGT, vol. 40(3), p. 1171:
"56-2. ***Spermacoce burchellii*** (E.L. Cabral & Bacigalupo) Delprete, J. Bot. Res. Inst. Texas 1: 1025. 2007. - *Borreria burchellii* E.L. Cabral & Bacigalupo, Bonplandia 10: 126. 2000. - *Borreria tenella* (Kunth) Cham. & Schltdl. var. *pumila* K. Schum. in Mart., Fl. Bras. 6(6): 56. 1888; non *Borreria pumila* DC., 1830. Tipo: Brasil, Tocantins, Porto Nacional [como "Goyaz, ad Porto Real"], s.d. [1828-1829] (fl), *Burchell 8679-10* (lectótipo, BR, escolhido por Cabral & Bacigalupo, 2006)."

Accepted name: ***Spermacoce burchellii*** (E.L.Cabral & Bacigalupo) Delprete

Type: BRAZIL. Tocantins: Porto Nacional [as "Goyaz, ad Porto Real"], s.d. [1828–1829] (fl), *W.J. Burchell 8679-10* (BR [barcode 000000988751], lectotype designated by Cabral and Bacigalupo (2000: 126)).

FGT, vol. 40(3), p. 1174:
"56-3. ***Spermacoce capitata*** Ruiz. & Pav., Fl. Per. 1: 61. 1798. - *Borreria capitata* (Ruiz & Pav.) DC., Prodr. 4: 545. 1830. Tipo: Peru, "Habitat in declivibus montium, Pillao ad Iscutunam", s.d., *Ruiz & Pavón s.n.* (holótipo, MA)."

Accepted name: ***Spermacoce capitata*** Ruiz. & Pav.

Type: PERU. Huánuco: "in declivibus montium, Pillao ad Iscutunam", 1787, *H. Ruiz López & J.A. Pavón y Jiménez s.n.* (MA [No. 815641 ex Herbarium Peruvianum Ruiz et Pavon No. 13/12], lectotype designated by Moraes (2011: 911)).

FGT, vol. 40(3), p. 1181:
"56-4. ***Spermacoce crispata*** (K. Schum.) Delprete, J. Bot. Res. Inst. Texas 1: 1025. 2007. - *Borreria tenella* (Kunth) Cham. & Schltdl. var. δ *crispata* K. Schum. in Mart., Fl. Bras. 6(6): 55. 1888. - *Borreria crispata* (K. Schum.) E.L. Cabral & Bacigalupo, Bonplandia 10: 126. 2000. Tipo: Brasil, Goiás, V/1840, *Gardner 4175* (lectótipo, BR [sic!], escolhido por Cabral & Bacigalupo; isolectótipos, BR, NY [2], P; foto G-Del em NY)."

Accepted name: ***Spermacoce crispata*** (K.Schum.) Delprete

Type: BRAZIL. Goiás: "Sandy campos between S. Domingos & Posse", May 1840, *G. Gardner 4175* (BM [barcode 000053647], lectotype designated by Cabral and Bacigalupo (2000: 127); isolectotypes, BR [barcode 000000530525, annotated as lectotype], F [Acc. No. 767841], K [2 sheets, barcodes K000470322, K000470323], NY [2 sheets, barcodes 00130930, 00130931], P [barcode P00723672, annotated as lectotype]; photo-G [F 25582] in F, NY).

Notes: Cabral and Bacigalupo (2000: 126–127) cited the type of *Borreria tenella* var. δ *crispata* K. Schum. as "Lectotipo aquí elegido: Brasil, Goiás, May. 1840 (fl, fr), Gardner 4175 (BM!). Isolectotipos: BR!, NY!, P!, Foto F 25582 G-DEL." Delprete (2010c: 1181) incorrectly wrote that Cabral and Bacigalupo (2000: 127) designated the

specimen at BR as the lectotype of this taxon. Delprete's statement was due to a typographical error, and the lectotype designated by Cabral and Bacigalupo is the BM specimen with barcode 000053647.

FGT, vol. 40(3), p. 1186:
"56-5. ***Spermacoce cupularis*** (DC.) Kuntze, Revis. Gen. Pl. 3(2): 123. 1898. - *Borreria cupularis* DC., Prodr. 4: 543. 1830. Tipo: Brasil, sem localidade, s.d., *Pohl s.n.* (holótipo, G-DC)."

Accepted name: *Spermacoce cupularis* (DC.) Kuntze

Type: BRAZIL. Without locality, s.d., *J.B.E. Pohl s.n.* (holotype, G-DC [barcode G00667114]; isotypes BR [2 sheets, barcodes 000000530493, 000000530558], M [barcode M-0187068]; possible isotype K [barcode K000470351, with "790" as collection number]).

Notes: Candolle (1830: 543), in the protologue of *Borreria cupularis* DC., wrote that the material studied was collected by Pohl in Brazil, without citing the collection number or the collection locality. In G-DC, there is only one specimen annotated by Candolle with this name, and is the holotype.

FGT, vol. 40(3), p. 1189:
"56-6. ***Spermacoce dasycephala*** (Cham. & Schltdl.) Delprete in A. Reis, Fl. Ilustr. Catarinense RUBI 2: 719. 2005. - *Diodia dasycephala* Cham. & Schltdl., Linnaea 3: 348. 1828. - *Borreria dasycephala* (Cham. & Schltdl.) Bacigalupo & E. L. Cabral, Opera Bot. Belg. 7: 306. 1996. - Tipo: Brasil meridional, sem localidade, s.d., *Sellow s.n.* (holótipo, B, destruído, foto em F, NY)."

Accepted name: *Spermacoce dasycephala* (Cham. & Schltdl.) Delprete

Type: SOUTHERN BRAZIL. "Brasilia meridionalis", without locality, s.d., *F. Sellow s.n.* (HAL [barcode HAL0098296], lectotype designated by Miquel et al. (2022: 406); possible isolectotype HBG [barcode HBG-521716]).

Notes: In the protologue of *Diodia dasycephala* Cham. & Schltdl., Chamisso and Schlechtendal (1828: 348) cited the material studied as "In Brasiliae meridionalis campis legit Sellowius pluribus locis, seminaque transmisit ad hortum nostrum botanicum, ubi falsis sub nominus: Sp. repens et capitellata Hb. Willd. colebatur." The original material at B was destroyed during WWII. Two original specimens, annotated by Schlechtendal, are at HAL and HBG, and are discussed below.

On the HAL sheet, barcode HAL0098296, is affixed a plant with flowers and fruits, and a label annotated as "Diodia dasycephala N. Sellow, Brasilia meridionalis" and the stamp "scripsit: D.F.L. v. Schlechtendal." Because Chamisso and Schlechtendal (1828: 348) wrote that Sellow's gatherings of *D. dasycephala* were collected in several localities, and the specimen label has the annotation "Brasilia meridionalis" that specimen was designated as the lectotype by Miguel et al. (2022: 405).

On the HBG sheet, barcode HBG-521716, are affixed two labels and a plant with flowers and fruits. One label has the annotation "Diodia dasycephala N. Brasilia" handwritten by Schlechtendal. The other label has the stamp "ISOTYPUS" and the handwritten annotation (author unknown) "Diodia dasycephala Cham. & Schltdl., Linnaea 3: 348. 1828." That specimen is a possible isolectotype.

FGT, vol. 40(3), p. 1194:
"56-7. ***Spermacoce dimorpha*** (J.H. Kirkbr.) Delprete, J. Bot. Res. Inst. Texas 1: 1025. 2007. - *Borreria dimorpha* J.H. Kirkbr., Brittonia 49: 373, fig. 9. 1997. Tipo: Brasil, Goiás, Chapada dos Veadeiros, Mun. Alto Paraíso, a 9 km da cidade, rod. GO-118 para Teresina de Goiás, 14°03'02"S, 47°31'26"W, 1520 m, 28/VII/1994 (fl, fr), *M.A. da Silva, T. Filgueiras, C. Resende, Gonçalves, Santos, Silva, J. Felfili, Nogueira Silva & Aurélio Silva 2117* (holótipo, IBGE; isótipo, US)."

Accepted name: *Spermacoce dimorpha* (J.H.Kirkbr.) Delprete

Type: BRAZIL. Goiás: Chapada dos Veadeiros, Mun. Alto Paraíso, a 9 km da cidade, rod. GO-118 para Teresina de Goiás, 14°3'2"S, 47°31'26"W, 1520 m, 28 Jul. 1994 (fl, fr), *M.A. da Silva, T.S. Filgueiras, A.V. Resende, K.G.C. Gonçalves, J.B. Santos, J.C.S. Silva, J.M. Felfili, P.E. Nogueira Silva & M. Aurélio Silva 2117* (holotype, IBGE [Acc. No. 32351]; isotypes, RB [Acc. No. 325243, barcode 00543473], SP [barcode SP001523], US [without barcode]).

FGT, vol. 40(3), p. 1196:
"56-8. ***Spermacoce eryngioides*** (Cham. & Schltdl.) Kuntze, Revis. Gen. Pl. 3(2): 123. 1898. - *Borreria eryngioides* Cham. & Schltdl., Linnaea 3: 316. 1828. - *Bigelowia eryngioides* (Cham. & Schltdl.) Hook. & Arn.,

Bot. Miscell. 3: 361. 1833. Tipo: Brasil, "Pluribus locis variisque in fruticetis Brasiliae meridionalis", *Sellow s.n.* (holótipo, B, destruído; provável isótipo, US)."

Accepted name: ***Spermacoce eryngioides*** (Cham. & Schltdl.) Kuntze

Type: SOUTHERN BRAZIL: "Pluribus locis variisque in fruticetis Brasiliae meridionalis", s.d., *F. Sellow s.n.* (L [barcode L0057635], lectotype designated by Cabral et al. (2011: 261); isolectotypes HBG [barcode HBG-521829], K [barcode K000470201]; possible isolectotypes W [Acc. No. 285798], US [barcode 00409543]; dubious isolectotype E [barcode E00504647]).

Notes: In the protologue of *Borreria eryngioides* Cham. & Schltdl., Chamisso and Schlechtendal (1828: 316) cited the material studied as "Pluribus locis variisque temporibus in fruticetis Brasiliae meridionalis legit Sellow." The original material at B was destroyed during WWII. Specimens annotated by Schlechtendal are at E, HBG, L, US and W, and are discussed below.

On the L sheet, with barcode L0057635, are affixed two plants with flowers and fruits, and two labels. One label has the handwritten annotation "Borreria eryngioides N., ! Sch., Hb. Berol. 1833, Sellow, Brasilia meridionalis." The annotation "Sch." means that this specimen was seen by Schlechtendal. The other label, with red paper, has "TYPE" printed, and "Sellow s.n., Borreria eryngioides Cham. & Schl." handwritten by an unknown author. This specimen was designated as lectotype by Cabral et al. (2011: 261).

On the HBG sheet, with barcode HBG-521829, are affixed two plants with flowers and fruits, and two labels. One label has the annotation "Borreria eryngioides N. Brasilia" handwritten by Schlechtendal. The other label has the stamp "ISOTYPUS" and the handwritten annotation (author unknown) "Borreria eryngioides Cham. & Schltdl., Linnaea 3: 316. 1828. leg. F. Sellow, Brazil." This specimen is an isolectotype.

On the E sheet, with barcode E00504647, is affixed a specimen with multiple branches with fruits, and a single taproot. This specimen does not resemble the other specimens here treated as possible original material of *Borreria eryngioides*, and probably does not belong to the same gahering, or it might even be a different species. On the sheet is affixed a label with the heading "Herb. Reg. Berolinense", Borreria eryngioides Cham. et Schlecht.", and "Brasilia. Sellow legit" printed at the botoom of the label. This specimen is a dubious isolectotype.

On the W sheet, Acc. No. 285798, there are two plants with flowers and fruits and two labels. One label has the annotation "Borreria eryngioides N. Brasilia" handwritten by Schlechtendal. The other label bears the annotation "isotype" by R. Salas, 2011. As Chamisso and Schlechtendal (1828: 316) wrote that the material studied was collected in numerous localities, the W specimen is a possible isolectotype.

The US specimen, barcode 00409543, is possible original material. It has a label handwritten by Schlechtendal saying "Borreria eryngioides N. Linnaea III, p. 316. Brasilia", but it does not report the collector. This specimen is a possible isolectotype of *Borreria eryngioides*.

FGT, vol. 40(3), p. 1202:
"56-9. ***Spermacoce glabra*** [Rich. in] Michx., Fl. Bor.-Amer. 1: 82. 1803. - *Spermacoceodes glabrum* (Michx.) Kuntze, Revis. Gen. Pl. 3: 123. 1898. Tipo: Estados Unidos, "ad ripas fluminis Ohio et Mississipi, s.d., *Michaux s.n.* (holótipo, P)."

Accepted name: ***Spermacoce glabra*** Michx.

Type: USA: "ad ripas fluminis Ohio et Mississipi", s.d., *A. Michaux s.n.* (P [P02285140], lectotype designated by Florentín et al. (2020: 592); isolectotype P [P02285141]).

FGT, vol. 40(3), p. 1204:
"56-10. ***Spermacoce incognita*** (E.L. Cabral) Delprete, J. Bot. Res. Inst. Texas 1: 1025. 2007. - *Borreria incognita* E.L. Cabral, Opera Bot. Belg. 7: 322, fig. 8. 1996. Tipo: Brasil, Goiás, Campo Alegre, rod. BR-050, km 222, 8/II/1994 (fl), *Hatschbach et al. 59881*_(holótipo, MBM; isótipos, CTES n.v., NY, SI n.v., UB)."

Accepted name: ***Spermacoce glabra*** Michx.

Type: BRAZIL. Goiás: Mun. Campo Alegre, rod. BR-050, km 222, 8 Feb. 1994 (fl), *G. Hatschbach, M. Hatschbach & J.M. Silva 59881* (holotype, MBM [barcode MBM165465]; isotypes, BHCB [barcode BHCB000402], BR [000000530527], C [barcode C10018072], CTES [barcode CTES0013511], G [2 sheets, barcodes G00389686, G00389687], HBG [barcode HBG-521826], MO [Acc. No. 05081011], NY [barcode 00074088], SI [2 sheets, barcodes 003547, 003179], SPF [barcode SPF 00109332], UB [barcode UB0040277]).

FGT, vol. 40(3), p. 1208:
"56-11. ***Spermacoce irwiniana*** (E.L. Cabral) Delprete, J. Bot. Res. Inst. Texas 1: 1026. 2007. - *Borreria irwiniana* E.L. Cabral, Bonplandia 9: 36, fig. 3. 1996. Tipo: Brasil, Tocantins**,** gallery forest ca. 27 km S of Paraíso, ca. 500 m, 22/III/1968 (fl), *H.S. Irwin, H. Maxwell & D. Wasshausen 21617* (holótipo, NY; isótipos, F, UB)."

Accepted name: ***Spermacoce irwiniana*** (E.L.Cabral) Delprete

Type: BRAZIL. Tocantins: Gallery forest ca. 27 km S of Paraíso, ca. 500 m, 22 Mar. 1968 (fl), *H.S. Irwin, H. Maxwell & D. Wasshausen 21617* (holotype, NY n.v. [barcode unknown]; isotypes, CTES [barcode CTES0013513], F [Acc. No. 1727210], UB [barcode UB0040273]).

FGT, vol. 40(3), p. 1209:
"56-12. ***Spermacoce latifolia*** Aubl., Pl. Guian. 1: 55. pl. 19, fig. 1. 1775. - *Borreria latifolia* (Aubl.) K. Schum. in Mart., Fl. Bras. 6(6): 61. 1888. - *Tardavel latifolia* (Aubl.) Standl., Contr. U. S. Natl. Herb. 18: 122. 1916. Tipo: Guiana Francesa, "Habitat ad margines viam Caiennae & Guianae", s.d., *Aublet s.n.* (holótipo, BM)."

Accepted name: ***Spermacoce latifolia*** Aubl.

Type: FRENCH GUIANA: Road margins and disturbed fields of Cayenne and French Guiana, ''ad margines viarum Caîenne et Guianae'' and ''sur le bord des chemins, et dans les terreins défrichés à Caienne et à la grande-terre,'' s.d. [1762–1764], *J.B.C.F. Aublet s.n.* (MA [barcode MA317165], lectotype designated by Delprete (2015: 617)). For further information, see Delprete (2015).

Notes: For a distinction of this species from *Spermacoce alata*, see discussion under that species. For a clarification of the species delimitation of *S. latifolia*, a list of the most common synonyms and their respective types, along with eventual notes, is presented below.

Synonyms:
Spermacoce hexangularis Aubl., Hist. Pl. Guiane 1: 61, t. 22, figure 8. 1775. Spermacoce sexangularis Lemée, Fl. Guy. Fran¸ c. 3: 569. 1954 ["1953"], *nom. illeg. superfl.*

Type: [illustration] ''8. *Hexangularis*'' in Aublet, Hist. Pl. Guiane 1: 61, t. 22, figure 8. 1775 lectotype, designated by Delprete (2015: 616). – FRENCH GUIANA: Basin of Sinnamary River, *J.J. de Granville et al. 11383* (CAY [barcode CAY0224493], epitype designated by Delprete (2015: 616)).

Spermacoce coerulescens Aubl., Hist. Pl. Guiane 1: 55, t. 19, figure 2. 1775.

Type: FRENCH GUIANA: Road margins of Cayenne and French Guiana, ''Habitat in iisdem locis [ad margines viarum Caîenne et Guianae],'' *J.B.C.F. Aublet s.n.* (P-JJR [P-JJR 3: 118C], lectotype designated by Lanjouw and Uittien (1940: 158)).

Borreria perrottetii DC., Prodr. 4: 548. 1830.

Type: FRENCH GUIANA: Without locality, s.d., *G.S. Perrottet s.n.* (holotype G-DC [barcode G00667166]).

Notes: In the protologue of *Borreria perrottetii* DC., Candolle (1830: 548) wrote "In Guianâ Gallicâ cl. Perrottet. An Spermacoce aspera Aubl., Guian. I. p. 59. t. 22. f. 6. non Vahl? sed in nostrâ rami ferè glabri. (v.s. in h. Dunant.)" There is a sole sheet associated with this name at G-DC, with barcode G00667166. On the lower right corner of the sheet is pinned a label with the annotation "Spermacoce Perrottetii DC." handwritten by Candolle. On the sheet is pinned a tiny envelope with the annotation "Sp. [Spermacoce] aspera Aubl. ex Perrottet, Guiane" handwritten by an unknown author. In the envelope is included one leaf and several dehisced capsules. This specimen is the holotype of this name.

Borreria scabrida DC., Prodr. 4: 548. 1830 - *Borreria latifolia* var. *scabrida* (DC.) K. Schum. in Martius, Fl. Bras. 6(6): 61. 1888 - *Borreria latifolia* f. *scabrida* (DC.) Steyerm., Mem. New York. Bot. Gard. 23: 810. 1972.

Type: BRAZIL. Without locality, 1828, *J.B.E. Pohl s.n.* (holotype G-DC [barcode G00667191]).

Notes: Candolle (1830: 548) cited the material studied of *Borreria scabrida* DC. as "in Brasiliâ legit cl. Pohl. Spermacoce scabrida Pohl! in litt. Cor. duplò minor quàm in B. asclepiadea. (v.s.)." There is a sole sheet associated with this name in G-DC, with barcode G00667191. On the lower right corner is pinned a label with the annotation "Spermacoce scabrida Pohl, Borreria _____ [scabrida] DC." handwritten by Candolle. At the base of the specimen is glued a label with the annotation "Spermacoce scabrida, an nov. gen. Brésil, m. Pohl 1828." The specimen consists of a small branch with numerous leaf pairs, and two capitate inflorescenc-

es subtended by pairs of leaf-like bracts. This specimen is the holotype of *Borreria scabrida*.

Borreria tetraptera Miq., Linnaea 17: 70. 1843.

Type: SURINAME: Upper Surinam River, s.d. [Apr.], *H.C. Focke 468* (U [barcode U0005944], lectotype designated by Wiersema et al. (2017: 123)).

Borreria fockeana Miq., Linnaea 18: 299. 1845 ["1844"]; *Borreria latifolia* var. *fockeana* (Miq.) Bremek., Recueil Trav. Bot. N´eerl. 31: 307. 1934. - *Borreria latifolia* f. *fockeana* (Miq.) Steyerm., Mem. New York Bot. Gard. 23: 809. 1972.

Type: SURINAME. Without locallity, s.d. [1840], *H.C. Focke 505* (first-step lectotype designated by Bremekamp (1934: 307); U [barcode U0005943], second-step lectotype designated by Wiersema et al. (2017: 123); isolectotype K [barcode K000470336]).

Borreria penicillata Miq., Stirp. Surinam. Select. 176, t. 51. 1851 ["1850"].

Type: SURINAME: Upper Surinam River ["Surinamo superiore"], s.d. [1847], *H.C. Focke 1297* (U [barcode U0005945], lectotype designated by Wiersema et al. (2017: 123)).

FGT, vol. 40(3), p. 1216:
"56-13. ***Spermacoce multiflora*** (DC.) Delprete, J. Bot. Res. Inst. Texas 1: 1026. 2007. - *Diodia multiflora* DC., Prodr. 4: 564. 1830. - *Borreria multiflora* (DC.) Bacigalupo and Cabral, Darwiniana 37: 163. 1999. Tipo: Brasil, s.d., localidade e coletor desconhecidos (holótipo, G-DC)."

Accepted name: ***Spermacoce multiflora*** (DC.) Delprete

Type: BRAZIL: Without locality, s.d., *Collector Unknown s.n.* (holotype G-DC [barcode G00667278]).

Notes: Candolle (1830: 564) along with the description of *Diodia multiflora* DC., cited the material studied as "in Brasilia. Fructus facillimè bipartibilis, coccis clausis (v.s.)." The expression "(v.s.)", i.e., *visi siccum*, means that Candolle saw a specimen, collected in Brazil, in his own herbarium, but he did not cite the collector or the collection number. Delprete (2007: 1026) cited the holotype of this name as "Brazil. Locality, date, and collector unknown s.n. (holotype: G-DC!)." In G-DC there is a sole original specimen, with barcode G00667278, annotated by Candolle as "Diodia multiflora DC." An additional label pinned on the sheet has the annotation "Spermacoce, Bresil" handwritten by an unknown author. On the sheet are affixed two long branches with numerous leaf pairs and two capitate inflorescences at the axils of each node. This specimen is the holotype of this name.

FGT, vol. 40(3), p. 1221:
"56-14. ***Spermacoce neohispida*** Govaerts, World Checklist Seed Pl. 2: 18. 1996. - *Borreria hispida* Spruce ex K. Schum. in Mart., Fl. Bras. 6(6): 62. 1888. Síntipos: Brasil, Pará, Santarem, s.d. [1850], *Spruce 663* (B†, BM, K); Guiana Francesa, s.d. [1830-1850], *Leprieur s.n.* (B†, BR, P)."

Accepted name: ***Spermacoce neohispida*** Govaerts

Type: BRAZIL. Pará: Santarem, Apr. 1850, *R. Spruce 663* (B†; M [barcode M-0187057], lectotype designated by Sobrado and Cabral, (2015: 60); isolectotypes BM [barcode BM000901496], E [barcode E00504645 (without collection number)], F [Acc. No. 767123 (without collection number)], FI [barcode FI004834], GH [2 sheets, barcodes 01154900, 01154901], K n.v., MPU [barcode MPU022453 (without collection number)], NY [barcode 0013019], RB [Acc. No. 18894, barcode 00334938], RB [Acc. No. 18894, barcode 00334938], S [Acc. No. S05-1638 (without collection number)], TCD [barcode TCD0005897 (without collection number)], W [2 sheets, Acc. Nos. 14014, 118416]).

FGT, vol. 40(3), p. 1221:
Synonym:
"*Borreria hispida* Spruce ex K. Schum. var. *glabrescens* K. Schum. in Martius et al., Fl. Bras. 6(6): 62. 1888. Tipo: Brazil. Tocantins, "Goyaz prope Porto Real" [Porto Nacional], s.d. [1829], *Burchell 8675* (holótipo B†, photo in NY; lectótipo, NY, aqui designado)."

Type: BRAZIL. Tocantins: "Goyaz prope Porto Real" [now Porto Nacional], s.d. [1829], *W.J. Burchell 8675* (B†, photo in NY; NY [barcode 01085897], lectotype designated by Delprete (2010c: 1221); isolectotypes BR [barcode 000000530559], GH [barcode 01154956]; photo-B in F).

FGT, vol. 40(3), p. 1224:
"56-15. ***Spermacoce neotenuis*** Govaerts, World Checklist Seed Pl. 2: 18. 1996. - *Borreria tenuis* DC., Prodr. 4: 543. 1830; non *Spermacoce tenuis* Sessé & Moç., Fl. Mexic.: 25. 1893. Tipo: Brasil, sem localidade, s.d., *Pohl s.n.* (holótipo, G-DC)."

Accepted name: *Spermacoce neotenuis* Govaerts

Type: BRAZIL. "Goiás, prope Santa Rita", s.d., *J.B.E. Pohl 1719 (783 d)* (W [Acc. No. W0028719], **neotype here designated**; isoneotype K [barcode K000470202]; possible isoneotype BR [barcode 000000530529]).

Notes: In G-DC there is a single sheet, with barcode G00667111, annotated by Candolle as "Borreria tenuis DC." A label is affixed on the sheet, with the annotation "Spermacoce tenuis, Brésil, m. Pohl 1828" handwritten by an unknown author. The number "1828" corresponds to the year of collection of the specimen and is not a collection number. On the sheet is affixed another label with the annotation (translated from Spanish) "This specimen is considered as the type [of *B. tenuis*] does not coincide with the original description of DC. Prodr. 4: 543, 1830, which says "antheris inclusis". It is a specimen that belongs to *Mitracarpus* (which has exserted stamens, unequal calyx lobes). However, the isotype in F concides with the original description. Elsa Cabral/1995." I concur with Cabral that this specimen cannot be treated as original material of *Borreria tenuis* DC. After exaustive searches, no original specimen associated with this name could be found in F. Three original specimens collected by Pohl and annotated as *B. tenuis* are discussed below.

A sheet in W, with Acc. No. W0028719, has numerous plants with flowers and fruits, and three labels. A label on the lower right corner of the sheet has the annotation "1719, Hb. Bras., Borreria tenuissima Pohl, S. Rita, (783 d), Pohl" handwritten by Pohl. Above that label, is affixed another label with the annotation "Borreria tenuis DC., Borreria tenuissima non exitat." handwritten by K. Schumann, and the stamp "det. Schumann in Fl. Bras." On the sheet, there is a third label with the annotation "Isotype of: Borreria tenuis DC., Prodr. 4. 543. 1830. 30/03/2011, det./rev. Salas, R. CTES." This specimen is here designated as the neotype of *Borreria tenuis*.

On the K sheet with barcode K000470202 and the stamp "Herbarium Hookerianum", there are numerous plants with flowers and fruits on it. The annotation "Brazil, Herb. dupl. Vien." was handwritten directly on the sheet by an unknown author. Just below the annotation is affixed a label with the number "783" handwritten by another unknown author. On the lower right corner, there is a label with the annotation "Pohl 783 is cited by Schumann Fl. Bras. 6(6):45-46 as B. tenuis DC., Goiás." This specimen is an isoneotype of *Borreria tenuis* DC.

A sheet in BR with barcode 000000530529 has two plants affixed on it. On the sheet, there is a label with the stamp "Herb. Hort. Bruxell. – Coll. MARTII" and the annotation "Minas: Pohl, Communic. Herb. Vindobon. 1847." Another label has "Borreria tenuis DC." and the stamp "det. Schumann in Fl. Bras." This specimen is a possible isoneotype of this name.

FGT, vol. 40(3), p. 1224:
Synonym:
"*Borreria gracillima* DC., Prodr. 4: 543. 1830, **syn. nov.** - *Spermacoce gracillima* (DC.) Delprete, Rev. Biol. Neotrop. 3: 72. "2006" [2007]. Type: Brazil. Tocantins: "Goyaz, prope São João da Palma" [agora cidade de Paranã, 12º36'S, 47º52'W], s.d., *Pohl 1242* (holótipo, G-DC; isótipo, F)."

Type: BRAZIL. Tocantins: "Goyaz, prope São João da Palma" [now town of Paranã], s.d., *J.B.E. Pohl 1242* (holotype, G-DC [barcode G00667099]; isotypes, BR [barcode 000000530526], M [barcode M-0187065]). Photograph 6712 at F of a B specimen, which is another isotype, and is now destroyed.

Notes: There is a sole specimen in G-DC associated with *Borreria gracillima* DC., with barcode G00667099. On the sheet are pinned two labels, "Spermacoce tenuissima, Brésil, m. Pohl 1828" handwritten by an unknown author. The number "1828" corresponds to the year of collection of the specimen and is not a collection number. On the lower right corner is pinned a label with the annotation "Borreria? gracillima DC." handwritten by Candolle. This specimen is the holotype of *B. gracillima*.

FGT, vol. 40(3), p. 1229:
"56-16. ***Spermacoce ocymifolia*** Willd. ex Roem. & Schult., Syst. Veg. 3: 530. 1819. - *Hemidiodia ocymifolia* (Willd. ex Roem. & Schult.) K.Schum. in Mart., Fl. Bras. 6(6): 30. pl. 72. 1888. - *Diodia ocymifolia* (Willd. ex Roem. & Schult.) Bremek., Rec. Trav. Bot. Néerl. 31: 305. 1934. - *Borreria ocymifolia* (Willd. ex Roem. & Schult.) Bacigalupo & Cabral, Opera Bot. Belg. 307. 1996. Tipo: "India occidentalis. *Rudolphi*" (holótipo, B-Willd.)."

Accepted name: ***Spermacoce ocymifolia*** Willd.

Type: HAITI. "Santo Domingo", s.d. [1796–1801], *A. Poiteau s.n. dedit K.A. Rudolphi* (holotype B-W [barcode B –W 02609 -01 0]).

Notes: Roemer and Schultes (1818: 530) under "Species SPERMACOCES ex Herbario Willdenoviano" presented the description and cited the material examined of *Spermacoce ocymifolia* Willd. as "43. Spermacoce ocymifolia; floribus verticillatis, staminibus inclusis, setis stipularum longioribus, ramulis foliisque subtus pubescentibus. *W. Mss. S. decidua Bosc. India occidentalis. Rudolphi*." At B-W, there is a sheet, barcode B -W 02609 -01 0, in a folder with a label handwritten by Willdenow with exactly the same text, word for word as that published by Roemer and Schultes. Willdenow also wrote directly on the lower right corner of the sheet "Rudolphi. W." On the upper left corner is a label bearing "Spermacoce portoricensis, Diodia ocimifolia K. Sch." annotated by K. Schumann. On the lower left corner is a label with the annotation "Sine dubio, E Sto. Domingo (Haiti) leg. Poiteau, 1909 det. I. Urban." This specimen was collected by A. Poiteau in Haiti, provided by Rudolphi to Willdenow, and included in the Willdenow herbarium.

FGT, vol. 40(3), p. 1234:
"56-17. ***Spermacoce ovalifolia*** (M. Martens & Galeotti) Hemsl., Biol. Centr. Amer. Bot. 2: 59. 1881. - *Borreria ovalifolia* M. Martens & Galeotti, Bull. Acad. Roy. Sci. Bruxelles 11: 129. 1844. Tipo: México, "dans le savane et dans le endroits humides de la colonie de Mirador, à 3000 pieds, fl. blanches, février" *H. Galeotti 2606* (holótipo, BR)."

Accepted name: ***Spermacoce ovalifolia*** (M.Martens & Galeotti) Hemsl.

Type: MEXICO. Veracruz: Mirador, "dans le savane et dans le endroits humides de la colonie de Mirador, à 3000 pieds, fl. blanches, février" *H. Galeotti 2606* (BR [barcode 000000532599], **lectotype here designated**; isolectotypes, BR [barcode 000000532566], K [barcode K000470223]).

Notes: In the protologue of *Borreria ovalifolia* M.Martens & Galeotti, Martens and Galeotti (1844: 129) cited the gathering *Galeotti 2606*. As they worked at BR, a specimen has commonly been cited as holotype. However, at BR there are two specimens of *Galeotti 2606*. Specimen with barcode 000000532599 has a label with handwritten annotation "Borreria ovalifolia Nobis, In humidis Mirador" and the printed text "Jun.–Oct. Coll. H. Galleotti, 1840. Cordillera. (Vera-Cruz) *Mexico*." This specimen is here designated the lectotype of *Borreria ovalifolia*.

The other specimen of *Galeotti 2606* at BR, with barcode 000000532566, has a label with the handwritten text "2606. Borreria ovalifolia nobis, Mirador" and the printed text "Coll. Galeotti, Mexico, prov^{ce} de___, hteur___, 184_. fl." This specimen is an isolectotype of *Borreria ovalifolia*.

FGT, vol. 40(3), p. 1241:
"56-18. ***Spermacoce poaya*** A. St. Hil., Plant. Us. Bras. 3: 1-3, tab 12 [p. 63-66]. 1824. - *Borreria poaya* (St. Hil.) DC., Prodr. 4: 549. 1830. Tipo: Brasil, Minas Gerais, sem localidade, s.d. [1816-1821], *A. Saint-Hilaire 340* (lectótipo, P, aqui selecionado; isolectótipo, P)."

Accepted name: ***Spermacoce poaya*** A.St.Hil.

Type: BRAZIL: Without locality, s.d. [1816–1821], *A. Saint-Hilaire 340* (P [barcode P02285120], lectotype designated by Delprete (2010c: 1241); isolectotype, P [barcode P02285121]).

Notes. In the protologue of *Spermacoce poaya* A. St. Hil., Saint-Hilaire (1824: 3) stated that this species was extremely common in the natural pastures of the state of Minas Gerais, and did not cite any collection. His own collections of this species, although not directly cited in his publications, are original material because they were examined by him. Delprete (2010c: 1241) designated as lectotype a specimen of *Saint-Hilaire 340*, to which was later assigned barcode P02285120, and cited the isolectotype, a duplicate of that gathering at P to which was later assigned barcode P02285121.

FGT, vol. 40(3), p. 1241:
Synonym:
"*Spermacoce gentianoides* A. St. Hil., Plant. Us. Bras. 3: 3, tab 12. 1824. Type: Brazil. Minas Gerais: sem localidade, s.d., *A. Saint-Hilaire s.n.* (*Catal. B1 N. 1318*) (lectótipo, P, aqui escolhido; provavel isolectótipo MPU)."

Type: BRAZIL. Minas Gerais: Without locality, s.d., *A. Saint-Hilaire Catal. B1 N. 1318* (P [barcode P02285123], lectotype designated by Delprete

(2010c: 1241); probable isolectotype MPU [barcode MPU022477 (without collection number)]).

Notes. In the protologue of *Spermacoce gentianoides* A. St. Hil., Saint-Hilaire (1824: 3) did not cite any locality, collector, or collector number. Delprete (2010c: 1241) designated as lectotype the specimen *A. Saint-Hilaire s.n.* (*Catal. B1 N. 1318*) in P, collected by Saint-Hilaire in the state of Minas Gerais to which was later assigned barcode P02285123.

FGT, vol. 40(3), p. 1241:

Synonym:

"*Spermacoce poaya* var. *pubescens* A. St. Hil., Plant. Us. Bras. 3: 3, tab 12. 1824. Type: "Paturages naturels, Province des Missions, Serra-de-S.-Xavier" *A. Saint-Hilaire s.n.* (*Catal. C2 N. 2774 bis*) (lectótipo, P, aqui escolhido; isolectótipo, P)."

Type: BRAZIL. São Paulo: "Paturages naturels, Province des Missions, Serra-de-S.-Xavier," [Serra de São Francisco Xavier, Mun. São José dos Campos], s.d., *A. Saint-Hilaire Catal. C2 N. 2774 bis* (P [barcode P02285124], lectotype designated by Delprete (2010c: 1241); isolectotype, P [barcode P02285125], MPU [barcode MPU022468]).

Notes. In the protologue of *Spermacoce poaya* var. *pubescens* A.St.Hil., Saint-Hilaire (1824: 3) stated (translated from French) "This variety grows in districts more southern that the preceding [the typical variety]. I found it in natural pastures near the town of *Morongava*, province of São Paulo, and those near the *Serra-de-S.-Xavier* in the province of Missiones." Delprete (2010c: 1241) designated as lectotype a specimen in P, collected by Saint-Hilaire in the Serra de São Francisco Xavier, to which was later assigned barcode P02285124.

FGT, vol. 40(3), p. 1250:

"56-19. ***Spermacoce pulchristipula*** (Bremek.) Delprete, J. Bot. Res. Inst. Texas 1: 1027. 2007. - *Diodia pulchristipula* Bremek., Rec. Trav. Bot. Néerl. 33: 713. 1936. - *Borreria pulchristipula* (Bremek.) Bacigalupo & E.L. Cabral, Bol. Soc. Argent. Bot. 34: 151. 2000. Tipo: Suriname, Sipaliwini Savanna, Camp XI, near the Brazilian border, 10/XII/1935 (fl, fr), *Rombouts 360* (holótipo, U; isotipo, US; foto-US em NY)."

Accepted name: *Spermacoce pulchristipula* (Bremek.) Delprete

Type: SURINAME: Sipaliwini Savanna, Camp XI, near the Brazilian border, 10 Dec. 1935 (fl, fr), *H.E. Rombouts 360* (holotype, U [barcode U0005986]; isotypes, K [barcode K000470316], US [barcode 00130069]; photo-US at NY).

FGT, vol. 40(3), p. 1254:

"56-20. ***Spermacoce pumila*** (DC.) Pohl ex B.D. Jacks., Index Kew. 2: 958. 1896. - *Borreria pumila* DC., Prodr. 4: 543. 1830; non *Borreria tenella* (Kunth) Cham. & Schltdl. var. *pumila* K. Schum. in Martius et al., Fl. Bras. 6(6): 54. 1888 [= *Spermacoce burchellii* (E.L. Cabral & Bacigalupo) Delprete]. Tipo: Brasil, sem localidade, s.d., *Pohl s.n.* (holótipo, G-DC)."

Accepted name: *Spermacoce pumila* (DC.) Pohl ex B.D.Jacks.

Type: BRAZIL: Without locality, s.d., *J.B.E. Pohl s.n.* (holotype, G-DC [barcode G00667113]; isotype, W [Acc. No. W0028712]).

Notes: There is a sole sheet associated with this name at G-DC, with barcode G00667113. On the lower right corner is pinned a label with the annotation "Spermacoce pumila Pohl, Borreria _____ [pumila] DC." handwritten by Candolle. At the base of the specimen is glued a label with the annotation "Spermacoce pumila, Brésil, m. Pohl 1828." The number "1828" corresponds to the year of collection of the specimen and is not a collection number. The specimen consists of a small branch with numerous nodes with linear leaves, and numerous capitate inflorescences subtended by numerous linear leaves. This specimen is the holotype of *Borreria pumila*.

FGT, vol. 40(3), p. 1257:

"56-21. ***Spermacoce reflexa*** (J.H. Kirkbr.) Govaerts, World Checklist Seed Pl. 2: 18. 1996. - *Borreria reflexa* J.H. Kirkbr., Acta Amaz. 10: 112, fig. 18. 1980. Tipo: Brasil, Bahia, Espigão Mestre, serra a 22 km W de Barreiras, ca. 620 m, 2/III/1972 (fl, fr), *W.R. Anderson, M. Stieber & J.H. Kirkbride Jr. 36482* (holótipo, UB; isótipos, NY, US)."

Accepted name: *Spermacoce reflexa* (J.H. Kirkbr.) Govaerts

Type: BRAZIL. Bahia: Espigão Mestre, serra at 22 km W from Barreiras, ca. 620 m, 2 Mar. 1972 (fl, fr), *W.R. Anderson, M. Stieber & J.H. Kirkbride Jr. 36482*

(holotype, UB [barcode UB0041228]; isotypes, F [Acc. No. 1886298], MO [Acc. No. 2817627], NY [barcode 01033069], US [barcode 00169806]).

FGT, vol. 40(3), p. 1261:
"56-22. ***Spermacoce scabiosoides*** (Cham. & Schltdl.) Kuntze, Revis. Gen. Pl. 3: 123. 1898 (como "scabiosodes"). - *Borreria scabiosoides* Cham. & Schltdl., Linnaea 3: 318. 1828. Tipo: Brasil, Rio de Janeiro, s.d., *F. Sellow s.n.* (holótipo B, destruído)."

Accepted name: ***Spermacoce scabiosoides*** (Cham. & Schltdl.) Kuntze

Type: BRAZIL. Bahia: Mun. Barreiras, Prainha, margem do Rio das Ondas, 12º08'48"S, 45º00'55"W, 456 m, 1 Apr. 2009, *D. Cardoso, R.M. Salas* & *A.A. Cabaña-Fader 2626* (first-step neotype designated by Cabral et al. (2011: 265); HUEFS [Acc. No. 149536, barcode HUEFS000033396] **second-step neotype here designated**; isoneotypes CTES n.v., K n.v., SI n.v.]).

Notes: Delprete (2010c: 1261) cited the type of *Borreria scabiosoides* Cham. & Schltdl. as "Brasil, Rio de Janeiro, s.d., *Sellow s.n.* (holótipo B, destruído)." In the image of the B specimen, destroyed during WWII, the label indicates that it was collected by Sellow and has the collection number 323. However, no specimen of *Sellow 323* of *B. scabiosoides* can be found in any herbarium. In addition, specimens of *Sellow 323* from the state of São Paulo are syntypes of *Mollinedia chrysophylla* Perkins (Monimiaceae) and are present at BR, GH, K, and P.

Cabral et al. (2011: 265) about *Borreria scabiosoides* wrote "Tipo: Brasil, Rio de Janeiro, *F. Sellow s.n.* (Holotipo B†, Fot. F 884 en CTES!). Epitipo, aquí seleccionado: Brasil, Bahia, Barreiras, Prainha, margem do Rio das Ondas, 12º08'48"S, 45º00'55"W, 456 m, 1/V/2009, *D. Cardoso, R.M. Salas* & *A.A. Cabaña-Fader 2626* (HUEFS!, CTES!, K!, SI!)." In their discussion, they confirmed that no original specimen of *Sellow 223* of *B. scabiosoides* can be found, and that in the photograph of the destroyed B specimen, which they called "phototype" (as "fototipo (F 884)") is shown a flowering branch. However, details of flowers and seeds are not available in the photograph. They proposed as "epitype" a gathering from the state of Bahia, with duplicates distributed in numerous herbaria. In the current *Code*, the term "phototype" does not exists, and it has no meaning. Also, in the absence of original material, it is not possible to designate an epitype.

Article 9.10 of the *Code* allows the correction of an epitype to a neotype designation. As the conditions required by Art. 7.11 of the *Code* are met, the citation of *Cardoso et al. 2626* as epitype can be corrected to a neotype designation. However, as Cabral et al. (2011) cited four specimens as "epitype", namely HUEFS, CTES, K, and SI, their citation is here interpreted as a first-step neotype designation. Following their citation, the specimen *Cardoso et al. 2626* at HUEFS is here designated as a second-step neotype.

FGT, vol. 40(3), p. 1264:
"56-23. ***Spermacoce schumanniana*** (Taub. ex Ule) Govaerts, World Checklist Seed Pl. 2: 18. 1996. - *Borreria schumanniana* Taub. ex Ule in Cruls, Rapp. Comm. Expl. Plat. Centr. Bresil: 351. 1894. Tipo: Brasil, Goiás, em campos abertos perto do Rio Paranaíba, /II/1893 (fl, fr), *Ule 2960* (holótipo B destruído; lectótipo HBG, escolhido por Delprete, 2007)."

Accepted name: ***Spermacoce schumanniana*** (Taub.) Govaerts

Notes: *Borreria schumanniana* Taub. ex Ule was first published as a *nomen nudum* in Cruls (1894: 351). The same name was validly published by Taubert (1895: 453) with a detailed description, and the citation of the material studied as "in locis apertis ad flumen Paranahyba: Ule n. 2960." Hence the authority of this name should be assigned only to Taubert.

Type: BRAZIL. Goiás: "Auf freien stellen an Paranahyba" [open fields near Rio Paranaíba], Feb. 1893 (fl, fr), *E. Ule 2960* (holotype B†; lectotype HBG [barcode HBG-506551], designated by Delprete (2007: 1028); isolectotype R [2 sheets, Acc. No. 42218, barcodes R000042218, R000042218a]).

FGT, vol. 40(3), p. 1268:
"56-24. ***Spermacoce schumannii*** (Standl. ex Bacigalupo) Delprete in Reis, Fl. Ilustr. Catarin. RUBI 2: 754. 2005. - *Diodia gymnocephala* K. Schum. in Mart., Fl. Bras. 6(6): 16. 1888, *nom. conf.*; non *Borreria gymnocephala* DC., Prodr. 4: 549. 1830 [= *Spermacoce palustris* (Cham. & Schltdl.) Delprete] - *Diodia schumannii* Standl. ex Bacigalupo in A. Burkart, Fl. Ilustr. Entre Ríos. Colecc. Ci. Inst. Nac. Tecnol. Agropec. 6(6) 15, fig. 5. 1974, *nom. illeg.* - *Borreria flavovirens* Bacigalupo & E.L. Cabral, Hickenia 2 (56): 261. 1998, *nom. nov. superfl.* (baseado em *D. schumannii* Standl. ex Bacigalupo). Tipo: Argentina, Entre Ríos, Dpto. La Paz, Isla Curuzú-Chalí, 10/IV/1968 (fl, fr), *Burkart et al. 27103*

(holótipo, SI n.v.; isótipo, CTES n.v.; fotos-CTES em NY, UFG)."

Accepted name: ***Spermacoce schumannii*** (Standl. ex Bacigalupo) Delprete

Notes: A separate article dealing with the complex nomenclature of this species is being prepared by Kirkbride et al. (submitted).

Type: ARGENTINA. Entre Ríos: Dpto. La Paz, Isla Curuzú-Chalí, 10 Apr. 1968 (fl, fr), *A. Burkart, N.S. Troncoso, E.R. Guaglianone & R.A. Palacios 27103* (holotype, SI n.v.; isotypes, CTES n.v., US [barcode 01268546]; photos-CTES in NY, UFG).

FGT, vol. 40(3), p. 1273:
"56-25. ***Spermacoce simplicicaulis*** (K. Schum. ex Sucre) Govaerts, World Checklist Seed Pl. 2: 19. 1996. - *Borreria simplicicaulis* K. Schum. ex Sucre, Rodriguésia 38: 253. 1971. Tipo: Brasil, Goiás, Fazenda do Cipó, perto de Itaquira [Salto de Itiquira], II/1895 (fl), *Glaziou 21514* (holótipo, R)."

Accepted name: ***Spermacoce simplicicaulis*** (K.Schum. ex Sucre) Govaerts

Type: BRAZIL. Goiás: "Fazenda do Cipó, perto de Itaquira" [near Itiquira Waterfall], 3 Feb. 1895 (fl), *A.F.M. Glaziou 21514* (holotype, R [Acc. no. 9976, barcode R000009976]; isotypes F [Acc. No. 1012162], P [barcode P02285135], R [Acc. no. 9976, barcode R000009976a]; possible isotype K [barcode K001060035]).

Notes: Sucre (1971: 253–254) cited the holotype of *Borreria simplicicaulis* K. Schum. ex Sucre as *Glaziou 21514* at R, with the type locality "Estado de Goiás – Fazenda do Cipó, perto de Itaquira [Salto de Itiquira]" and the collection date of February 1895. At R, there are two specimens of *Glaziou 21514*, both with Accession Number 9976, and with barcode numbers R000009976 and R000009976a. Specimen with R000009976 is labeled as holotype and has the typewritten label "Borreria simplicicaulis K. Schum. ex D. Sucre Sp. Nov., D. Sucre … outubro – 1964, Nota: Exemplares com 4 sépalas" and it is here confirmed to be the holotype. Specimen R000009976a is labeled as isotype and has no typewritten label by Sucre.

It is well-known among botanists (e.g., Santos, 2016; Sleumer, 1954; Smith, 1966; Wurdack, 1970; Delprete, 2022) that Glaziou's specimen numbering is difficult to interpret, and often misleading or erroneous. He also reported localities, which he never visited; for example, he included Amazonian collections in his herbarium citing them as collected by him in Rio de Janeiro, or specimens with the same number have labels reporting different localities (Delprete, 2022). As for *Glaziou 21514*, the labels of specimens present in different herbaria report several localities from the states of Goiás or Minas Gerais. Most likely, Glaziou's number "21514" represents a "species number" and not a collection number.

The specimen *Glaziou 21514* at K, barcode K001060035, has a label with the heading "Brazil: Chiefly Province of Goyaz" without any further information about the collection locality. This specimen is treated as a possible isotype.

There are three specimens of *Glaziou 21514* in P. The label of the specimen with barcode P02285133 reports the collection locality as "Minas" and was annotated by Glaziou, therefore it is not original material. The specimen with barcode P02285134 has a label reporting the collection date and locality as "Minas Gerais, Saia Velha dans les campos, le 22 mars 1893", handwritten by Glaziou, and therefore, is not original material.

The third specimen of *Glaziou 21514* at P, with barcode P02285135, has a label reporting the collection date and locality as "Fazenda du Cipo, près de la superbe cascade de Itiquira, le 3 fevrier 1895", handwritten by Glaziou. The locality on the specimen label is in the state of Goiás, hence this specimen is here treated as an isotype of *Borreria simplicicaulis*. This specimen was incorrectly determined as "Borreria ocymoides (Burm. f.) DC" by E.L. Cabral (without date).

FGT, vol. 40(3), p. 1275:
"56-26. ***Spermacoce suaveolens*** (G. Mey.) Kuntze, Rev. Gen. Pl. 3(2): 124. 1898. - *Borreria suaveolens* G. Mey., Prim. Fl. Esseq. 81, pl. l. 1818 (syn. P. Browne, Jam. 141 excl.). - *Borreria tenella* K. Schum. var. *suaveolens* (G. Mey.) K. Schum. in Mart., Fl. Bras. 6(6): 56, pl. 76, fig. 2. 1888. - *Borreria capitata* (Ruiz & Pav.) DC. var. *suaveolens* (G. Mey.) Steyerm., Mem. New York Bot. Gard. 23: 825. 1972. Tipo: G.F.W. Meyer, Prim. Fl. Esseq. Pl. 1. 1818 (lectótipo)."

Accepted name: ***Spermacoce suaveolens*** (G.Mey.) Kuntze

Type: [GUYANA] [protologue] "In arenosis continentis circa Arouabischkrek", s.d. [1790–1796], *E.K.*

Rodshied s.n. (GOET, destroyed?). – G. Meyer, Prim. Fl. Esseq., pl. 1 [excluding figs. 1–3 to the left (*Borreria parviflora*), and figs. 1–2 to the right (*Borreria stricta*)], Nov. 1818, **lectotype here designated.**

Notes: Meyer (1818, p. [VII]), in the introduction of *Florae Essequeboensis*, explained the origin of the specimens from the Essequibo River Basin that he studied, as follows (liberal translation from Latin): "[…] The specimens originated from the Rio Essequebo region [now Rio Essequibo], a colony that was ceded from the Belgians to the English in the year 1814, which is situated in Oriental America at the boreal latitude of 7 degrees, and occidental longitude of 42 degrees, at the mouth of the Essequebo River, comprising a number of islands and a portion of the continent. Such [plant] rarities were delivered [to me] from two sources. One part is a group of specimens that came into my possession, collected by Dr. Ernest Carl Rodshield, who conducted the art of medicine in the Essequibo Colony, where he died at the end of last century; the other part is a small number of specimens, previously collected in the same locality, most of which were indeterminate and some others were new [undescribed species], which were gracefully communicated to me by my dear friend Mertens, distinguished Professor of Bremen, famous for his multiple and acute wisdom, liberality, and indefatigable, with great praise for the study of the literary world, and for the promotion and development of botany. He was, no less than his son Enrich, emulator of his father, admirably praised in many branches of science […], sharing the herbarium with his father, which is considered among the largest in Germany, who conferred on me, with my utmost gratitude, the authorization to manage this public institution." Therefore, according to Meyer, the specimens that he studied for his *Florae Essequeboensis* were collected by Rodshied and an anonymous collector. Ernst Karl Rodshied was a German physician and botanist, who practiced in the Dutch colony at the mouth of the Essequibo River, from 1790 until his death in 1796 (Meyer, 1818: [VII]–X; Stafleu & Cowan, 1983: 833–834; Ek, 1990: 66). Rodshied wrote a book on medical practice and climatic conditions of the colony in which he also described 114 medicinal plants of that region (Rodshied, 1794). The mouth of the Essequibo River is now in Guyana, and not in Suriname as erroneously reported by several authors (e.g., Steyermark, 1972; Dwyer, 1980; Lorence, 1999; Adams & Taylor, 2012).

Vegter (1976: 530) reported that F.K. Mertens (1764–1831) collected in several European country but did not mention any trip to Guyana. According to the biography published by his son, F.K. Mertens never left continental Europe (Mertens, 1844). Ek (1990, p. 59) reported that Franz Karl ("Carl") Mertens collected in Guyana in 1809, in the Essequibo Region and his specimens are at BM; this is probably a misinterpretation of Mertens's biography of his father, as he reported that in 1809 his father lectured on two trips to the Essequibo River, Berbice and Demerara made by Bolingbroke (1807, 1809). On the other hand, in the same volume, Ek (1990) reported that the specimens used by Meyer for the *Florae Essequeboensis* were collected by Rodshied. However, as explained in the introduction of his work, the specimens used by Meyer came from two sources: those of Rodshied, and those from an anonymous collector, which Mertens passed to Meyer. Wiersema (2015) published a similar explanation about the original specimens used by Meyer, and added that after Mertens' death in 1831, his herbarium was transferred to the St. Petersbourg herbarium (LE; Stafleu & Cowans 1981). Therefore, a search at LE for original specimens of *Borreria suaveolens* is necessary to eventually locate original specimens (V. Dorofeyev, personal communication).

Meyer (1818: 81–84) provided an accurate description of *Borreria suaveolens* and included a detailed accompanying plate. He described this species as an erect shrub, 2–3 feet (60–90 cm) tall, much branched; with glabrous, reddish-brown bark; stems dichotomously branching, erect-patent, terete, with young stems slightly tetragonal; main leaves opposite, subtending axillary brachyblasts topped by 4–6 smaller leaves; leaf blades linear, glabrous, acuminate; stipules sub-cartilaginous, with numerous rigid, reddish setae; inflorescences in globose-capitate verticils, subtended by involucral bracts, similar to the cauline leaves, sometimes longer than the floral heads, subcoriaceous, rugose-veined, with ciliate margins, base membranaceous-setose, minute, bi- or tri-fid; flowers short-pedicellate; calyx tubular, narrow at the mouth, 4-lobed, lobes subulate, with membranous margin, in two pairs, one longer than the other pair (although in plate 1, the calyx lobes are consistently equal to each other), sometimes topped by a seta; corolla membranaceous, white, slightly longer than the calyx, tube cylindrical, wider at mouth (i.e., infundibuliform), 4-lobed, lobes lanceolate, acuminate, reflexed, with 1 or 2 faint veins, these decurrent along the tube; stamens barely longer than the corolla, anthers bilocular, oblong-elliptic, white, dehiscing by a longitudinal slit; style filiform, slightly longer than the filaments, stigma emarginated; capsule oblong-ovoid, crowned by the aristate-lobed calyx (although the calyx lobes are not aristate), bilocular, bivalved; valves oblong, margins reflexed inwards, basally connate, apex bifid and thinly hispidulous; and seeds 2, solitary, brown, oblong, some-

times narrowly so, dorsally convex, ventrally flat, with a longitudinal groove. Along with the description of *Borreria suaveolens*, Meyer (1818) cited in synonymy the polynomial "Spermacoce fruticulosa atque ramosa, foliis linearibus, floribus constipates ad alas. BROWN. Jam. P. 1414. N. 4." He cited the collection locality of the material studied as "In arenosis continentis circa Arouabischkrek", without citing the herbarium of deposit.

Several type citations of *Borreria suaveolens* are present in specialized literature; however, none of them are entirely correct, as in most of them, there are various errors, for the country of collection, the original collector, or by citing a non-existing specimen as type. Steyermark (1972: 819–826) treated *B. suaveolens* as a variety of a broadly delimited *Borreria capitata* (Ruiz & Pav.) DC., along with a discussion on the diagnostic characters that can be used to identify the varieties that he included in *B. capitata*. He cited the type of *B. suaveolens* as "In arenosis continentis circa Arouabischkreck, Suriname, *Meyer*" without citing any herbarium; however, G.F.W. Meyer never collected in Tropical America. Dwyer (1980, p. 54), as Steyermark, cited the type of *B. suaveolens* as "Surinam, in Arenosis Continentis circa Arouabischkrek, *Meyer,* not seen." Lorence (1999: 169) cited the type of *Spermacoce suaveolens* (G. Mey.) Kuntze as "Surinam: in arenosis continentis circa Arouabischkrek, *G. Meyer s.n.* (Holotype GOET. n.v.)." Delprete (2010c: 1275) cited the type of this name as "G.F.W. Meyer, Prim. Fl. Esseq., pl. 1 (lectótipo)." However, according to Article 7.11 of the *Code* (Turland et al., 2018), this citation cannot be treated as a valid lectotypification because it lacks "here designated" or a similar expression.

Adams and Taylor (2012: 280) cited the type of this name as "Holotype: Surinam, *Rodshied s.n.* (GOET)." The original material of *B. suaveolens* was probably collected by Rodschied in Guyana, and supposedly integrated within the Meyer herbarium, therefore it is supposedly at GOET (Stafleu & Cowan, 1981: 447–448.). However, after several exhaustive searches by Marc Appelhans, GOET Herbarium Curator (pers. comm.), there is no original material associated with this name in that herbarium. A possible explanation for the lack of this material is that the Meyer herbarium was partly destroyed in 1880–1881, and the original material of *B. suaveolens* is no longer extant (Marc Appelhans, pers. comm.). Therefore, the only original material for this name is Plate 1, excluding figs. 1–3 to the left (*Borreria parviflora* G. Meyer), and figs. 1–2 to the right (*Borreria stricta* (L.f.) G. Meyer) of Meyer's *Florae Essequeboensis*, which is here designated the lectotype of *B. suaveolens*.

FGT, vol. 40(3), p. 1279:
"56-27. ***Spermacoce tenella*** Kunth in Humb. & Bonpl., Nov. Gen. Sp. 3: 345. 1819. - *Borreria tenella* (Kunth) Cham. & Schltdl., Linnaea 3: 317. 1828. - *Borreria tenella* var. *genuina* K. Schum. in Mart., Fl. Bras. 6(6): 55. 1888. - *Spermacoce suaveolens* var. *tenella* (Kunth) Kuntze, Rev. Gen. Pl. 3(2): 124. 1898. - *Tardavel tenella* (Kunth) Standl., Contr. U. S. Natl. Herb. 18: 122. 1916. - *Borreria capitata* (Ruiz & Pav.) DC. var. *tenella* (Kunth) Steyerm., Mem. New York Bot. Gard. 23: 823. 1972. Tipo: Venezuela, Amazonas, San Fernando de Atabapo, *Humboldt & Bonpland s.n.* (holótipo, P-Bonpl.; isótipo, B-Willd., fotos de B-Willd. em F, NY)."

Accepted name: *Spermacoce orinocensis* Willd. in Roem. & Schult.

Nomenclature and typification

Spermacoce orinocensis Willd. in Roemer & Schultes, Syst. Veg. 3: 531. Apr–Jul 1818 ("oronocensis").

(≡) *Spermacoce tenella* Kunth in Humboldt & Bonpland, Nov. Gen. Sp. 3: 345 (ed. quarto), 270 (ed. folio). 21 Nov 1819, *nom. illeg. superfl.*

(≡) *Borreria tenella* Cham. & Schltdl. in Linnaea 3: 317. 1828, *nom. illeg. superfl.*

(≡) *Borreria orinocensis* (Willd.) L.M.Miguel, Sobrado & E.L.Cabral, Darwiniana, n.s. 10(2): 407. 2022.

Type: VENEZUELA. Amazonas: "prope San Fernando Atabapo", s.d., *A.J.A.G. Bonpland & F.W.H.A. Humboldt s.n.* [*913*] (holotype, B [barcode B –W 02637 -01 0]; isotypes, HAL [barcode HAL0098363], P-Bonpl. [barcode P00671089]).

Notes: For additional comments on the nomenclature and typification of the the names associated with this species, see Kirkbride and Wiersema (2020), and Miguel et al. (2022).

FGT, vol. 40(3), p. 1289:
"56-28. ***Spermacoce tocantinsiana*** (E.L. Cabral & Bacigalupo) Delprete, J. Bot. Res. Inst. Texas 1: 1028. 2007. - *Borreria tocantinsiana* E.L. Cabral & Bacigalupo, Kew Bull. 59: 284. 2004. Tipo: Brasil, Tocantins, Mun. Conceição do Tocantins, Faz. Cartão de Visita, 400 m, 11/V/2000 (fl, fr), *Hatschbach, Schinini & Barboza 70928* (holótipo, MBM; isótipo, CTES n.v.)."

Accepted name: ***Spermacoce tocantinsiana*** (E.L.Cabral & Bacigalupo) Delprete

Type: BRAZIL. Tocantins: Mun. Conceição do Tocantins, Rod. TO-050, 5 km S de Conceição do Tocantins, Fazenda Cartão de Visita, 400 m, 11 May 2000 (fl, fr), *G. Hatschbach, A. Schinini & E. Barboza 70928* (holotype, MBM [barcode MBM251462]; isotypes, CTES [barcode CTES0013514], RB [Acc. No. 463511, barcode 00543481], SI n.v.).

FGT, vol. 40(3), p. 1290:
"56-29. ***Spermacoce verticillata*** L., Sp. Pl. 102. 1753. - *Borreria verticillata* (L.) G. Mey., Prim. Fl. Esseq., 83. 1818. - *Bigelowia verticillata* (L.) Spreng., Syst. Veget. 1: 404. 1825. - Non *Spermacoce verticillata* sensu Vell., Fl. Flum. 1, tab. 127. 1825. [= *Spermacoce tenella* Kunth]. Tipo: Material cultivado no Jardim de Clifford (holótipo, LINN)."

Accepted name: ***Spermacoce verticillata*** L.

Type: [icon] "Spermacoce verticillis globosis" in Dillenius, Hort. Eltham. 2: 369, t. 277, f. 358. 1732, lectotype designated by Rendle, J. Bot. 72: 331. 1934.

FGT, vol. 40(3), p. 1297:
"56-30. ***Spermacoce vulpina*** (Standl.) Govaerts, World Checklist Seed Pl. 2: 19. 1996. - *Borreria vulpina* Standl., Publ. Field Mus., Bot. 8: 389. 1931. Tipo: Brasil, Mato Grosso, Cuiabá, Coches da Ponte, III/1911 (fl, fr), *F.C. Beni 2802* (holótipo, B, destruído; fragmento-B em F, foto-F em NY)."

Accepted name: ***Spermacoce vulpina*** (Standl.) Govaerts

Type: BRAZIL. Mato Grosso: Cuiabá, Coxipó da Ponte, Mar. 1911 (fl, fr), *F.C. Hoene 2802* (F [(ex B) Acc. No. 638767, barcode F0068552F], **lectotype here designated**).

Notes: In the protologue of *Borreria vulpina* Standl., Standley (1931: 389) cited as holotype a specimen of *Hoene 2802* at B, which was destroyed during WWII. A photograph of that specimen (F0BN049861) shows a label with the heading "Commissão Rondon, F.C. Hoene, Botanico" the typewritten annotations "Março 1911, num. 2802, Rubiaceae, Coxipó da Ponte, Cuyabá", and the annotations "Borreria vulpina Standl." handwritten by Standley. After an extensive search in numerous herbaria, the sole extant original material associated with this name that could be found are the fragments included in an envelope affixed on the sheet with Accession No. 638767 at F. The fragments, consisting of two flowering heads subtended by four bracts, are sufficient for the identifications of the species and application of the name. The F specimen is here designated the lectotype of *Borreria vulpina* Standl.

Delprete (2010c: 1297) incorrectly reported the collector of the original gathering of this name as "*F.C. Beni 2802*". The reported last name "Beni" is a typographical error, as the collector of this gathering was Frederico Carlos Hoene (1882–1959).

FGT, vol. 40(3), p. 1300:
"56-31. ***Spermacoce warmingii*** (K. Schum.) Kuntze, Rev. Gen. 3(2): 123. 1898. - *Borreria warmingii* K. Schum. in Mart., Fl. Bras. 6(6): 42. 1888. Tipo: Brasil, Minas Gerais, Lagoa Santa, s.d., *Warming s.n.* (holótipo, B, destruído, foto em F, NY)."

Accepted name: ***Spermacoce warmingii*** (K.Schum.) Kuntze

Type: BRAZIL. Minas Gerais: Lagoa Santa, s.d., *E. Warming s.n.* (C [barcode C10018075], **lectotype here designated**; isolectotype C [barcode C10018076]).

Notes: Schumann (1888: 42) cited the material studied of *Borreria warmingii* K. Schum. as "Habitat in provincia Minaes Gerais ad Lagoa Santa: Warming." The holotype specimen at B was destroyed during WWII. Two original specimens of *Warming s.n.* of *B. warmingii* are at C. The specimen with barcode C10018075, is composed of two plants with a terminal flowering head. The specimen label has the heading "Herbarium Eug. Warming" and the handwritten text "Borreria warmingii K. Sch." by K. Schumann, and "Legit: Eug. Wrmg. [Warming] ad Lagoa Santa." This specimen is here designated the lectotype of *Borreria warmingii*.

The other specimen at C, with barcode C10018076, consists of a single plant without the distal portion and a distal portion of a plant with a terminal flowering head. Most likely the fertile distal portion is the continuation of the vegetative portion. On the sheet are affixed two labels, one with the annotation "Martius Hb. Fl. Bras. 1058 ex p." with the printed text "det. Schumann in Fl. Bras." The other label has the heading "Herbarium Eug. Warming" and the handwritten text (unknown author) "Borreria Warmingii Schum., legit Warming ad Lagoa

Santa 2/3 64 [probably meaning that it was collected on 2 March 1864], determ. Schum. [K. Schumann]." This specimen is an isolectotype of *Borreria warmingii*.

FGT, vol. 40(3), p. 1307:
"56-32. ***Spermacoce wunschmannii*** (K. Schum.) Kuntze, Revis. Gen. Pl. 3(2): 123. 1898. - *Borreria wunschmannii* K. Schum. in Mart., Fl. Bras. 6(6): 53. 1888. Tipo: Brasil, Tocantins, "prope Porto Real" [agora Porto Nacional], s.d. [XI/1828 -IV/1829], *Burchell 8683* (lectótipo, BR, designado por Cabral & Bacigalupo, 2005)."

Accepted name: ***Spermacoce wunschmannii*** (K.Schum.) Kuntze

Type: BRAZIL. Tocantins: "prope Porto Real" [now Porto Nacional], s.d. [Nov. 1828–Apr. 1829], *W.J. Burchell 8683* (BR [barcode 000000530562], lectotype designated by Cabral and Bacigalupo (2005: 139); isolectotype K [barcode K000470350]).

Notes: In the protologue of *Borreria wunschmannii* K. Schum., Schumann (1888: 53–54) cited several gatherings as "Habitat in Brasiliae provincia Goyaz prope Porto Real: *Burchell n. 8683*; inter Funil et S. Joâo ad fluvium Tocantins: *Burchell n. 8950, 8977*." The state of Goiás at the time of Burchell was much larger and extended all the way to the Amazon Basin, and in 1988 was divided in two states, Goiás and Tocantins. The city cited by Schumann as Porto Real is now in the state of Tocantins and currently has the name of Porto National. Cabral & Bacigalupo (2005: 139) designated the BR specimen of *Burchell 8683* as the lectotype of *B. wunschmannii*.

57. **STACHYARRHENA** Hook. f., Hooker's Icon. Pl. 11: 54-55, tab. 1068. 1870.

FGT, vol. 40(3), p. 1311:
"57-1. ***Stachyarrhena*** cf. ***harleyi*** J.H. Kirkbr., Rev. Bras. Bot. 6: 114. 1984 ["1983"]. Tipo: Brasil, Bahia, 20 km N along road from Una to Ilheus, 15º11'S, 39º02'W, 0-100 m, 23/I/1977 (fl), *R. Harley et al. 18184* (holótipo, UB; isótipos, CEPEC, K n.v.)."

Accepted name: ***Stachyarrhena*** cf. ***harleyi*** J.H.Kirkbr.

Type: BRAZIL. Bahia: 20 km N along road from Una to Ilheus, evergreen rain forest, partially disturbed, 15º11'S, 39º2'W, 0–100 m, 23 Jan. 1977 (fl), *R. Harley, S.J. Mayo, R.M. Storr, T.S. Santos & R.S. Pinheiro 18184* (holotype, UB [Acc. No. 21423]; isotypes, CEPEC [Acc. No. 20527], HUEFS [Acc. No. 42135], K [2 sheets, barcodes K000015178, K000015179]).

Gatherings in the state of Tocantins: Mun. Tranqueira, mata de galeria, 8º11'S, 48º8'W, 15 Jan. 2002 (fr), *S.F. Lolis et al. 361* (HTO); Mun. Itacajá, Reserva Indigena Krahó, Aldeia Pedra Branca, ca. 600 m a NE da aldeia, passagem antiga, 8º18'S, 47º37'W, 9 May 2000 (fr), *A.A. Santos et al. 715* (CEN).

Notes: The two above cited fruiting gatherings collected in the state of Tocantins were provisionally identified as "*Stachyarrhena* cf. *harleyi* J.H.Kirkbr." Most likely, those specimens represent an undescribed species, but, as no flowering specimens are available, they remain with uncertain identity.

58. **STAELIA** Cham. & Schltdl., Linnaea 3: 364, tab. 3, fig. 3. 1828.

Notes: Salas and Cabral (2010a, 2010b, 2010c), as a result of morphological comparison of species within *Staelia sensu lato*, segregated the genera *Tessiera* DC. and *Planaltina* R.M. Salas & E.L. Cabral from *Staelia*, presenting a set of flower, fruit, pollen, and vegetative characters to differentiate them. Following Salas and Cabral (2010a, 2010b, 2010c), the three genera of the *Staelia* complex are: 1) *Tessiera*, a genus of two species endemic to Mexico; 2) *Planaltina*, a genus with three species endemic to the Brazilian Planalto, occurring in the states of Goiás, Minas Gerais and the Federal District; 3) *Staelia*, a genus of about 17 species occurring in Argentina, Bolivia, Brazil, Paraguay and Uruguay. A key to differentiate these three genera, extracted from Salas et al. (2010b), translated from Spanish, is presented below.

1. Leaves pseudoverticillate, with axillary brachyblasts; leaf blades with inconspicuous secondary veins; stipular sheath with glabrous lacinia; fruit with longitudinal and oblique dehiscence; basal portion of fruit consists of the septum, pedicel and basal portion of carpels; calyx 2-lobed, lobes equal; corolla commonly white; style bifid; seeds 0.8–1.2 mm long, ventral side without transversal grooves (except *Staelia tocantinsiana* R.M. Salas & E.L. Cabral); pollen grains small, with large ectocolpi..... ***Staelia***

1. Leaves opposite, without axillary brachyblasts; leaf blades with 4–7 conspicuous secondary veins on each side of midrib; stipular sheath with pubescent lacinia; fruit with

longitudinal dehiscence; basal portion of fruit consists of the septum and the pedicel; calyx 4–7-lobed, lobes equal or unequal; corolla white, pink, violet or lilac; style capitate or capitate-lobed; seeds 1.5–2.5 mm long, ventral side with (3–)6–12 transversal grooves extending to the dorsal side (except *Planaltina lanigera*); pollen grains large, with short ectocolpi 2

2. Stems scabrous, puberulous, glabrescent or glabrous; stipular sheath hirsute or villous; leaf blades papyraceous to subcoriaceous; corolla throat with a discontinuous ring of 4 tufts of hairs alternate to the lobes; nectariferous disk 2-lobed; pollen grains suboblate, 13–14-colporate; exine perforations without thickening; fruit with both carpels equally developed; intercarpellary septum membranaceous, with seed impressions; seed ventral side flat, dorsal side with transversal narrow grooves or lobed; seed episperm irregularly reticulate, with periclinal walls irregularly microperforate ..... ***Tessiera***

2. Stems lanate, hirtous or hispid, sometimes with a glabrescent basal portion; stipular sheath densely lanate or hispid; leaf blades thick, coriaceous when dry; corolla throat with a continuous ring of hairs; nectariferous disk entire; pollen grains spheroidal, 10–11-colporate; exine perforations with thickening; fruits with one carpel more developed than the other; intercarpellary septum coriaceous, without seed impressions; seed ventral side with transversal grooves, dorsal side without transversal grooves (except *P. capitata*); seed episperm regularly reticulate-foveolate or reticulate-areolate, with polyhedric cells with smooth periclinal walls ..... ***Planaltina***

FGT, vol. 40(3), p. 1320:
"58-1. ***Staelia aurea*** K. Schum. in Mart., Fl. Bras. 6(6): 77. 1888. Tipo: Brasil, Piauí, "Provinciae Piauhy parte septentrionale", IV/1839 (fl), *Gardner 2192* (holótipo B, destruído; lectótipo K, aqui designado; isolectótipos, F, P, US, W; foto-B em NY)."

Accepted name: ***Staelia aurea*** K.Schum.

Type: BRAZIL. Piauí: "Provinciae Piauhy parte septentrionale", "Oeiras", Apr. 1839 (fl), *G. Gardner 2192* (B†; first-step lectotype designated by Salas and Souza in Delprete (2010c: 1320); W [Acc. No. W0028587], **second-step lectotype here designated**; isolectotypes, BM [barcode 000546732], F [2 sheets, Acc. No. 775774, 775775], K [2 sheets, K000016432, K000016433], P [barcode P02285104, P02285105, P02285106], S [Acc. No. S05-1677], US [barcode 00130115], W [Acc. No. W 1889-0113605]; photo-B in NY).

Notes: In the protologue of *Staelia aurea* K.Schum., Schumann (1888: 77–78) cited the following gatherings from the states of Piauí, Goiás and Tocantins: *Gardner 9192*, *Burchell 8995*, *Burchell 7731*, and *Martius s.n.*

Salas and Souza (2010: 1320) cited as lectotype of *Staelia aurea* the gathering *Gardner 2192* at K. There are two specimens of *Gardner 2192* at K, both without any proof that they were examined by Schumann. Therefore, Salas and Souza's citation is a first-step lectotypification on *Gardner 2192*. The specimen with barcode K000016432 has the stamp "Herbarium Hookerianum" and a label with the annotation "2192. Rubiaceae sp. Dry hilly places near Oeiras. April 1839" handwritten by Gardner. On the sheet, there are affixed two plants with numerous flowers and fruits. The second specimen in K with barcode K000470393 has the stamp "Herbarium Benthamianum." On the sheet, there are four plants with numerous flowers and fruits. On the base of these two plants, is glued a label with the printed text "Prov. Piauhy, Brasilia tropica, Gardner, 1839" and the handwritten number "2192."

At W there are two specimens of *Gardner 2192*. The specimen with accession number W0028587 has a label with the annotation "Staelia aurea m." and the stamp "det. Schumann in Fl. Bras." This specimen was annotated as lectotype of *S. aurea* by Kirkbride in 1979, but that choice was not published. That specimen is here designated as the second-step lectotype of this name.

The other specimen at W, with accession number W 1889-0113605, has a small label with the handwritten annotation "Staelia, 2192. Piauhy, Gardner". This specimen was not annotated by Schumann and is an isolectotype.

FGT, vol. 40(3), p. 1324:
"58-2. ***Staelia capitata*** K. Schum. in Mart., Fl. Bras. 6(6): 72. 1888. Brasil, Minas Gerais, "inter Alegre et fluvium São Francisco", IX/1834, *Riedel 2880* (holótipo, B, destruído; lectótipo, K, aqui designado; isolectótipo, BR; foto-B em CTES)."

Accepted name: ***Planaltina capitata*** (K.Schum.) R.M.Salas & E.L.Cabral, J. Bot. Res. Inst. Texas 4(1): 199. 2010b.

Type: BRAZIL. Minas Gerais: "inter Alegre et fluvium São Francisco", Sep. 1834, *L. Riedel 2880 pro parte* (B†; first-step lectotype designated by Salas & Cabral (Jul. 2010b: 199); K [barcode K000470402], **second-step lectotype here designated**; isolectotype, BR *pro parte* [barcode 000000574157, specimen on the right side of the sheet]; photo-B in CTES and F).

Notes: In the protologue of *Staelia capitata* K.Schum., Schumann (1888: 72–73) cited the material

studied as "*Habitat in campis arenosis inter Alegre et fluvium S. Francisco: Riedel n. 2880 ex p.; in herb. Monacensis quoque exemplum a cl. Pohl loco haud indicato collectum asservatur.*" The original material at B has been destroyed, and only a photograph of the B specimen of *Riedel 2880* is available at F (barcode F0BN000899). The lectotype citation of *Staelia capitata* on a K sheet was first published by Salas and Cabral (2010b: 199) on 29 July 2010. The same lectotype designation was republished in the FGT by Salas and Souza (in Delprete, 2010c: 1320) in November 2010. On the K sheet cited by Salas and Cabral, there are two labels and two different specimens of a mixed collection of *Riedel 2880*. Because Salas and Cabral (2010b: 199) in their publications did not indicate which of the two specimens is the lectotype, a second-step designation is necessary.

On the K specimen cited by Salas and Cabral (2010b: 199), there are two labels. One label has the heading "Ex herbario horti Petropolitani" and the annotation "Staelia capitata K. Schum., Brasilia, In campis arenosis inter Alegres et R. St. Francisco, IX. 1834. Riedel." The other label has the following annotation "522. no. 2880. Borreria. C. erecto 2 ped. villoso, fol. rigidis, jubit. villosis, flor. albis verticill. In campibus arenosis Alegres et R. St. Francisco, sept 1834. Riedel" handwritten by Riedel. Near the left margin of the sheet, specimen with barcode K000470402 is *Riedel 2880 pro parte*, which is original material of *Staelia capitata*. On the right side of that specimen, there is a small plant of *Mitracarpus* sp., with barcode K000470403, which is not original material. Specimen with K000470402 is here designated the second-step lectotype of *Staelia capitata*.

On the sheet of *Riedel* 2880 at BR with barcode 000000574157, there is also a mixed collection. The label on the sheet has the heading "Ex herbario horti Petropolitani", the stamp "Herb. Hort. Bruxell. – Coll. Martii" and the handwritten annotation (author unknown) "219. No. 2880. Borreria. In camp. arenosis inter Alegres et Rio St. Francisco. Sept. 34. Brasilia. Riedel." The specimen affixed on the left side of the sheet is a species of *Mitracarpus*. The specimen on the right side of the sheet is original material of *Staelia capitata* and is an isolectotype.

FGT, vol. 40(3), p. 1328:
"58-3. ***Staelia galioides*** DC., Prodr. 4: 573. 1830. Tipo: Brasil, Goiás, "inter Goyas et Santa Rita" [entre as cidades de Goiás e Santa Rita], s.d. [1818-1819], *Pohl 2013-822* (holótipo, G-DC; isótipos, BR, K, W)."

Accepted name: *Staelia galioides* DC.

Type: BRAZIL. Goiás: "inter Goyas et Santa Rita" [between the towns of Goiás and Santa Rita], s.d. [1818–1819], *J.B.E. Pohl 2013 (822d*) (holotype, G-DC [barcode G00667501 (without collection number)]; isotypes, BR [barcode 000000532747 (without collection number)], K [3 sheets, barcodes K000470398, K000470399, K000470400], M [barcode M-0189332 (without collection number), W [2 sheets, barcode W0028585, W0028586]).

Notes: In the protologue *Staelia galioides* DC., Candolle (1830: 573) cited the material studied as "In Brasilià legit cl. Pohl." and "(v.s.)" which means that he saw a specimen in G-DC. In G-DC there is a sole specimen associated with this name, with barcode G00667501. On the lower right corner of the sheet is affixed a label with the annotation "Spermacoce galioides Pohl! – Staëlia_____ [galioides] DC." handwritten by Candolle. At the base of the specimen is affixed a label with the annotation "Spermacoce galioides, Brésil, m. Pohl 1828" handwritten by an unknown author. The number "1828" is the year that Pohl's specimen was integrated in Candolle's herbarium, and is not a collection number. The specimen consists of a plant with two branches with numerous nodes with linear leaves and axillary brachyblasts with numerous linear leaves. At the terminal portion of the branches are present numerous small capitate inflorescences. This specimen is the holotype of *S. galioides*.

FGT, vol. 40(3), p. 1331:
"58-4. ***Staelia lanigera*** (DC.) K. Schum. in Mart., Fl. Bras. 6(6): 73. 1888. - *Tessiera lanigera* DC., Prodr. 4: 574. 1830. Tipo: Brasil, "prope Maria da Souza", s.d. [1818-1819], *Pohl 5085* (holótipo, G-DC, isótipo, W)."

Accepted name: *Planaltina lanigera* (K.Schum.) R.M.Salas & E.L.Cabral, J. Bot. Res. Inst. Texas 4(1): 202. 2010.

Type: BRAZIL. "prope Maria da Sonza", s.d. [1818–1819], *J.B.E. Pohl 5085* (holotype, G-DC [barcode G00667492 (without collection number)], isotype, W [Acc. No. W0028588])

Notes: In the protologue of *Tessiera lanigera* DC., Candolle (1830: 574) cited the material studied as "In Brasilià legit cl. Pohl. (v.s.)". In G-DC there is a sole sheet associated with this name, with barcode G00667492. On the lower right corner of the sheet there is a label with the annotation "Tessiera lanigera DC."

handwritten by Candolle. At the base of the specimen is affixed a label with the annotation "Diodia! Spermacoce! lanigera, Brésil, m. Pohl 1828" handwritten by an unknown author. The number "1828" is the year that Pohl's specimen was integrated in Candolle's herbarium, and is not a collection number. Pohl's collection number of this gathering is not indicated on this sheet. The specimen consists of a long branch with numerous leaf pairs and numerous axillary inflorescences. The whole plant is lanate, hence the specific epithet. This specimen is the holotype of this name.

On a sheet in W with Accession No. W0028588 are affixed several labels. One of them has the annotation "5085, Hb. Bras., Tesseria [sic!] lanigera DC, Ad Mar da Sonza, Pohl". Another label on the sheet has the annotation "Staëlia lanigera m." and the stamp "det. Schumann in Fl. Bras." On the sheet are affixed two branches with numerous leaf pairs and numerous axillary inflorescences, with the characteristic lanate vestiture. This specimen is an isotype of *Tessiera lanigera* DC.

A species of *Planaltina* to be added to FGT:

Planaltina myndeliana R.M.Salas & E.L.Cabral, J. Bot. Res. Inst. Texas 4(1): 204. 29 Jul. 2010.

Type: BRAZIL. Goiás: Mun. São João da Aliança, Córrego das Brancas, próximo a barra do Jacaré, 9 Feb. 1994, *G. Hatschbach & J.M. Silva 60266* (holotype, MBM n.v.; isotype, CTES n.v.).

Accepted name: *Planaltina myndeliana* R.M.Salas & E.L.Cabral

Paratypes: BRAZIL. Goiás: Chapada dos Veadeiros, 21 Dec. 1967, *A.P. Duarte 10670* (HB, RFA, UB, US).

FGT, vol. 40(3), p. 1334:
"58-5. ***Staelia tocantinsiana*** Salas & E.L. Cabral, Rev. Biol. Netrop. 3: 1, fig. 1. "2006" [2007]. Tipo: Brasil, Tocantins, Mun. Lagoa da Confusão, Ilha do Bananal, Parque Nacional do Araguaia, Praia do Gado, 10°24'S, 50°29'W, 180 m, 23/III/1999 (fl, fr), *M.A. Silva, J.T. dos Santos, A.D. dos Santos, N.R. Oliveira, R.C. Mendonça & E. Cardoso 4091* (holótipo, IBGE; isótipos, CTES, CH, NY, RB)."

Accepted name: *Staelia tocantinsiana* R.M.Salas & E.L.Cabral

Type: BRAZIL. Tocantins: Mun. Lagoa da Confusão, Ilha do Bananal, Parque Nacional do Araguaia, Praia do Gado, 10°24'2"S, 50°29'7"W, 180 m, 23 Mar. 1999 (fl, fr), *M.A. Silva, J.T. dos Santos, A.D. dos Santos, N.R. Oliveira, R.C. Mendonça & E. Cardoso 4091* (holotype, IBGE [Acc. No. 046561, barcode 00046561]; isotypes, CH n.v., CTES n.v., NY [barcode 01085902]).

Notes: Salas and Cabral (2007: 1) stated that one of the isotypes of *Staelia tocantinsiana* Salas & E.L. Cabral is at RB, but after exhaustive searches (pers. obs.) it was concluded that no such specimen is there.

FGT, vol. 40(3), p. 1335:
"58-6. ***Staelia vestita*** K. Schum. in Mart., Fl. Bras. 6(6): 78. 1888. Tipo: Brasil. Goiás, Rio Paraná a Talaya, *Burchell 7989* (Lectótipo, BR, aqui escolhido; isolectótipos, K, P n.v.)."

Accepted name: *Staelia vestita* K.Schum.

Type: BRAZIL. Goiás: "Rio Paranán a Taláya, Riacho Atalaia [ca. 13°30'–25'S, 46°53'W]", *W.J. Burchell 7989* (BR [barcode 000000532714], lectotype designated by Salas and Souza in Delprete (2010c: 1335); isolectotypes, K [barcode K000470394], P [barcode P02285109]).

Notes: In the protologue of *Staelia vestita* K.Schum., Schumann (1888: 78) cited three gatherings from Brazil: *Gardner 2187* from the state of Piauí, *Burchell 7989* from the state of Goiás, and *Martius s.n.* without locality.

Salas and Souza in Delprete (Dec. 2010c: 1335) designated as the lectotype of *Staelia vestita* the BR specimen with barcode 000000532714. The specimen has a label with the stamp "Herb. Hort. Bruxell. Coll. Martii" and the handwritten annotation "Brasilia: ad Cavalcante, prov. Goyaz – H. Kewenses 1869, Burchell no. 7989." On the sheet is handwritten in pencil by Joseph H. Kirkbride Jr., "Rio Paranán to Taláya, Goiás." The penciled information about the locality was extracted from Smith and Smith's (1967) study on the itinerary of Burchell in Brazil. In that study, Smith and Smith listed Burchell's collection numbers between *7986* and *7991* as collected at "Rio Paranán to Taláya (Riaucho [! sic; Riacho] Atalaia, AGS: S 13°30'–25', W 46°53')."

FGT, vol. 40(3), p. 1338:
"58-7. ***Staelia virgata*** (Willd. ex Roem. & Schult.) K. Schum. in Mart., Fl. Bras. 6(6): 76. 1888. - *Spermacoce virgata* Willd. ex Roem. & Schult., Syst. Veg. 3: 281,

531. 1818; Mant. 3: 205. 1827. - *Mitracarpus virgatus* (Willd. ex Roem. & Schult.) Cham. & Schltdl., Linnaea 3: 363. 1828. Tipo: Brasil, sem localidade, *F.W. Sieber in Hoffmannsegg s.n.* (holótipo, B-Willd 2634; isótipo, BR; foto-B-Willd em NY)."

Accepted name: *Staelia virgata* (Willd.) K.Schum.

Staelia virgata (Willd.) K.Schum. in Mart., Fl. Bras. 6(6): 76. 1888. - *Spermacoce virgata* Willd., Syst. Veg. 3: 281, 531. 1818; Mant. 3: 205. 1827. - *Mitracarpus virgatus* (Willd.) Cham. & Schltdl., Linnaea 3: 363. 1828.

Type: BRAZIL. Pará: Without locality, s.d., *F.W. Sieber in J.C. Hoffmannsegg s.n.* (holotype, B-W 2634 [barcode B-W 02634-01 2]; isotypes, BR [barcode 000000532683], HAL [barcode HAL9113954], W [Acc. No. 1889-0192932]; photo-B-W in NY).

Notes: The names *Spermacoce virgata* Link ex Roem. & Schult. (Syst. Veg. 3: 281. 1818) and *S. virgata* Willd. (Syst. Veg. 3: 531. 1818) were published simultaneously in the same volume. Article 6.3 Note 2 of the *Code* (Turland et al. 2018) states, "When the same name, based on the same type, has been published independently at different times, perhaps by different authors, then only the earliest of these "isonyms" has nomenclatural status. The name is always to be cited from its original place of valid publication, and later isonyms may be disregarded (but see Art. 14.14)." Hence, according to Note 2 the two *S. virgata* names are not isonyms. Gandhi (pers. comm. 2023), in the IPNI website (https://www.ipni.org/n/60470144-2), presented the following remarks "The names *S. virgata* Link ex Roem. & Schult. (p. 281) and *S. virgata* Willd. (p. 531) have equal priority; both names were based on specimens sent by Hoffmannsegg; Cham. & Schtdl. (in Linnaea 3: 363. 1828) and DC. (Prodr. 4: 572. 1830) cited Willdenow as the author of the name on both pages; therefore, the Willdenow name is treated as having priority." Following this logic, the first sentence of Art. 53.5 is critical in solving this situation, "When two or more legitimate homonyms have equal priority (see Note 1), the first of them that is adopted in an effectively published text (Art. 29–31) by an author who simultaneously rejects the other(s) is treated as having priority." The key part of the sentence is, "… an author who simultaneously rejects the other …" The second sentence is also critical, "Likewise, if an author in an effectively published text replaces with other names all but one of these homonyms, the homonym for the taxon that is not renamed is treated as having priority (see also Rec. F.5A.2)." The key part of the sentence is, "… other names all but one of these homonyms …" Hence, the name and authority accepted for the basionym of this species is *Spermacoce virgata* Willd.

59. **TOCOYENA** Aubl., Pl. Guiane 1: 131, pl. 50. 1775.

FGT, vol. 40(3), p. 1346:
"59-1. ***Tocoyena arenicola*** Delprete, J. Bot. Res. Inst. Texas 2: 988, fig. 2. 2008. Tipo: Brasil, Tocantins, Mun. Miracema do Tocantins, estrada a 3 km da cidade em direção de Lajeado (TO-070), área de cerrado em solo de areia branca, 9°35'13"S, 48°24'32"W, 230 m, 3/XI/2005 (fl, fr), *P.G. Delprete, H. Lorenzi, J.A. Lombardi & E.G. Gonçalves 9249* (holótipo, UFG; isótipos, HPL, K, MO, NY, RB, UB)."

Accepted name: *Tocoyena arenicola* Delprete

Type: BRAZIL. Tocantins: Mun. Miracema do Tocantins, estrada a 3 km da cidade em direção de Lajeado (TO-070), área de cerrado em solo de areia branca, 9°35'13"S, 48°24'32"W, 230 m, 3 Nov. 2005 (fl, fr), *P.G. Delprete, H. Lorenzi, J.A. Lombardi & E.G. Gonçalves 9249* (holotype, UFG [Acc. No. 43350]; isotypes, HPL [2 sheets, Acc. Nos. HPL10948, HPL10950], HTO [Acc. No. unknown], K [barcode K000265571], MO [Acc. No. 6149085], NY [barcode 01182949]).

Notes: Delprete (2008c: 988; 2010c: 1346) wrote that one of the isotypes of *Tocoyena arenicola* Delprete is at RB. In 2009, unmounted duplicates of *Delprete et al. 9249* were left at UFG to be distributed to the herbaria indicated in the protologue. However, the duplicates to be sent to RB and UB were not sent to those institutions, and one of them was sent to HTO instead.

FGT, vol. 40(3), p. 1351:
"59-2. ***Tocoyena brasiliensis*** Mart., Flora 24(2), suppl. 2: 82. 1841. Tipo: Brasil, Rio de Janeiro, Monte Telegraphi prope Sebastianopolis, s.d., *Luschnath in Martius Herb. Fl. Brasil. s.n.* (holótipo, BR)."

Accepted name: *Tocoyena brasiliensis* Mart.

Type: BRAZIL. Rio de Janeiro: Sebastianopolis, "Monte Telegraphi prope Sebastianopolis", Jun. 1834 (fl), *B. Luschnath s.n.* [*in Martius Herb. Fl. Brasil.*] (holotype, BR [barcode 000000578046]).

Notes: In the protologue of *Tocoyena brasiliensis* Mart., Martius (1841: 82–83) cited the locality and phenology of the material studied as "Crescit in Monte Telegraphi prope Sebastianopolin; Junio floret" without citing the collector and herbarium of deposit. Schumann (1889: 348), among other collections studied of *T. brasiliensis*, cited the specimen "*in monte Telegraphenberg: Luchnath, floret Junio*". Most likely, Schumann's citation refers to the original specimen cited by Martius. The BR specimen, barcode 000000578046, has a label with heading "Herbarium Martii" and the handwritten information "Tocoyena brasiliensis Mart., frutex arborescens; – flores viridis-lutei. Thelegraphenberg, Brasil: Leg. Luschnath, Juny 1834." The BR specimen is the holotype of *Tocoyena brasiliensis*. A second label on this specimen has the annotation "Tocoyena brasiliensis Mart." by K. Schumann, and a third label has the annotation "Tocoyena sellowiana (Cham. & Schltdl.) Schum., det. A.L. Prado, 25.04.1984." Prado (1987), in an unpublished Master Dissertation, treated *T. brasiliensis* and *T. sellowiana* as synonymous. However, *T. sellowiana* is recognized as a distinct species by Siberbauer-Gottsberger et al. (1992) and Delprete (2010c). Siberbauer-Gottsberger et al. (1992: 160) differentiated *T. brasiliensis* in having "Corolla tube entrance villous; leaves obovate, 15–17 x 6–7.5 cm (NE. to E. Brazil)", whereas *T. sellowiana* has "Corolla tube entrance glabrous; leaves oblong-lanceolate, smaller, mostly 7–9 x 2.5–5.5 cm (E. Brazil)." This distinction between the two species is followed here. *Tocoyena brasiliensis* occurs throughout the Cerrado Biome and not just "NE to E Brazil", as stated by Siberbauer-Gottsberger et al. (1992: 160). As Delprete (2010c: 1352–1354) wrote, *T. brasiliensis* occurs from the state of Amapá to the state of São Paulo, and the holotype specimen is from the state of Rio de Janeiro.

FGT, vol. 40(3), p. 1354:
"59-3. ***Tocoyena formosa*** (Cham. & Schltdl.) K. Schum. in Mart., Fl. Bras. 6(6): 347. 1889. - *Gardenia formosa* Cham. & Schltdl., Linnaea 4: 200. 1829. Tipo: Brasil meridional, s.d., *Sellow s.n.* (holótipo B, destruído; frag- B at F)."

Accepted name: ***Tocoyena formosa*** (Cham. & Schltdl.) K.Schum.

Type: BRAZIL. Goiás: Mun. Monte Alegre, rod. Monte Alegre - Campos Belos (BR-010), km 137, arvoreta de 4 m com tronco principal contorto e copa umbeliforme, botões florais verdes, corola branca e muito perfumada durante a antese, tornando-se amarela após a antese, 13°9'5"S, 46°45'57"W, 580 m, 1 Nov. 2005 (fl), *P.G. Delprete, H. Lorenzi, J. Lombardi & E. Gonçalves 9228* (GB [barcode GB-0210435], **neotype here designated**; isoneotypes, CAY [barcode CAY223351], HPL [Acc. No. 10984], HTO [Acc. No. 9991], UFG [Acc. No. 40686]).

Notes: Chamisso and Schlechtendal (1829b: 200–201) cited the material studied of *Gardenia formosa* Cham. & Schltdl. as "E Brasilia aequinocialis misit Sellowius unicum, prohdor, specimen floriferum, fructu deficiente." (Equatorial Brazil, unfortunately a sole flowering specimen collected by Sellow, without fruit). According to Stafleu and Cowan (1976: 482; 1985: 190, respectively) "Chamisso's own herbarium was also acquired by LE." and "Diederich Franz Leonard von Schlechtendal - Herbarium and types: HAL. Several of the types of his Berlin period were at B (mainly destroyed). – Plants for the botanical gardens of Berlin and Halle, and material from his herbarium (but collected by others) are e.g. at CAS, E, FI, G, L, M, MW, WAG." The original material at B was destroyed during WWII.

After exhaustive search, no original specimen of *Gardenia formosa* was found at HAL (Marcus Lehnert, HAL Curator, pers. comm., 5 Sep. 2022). A fragment of the original specimen at B was reported in previous literature (e.g., Delprete 2010c) to be present at F; however, after exhaustive search, there is no original fragment of *G. formosa* at F (Lucia Kawasaki, pers. comm., 2 Aug. 2022).

A specimen at K, barcode K000424433, has a label with the heading "Ex Museo botanico Berolinensi", the printed text "Brasilia, leg. Sellow", the handwritten annotation "Tocoyena formosa K. Schum.", and the stamp "determ. C. Schumann". A smaller label has the printed information "Brasilia. Reliquiae d. Sello. No.", the stamp "15 nov. 1907" and the annotation "25 III". It has been annotated as "Tocoyena formosa var. pseudobrasiliensis Gottsb. & Ehrend." by Siberbauer-Gottsberger in 1998. This specimen consists of a small branch with several leaves and an immature fruit. Because it has a fruit, it cannot be original material, as Chamisso and Schlechtendal wrote that they only studied a flowering specimen.

In absence of original material, a neotype needs to be selected, and possibly with duplicates distributed in several herbaria. The gathering *Delprete et al. 9228* has duplicates distributed in five herbaria, and the specimen at GB is here designated as the neotype of *Gardenia formosa*.

FGT, vol. 40(3), p. 1355:

Synonym:

Tocoyena formosa var. *pseudobrasiliensis* Gottsb. & Ehrend., Pl. Syst. Evol. 181: 162. 1992.

Type: BRAZIL. São Paulo: Mun. Botucatu, 18 km N, 14 km E of São Manuel, along São Manuel-Piracicaba Hwy, near ex-railway station Treze de Maio, 22º45'S, 48º25'W, 550 m, 1 Nov. 1971 (fl), *I. Gottsberger & G. Gottsberger 11-11171* (holotype, UB [barcode UB0040411, Acc.No. 12034]; isotypes, K [barcode K000172525], MBM [barcode MBM267187], NY [barcode 00581278], SP [barcode SP001575] UB [UB1063124, Acc. No. 11696 (the only specimen in SpeciesLink)]).

Notes: Silberbauer-Gottsberger et al. (1992: 162) for *Tocoyena formosa* var. *pseudobrasiliensis* Gottsb. & Ehrend. cited the holotype at UB and one of the isotypes at UB, but they did not specify which of the two specimens is the holotype. In UB there is only one specimen, with barcode UB0040411 and Acc. No. 12034, with the authors' original label specifying that it is the holotype, which is followed here.

Silberbauer-Gottsberger et al. (1992: 162) cited an isotype specimen at GI, but Martin de Jong (GI Curator, pers. comm., 28 August 2022) reported that there is no isotype specimen there, nor the paratype. The same authors also cited an isotype specimen at BOTU, but Henrique Borgatto (BOTU Curator, pers. comm., 12 September 2022) reported that there is no isotype specimen there, nor the paratype.

This variety has not been recognized by Deprete (2010c: 1354–1371), who treated *Tocoyena formosa* as a variable species, without any infraspecific taxa, and is here maintained as such.

FGT, vol. 40(3), p. 1372:

"59-4. ***Tocoyena viscidula*** Mart., Flora 24, suppl. 2: 80-81. 1841. Tipo: Brasil, Bahia, in silvis Caatinga mediterraneis, s.d., *Martius s.n.* (holótipo, M n.v., foto-M em UEC n.v., UFMT)."

Accepted name: ***Tocoyena viscidula*** Mart.

Type: BRAZIL. Bahia: "in silvis Caatinga mediterraneis", s.d., *C.F.P. Martius 3301* (holotype, M [barcode M-0189486], photo in UEC, UFMT).

Notes: In the protologue of *Tocoyena viscidula* Mart., Martius (1841: 80–81) cited the material studied as "In silvis Caatinga mediterraneis prov. Bahiensis." At M there is a specimen, barcode M-0189486, with the label with the printed text "Dr. Martius Iter Brasil" and the handwritten annotation "[Habitat in] sylv. Catinga indes., [Provinciae] Bahiensis, Nov." This specimen is the holotype of *T. viscidula*.

60. **UNCARIA** Schreber, *nom. cons.*, Gen. 125. 1789.

FGT, vol. 40(3), p. 1377:

"60-1. ***Uncaria guianensis*** (Aubl.) Gmel., Syst. Nat. 2: 370. 1791. - *Ourouparia guianensis* Aubl., Hist. Pl. Guiane 1: 177, t. 68. 1775. - *Uncaria aculeata* Willd. in Usteri (baseado em Ourouparia guianensis), Delect. Opusc. Bot. 2: 200. 1793. - *Nauclea guianensis* (Aubl.) Poir. in Lam., Encycl. Mét. 4: 436. 1797. - *Uruparia versicolor* Raf. (baseado em Ourouparia guianensis), Sylv. Tell. 148. 1830. - *Uruparia guianensis* (Aubl.) Kuntze, Rev. Gen. Pl. 1: 301. 1891. Tipo: Guiana Francesa, *Aublet s.n.* (holótipo, BM)."

Accepted name: ***Uncaria guianensis*** (Aubl.) Gmel.

Type: FRENCH GUIANA: Galibi Creek, at 40 miles from the coast, "in sylvis ad ripas amnis Galibiensis, quadraginta milliaribus, & ampliùs à maris littore" and "bord de la crique des Galibis […] en plein fleur dans le mois de Mai", s.d. [Apr–May 1763], *J.B.C.F. Aublet s.n.* (P-JJR 8: 270, lectotype designated by Lanjouw and Uittien (1940: 154); isolectotype, BM [barcode BM001008725]).

Notes: For further information about the typification of *Ourouparia guianensis* Aubl., see Delprete (2015).

61. **WARSZEWICZIA** Klotzsch., Flora 36: 716. 1853.

FGT, vol. 40(3), p. 1383:

"61-1. ***Warszewiczia longistaminea*** K. Schum. in Mart., Fl. Bras. 6(6): 218. 1889. Tipo: Brasil, Tocantins, Porto Nacional ["Goyaz, prope Porto Real"], s.d., *Burchell 8607* (holótipo, B, destruído; foto-B em NY e US; lectótipo, NY, aqui escolhido; isolectótipo F)."

Accepted name: ***Warszewiczia longistaminea*** K.Schum.

Type: BRAZIL. Tocantins: Porto Nacional ["Goyaz, prope Porto Real"], s.d., *W.J. Burchell 8607* (B†; NY [barcode 00259228], lectotype designated by

Delprete (2010c: 1383); isolectotypes, BR [barcode 000000532717], GH [barcode 00094780], K [3 sheets, barcodes K0001173867, K0001173868, K000173900], US [barcode 00137681]; isolectotype fragment F [ex P, Acc. No. 971120]; photo-B in F [F0BN000069] and NY).

Notes: In the protologue of *Warszewiczia longistaminea* K.Schum., Schumann (1889: 218–219) cited the material studied as "*Habitat in provincia Goyaz prope Porto Real: Burchell n. 8607.*" The material examined by Schumann, at B, was destroyed during WWII. The specimen of *Burchell 8607* at NY was designated as the lectotype of this name by Delprete (2010c: 1383).

FGT, vol. 40(3), p. 1386:
"61-2. ***Warszewiczia schwackei*** K. Schum. in Mart., Fl. Bras. 6(6): 219. 1889. Tipo: Brasil, Amazonas, Manaus, II/1855 (fl), *Spruce 3840* (holótipo, B, destruído; lectótipo, NY, aqui escolhido; isolectótipo K; foto-K em NY)."

Accepted name: ***Warszewiczia schwackei*** K.Schum.

Type: BRAZIL. Amazonas: [Rio Negro, Manaus] "Habitat in provincia Alto Amazonas prope Manáos", Feb. 1855 (fl), *R. Spruce 3840* (B†; NY [barcode 00259229], lectotype designated by Delprete (2010c: 1386); isolectotypes, BR [barcode 000000532706], E [barcode E00285370], F [Acc. No. 767832], G [2 sheets, barcodes G00436823, G00436824], GH [barcode 00057422], K [2 sheets, barcodes K000173865, K000173866], LD [Acc. No. 1816690]; isolectotype fragment F [ex G, Acc. No. 635234]; photo-K in NY).

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APPENDIX 1. NEW TYPIFICATIONS IN THE PRESENT ARTICLE. ACCEPTED NAMES ARE IN **BOLD**

Lectotypifications (81):

Amaioua intermedia Mart.
Borreria angustifolia Cham. & Schltdl. [≡ ***Galianthe angustifolia*** (Cham. & Schltdl.) E.L.Cabral].
Borreria ovalifolia M.Martens & Galeotti [≡ ***Spermacoce ovalifolia*** (M.Martens & Galeotti) Hemsl.].
Borreria suaveolens G.Mey. [≡ ***Spermacoce suaveolens*** (G. Mey.) Kuntze].
Borreria umbellata Spreng. [≡ ***Emmeorhiza umbellata*** (Spreng.) K.Schum.].
Borreria vulpina Standl. [≡ ***Spermacoce vulpina*** (Standl.) Govaerts].
Borreria warmingii K.Schum. [≡ ***Spermacoce warmingii*** (K.Schum.) Kuntze].
Chomelia pohliana Muell.Arg.
Chomelia ribesioides Benth. ex A.Gray
Coccocypselum condalia Pers.
Coccocypselum erythrocephalum Cham. & Schltdl.
Coccocypselum hasslerianum Chodat
Condalia lanceolata Ruiz & Pav. [≡ ***Coccocypselum lanceolatum*** (Ruiz &. Pav.) Pers.].
Coussarea platyphylla Muell.Arg.
Dialypetalanthus fuscescens Kuhlmann
Exostema formosum Cham. & Schltdl. ex DC. [≡ ***Rustia formosa*** (Cham. & Schltdl. ex DC.) Klotzsch].
Exostema formosum var. β *laeve* DC. [≡ ***Rustia formosa***].
Faramea bracteata Benth.
Faramea contracta Walp. [≡ ***Coussarea contracta*** (Walp.) Benth. & Hook. f. ex Müll. Arg.].
Faramea hydrangeaefolia Benth. [≡ ***Coussarea hydrangeifolia*** (Benth.) Benth. & Hook. f. ex Müll. Arg.].
Faramea multiflora A.Rich. ex DC.
Faramea nitida Benth.
Ferdinandusa elliptica Pohl
Ferdinandusa ovalis Pohl [= ***Ferdinandusa elliptica*** Pohl].
Ferdinandusa pubescens Wedd. [= ***Ferdinandusa speciosa*** Pohl].
Ferdinandusa speciosa Pohl
Galium megapotamicum Spreng.
Gardenia longiflora Ruiz & Pav. [≡ ***Rosenbergiodendron longiflorum*** (Ruiz. & Pav.) Fagerl.].
Gardenia sessilis Vell. [≡ ***Cordiera sessilis*** (Vell.) Kuntze].
Guagnebina luteorubra Vell. [≡ ***Manettia luteorubra*** (Vell.) Benth.].
Guettarda burchelliana Muell.Arg. [= ***Guettarda pohliana***].
Guettarda burchelliana var. *opaca* Muell.Arg. [= ***Guettarda pohliana***].
Guettarda pohliana Muell.Arg.
Guettarda viburnoides var. *genuina* Muell.Arg. [= ***Guettarda viburnoides*** Cham. & Schltdl.].
Guettarda viburnoides var. *pannosa* Muell.Arg. [= ***Guettarda viburnoides*** Cham. & Schltdl.].
Guettarda viburnoides var. *viburnoides* Muell.Arg. [= ***Guettarda viburnoides*** Cham. & Schltdl.]
Ixora chinensis Lam.
Ixora pubescens var. *glabrifolia* Muell.Arg. [= ***Ixora pubescens*** Willd. in Schult. & Schult. f.].
Ladenbergia cujabensis Klotzsch
Malanea macrophylla Bartl. ex Griseb.
Malanea parviflora Muell.Arg. [≡ ***Chomelia parviflora*** (Muell.Arg.) Muell. Arg.].
Malanea ribesioides var. *tomentosa* Muell. Arg. [= ***Chomelia ribesioides*** Benth. ex A.Gray].
Malanea ribesioides var. *villosula* Muell. Arg. [= ***Chomelia ribesioides*** Benth. ex A.Gray].
Ophiorrhiza lanceolata Forssk. [≡ ***Pentas lanceolata*** (Forssk.) Deflers].
Pagamea plicata Spruce ex Benth.
Palicourea marcgravii A.St.Hil.
Palicourea marcgravii var. *pubescens* A.St.Hil. [= ***Palicourea marcgravii*** A.St.Hil.].
Palicourea urbaniana Standl.
Psychotria crocea Sw. [≡ ***Palicourea crocea*** (Sw.) Roem. & Schult.].

Psychotria macrobotrys Ruiz & Pav. [≡ ***Palicourea macrobotrys*** (Ruiz & Pav.) DC.].
Psychotria microcephala (Willd. ex Roem. & Schult.) Muell.Arg. var. *tripotamica* Muell. Arg. [= ***Palicourea prunifolia*** (Kunth) Borhidi].
Psychotria racemosa Rich. [= ***Palicourea racemosa*** (Aubl.) G.Nicholson].
Psychotria rupestris Muell.Arg. [≡ ***Palicourea rupestris*** (Müll.Arg.) Delprete].
Psychotria schuechiana Müll.Arg. [= ***Palicourea subtriflora*** (Muell.Arg.) Delprete].
Psychotria stachyoides Benth. [≡ ***Palicourea rupestris*** (Müll.Arg.) Delprete].
Psychotria stipulosa Muell. Arg. [≡ ***Palicourea stipulosa*** (Müll.Arg.) Borhidi].
Psychotria subtriflora Muell. Arg. [≡ ***Palicourea subtriflora*** (Muell.Arg.) Delprete] .
Psychotria vellosiana Benth. [≡ ***Palicourea sessilis*** (Vell.) C.M.Taylor].
Psychotria villosa Vell., *nom. illeg.* [= ***Palicourea tenerior*** (Cham.) Delprete & J.H.Kirkbr.].
Psychotria viridis Ruiz & Pav.
Psychotria xanthocephala Muell.Arg. [= ***Palicourea prunifolia*** (Kunth) Borhidi].
Retiniphyllum kuhlmannii Standl.
Richardia brasiliensis Gomes
Richardsonia grandiflora Cham. & Schltdl. [≡ ***Richardia grandiflora*** (Cham. & Schltdl.) Steud.].
Rubia noxia A. St. Hil. [≡ ***Galium noxium*** (A.St.Hil.) Dempster].
Rudgea burchelliana Muell.Arg.
Rudgea erioloba Benth.
Rudgea goyazensis Muell.Arg.
Rudgea jacobinensis Muell.Arg. [= ***Rudgea erioloba*** Benth.].
Rudgea longiflora Benth.
Rudgea myrsinifolia Benth.
Rudgea tomentosa Rusby
Sabicea brasiliensis Wernham
Sabicea grisea Cham. & Schltdl.
Sabicea humilis var. *lanceolata* Wernham [= ***Sabicea humilis***].
Sabicea moorei Wernham [= ***Sabicea humilis*** S.Moore].
Spermacoce peruviana Pers. [≡ ***Galianthe peruviana*** (Pers.) E.L.Cabral].
Spermacoce polygonifolia A.St.Hil. [≡ ***Mitracarpus polygonifolius*** (A.St.Hil.) R.M.Salas & E.B.Souza].
Sprucea rubescens Benth. [≡ ***Simira rubescens*** (Benth.) Bremek. ex Steyerm.].
Staelia aurea K.Schum.
Staelia capitata K.Schum. [≡ ***Planaltina capitata*** (K.Schum.) R.M.Salas & E.L.Cabral].

Neotypifications (11):
Borreria scabiosoides Cham. & Schltdl. [≡ ***Spermacoce scabiosoides*** (Cham. & Schltdl.) Kuntze].
Borreria tenuis DC. [≡ ***Spermacoce neotenuis*** Govaerts].
Gardenia formosa Cham. & Schltdl. [≡ ***Tocoyena formosa*** (Cham. & Schltdl.) K.Schum.].
Gonzalagunia dicocca Cham. & Schltdl.
Hamelia patens Jacq.
Patabea coriacea Cham. [≡ ***Palicourea coriacea*** (Cham.) K.Schum.].
Psychotria anceps Kunth
Psychotria leiocarpa Cham. & Schltdl. [≡ ***Palicourea leiocarpa*** (Cham. & Schltdl.) Delprete].
Psychotria racemosa Rich. [≡ ***Palicourea racemosa*** (Aubl.) G.Nicholson].
Psychotria stachyoides Benth. [≡ ***Palicourea stachyoides*** (Benth.) Delprete].
Schwenkfeldia aurea Spreng. [≡ ***Coccocypselum aureum*** (Spreng.) Cham. & Schltdl.].

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Quantification of the size and distribution of the only known population of *Crepis pusilla* (Sommier) Merxm. (Asteraceae, Cichorieae) in Malta

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Abstract. *Crepis pusilla* (Asteraceae, Cichorieae) is "Critically Endangered" in the Maltese Islands, being restricted to a 60 metre country path. This study is the first to quantify the population and to precisely determine its distribution. Field surveys between February and May 2023 indicated a total of 27 confirmed individuals or close clusters of *Crepis pusilla* with a diameter ranging between 0.9 cm to 4.8 cm (mean 2.5 cm ± 0.9 cm). Flowering was observed during April and early May 2023, with each plant producing c. 150 achenes.

Keywords: Asteraceae, conservation, endangered species, Mediterranean, Malta, population assessment.

INTRODUCTION

The Dwarf Hawksbeard, *Crepis pusilla* (Sommier) Merxm. (Fig. 1) is a relatively small and distinct member of the Asteraceae, Tribe Cichorieae. It is classified in the subclade Crepinidae of the Cichorieae, being a sister group to the genera *Rhagadiolus*, *Lapsana* and *Lagoseris* (Kilian et al. 2009). The plant is an annual herb, approximately 3-7 cm tall, but usually appressed to the soil substratum, and acauline. Leaves are linear-lanceolate to oblong-spatulate, usually obtuse, entire, toothed, lobed, or pinnatifid, present in a basal rosette. The capitula have 9 to 12 sessile flowers. They may be solitary but are more frequently arranged in a glomerulus of <10 capitula. In the local context, solitary plants have been recorded but the occurrence of clusters of several plants is not unusual.

This species was first described by Sommier (1907) who established the monotypic genus *Melitella* to accommodate its morphological distinctiveness from other members of the Cichorieae, proposing the name *Melitella pusilla*. Shortly afterwards, Borg (1909) proposed a subspecific variety, *Melitella pusil-*

Figure 1. *Crepis pusilla* in flower at Dingli, Malta, in April 2023.

la var. *laciniata*, mainly based on its laciniate leaf margins and larger size relative to the 'typical' form which he called forma *microflorica*. The species was subsequently reclassified in the large genus *Crepis* by Merxmüller (1968) within which it is nonetheless an anomalous morphological form in view of its atypical habit (basal rosette with central capitula grouped into a glomerulus). In this regard, the reclassification of the species into *Crepis* also fills a gap in the biogeographic distribution of *Crepis* sect. *Zacintha*, between the Algero-Tunisian *Crepis patula* and the Eastern Mediterranean *Crepis multiflora* and *Crepis dioscoridis* (Merxmüller 1968).

Following the first records of Sommier (1907) and Borg (1909), the species was recorded from Libya (Borzi and Mattei, 1913), Crete (Zaffran 1967), Greece (Contrandriopoulos and Zaffran, 1969), Portugal (Batarda-Fernandes, 1972), Mallorca (Duvigneaud 1973), Cyprus (Hadjikyriakou et al. 2004), and Turkey (Greuter 2006+). The record from Libya should be considered doubtful. It was based on a single degraded specimen that was collected on 1 October 1912 (Sommier 1912) well after the growing season had ended. Moreover, Pampanini (1929), based on the type of soil accompanying the specimen, cast doubts on its provenance, suggesting that Borzi's specimen may have been confused with a cultivated one from the Botanic Garden of Palermo. Merxmüller (1968) also recorded the species from Australia, where it is considered an 'environmental weed' (White et al. 2018). However, this is a biogeographic outlier, suggesting that the presence of *C. pusilla* in Australia is attributable to human-assisted dispersal from its native Mediterranean range.

This species is one of the rarest indigenous species in the Maltese Islands, in terms of both distribution and abundance. Sommier's original record (Sommier 1907) derives from northeastern Gozo, between Wied ir-Rihan and Wied Bingemma, close to Nadur, where it was noted in 1906 and 1907. Despite careful searches in similar habitats across Malta, Gozo, and Comino, Sommier did not locate the plant anywhere else. Borg (1909) found what was presumably part of Sommier's original population at Wied Bingemma, Gozo, in 1909 as well as other plants at Wied Marsalforn, Gozo, in the vicinity of 'L-Arkata tan-Nofs', as reported by Gulia (1909). He also found populations of the species from Wied Liemu (part of Dingli) and from 'Dingli', later specified as Ghar Bittija (Borg 1927). The plants at Dingli–Ghar Bittija were larger than the ones in Gozo and were the ones on which the proposed variety *Melitella pusilla* var. *laciniata* was based. This proposal of var. *laciniata* and forma *microflorica* did not meet with consensus (Borg 1909) as the plants in Dingli-Ghar Bittija fell within the range of variation originally described by Sommier (1907). The authors have inspected specimens deposited by Borg in the Herbarium of the Jardí Botànic de la Universitat de Valéncia (JBV). The specimens were collected in 1913 and consist of nine individuals from Dingli-Ghar Bittija (specimen code VAL 135529) and twenty from Nadur, Gozo (specimen code VAL 135530). The distinction between the laciniate leaf margins of the Dingli-Ghar Bittija population and the smooth leaf margins of the Nadur population is marked, but generally unremarkable when considering the variation in leaf morphology characteristic of other members of the tribe.

The population originally recorded in Gozo was numerous ("*abbondantissima*") but restricted to an extent of a few hundred metres along a path. It was growing in compacted soil, coexisting with *Trifolium suffocatum*, *Plantago coronopus*, *Plantago bellardi*, *Cichorium spinosum*, *Filago prostrata* and *Romulea* sp. The population recorded by Borg (1927) at Dingli-Ghar Bittija was growing in a country lane, a habitat which, in the authors' experience, is also characterised by compacted soil and a similar species pool. Borg further remarked that the 'typical plant' in Gozo was growing on clayey soil and the variety at Dingli-Ghar Bittija on 'red soil' ("terreno rosso"). The distribution of records of *Crepis pusilla* in Malta is shown in Figure 2.

The species has, in view of its importance, been followed by several students of the local flora since. The populations recorded by Sommier (1907) and Borg (1909) in Gozo have not been found again. The only site from where it is currently known is Dingli-Ghar Bittija, presumably in or close to the location where it was found by Borg (1909), although the natural habitat type has been drastically reduced in the area due to road surfacing and infrastructure over the years. Other authors who have recorded this species include Lanfranco (1969), Lanfranco (1974), Haslam et al. (1977) and Brullo et al (2020). All these records referred to the population at Dingli-Ghar Bittija.

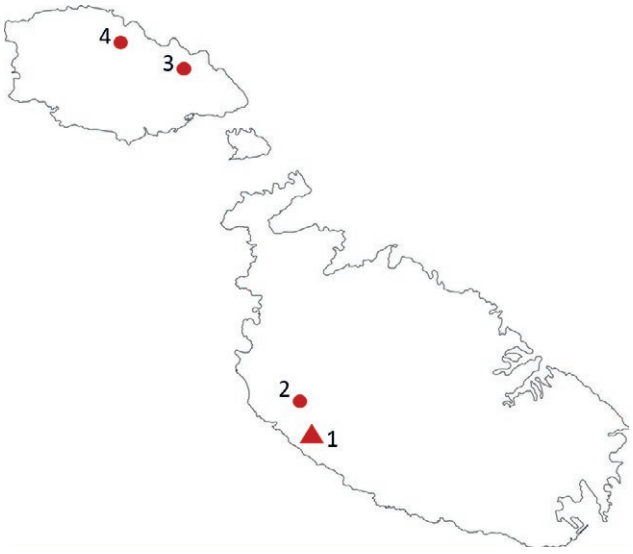

Figure 2. Distribution of past (discs) and present (triangle) records of *Crepis pusilla* from Malta. 1: Dingli - Ghar Bittija (Borg,1909), 2: Dingli - Wied Liemu (Borg, 1909) 35°52'29"N, 14°22'29"E, 3: Nadur (Sommier, 1907) 36°03'06"N, 14°18'03"E, 4: Marsalforn – L-Arkata tan-Nofs (Borg, 1909) 36°03'59"N, 14°22'59"E. The coordinates of points 2, 3, and 4 were inferred from literature and are therefore approximate, with a precision of approximately 1 km^2.

The habitat of the species in its remaining site is restricted to compacted coastal soils in clearings of a primordial *Periploco-Euphorbietum dendroidis*, now mainly occupied by agricultural areas. According to Brullo et al. (2020), *Crepis pusilla* is an indicator of the *Allietum lojaconoi* association and is a characteristic species of the *Plantagini-Catapodion balearica* alliance. Conversely, Bergmeier (2001) reports the species as being characteristic of shallow seasonal rockpools in Gavdos, Greece, where it is part of the *Tillaea alata-Crepis pusilla* community. Similar pools in Malta have been well-studied since 1988 (Lanfranco and Cuschieri, 2018) and although some of its companion species in the Gavdos pools (such as *Lythrum hyssopifolia* and *Juncus hybridus*) have been regularly noted from pools in Malta, *Crepis pusilla* itself has not.

The aim of this study was to survey the only currently-known location in Malta (Dingli-Ghar Bittija) colonised by this species in order to census the population size as accurately as possible and to map the distribution of individual plants. This is being done to better inform present and future conservation efforts regarding this species.

The present work on *Crepis pusilla* was carried out in the framework of LIFE Seedforce (LIFE20 NAT/IT/001468). The main aim of this project is to improve the conservation status of 29 EU Habitats Directive Annex II species with an 'Unfavourable-Inadequate' or 'Unfavourable-Bad' conservation status, according to reporting under Habitats Directive Article 17.

MATERIALS AND METHODS

Site of study

The only remaining location where *Crepis pusilla* is known to occur is situated at Dingli-Ghar Bittija, southwestern Malta (location: 35°51'24''N, 14°22'29''E). The site is a country path approximately 150 m in length and 4 m wide, oriented along an approximate east-west axis. The surface layer of the path consists of compacted topsoil that is deeper towards the margins of the path. In many parts of the path, the topsoil is eroded, exposing the underlying Upper Coralline Limestone bedrock. The path is bordered by dry stone walls approximately 2 m high with agricultural land along its northern margin. The southern margin of the path runs approximately parallel to an asphalted road along the cliff edge. Major disturbances, caused by infrastructural work close to the western end of the path, have been noted since 2018.

Survey method

The authors undertook a detailed survey of the population during the Winter/Spring 2023 growing season, making ten visits during the period between 1 March 2023 and 23 May 2023 using ground surveying augmented by UAV-assisted imagery. During this period, the temperature displayed a gradual warming trend (mean shade temperature: 14.1°C to 19.3°C; maximum: 26.7°C on 30 April). Approximately 54.3 mm of rain in seven rainfall events (> 1.0 mm) were recorded. The period of the year selected for survey was, based on the authors' previous observations, known to coincide with the vegetative, flowering, and fruiting phases of the life cycle. During this survey, the number of plants was enumerated, their size measured, and phenological state noted. The diameter of all rosettes was measured. Other patches of potentially suitable habitat in the vicinity were surveyed but no other individuals or populations were noted. During each visit, the country path was surveyed carefully by a team of at least three observers and the position of every known or suspected *Crepis pusilla* individual or cluster was indicated using a removable plastic site-marker. The phenological state of each individual, categorised as 'vegetative', 'flowering', 'fruiting' or 'dry', was noted during each visit. The species may

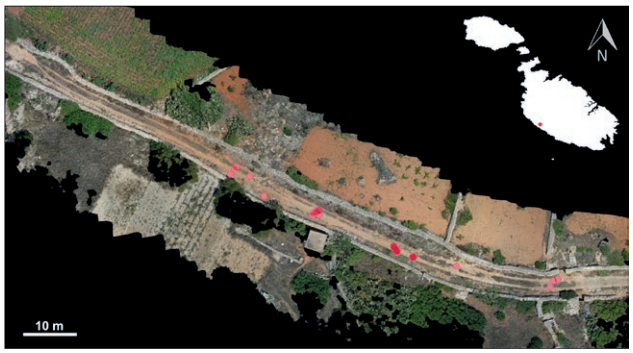

Figure 3. Site area of recorded *Crepis pusilla* population with approximate location of clusters of plants (marked by red discs) April 2023. Base photograph is an orthorectified image derived from drone photography and produced by the authors. An outline map of Malta is inset, showing the approximate location of the site with a red dot.

easily be confounded with juvenile *Cichorium spinosum* or *Plantago coronopus*, both of which can occupy the same habitat, and definitive identification was therefore only possible during the flowering phase. The position of every confirmed *Crepis pusilla* individual was determined in terms of x and y displacement relative to an internal frame of reference with a fixed origin and orientation and was accurate to the nearest centimetre. The coordinates obtained for each plant were used to draw a distribution map in R (R Core Team, 2023). This distribution map was overlain on an orthomosaic of the study area obtained through drone photography from an altitude of 30 m, giving a map showing the precise location of each plant against the background. This composite map (Fig. 3), if generated annually, can be used to monitor and evaluate changes in the abundance and distribution of the population.

Identification

The identity of the individual plants was determined during the flowering phase with reference to the description of the species given by Sommier and Caruana Gatto (1915).

Reproductive effort

The reproductive effort of the plants was estimated by calculating the number of seeds produced by each plant, based on a sample of five plants. The number of seeds collected was intentionally limited to this number to minimise impact on natural recruitment.

RESULTS

Population size and distribution

The field surveys indicated a total of 27 confirmed individuals or close clusters of *Crepis pusilla* with a diameter ranging between 0.9 cm to 4.8 cm (mean 2.5 cm ± s.d. 0.9 cm). This does not imply a population of 27 genetically-distinct individual plants, as some of the plants that were in very close proximity may have either originated from the rhizomes of the same individual or from distinct seeds germinated in close proximity. Nonetheless, this could not be confirmed without removing the plant from the soil, a course of action that the authors obviously could not resort to. The spatial distribution was distinctly non-uniform, with several individuals clustered in clumps. The distribution of the population is shown in Fig. 3, and it is concentrated within a span of 60 m of the path. The *C. pusilla* plants were mainly associated with the central zone of the path, which is most exposed to sunlight and disturbance from trampling, and where the topsoil is most compacted. The species was syntopic with *Erodium moschatum, Galactites tomentosus, Glebionis coronaria, Hordeum* sp., *Lobularia maritima, Medicago polymorpha, Plantago lagopus, Plantago coronopus, Silene colorata, Sonchus oleraceus*, *Romulea varicolor*, *Romulea melitensis*, and *Trifolium nigrescens* all of which were more abundant. The persistence of *Crepis pusilla* in the central portion of the path, where vegetation cover is sparse and soil confluence is low, suggests that it is intolerant of interspecific competition. This hypothesis is not supported by any experimental evidence at the moment and should be tested in a future study prior to the implementation of any targeted reinforcement programmes.

Phenology

Vegetative plants were first noted in February 2023. All plants were still in this phenological state up to early April. First flowering was noted on 11 April 2023. Six days later, on 17 April, peak flowering (defined as the

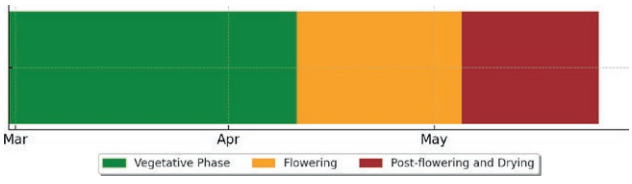

Figure 4. Representation of the phenological cycle of *Crepis pusilla* in 2023. Peak flowering was recorded on 17 April 2023.

maximum rate of flowering) was noted as 18 plants were flowering, and some were fruiting. The last flowering was observed on 5 May 2023. During this visit, one plant was still in flower and fruiting, 21 plants were dry and five still retained some foliage. No new plants or plant structures were observed after this date. The phenological pattern observed during the period of study is summarised in Figure 4.

Reproductive effort

Preliminary measurements suggest that each plant produces c. 150 achenes although the sample was too small to assess variability across the whole population. No direct pollination was observed during the field visits. However, the small, inconspicuous flowers situated at ground level suggest that apterous insects would be plausible candidates for this function. Similarly, no specific observations of seed dispersal were carried out. However, initial observations suggest that wind-assisted or surface runoff-assisted dispersal are probable routes.

DISCUSSION AND CONCLUSIONS

The results of this study represent the first precise quantification of the population size, distribution and phenological cycle of this plant in Malta.

Distribution

Apart from the initial records of Sommier (1907) and Borg (1909), there are no new published records of the distribution of the species in Malta. However, the pattern of past records suggests that both the extent of occurrence and the area of occupancy have decreased considerably. Of the four sites recorded in 1907-1909, only one (Dingli-Ghar Bittija) still supports a population of the species (Fig. 2). The present population at Dingli-Ghar Bittija is the only one referred to in the literature since at least 1969 (Lanfranco, 1969) and has been the only one known since the late 1940s (G. Lanfranco, pers. Comm. to S. Lanfranco, 2002). Similarly, there are no quantitative records of population size. However, the adjectives used by Sommier (1907) and Borg (1909), "abbondantissima" in Gozo and "molto abbondante" at Dingli-Ghar Bittija suggest that population sizes at the time were larger than they are today. Brullo et al. (2020) recorded the species in two relevés taken in April 1984, with Braun-Blanquet (BB) abundance indices of '1' and '2', with the relevé assigned BB-2 suggesting higher abundance than that recorded during this study. The reasons for this population decline have not been investigated, although they are probably related to urbanisation and consequent habitat loss in the vicinity of the areas from where the plant was recorded. Interspecific competition may also be a contributing factor. However, at present, with no studies beyond the casual-observational, this is speculation.

Habitat

The remaining habitat of the plant in Malta is a coastal country path with compacted terrarossa topsoil. Similarly, in Gozo, Sommier (1907) recorded the plant growing in compacted clayey soil whilst Borg (1909) noted the plant in uncompacted terrarossa soil at Dingli-Wied Liemu (Site 2 in Fig. 2). In other parts of its Mediterranean range, the habitat is similar. In Mallorca, the plant is recorded from annual grasslands, on clayey soils with high water retention, often coexisting with *Gymnostyles stolonifera*, *Asteriscus aquaticus*, *Filago pyramidata*, *Filago petroiani*, and *Centaurium pulchellum* (Sáez and Rosselló, 2001). The habitat in Gavdos (Bergmeier 2001) is different, where the plant was recorded as a component of the flora of the margins of seasonal pools, along with *Tillaea alata*.

Phenology

The phenological cycle cannot be compared to detailed records, as none were traced in the literature. However, Sommier (1907), in his description of the species, indicated that the plant was flowering on 15 April 1906 (the date of first discovery) and flowering and fruiting on 28 April 1907. Similarly, plants collected by Borg on 11 April 1913, and deposited in the JBV herbarium, were flowering and fruiting. The period of flowering and fruiting of the original population therefore coincides with the one observed during the present study. It stands to reason that an empirical study conducted over several years is necessary to characterise the phenological cycle in greater detail.

Conservation status

The entire population is concentrated in a single country path and should therefore be considered to have a regional IUCN conservation status of "Critically Endangered" [CR: C2a(i, ii)+D] (IUCN Standards and Petitions Committee, 2022). Improvement of the conservation status to 'favourable' would necessitate extensive

population reinforcement, a process that would only be plausible if the characteristics of the life cycle are known in detail. As such, further studies on the reproductive effort, germination requirements and growth of this species must be considered essential.

Recommendations

It is recommended that the procedure described in the present study is repeated annually to ensure that the interannual variation in population size is well-characterised. Moreover, targeted surveys in potentially suitable locations, including the *locus classicus* in Nadur, Gozo, should be carried out annually to ascertain the persistence or otherwise of the species as well as to identify candidate sites for targeted reinforcement of the local population. Subsequent studies should also focus on identification of any lifecycle bottlenecks and address the issue of reduced dispersal and range extension of the population.

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AUTHORS' CONTRIBUTIONS

Conceptualization: LC, RGR, JB, SL. Data curation: LC, RGR, SL. Formal analysis: LC, RGR, SL. Funding acquisition: JB, SL. Investigation: LC, RGR, JB, SL. Methodology: LC, RGR, SL. Resources: SL. Supervision: JB, SL. Visualization: LC, RGR. Project administration: JB, SL. Software: SL, LC, RGR. Validation: LC, RGR, JB, SL. Writing – original draft: LC, RGR, SL. Writing – review and editing: LC, RGR, JB, SL.

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