Nomenclatural Notes on *Garcinia* (Clusiaceae) from Madagascar and the Comoros

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Abstract. New results from phylogenetic analyses utilizing chloroplast and nuclear DNA markers agree with morphology in support of the unification of all of *Rheedia* L. and part of *Ochrocarpos* Thouars with *Garcinia* L. and show that species occurring in Madagascar and the Comoros fall into four separate lineages, which are designated here as informal species groups. An examination of *Garcinia* from these areas results in the recognition of 32 currently described species, all but one of which are endemic. The widespread African species, *G. livingstonei* T. Anderson, is noted for the first time to occur in Mayotte. Eleven new combinations are published here: *G. ambrensis* (H. Perrier) P. Sweeney & Z. S. Rogers, *G. anjouanensis* (H. Perrier) P. Sweeney & Z. S. Rogers, *G. arenicola* (Jumelle & H. Perrier) P. Sweeney & Z. S. Rogers, *G. calcicola* (Jumelle & H. Perrier) P. Sweeney & Z. S. Rogers, *G. dalleizettei* (H. Perrier) P. Sweeney & Z. S. Rogers, *G. mangorensis* (R. Viguier & Humbert) P. Sweeney & Z. S. Rogers, *G. multifida* (H. Perrier) P. Sweeney & Z. S. Rogers, *G. parvula* (H. Perrier) P. Sweeney & Z. S. Rogers, *G. thouvenotii* (H. Perrier) P. Sweeney & Z. S. Rogers, *G. tsaratananensis* (H. Perrier) P. Sweeney & Z. S. Rogers), and *G. urschii* (H. Perrier) P. Sweeney & Z. S. Rogers. Three new names, *G. dauphinensis* P. Sweeney & Z. S. Rogers, *G. megistophylla* P. Sweeney & Z. S. Rogers, and *G. tsimatimia* P. Sweeney & Z. S. Rogers, are provided for *O. parvifolius* Scott-Elliot, *R. megaphylla* H. Perrier, and *R. pedicellata* (Jumelle & H. Perrier) H. Perrier, respectively. Lectotypes are designated for 12 names: *G. crassiflora* Jumelle & H. Perrier, *G. disepala* Vesque, *G. melleri* Baker, *G. polyphlebia* Baker, *G. verrucosa* Jumelle & H. Perrier, *O. ambrensis* H. Perrier, *O. macrophyllus* O. Hoffmann, *O. parvifolius*, *O. parvulus* H. Perrier, *O. tsaratananae* H. Perrier, *R. arenicola* Jumelle & H. Perrier, and *R. calcicola* Jumelle & H. Perrier.

Key words: Clusiaceae, Comoros, *Garcinia*, Guttiferae, Madagascar, *Mammea*, *Ochrocarpos*, *Rheedia*, *Tsimatimia*, *Xanthochymus*.

When broadly circumscribed, the genus *Garcinia* L. contains more than 250 species (Jones, 1980; Stevens, 2006) of mostly small- to medium-sized dioecious trees and has a pantropical distribution with centers of diversity in Madagascar and Southeast Asia. *Garcinia mangostana* L., known by the common name mangosteen, is probably the most widely recognized member of the genus, being a popular fruit tree from Southeast Asia and the subject of a burgeoning herbal supplement industry. The genus is notable for its high sympatric species diversity (e.g., Whitmore, 1998; Lee et al., 2002; Thomas et al., 2003) and the large amount of morphological variation present in the flowers.

Almost since its inception, the limits of *Garcinia* and related genera, including four with representatives in Madagascar, i.e., *Ochrocarpos* Thouars, *Rheedia* L., *Tsimatimia* Jumelle & H. Perrier, and *Xanthochymus* Roxburgh, have been debated (e.g., Planchon & Triana, 1860; Vesque, 1893; Engler, 1893, 1925; Jumelle & Perrier de la Bâthie, 1910; Perrier de la Bâthie, 1948, 1951; Robson, 1958; Adams, 1970; Jones, 1980; Gustafsson et al., 2002; Stevens, 2006). In the last infrageneric classification of the group, Jones (1980) adopted a broad concept of the genus (including *Ochrocarpos* p.p., *Rheedia*, *Tsimatimia*, and *Xanthochymus*) and recognized 14 sections that were delimited largely by staminate floral morphology.

Recently, a broad-scale molecular phylogenetic study of *Garcinia* utilizing two nuclear DNA markers

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(granule-bound starch synthase [GBSSI] and ITS) has been completed (Sweeney, 2008). The results of that study, which include a geographically, taxonomically, and morphologically comprehensive sampling of species, indicate that a broad circumscription of the genus *Garcinia* is supported (sensu Jones, 1980; Stevens, 2006) and suggests that the genus has representatives from four lineages in Madagascar and the Comoros. Two of these lineages have taxa that are widely treated as *Garcinia*, whereas the remaining two include members that were placed into the genera *Ochrocarpos* and *Rheedia* by Perrier de la Bâthie (1948, 1951).

Perrier de la Bâthie (1951) placed all Malagasy Clusiaceae with unisexual flowers and fused sepals in bud into *Ochrocarpos*. Kostermans (1956, 1961) and de Wilde (1956) both commented on the affinity of some species of *Ochrocarpos* to *Mammea* L., with de Wilde (1956) suggesting that *Ochrocarpos* in its entirety should be sunk into *Mammea*. While Kostermans (1956, 1961) thought that all of the Asian and some of the Malagasy *Ochrocarpos* should be moved into *Mammea*, he doubted that Malagasy *Ochrocarpos* completely belonged there, suggesting instead that *Ochrocarpos*, in part, should be maintained to include those species of the genus with phalangiate androecia and leaves lacking the higher order venation he considered to be characteristic of true *Mammea* (see below). Earlier, Vesque (1893: 482) regarded species of *Ochrocarpos* as being closely related to *Garcinia* and transferred *O. decipiens* Baillon into *Garcinia*. Jones (1980) and Stevens (2005) agreed that *Ochrocarpos* comprised two different groups of species, one related to *Garcinia* and the other to *Mammea*. The *Ochrocarpos* species related to *Garcinia* can be recognized by their seeds, which possess an embryo with a grossly swollen (vs. unswollen) hypocotyl and minute (vs. large) cotyledons, by the stamens arranged in phalangiate (vs. non-phalangiate or fasciculate) androecia in the staminate flowers, and by the leaves without punctate glands and with exudate-containing canals transversely intersecting the secondary veins (vs. leaves with punctate glands occupying the areoles and rarely with exudate-containing canals). Minute cotyledons are less than 1/10 of the length of the embryo, and large cotyledons account for most of the embryo (Brandza, 1908; Stevens, 2006). The affinity of the *Ochrocarpos* species possessing non-fasciculate androecia to *Mammea* has recently been supported by a combined phylogenetic analysis of molecular and morphological data (Notis, 2004), and the molecular phylogenetic study of Sweeney (2008) supports the placement of the *Ochrocarpos* species with phalangiate androecia in *Garcinia*. Kostermans (1956, 1961) and Stevens (2005) have transferred Malagasy species to *Mammea*, but four *Ochrocarpos* species with phalangiate androecia treated by Perrier de la Bâthie (1951) still lack valid names in *Garcinia*. Perrier de la Bâthie (1948, 1951) recognized *G. cauliflora* Baker, but Stevens (2005) transferred the species to *Mammea*, creating the combination, *M. cauliflora* (Baker) P. F. Stevens.

Earlier authors distinguished the genus *Rheedia* from *Garcinia* by its flowers possessing two sepals instead of four (e.g., Planchon & Triana, 1860; Engler, 1893, 1925). Robson (1958) correctly pointed out that this distinction breaks down when one takes into account the total variation within the two genera. Robson (1958) and later Adams (1970) argued for the inclusion of *Rheedia* in *Garcinia*, and this circumscription has been adopted in recent treatments (e.g., Kearns et al., 1998; Schatz, 2001). Molecular phylogenetic studies support this view (Gustafsson, 2002; Sweeney, 2008). Robson (1958) noted that *Rheedia* and *Garcinia* were published simultaneously and that, when united, *Garcinia* should be the preferred generic name in consideration of its size. Ten species recognized as *Rheedia* by Perrier de la Bâthie (1951) lack valid names in *Garcinia*.

Molecular phylogenetic data, strongly supported by morphology, suggest that the *Garcinia* of Madagascar and the Comoros belong to four different clades that generally correspond to previously recognized taxonomic sections within *Garcinia*. Each of these clades is made up of species that share unique combinations of morphological characters (Sweeney, 2008). The 32 species recognized in the synopsis (Table 1) are placed, using morphology, into one of four informal groups that correspond to those clades identified in the molecular analyses. While our groups roughly correspond to previously recognized sections, we do not assign species to formally named sections because our groups do not absolutely correspond to any previous author's circumscription. These groups can be identified with the accompanying key and illustrations of the staminate and pistillate flowers of representative species of all four groups (Figs. 1, 2). Fourteen species lack names in the genus, thus leading us to propose 11 new combinations and three new names for 10 species in *Rheedia* and for four species from *Ochrocarpos*.

The typification status of all names is addressed following the protocol employed by Turland and Jarvis (1997: 458–461). Our investigation is based on an examination of herbarium specimens deposited at B, BM, G, K, MO, P, TAN, and TEF.

A Key to the Four Species Groups of *Garcinia* in Madagascar and the Comoros

1a. Staminate flowers with a disk occupying the center of the flower; pistillate flowers with an annular or lobed disk beneath the ovary.

Table 1. The 32 species of *Garcinia* in Madagascar and the Comoros, their previous assignment in Perrier de la Bâthie (1951), and the species group to which each is assigned here. The four species groups are recognized by morphology and supported by evidence of the first author (Sweeney, 2008) utilizing the two nuclear DNA markers GBSSI and ITS.

Species group	Accepted name	Previous assignment
Brindonia group	*Garcinia asterandra* Jumelle & H. Perrier	*Garcinia asterandra* Jumelle & H. Perrier
	G. chapelieri (Planchon & Triana) H. Perrier	*G. chapelieri* (Planchon & Triana) H. Perrier
	G. crassiflora Jumelle & H. Perrier	*G. crassiflora* Jumelle & H. Perrier
Paragarcinia group	*Garcinia cerasifer* (H. Perrier) P. F. Stevens	*Ochrocarpos cerasifer* H. Perrier
	G. dauphinensis P. Sweeney & Z. S. Rogers	*O. parvifolius* Scott-Elliot
	G. decipiens (Baillon) Vesque	*O. decipiens* Baillon
	G. disepala Vesque	*O. multiflorus* O. Hoffmann
	G. madagascariensis (Planchon & Triana) Pierre	*Rheedia madagascariensis* Planchon & Triana
	G. melleri Baker	*O. madagascariensis* Choisy (non Planchon & Triana)
	G. multifida (H. Perrier) P. Sweeney & Z. S. Rogers	*O. multifidus* H. Perrier
	G. orthoclada Baker	*O. orthocladus* (Baker) H. Perrier
	G. parvula (H. Perrier) P. Sweeney & Z. S. Rogers	*O. parvulus* H. Perrier
	G. pauciflora Baker	*G. pauciflora* Baker
	G. polyphlebia Baker	*G. chapelieri* (Planchon & Triana) H. Perrier
	G. tsaratananensis (H. Perrier) P. Sweeney & Z. S. Rogers	*O. tsaratananae* H. Perrier
Rheedia group	*Garcinia ambrensis* (H. Perrier) P. Sweeney & Z. S. Rogers	*Rheedia ambrensis* H. Perrier
	G. anjouanensis (H. Perrier) P. Sweeney & Z. S. Rogers	*R. anjouanensis* H. Perrier
	G. aphanophlebia Baker	*R. aphanophlebia* (Baker) H. Perrier
	G. arenicola (Jumelle & H. Perrier) P. Sweeney & Z. S. Rogers	*R. arenicola* Jumelle & H. Perrier
	G. calcicola (Jumelle & H. Perrier) P. Sweeney & Z. S. Rogers	*R. calcicola* Jumelle & H. Perrier
	G. commersonii (Planchon & Triana) Vesque	*R. madagascariensis* (Planchon & Triana) H. Perrier
	G. dalleizettei (H. Perrier) P. Sweeney & Z. S. Rogers	*R. dalleizettei* H. Perrier
	G. livingstonei T. Anderson	
	G. mangorensis (R. Viguier & Humbert) P. Sweeney & Z. S. Rogers	*R. mangorensis* R. Viguier & Humbert
	G. megistophylla P. Sweeney & Z. S. Rogers	*R. megaphylla* H. Perrier
	G. pervillei (Planchon & Triana) Vesque	*R. pervillei* Planchon & Triana
	G. thouvenotii (H. Perrier) P. Sweeney & Z. S. Rogers	*R. thouvenotii* H. Perrier
	G. tsimatimia P. Sweeney & Z. S. Rogers	*R. pedicellata* (Jumelle & H. Perrier) H. Perrier
	G. urschii (H. Perrier) P. Sweeney & Z. S. Rogers	*R. urschii* H. Perrier
Xanthochymus group	*Garcinia capuronii* Z. S. Rogers & P. Sweeney	
	G. lowryi Z. S. Rogers & P. Sweeney	
	G. verrucosa Jumelle & H. Perrier	*G. verrucosa* Jumelle & H. Perrier

2a. Stamens and staminodes free in staminate and pistillate flowers . . . . Rheedia group (Fig. 1A–D)

2b. Stamens and staminodes phalangiate in staminate and pistillate flowers . . . . . Xanthochymus group (Fig. 1E, F)

1b. Staminate flowers lacking a disk and instead with a mushroom-shaped pistillode or with stamens occupying the center of the flower; pistillate flowers lacking a disk.

3a. Sepals 4 and free in bud; staminate flowers lacking a well-developed pistillode and stamens free; ovary in pistillate flowers and fruit with deep furrows down the septal radius . . . . . Brindonia group (Fig. 2A–E)

3b. Sepals usually 2 and fused in bud; staminate flowers with a mushroom-shaped pistillode and with stamens in phalanges; ovary in pistillate flowers and fruit usually lacking furrows down the septal radius . . . . . Paragarcinia group (Fig. 2F–H)

Discussion of Species Groups

Rheedia group

Thirteen members of this group (Table 1; Fig. 1A–D) were treated as *Rheedia* by Perrier de la Bâthie (1951) and were placed into Jones' (1980) invalidly published *Garcinia* sect. *Rheedia*. The new report of *G. livingstonei* T. Anderson from Mayotte material marks the first instance the species has been found occurring naturally outside of continental Africa. The 14 species of this group in Madagascar and the Comoros can be recognized by their staminate flowers having numerous free stamens surrounding a disk located in the center of the flower (or inserted on disk in *G. livingstonei*) and by their pistillate flowers with an annular disk beneath the ovary. The results of Sweeney (2008) suggest that the

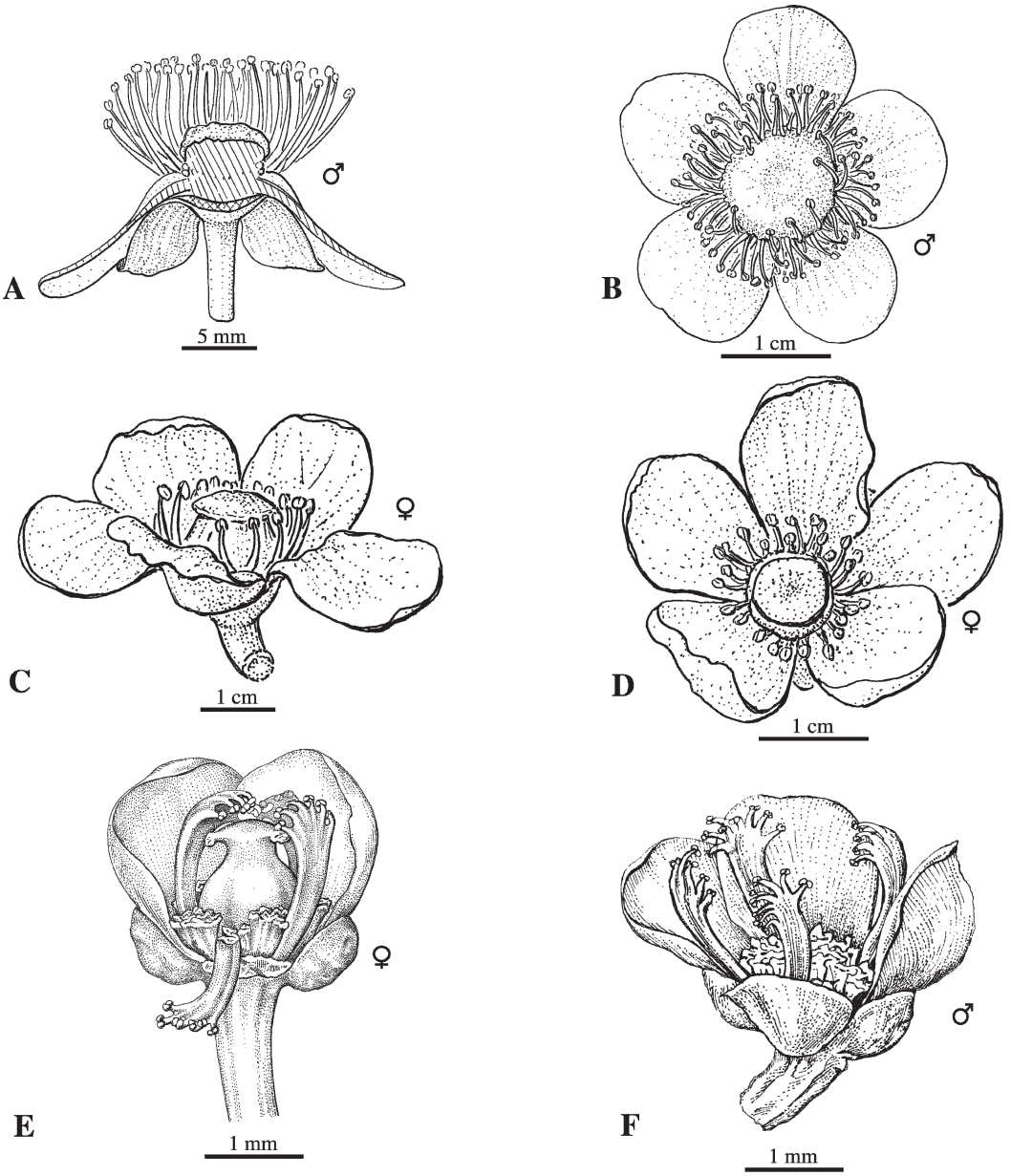

Figure 1. A–D. Rheedia group: *Garcinia commersonii*. —A, B. Staminate flowers, showing numerous free stamens and the central disk. —C, D. Pistillate flowers, showing numerous free staminodes (disk not visible). E, F. Xanthochymus group: *Garcinia lowryi*. —E. Pistillate flower, showing four antepetalous phalanges alternating with disk lobes (one sepal and two petals removed, phalange in foreground broken). —F. Staminate flower, showing four antepetalous phalanges and the central disk (one petal in foreground removed). Sources: A, B, *G. Schatz et al. 3371* (MO); C, D, *Service Forestier 22875* (MO); E, *N. Dumetz & G. McPherson 1156* (MO); F, *G. McPherson & N. Dumetz 14648* (TEF). A–D illustrated by J. Myers; E, F illustrated by L. R. Andriamiarisoa.

Malagasy and Comorian *Rheedia* and *G. livingstonei* are sister taxa, and that clade is sister to a clade of South American *Rheedia*. The entire Rheedia group plus the *G. livingstonei* clade is nested within a group of African *Garcinia* representing *Garcinia* sect. *Rheediopsis* Pierre (sensu Jones, 1980).

Included species. *Garcinia ambrensis* (H. Perrier) P. Sweeney & Z. S. Rogers, *G. anjouanensis* (H. Perrier) P. Sweeney & Z. S. Rogers, *G. aphanophlebia* Baker, *G. arenicola* (Jumelle & H. Perrier) P. Sweeney & Z. S. Rogers, *G. calcicola* (Jumelle & H. Perrier) P. Sweeney & Z. S. Rogers, *G. commersonii*

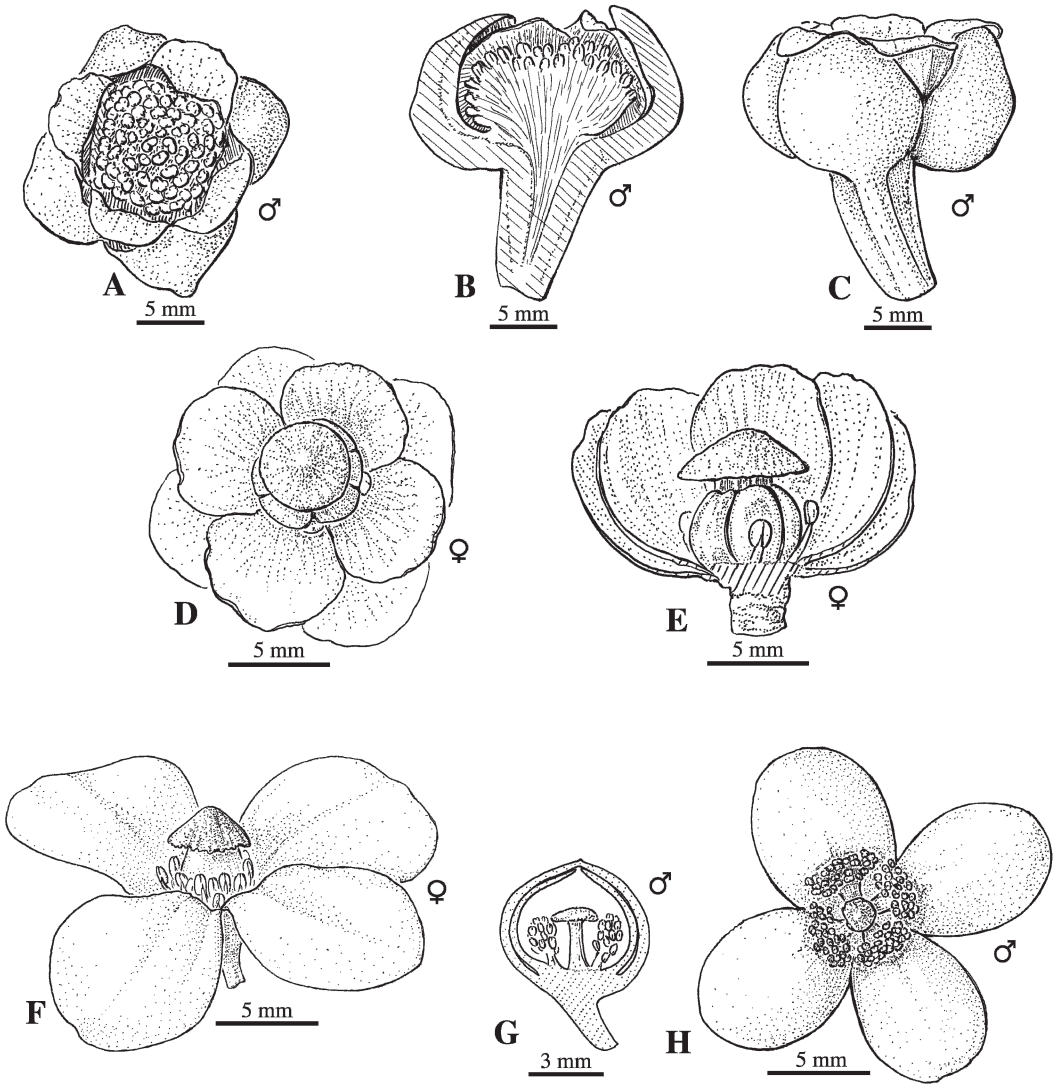

Figure 2. A–E. Brindonia group: *Garcinia chapelieri*. —A–C. Staminate flowers, showing four sepals, four petals, and numerous free stamens. —D, E. Pistillate flowers, showing several deep furrows down the septal radius of the ovary (E with two sepals and one petal removed). F–H. Paragarcinia group: *Garcinia decipiens*. —F. Pistillate flower, showing four petals (sepals not visible), several free stamens, the ovary, and the stigma. —G. Staminate flower bud, longitudinal section, showing fused two sepals, two petals, two phalanges, and the mushroom-shaped pistillode. —H. Staminate flower, showing petals, four antepetalous phalanges, and the pistillode. Sources: A–C, *G. Schatz et al. 3373* (MO); D, E, *P. Lowry et al. 4000* (MO); F, *J. Aridy & A. Moïse 183* (MO); G, H, *Service Forestier 21601* (P). All parts illustrated by J. Myers.

(Planchon & Triana) Vesque, *G. dalleizettei* (H. Perrier) P. Sweeney & Z. S. Rogers, *G. livingstonei* T. Anderson, *G. mangorensis* (R. Viguier & Humbert) P. Sweeney & Z. S. Rogers, *G. megistophylla* P. Sweeney & Z. S. Rogers, *G. pervillei* (Planchon & Triana) Vesque, *G. thouvenotii* (H. Perrier) P. Sweeney & Z. S. Rogers, *G. tsimatimia* P. Sweeney & Z. S. Rogers, *G. urschii* (H. Perrier) P. Sweeney & Z. S. Rogers.

XANTHOCHYMUS GROUP

Until recently, this group (Table 1; Fig. 1E, F) was represented in Perrier de la Bâthie (1951) by *Garcinia verrucosa* Jumelle & H. Perrier, an endemic Malagasy species, but two additional species were described by Rogers and Sweeney (2007). The three species representing this group in Madagascar are distinct from other Malagasy and Comorian *Garcinia* by having

staminate flowers lacking a pistillode and possessing four antepetalous phalanges that are composed of incompletely fused filaments surrounding a disk in the center of the flower and by their pistillate flowers with a lobed disk beneath the ovary (lobes alternate with the phalanges). *Garcinia verrucosa* is placed among a monophyletic group of species from *Garcinia* sect. *Xanthochymus* (sensu Jones, 1980) by molecular data (Sweeney, 2008). This clade has species distributed into Africa, Madagascar, India, Nepal, southern China, and Malesia (Sweeney, 2008).

Included species. *Garcinia capuronii* Z. S. Rogers & P. Sweeney, *G. lowryi* Z. S. Rogers & P. Sweeney, *G. verrucosa*.

BRINDONIA GROUP

In Madagascar this group (Table 1; Fig. 2A–E) contains three of the six species treated as *Garcinia* by Perrier de la Bâthie (1951) and is distinct from the other groups by having flowers with four sepals free in bud and staminate flowers that possess numerous stamens occupying the center of the flower (pistillode and disk absent), and by ovaries and fruits usually with deep furrows down the septal radius. Molecular phylogenetic analyses (Sweeney, 2008) suggest that these species fall within a group comprised almost entirely of taxa previously placed into *Garcinia* sect. *Brindonia* by Jones (1980).

Included species. *Garcinia asterandra* Jumelle & H. Perrier, *G. chapelieri* (Planchon & Triana) H. Perrier, *G. crassiflora* Jumelle & H. Perrier.

PARAGARCINIA GROUP

This strictly Malagasy group contains 12 species (Table 1; Fig. 2F–H) and largely corresponds to *Garcinia* sect. *Paragarcinia* (Baillon) Vesque sensu Jones (1980). Eight species were previously recognized (Perrier de la Bâthie, 1951) in *Ochrocarpos* sect. *Paragarcinia* Baillon, while a ninth was unplaced within *Ochrocarpos*. Two species, *G. pauciflora* Baker and *G. polyphlebia* Baker, were last treated under *Garcinia*, and *G. madagascariensis* (Planchon & Triana) Pierre was treated as a synonym of the invalid combination *Rheedia madagascariensis* (Perrier de la Bâthie, 1951). The Paragarcinia group is characterized by flowers with two sepals fused in bud (except *G. madagascariensis* and *G. pauciflora*) and staminate flowers with a mushroom-shaped pistillode and four to eight or more antepetalous (occasionally branched) phalanges of sessile to subsessile stamens. Phylogenetic analyses including species from this group suggest that it is a strongly supported clade comprised entirely of taxa endemic to Madagascar; however, the exact position of this lineage within *Garcinia* remains unresolved (Sweeney, 2008).

Included species. *Garcinia cerasifer* (H. Perrier) P. F. Stevens, *G. dauphinensis* P. Sweeney & Z. S. Rogers, *G. decipiens* (Baillon) Vesque, *G. disepala* Vesque, *G. madagascariensis*, *G. melleri* Baker, *G. multifida* (H. Perrier) P. Sweeney & Z. S. Rogers, *G. orthoclada* Baker, *G. parvula* (H. Perrier) P. Sweeney & Z. S. Rogers, *G. pauciflora*, *G. polyphlebia*, *G. tsaratananensis* (H. Perrier) P. Sweeney & Z. S. Rogers.

A Synopsis of *Garcinia* in Madagascar and the Comoros

Thirty-two species of *Garcinia* are treated in this taxonomic synopsis (refer to Table 1 for species group designation). Thirty are endemic to Madagascar, *G. anjouanensis* is endemic to the Comoros, and *G. livingstonei* occurs in Mayotte and Africa. One dubious name, *Ochrocarpos madagascariensis* Choisy, is also discussed. This alphabetically arranged list includes 11 new combinations (*G. ambrensis*, *G. anjouanensis*, *G. arenicola*, *G. calcicola*, *G. dalleizettei*, *G. mangorensis*, *G. multifida*, *G. parvula*, *G. thouvenotii*, *G. tsaratananensis*, *G. urschii*) and three new names (*G. dauphinensis*, *G. megistophylla*, *G. tsimatimia*). Twelve names are lectotypified. *Garcinia ochrocarpoides* Jumelle & H. Perrier and *O. madagascariensis* were lectotypified by previous authors.

1. **Garcinia ambrensis** (H. Perrier) P. Sweeney & Z. S. Rogers, comb. nov. Basionym: *Rheedia ambrensis* H. Perrier, Mém. Mus. Natl. Hist. Nat., n.s., 24: 91. 1948. TYPE: Madagascar. "Près du lac Maudit, sur la Montagne d'Ambre, au N de la Grande Ile…," ♂ fl., *H. Perrier de la Bâthie 17730* (holotype, P030787; isotype, P030788).
2. **Garcinia anjouanensis** (H. Perrier) P. Sweeney & Z. S. Rogers, comb. nov. Basionym: *Rheedia anjouanensis* H. Perrier, Mém. Mus. Natl. Hist. Nat., n.s., 24: 91. 1948. TYPE: Comoros. "Anjouan…," ca. 700 m, fr., *Lavanchie 20* (holotype, P030789; isotype, P030790).
3. **Garcinia aphanophlebia** Baker, J. Linn. Soc., Bot. 25: 295. 1889. *Rheedia aphanophlebia* (Baker) H. Perrier, Mém. Mus. Natl. Hist. Nat., n.s., 24: 90. 1948. TYPE: Madagascar. "E. de la grande Ile…," ca. 500–1500 m, ♂ fl., *R. Baron next 5797* (holotype, K000240255; isotypes, K000240256, P030791).

The Kew sheet (K000240255) is the only relevant material bearing the collection number (i.e., "next 5797") as it was cited in the protologue (Baker, 1889:

295). On that sheet, someone anonymously marked out the "next 5797" and wrote in "5796." The other sheet at K (K000240256) is only numbered with "5796," whereas the final digit of the number on the P sheet (P030791) was changed anonymously from "7" to "6."

4. Garcinia arenicola (Jumelle & H. Perrier) P. Sweeney & Z. S. Rogers, comb. nov. Basionym: *Rheedia arenicola* Jumelle & H. Perrier, Ann. Sci. Nat. Bot., sér. 9, 11: 269. 1910. TYPE: Madagascar. "…région de Madirovalo, dans le Boina, et près de Manongarivo, dans l'Ambongo…sablonneux secs du Bongo-Lava," Oct. 1900, ♂ fl., *H. Perrier de la Bâthie 1119 bis* (lectotype, designated here, P030792).

Several unvouchered localities in northwestern Madagascar were prominently mentioned in the protologue of *Garcinia arenicola* (Jumelle & Perrier de la Bâthie, 1910: 270). Three separate collections (*Perrier de la Bâthie 1119*, *1119 bis*, *1119 ter*), each represented by a single sheet in the P herbarium, bear some part of the locality information from the protologue. Two of these (*1119 bis*, *1119 ter*) are annotated as types of the basionym in Perrier de la Bâthie's own hand, and *Perrier de la Bâthie 1119 bis* (P030792) is designated as the lectotype, as it is in the best condition. The two other collections are regarded as syntypes.

5. Garcinia asterandra Jumelle & H. Perrier, Ann. Sci. Nat. Bot., sér. 9, 11: 280. 1910. TYPE: Madagascar. "…Massif du Manongarivo…," 1400 m, ♂ fl., *H. Perrier de la Bâthie 5311* (holotype, P030763).

6. Garcinia calcicola (Jumelle & H. Perrier) P. Sweeney & Z. S. Rogers, comb. nov. Basionym: *Rheedia calcicola* Jumelle & H. Perrier, Ann. Sci. Nat. Bot., sér. 9, 11: 266. 1910. TYPE: Madagascar. "…dans la Moyenne-Mahavavy,…le Tompoketsa,…environs de Majunga,… ravin d'Antsahobé…," Oct. 1904, ♂ fl., imm. fr., *H. Perrier de la Bâthie 1752* (lectotype, designated here, P030795).

Several unvouchered localities were mentioned in the protologue of *Rheedia calcicola* (Jumelle & Perrier de la Bâthie, 1910: 268). These place names have been traced to two collections (*Perrier de la Bâthie 1752* and *8148*) deposited in the P herbarium that were annotated as types of the basionym in Perrier de la Bâthie's own hand. Sheet P030795 of *Perrier de la Bâthie 1752* bears staminate flowers and immature fruit and, as the most complete collection, is designated as the lectotype. Two sheets of *Perrier de la Bâthie 8148* were found at P (P030793, P030794). These syntypes only bear fruits.

7. Garcinia capuronii Z. S. Rogers & P. Sweeney, Syst. Bot. 32: 773. 2007. TYPE: "Fianarantsoa, Kianjavato, entre Ifanadiana et Anosivolo," 6 Dec. 1964, ♀ fl., fr., *Service Forestier (Capuron) 23916* (holotype, P030776; isotypes, P030774, P030775, P030777, TEF).

8. Garcinia cerasifer (H. Perrier) P. F. Stevens, Harvard Pap. Bot. 9: 433. 2005. Basionym: *Ochrocarpos cerasifer* H. Perrier, Mém. Mus. Natl. Hist. Nat., n.s., 24: 103. 1948. *Mammea cerasifer* (H. Perrier) Kostermans, Djawatan Kehutanan Indonesia Bagian Planologi Kehutanan, Djalen Perniagaan 44: 12. 1956. TYPE: Madagascar. "…Massif de l'Ikongo…," ca. 1400 m, fr., *R. Decary 5659* (holotype, P030860; isotypes, K00240251, P00389082, TAN000266).

9. Garcinia chapelieri (Planchon & Triana) H. Perrier, Mém. Mus. Natl. Hist. Nat., n.s., 24: 97. 1948. Basionym: *Ochrocarpos chapelieri* Planchon & Triana, Ann. Sci. Nat. Bot., sér. 4, 14: 366. 1860. TYPE: Madagascar. s. loc., imm. fr., *L. Chapelier s.n.* (holotype, P030769).

Perrier de la Bâthie (1948, 1951) treated *Garcinia polyphlebia* as a synonym of *G. chapelieri*. An examination of the original material of *G. polyphlebia* and *G. chapelieri* at K and P indicates that the two are quite different morphologically and that *G. polyphlebia* is instead closer to the former *Ochrocarpos* species of *Garcinia* (i.e., the Paragarcinia group herein). Given these differences, we resurrect *G. polyphlebia* (treated below). Newly collected pistillate material at MO closely matches the type material of *G. chapelieri* vegetatively, and the ovaries and fruits of this material have several distinctive furrows down the septal radius. Perrier de la Bâthie (1951: 60) described the fruits of *G. chapelieri* as smooth; however, the fruit description was probably based on the type material of *G. polyphlebia* under the assumption that the two species were synonymous.

10. Garcinia commersonii (Planchon & Triana) Vesque, Monogr. Phan. 8: 484. 1893. Basionym: *Rheedia commersonii* Planchon & Triana, Ann. Sci. Nat. Bot., sér. 4, 14: 312. 1860. TYPE: Madagascar. s. loc., ♀ fl., *P. Commerson s.n.* (holotype, P-JU 11865).

Garcinia pachyphylla Baker, J. Linn. Soc., Bot. 25: 295. 1889. TYPE: Madagascar. "North-west…," ♂ fl., *R. Baron 5757* (holotype, K000240238; isotypes, K000240239, P030798).

Ochrocarpos humblotii Drake, Bull. Mens. Soc. Linn. Paris 2: 1220. 1896, as "*Humbloti*." *Rheedia humbloti* (Drake) R. Viguier & Humbert, Rev. Gén. Bot. 25, bis: 637. 1914. TYPE: Madagascar. s. loc., ♂ fl., *L. Humblot 391* (holotype, P030800; isotypes, K000240243, K000240244, P030801, P030802).

Garcinia commersonii and its synonyms were previously recognized as synonyms of the invalid name "*Rheedia madagascariensis* (Planchon & Triana) H. Perrier" by Perrier de la Bâthie (1948: 92, 1951: 46). See further discussion of the name under *G. madagascariensis* (Planchon & Triana) Pierre. The provenance in the protologue of the original material (*Humblot 391*) for *Ochrocarpos humblotii* was cited as "Iles Comores, ou Madagascar?". However, Perrier de la Bâthie (1948: 92) indicated that the type was collected in the littoral forest of Madagascar, not the Comoros, and the taxon has apparently not been collected outside of Madagascar thus far.

11. Garcinia crassiflora Jumelle & H. Perrier, Ann. Sci. Nat. Bot., sér. 9, 11: 279. 1910. TYPE: Madagascar. "…dans le Manongarivo et le Sambirano," ♂ fl., fr., *H. Perrier de la Bâthie 5305* (lectotype, designated here, P030764; isotype, P030765).

In the protologue, Jumelle and Perrier de la Bâthie (1910: 280) cited the provenance of the original material as "Manongarivo et le Sambirano." Three relevant collections, *Perrier de la Bâthie 5305* (P030764, P030765), *5313* (P030767), and *5313 bis* (P030766), have been found at P, and all are annotated as types with the place of publication of the protologue in Perrier de la Bâthie's own hand, and bear inscriptions with at least one of the two place names mentioned in the protologue. *Perrier de la Bâthie 5305* (P030764) is the most complete specimen of the original material and is designated as the lectotype. The isolectotype consists of nothing more than a few fruits glued to the sheet. *Perrier de la Bâthie 5313* and *5313 bis* should be regarded as syntypes.

12. Garcinia dalleizettei (H. Perrier) P. Sweeney & Z. S. Rogers, comb. nov. Basionym: *Rheedia dalleizettei* H. Perrier, Mém. Mus. Natl. Hist. Nat., n.s., 24: 93. 1948. TYPE: Madagascar. "EST: Mt. Vatohazo, dans le bassin inférieur du Mangoro…," 300–400 m, ♂ fl., *H. Perrier de la Bâthie 18064* (holotype, P030796; isotype, P030797).

Two sheets of *Perrier de la Bâthie 18064* have been found at P. Sheet P030796 bears a lectotype sticker, but this is an error as the collection is the only original material cited in the protologue (Perrier de la Bâthie, 1948: 93).

13. Garcinia dauphinensis P. Sweeney & Z. S. Rogers, nom. nov. Replaced name: *Ochrocarpos parvifolius* Scott-Elliot, J. Linn. Soc., Bot. 29: 5. 1891. TYPE: Madagascar. "Woods near Fort Dauphin…," ♂ fl., *G. Scott-Elliot 2710* (lectotype, designated here, K000240237; isotypes, P00568804, P030823).

Two collections, *Scott-Elliot 2710* and *2840*, both noted to be collected near Fort Dauphin, were cited in the protologue (Scott Elliot, 1891: 5). The former, *Scott-Elliot 2710*, is the more complete collection, and the K sheet (K000240237), clearly annotated as the type specimen of *Ochrocarpos parvifolius*, is selected as the lectotype. The epithet *parvifolia* is validly occupied by *Garcinia parvifolia* (Miquel) Miquel (Miquel, 1864) for a species native to Peninsular Malaysia, Borneo, and Sumatra (Whitmore, 1973). We choose our new epithet to refer to the collection locality of the type specimen, but the species may occur as far north as the Masoala Peninsula.

14. Garcinia decipiens (Baillon) Vesque, Monogr. Phan. 8: 482. 1893. Basionym: *Ochrocarpos decipiens* Baillon, Adansonia 11: 370. 1876. TYPE: Madagascar. "Nossi-Bé, in humidis…," Jan. 1841, ♂ fl., *A. Pervillé 421* (holotype, P030815; isotypes, K000240241, P030816).

Ochrocarpos macrophyllus O. Hoffmann, Sert. Pl. Madagasc. 7. 1881. TYPE: Madagascar. "Nossi-komba," Dec. 1879, ♂ fl., *J. Hildebrandt 3239* (lectotype, designated here, P030818; isotypes, BM, K000240245, G00090054, P030817, P00462369).

Garcinia ochrocarpoides Jumelle & H. Perrier, Ann. Sci. Nat. Bot., sér. 9, 11: 275. 1910. *Ochrocarpos jumellei* R. Viguier & Humbert, Rev. Gén. Bot. 25, bis: 635. 1914, nom. illeg. superfl. TYPE: Madagascar. "Dans le massif du Manongarivo…bois du versant du Sambirano…," ♀ fl., *H. Perrier de la Bâthie 5312* (lectotype, designated by Perrier de la Bâthie, 1948: 109, P00462373).

The original material of *Ochrocarpos macrophyllus* (*Hildebrandt 3239*) deposited at B is no longer extant (R. Vogt, pers. comm.). Two sheets of original material are present at P, and the most complete (P030818) is designated as the lectotype.

Ochrocarpos jumellei R. Viguier & Humbert is illegitimate and superfluous according to Article 52.1 of the *International Code of Botanical Nomenclature* (McNeill et al., 2006: 92–93) because Viguier and Humbert (1914: 635) did not adopt the available epithet of the clearly indicated basionym when publishing the name.

15. Garcinia disepala Vesque, Epharmosis, part 2: pl. 159. 1889. *Ochrocarpos multiflorus* O. Hoffmann, Sert. Pl. Madagasc. 7. 1881. TYPE:

Madagascar. "Nossi-komba, arbor ad littora maris floribus lacteis…," Feb. 1880, ♂ fl., *J. Hildebrandt 3337* (lectotype, designated here, G00090050 [stamp 724413]; isotypes, G00090049 [2], G00090050 [stamp 724412], K00380200, P030820, P030821).

Ochrocarpos multiflorus and *Garcinia disepala* are homotypic, the former having been published about eight years before the latter, but the epithet already existed in *Garcinia* for the validly published *G. multiflora* Champion ex Bentham (1851), a name that pertains to a widespread Asian species occurring in southern China, Taiwan, and northern Vietnam (Li et al., 2007).

The original material of *Hildebrandt 3337* deposited at B is no longer extant (R. Vogt, pers. comm.), so the sheet at G bearing the accession number G00090050 and stamped with 724413 is designated as the lectotype.

16. **Garcinia livingstonei** T. Anderson, J. Linn. Soc., Bot. 9: 263. 1867. TYPE: Africa. "Hab. in rupibus schistosis prope flumen Zambesi, in horto botanico Calcuttensi ex Africa culta," ♀ fl., *D. Kirk s.n.* (holotype, CAL not seen).
17. **Garcinia lowryi** Z. S. Rogers & P. Sweeney, Syst. Bot. 32: 775. 2007. TYPE: Madagascar. "Toliara, Fort-Dauphin, W of town in forest called Mandena, trail through Botanical Garden," 6 Dec. 1989, ♂ fl., *G. McPherson & N. Dumetz 14648* (holotype, MO; isotypes, P, TAN, TEF).
18. **Garcinia madagascariensis** (Planchon & Triana) Pierre, Fl. Forest. Cochich. 1(5): 5. 1883. Basionym: *Xanthochymus madagascariensis* Planchon & Triana, Ann. Sci. Nat. Bot., sér. 4, 14: 305. 1860, as "*Xanthochymus ? madagascariensis*." TYPE: Madagascar. s. loc., ♂ fl., *P. Commerson s.n.* (holotype, P-JU 11879; isotype, P0303771).

The history of *Garcinia madagascariensis* and its basionym, *Xanthochymus madagascariensis*, has been confused in the literature and herbarium almost since the names were first published. The name "*Xanthochymus ? madagascariensis*" first appeared in Planchon and Triana (1860: 305) and was reproduced two years later in a reprint entitled *Mémoire sur la famille des Guttifères* (Planchon & Triana, 1862: 150).

Baillon (1877: 402) suggested that *Xanthochymus* should be united with *Garcinia* and erroneously cited page 303 of Planchon and Triana's publication. Pierre (1883) formally transferred the species to *Garcinia*, attributing authorship of the name incorrectly to Baillon, presumably because Baillon (1877) listed "*Xanthochymus madagascariensis* Pl. et Triana. Mém Guttif. p. 150. Habite Madagascar (Commerson)" as the basionym of *G. madagascariensis*.

Perrier de la Bâthie (1948: 97) referred the name *Garcinia madagascariensis* (with "Baillon ex Pierre" as the author) to an entity known to him only as an incomplete, unnumbered Commerson specimen housed at P (no accession number). In that publication, he went on to mention "*Xanthochymus madagascariensis* Pl. et Tri., *Mem. Ternstr. Gutt.*, *150*" in synonymy, which was an incorrect reference to the reprinted protologue appearing in the aforementioned *Mémoire sur la famille des Guttifères* (Planchon & Triana, 1862: 150). While Perrier de la Bâthie (1948: 97) did not provide a description of "*G. madagascariensis* Baillon ex Pierre," the species is noted in his key of *Garcinia* as having "Un gros rudiment styliforme de gynécée, coiffé d'un large stigmate rouge…," which could be accommodated within the description provided in the protologue of *X. madagascariensis*. In this instance, it seems that Perrier de la Bâthie (1948) recognized a taxon based on the type of *X. madagascariensis*, and thus referred to the same taxon recognized as such by Pierre (1883) and Planchon and Triana (1860). Curiously, only two years later Perrier de la Bâthie (1951) no longer recognized the name *G. madagascariensis*, referring to the name only as a synonym of his invalid combination, "*R. madagascariensis*."

Perrier de la Bâthie (1948: 92), under the genus *Rheedia*, created a new invalid combination, *R. madagascariensis*, which he also puzzlingly based on *Xanthochymus madagascariensis* Planchon & Triana, this time correctly citing "*Ann Sc. Nat. Bot.*, *sér. 4*, *XIV* (1860), *305*" for the protologue of the basionym (Planchon & Triana, 1860: 305). He also cited "*Garcinia madagascariensis* H. Bn., Hist. Pl., VI, 402" as a synonym, providing the same erroneous place of publication and authorship as before. Perrier de la Bâthie (1948: 92) synonymized several names (*G. commersonii*, *G. pachyphylla*, *Ochrocarpos humblotii*, *R. commersonii*, and *R. humblotii*) with *R. madagascariensis*. All of these taxa are morphologically similar in having staminate flowers with free stamens arranged in a ring around a central disk, a characteristic of our Rheedia group. The original material of *R. commersonii*, like that of *X. madagascariensis*, is an unnumbered Commerson specimen, and this similarity apparently led Perrier de la Bâthie to mistakenly conclude that *R. commersonii* and *X. madagascariensis* were homotypic. However, this is extremely unlikely as the protologue of *X. madagascariensis* describes a plant quite different from that of the original material of *R. commersonii*. Our study suggests that the entity that Perrier de la Bâthie

(1948, 1951) referred to as "*Rheedia madagascariensis*" (nom. inval.) represents a distinct taxon and consequently needs a valid name in *Garcinia*. Aside from *X. madagascariensis*, we also agree that the names Perrier de la Bâthie (1948, 1951) placed into synonymy under *R. madagascariensis* refer to the same taxon. The name *R. commersonii* Planchon & Triana has priority when recognized as *Rheedia*, and *G. commersonii* (Planchon & Triana) Vesque is the correct name when *Rheedia* and *Garcinia* are united.

In regard to the original material of *Xanthochymus madagascariensis*, Planchon and Triana (1860: 305) mentioned one or more unnumbered Commerson collections in the protologue with the provenance statement, "Commerson in herb. A. L. de Jussieu et in herb. Thoüin, nunc Cambessèdes." In the Jussieu herbarium at P, we found a specimen attributed to Commerson (sheet 11879) that corresponds to the description in the protologue. This material consists of a branch with leaves and staminate flowers, and we consider it to represent holotype material overlooked most recently by Perrier de la Bâthie (1948, 1951). Another sheet in the general herbarium closely matches the P-JU specimen and presumably corresponds to the collection cited in the protologue that was originally housed separately as part of Thoüin's herbarium. We regard this specimen (P0303771) as an isotype duplicate. Both sheets closely resemble specimens subsequently collected from the southeast coast of Madagascar, an area where Commerson was known to have collected (Dorr, 1997: 93–95). This material may have also served as the basis for plate 348 labeled as *Garcinia madagascariensis* (without associated authorship or text) in Grandidier's *Atlas* (Drake, 1896).

19. Garcinia mangorensis (R. Viguier & Humbert) P. Sweeney & Z. S. Rogers, comb. nov. Basionym: *Rheedia mangorensis* R. Viguier & Humbert, Bull. Soc. Bot. France 61: 131. 1914. TYPE: Madagascar. "…bords de la Sahamarirana entre Ampasimpotsy et Bevalanirano, province d'Andovoranto, district de Moramanga…," ca. 900 m, 24 Oct. 1912, ♀ fl., *R. Viguier & H. Humbert 1011* (holotype, P030803; isotype, G00018840).

20. Garcinia megistophylla P. Sweeney & Z. S. Rogers, nom. nov. Replaced name: *Rheedia megaphylla* H. Perrier, Mém. Mus. Natl. Hist. Nat., n.s., 24: 90. 1948. TYPE: Madagascar. "Est (S), forêt orientale,…sur le Mt. Vatovavy à ouest de Mananjary…," ca. 400–500 m, ♂ fl., *R. Decary 13689* (holotype, P030804; isotype, P030805).

When attempting to provide a name in *Garcinia* for the combination *Rheedia macrophylla* (Martius) Planchon & Triana (Planchon & Triana, 1860), Verdcourt (1976: 262) published the illegitimate, superfluous new name *G. megaphylla* Verdcourt. He was apparently unaware that the combination was based on *G. macrophylla* Martius (Martius, 1841), basing his new name on "*Rheedia macrophylla* Planchon & Triana," rather than on the actual basionym (for a more complete discussion, see Hammel, 1989). Because the epithet "*megaphylla*" is validly occupied in *Garcinia*, a new epithet is needed for *R. megaphylla* when it is transferred to *Garcinia*. In keeping with the meaning conveyed in the replaced name and in reference to the very large leaves found in this species (perhaps the largest in the genus), we select the epithet "*megistophylla*," meaning very big leaves.

21. Garcinia melleri Baker, J. Linn. Soc., Bot. 20: 92. 1883. TYPE: Madagascar. "Between Tamatave and Antananarivo…," ♀ fl., *C. Meller s.n.* (lectotype, designated here, K000240242; isotype, P030819).

Ochrocarpos goudotianus Planchon & Triana, Ann. Sci. Nat. Bot., sér. 4, 14: 365. 1860. TYPE: Madagascar. s. loc., 1830, imm. fr., *J. Goudot s.n.* (holotype, P00568801; isotype, G00090054).

Garcinia comorensis Drake, Bull. Mens. Soc. Linn. Paris 2: 1221. 1896. *Ochrocarpos comorensis* (Drake) R. Viguier & Humbert, Rev. Gén. Bot. 25, bis: 634. 1914. TYPE: Madagascar. Lac de Nossi-Vé, 11 Apr. 1882, ♀ fl. bud, *L. Humblot 144* (holotype, P; isotype, K000240247).

Garcinia melleri was previously recognized as a synonym of the name *Ochrocarpos madagascariensis* Choisy (with the incorrect authorship "DC.") in Perrier de la Bâthie (1948, 1951). However, the name *O. madagascariensis* is dubious in its application and is therefore treated as such at the end of the paper.

Two collections, *Baron s.n.* (K000380201) and *Meller s.n.* (K000240242, P030819), were cited as original material for *Garcinia melleri*. Earlier statements by Perrier de la Bâthie (1948: 110, 1951: 92) mentioning *Meller s.n.* as the type of the name cannot be considered an effective lectotypification, since a depository was not specified and none of the material at K or P bears any indication that Perrier de la Bâthie examined it. Thus, it is impossible to distinguish between the duplicates deposited in those herbaria, and the K sheet of *Meller s.n.* is now designated as the lectotype of the name because it is the most complete specimen.

The provenance of the type material of *Garcinia comorensis* was cited as "Iles Comores" in the protologue, but the notes for *Humblot 144* in the field book register at P provide contradictory information,

namely "*Garcinia comorensis* Drake, est daté du 11 avril 1882, Lac de Nossi-Vé. Grand arbre 20 m. Fleurs blanc crème, terre sablonneuse, 150 m. d'alt." No other collections of *G. melleri* have been made from the Comoros, so we infer that the protologue's provenance was probably an inadvertent mistake by Drake.

22. Garcinia multifida (H. Perrier) P. Sweeney & Z. S. Rogers, comb. nov. Basionym: *Ochrocarpos multifidus* H. Perrier, Mém. Mus. Natl. Hist. Nat., n.s., 24: 106. 1948. TYPE: Madagascar. "E. du Lac Aloatra à Menaloha…," ♂ fl., *G. Cours 672* (holotype, P030822).

23. Garcinia orthoclada Baker, J. Linn. Soc., Bot. 22: 446. 1887. *Ochrocarpos orthocladus* (Baker) H. Perrier, Mém. Mus. Natl. Hist. Nat., n.s., 24: 108. 1948. TYPE: Madagascar. s. loc., fr., *R. Baron 3633* (holotype, K000240240; isotype, P00462365).

Rheedia laka R. Viguier & Humbert, Bull. Soc. Bot. France 61: 131. 1914. TYPE: Madagascar. "…forêt d'Analamazoatra," ca. 1000 m, 3 Nov. 1912, fr., *R. Viguier & H. Humbert 1111* (holotype, P00462367; isotypes, B100158974, G00090051 p.p.).

Ochrocarpos ambrensis H. Perrier, Mém. Mus. Natl. Hist. Nat., n.s., 24: 107. 1948, syn. nov. TYPE: Madagascar. "Forêt de la Montagne d'Ambre,…sur roches volcaniques, près de Diégo-Suarez (Nord)…," ca. 1200 m, ♂ fl., *H. Perrier de la Bâthie 17548* (lectotype, designated here, P030814; isotypes, K000240257, P00568806, TAN000265).

The isotype of *Rheedia laka* at G (G00090051) is fragmentary, and the thick leafless branch on the left hand side of the sheet is excluded as it does not appear to represent the species.

Ochrocarpos ambrensis was described as a distinct species by Perrier de la Bâthie (1948: 107) with some reservations regarding its distinctness from *O. orthocladus* (≡ *Garcinia orthoclada*, sensu Baker). We cannot find morphological differences to retain this taxon as distinct from *G. orthoclada* and treat it here for the first time as a new synonym of that name. Two collections (*Perrier de la Bâthie 17548*, *18892*), both noted as coming from Montagne d'Ambre, were cited in the protologue of *O. ambrensis* (Perrier de la Bâthie, 1948: 107). *Perrier de la Bâthie 17548* (P030814) has the most intact staminate flowers and is designated as lectotype. The other syntype, *Perrier de la Bâthie 18892* (P00568805), is in fruit.

24. Garcinia parvula (H. Perrier) P. Sweeney & Z. S. Rogers, comb. nov. Basionym: *Ochrocarpos parvulus* H. Perrier, Mém. Mus. Natl. Hist. Nat., n.s., 24: 108. 1948. TYPE: Madagascar. "…sur le massif du Tsaratanana et ses abords, Nord du Domaine central,…Sahandrakoto, au S. du Tsaratanana…," ca. 1500–2400 m, ♂ fl., *H. Perrier de la Bâthie 16179* (lectotype, designated here, P00462372; isotype, P00568803).

Two collections, *Decary 1059* (P) and *Perrier de la Bâthie 16179* (P [2]), were cited in the protologue (Perrier de la Bâthie, 1948: 108). The more complete P sheet (P00568803) of the latter collection is designated as the lectotype.

25. Garcinia pauciflora Baker, J. Linn. Soc., Bot. 20: 92. 1883. TYPE: Madagascar. "Forest of Analamazaotra…," imm. fr., *R. Baron 1382* (holotype, K000240235; isotypes, K000240236, P030779).

Garcinia cernua Baker, J. Linn. Soc., Bot. 22: 446. 1887. TYPE: Madagascar. s. loc., imm. fr., *R. Baron 2653* (holotype, K000240234; isotypes, K000240233, P030780).

Perrier de la Bâthie (1948: 96) invalidly published the infraspecific name "*Garcinia pauciflora* var. *depauperata*" without an accompanying Latin description. The name, based on *Viguier & Humbert 982*, refers to an entity he considered to be closely related to *G. pauciflora*. However, it is clear after comparing the type material with Perrier de la Bâthie's (1948, 1951) descriptions of the two taxa in question that they are not closely related because the invalid variety *depauperata* has the staminate flower morphology of the Brindonia group, whereas *G. pauciflora* belongs to the Paragarcinia group.

26. Garcinia pervillei (Planchon & Triana) Vesque, Monogr. Phan. 8: 485. 1893, as "*Garcinia ? Pervillei*." Basionym: *Rheedia pervillei* Planchon & Triana, Ann. Sci. Nat. Bot., sér. 4, 14: 312. 1860. *Tsimatimia pervillei* (Planchon & Triana) Jumelle & H. Perrier, Ann. Sci. Nat. Bot., sér. 9, 11: 256. 1910. TYPE: Madagascar. "Île Nossibé…," 18 Jan. 1841, imm. fr., *A. Pervillé 407* (holotype, P030807; isotypes, P030808, P030809).

The genus *Tsimatimia* was created by Jumelle and Perrier de la Bâthie (1910: 263–264) to accommodate *Garcinia pervillei* and *T. pedicellata* Jumelle & H. Perrier (recognized below as *G. tsimatimia*), which they believed differed from related genera in a few characters of the calyx, androecium, and ovary. Perrier de la Bâthie (1948) himself later placed *Tsimatimia* in synonymy with *Rheedia*, based partly on the observation that both species had free stamens surrounding a disk. *Tsimatimia* has not been used by subsequent authors.

27. Garcinia polyphlebia Baker, J. Linn. Soc., Bot. 22: 447. 1887. TYPE: Madagascar. Central Madagascar, imm. fr., *R. Baron 3101* (lectotype, designated here, K000240249).

Two collections, *Baron 3064* (K000240248, K000240250, P030768) and *Baron 3101* (K000240249), were cited in the protologue of *Garcinia polyphlebia*. The K sheet of *Baron 3101* is designated as the lectotype because it is the only original element bearing the designation of type in what appears to be Baker's handwriting.

28. Garcinia thouvenotii (H. Perrier) P. Sweeney & Z. S. Rogers, comb. nov. Basionym: *Rheedia thouvenotii* H. Perrier, Mém. Mus. Natl. Hist. Nat., n.s., 24: 90. 1948, as "*Rheedia ? Thouvenotii*." TYPE: Madagascar. "Centre (E), forêt d'Analamazoatra…," 1000 m, ♂ fl., *E. Thouvenot s.n.* (holotype, P030810; isotypes, P030811, P030812).

29. Garcinia tsaratananaensis (H. Perrier) P. Sweeney & Z. S. Rogers, comb. nov. Basionym: *Ochrocarpos tsaratananae* H. Perrier, Mém. Mus. Natl. Hist. Nat., n.s., 24: 108. 1948. TYPE: Madagascar. "Sylve à lichens et forét à mousses,…dans le massif du Tsaratanana," ca. 2000 m, ♂ fl., *H. Perrier de la Bâthie 16263* (lectotype, designated here, P00462368).

Two collections, *Perrier de la Bâthie 16262* (P00568807) and *16263* (P00462368), both from the Tsaratanana massif, were referred to indirectly by the provenance given in the protologue of *Ochrocarpos tsaratananensis* (Perrier de la Bâthie, 1948: 108). The latter collection number is flowering and is designated as the lectotype. The other syntype is in fruit. The epithet as originally provided was derived from a geographic locality and, according to Recommendation 60.D.1 of the ICBN (McNeill et al., 2006: 112), should take the form of an adjective, and thus the suffix of the epithet is adjusted here.

The name "*Ochrocarpos tsaratananae* var. *rotundifolius*" first appeared in Perrier de la Bâthie (1951: 86) followed by the phrase "Vig. et Humb., mss. in Herb. Mus. Paris," and a diagnosis and discussion in French without the necessary validating Latin. Characters cited as diagnostic in the protologue for this variety were based on two specimens and break down when additional collections are examined.

30. Garcinia tsimatimia P. Sweeney & Z. S. Rogers, nom. nov. Replaced name: *Tsimatimia pedicellata* Jumelle & H. Perrier, Ann. Sci. Nat. Bot., sér. 9, 11: 265. 1910. *Rheedia pedicellata* (Jumelle & H. Perrier) H. Perrier, Mém. Mus. Natl. Hist. Nat., n.s., 24: 90. 1948. TYPE: Madagascar. "…des terrains primitives gneissiques des forêts de l'Ankaizina…," 1908, ♂ fl., *H. Perrier de la Bâthie 5316* (holotype, P030806).

The *pedicellata* epithet is already in use in the genus for *Garcinia pedicellata* (G. Forster) Seemann, an endemic New Caledonian species (Smith, 1981; Jaffré et al., 2004). Thus, we establish the new name, *G. tsimatimia*, here for the Malagasy species. The epithet is based on *Tsimatimia*, the generic name of the basionym, which in turn was roughly based on the Malagasy common name "Tsimatimanota," meaning literally "not punished for sinning" in the Malagasy language. Our epithet is composed arbitrarily as supported by Art. 23.2 of the ICBN (McNeill et al., 2006: 45).

31. Garcinia urschii (H. Perrier) P. Sweeney & Z. S. Rogers, comb. nov. Basionym: *Rheedia urschii* H. Perrier, Mém. Mus. Natl. Hist. Nat., n.s., 24: 89. 1948. TYPE: Madagascar. "Centre (E), forêt d'Analamazoatra…," 1000 m, ♂ fl., *E. Ursch 42* (holotype, P030813).

32. Garcinia verrucosa Jumelle & H. Perrier, Ann. Sci. Nat. Bot., sér. 9, 11: 277. 1910. TYPE: Madagascar. "Sambirano,…bords du Ramena," 300 m, Aug. 1908, ♂ fl., *H. Perrier de la Bâthie 5314* (lectotype, designated here, P030782).

Four infraspecific taxa (subspecies "*orientalis*" and "*typica*," and varieties "*apiculata*" and "*piriformis*") were invalidly described under *Garcinia verrucosa* in Perrier de la Bâthie (1948: 95–96), all of which lack a validating Latin diagnosis or description. No original material was explicitly cited in the protologue of *G. verrucosa* (Jumelle & Perrier de la Bâthie, 1910: 277), thus a collection with staminate flowers cited as subspecies *typica* by Perrier de la Bâthie (1948) is chosen for the lectotype of the species. An examination of herbarium material of *G. verrucosa* collected subsequent to Perrier de la Bâthie's work indicates that the cited differences between his infraspecific taxa break down.

DOUBTFUL NAME

Ochrocarpos madagascariensis Choisy, Prodr. 1: 560. 1824, non *Ochrocarpos madagascariensis* Planchon & Triana, Ann. Sci. Nat. Bot., sér. 4, 14: 364. 1860. TYPE: Madagascar. s. loc., pl. 26 in Petit-Thouars, Hist. Vég. Isles Austral. Afriq. 1806 (lectotype, designated by Sprague, 1934: 89, pl. 26, Petit-Thouars, 1806).

Petit-Thouars first described the genus *Ochrocarpos* in his *Genera Nova Madagascariensia* (1805: 15)

without any validating description of a species, apparently basing the name on one of his own personal herbarium collections. Choisy (1824: 560) validated Petit-Thouars' generic description by providing a species description of *O. madagascariensis*, which he indicated as being based on an unnumbered Petit-Thouars specimen. Original material, which should have been deposited at P or possibly G-DC, was not found in either herbarium. Planchon and Triana (1860: 364) provided an amplified species description of *O. madagascariensis*, based on a different, unnumbered Petit-Thouars specimen at P, which we refer to the invalid "*Ochrocarpos planchonianus*" (discussed below).

Sprague (1934: 89), having been unable to locate any herbarium specimens traceable to Petit-Thouars, provided a detailed discussion of the history of *Ochrocarpos* and *O. madagascariensis*, and concluded that the only available original material of the taxon was plate 26 in the very rare "edition 2" of *Histoire Végétaux Recueillis dans les Isles Australes d'Afrique* (Petit-Thouars, 1806). Sprague reproduced the plate (labeled as *Ochrocarpos* and lacking accompanying text) in his publication and clearly indicated that the illustration should be regarded as the type. The plant figured in the illustration is an ample fruiting branch along with dissected young fruits and does not conflict with either Petit-Thouars' or Choisy's descriptions. However, both descriptions are so broad that specimens of many other species of Malagasy *Garcinia* would also not obviously conflict with either one, and the illustration is not identifiable to species.

Perrier de la Bâthie (1948: 103, 109) believed he had rediscovered the missing Petit-Thouars original material of the name at P, and annotated the sheet (no accession number) with the inscription, "Type très probable du genre *Ochrocarpos* Thouars et type de *O. madagascariensis* DC." The specimen is in poor condition, consisting of five detached leaves, and is unlikely to have been original material for Choisy's name. The specimen was not annotated as *O. madagascariensis* by anyone prior to Perrier de la Bâthie, and it obviously conflicts with the morphology of the plant figured in plate 26 of Petit-Thouars (1806). Leaves on the P sheet annotated by Perrier de la Bâthie are obovate and rounded or emarginate at their apex, while those figured in the plate of *O. madagascariensis* are elliptic with an acute apex. The leaves on this particular P sheet closely resemble those of *G. melleri* in shape, venation pattern, and color. Unfortunately, we have not found any material approximating Sprague's lectotype.

Perrier de la Bâthie (1948: 102) considered the sterile Petit-Thouars material on which Planchon and Triana (1860: 364) based their description of *Ochrocarpos madagascariensis* to be different from that which Choisy had used, leading him to publish the invalid name "*Ochrocarpos* ? *Planchonianus*" based on that same material and without the necessary Latin description or diagnosis. Two years later, Perrier de la Bâthie (1951: 92), beneath *O. madagascariensis* sensu Planchon & Triana (non *O. madagascariensis* sensu Choisy), treated the presumed original material as a young shoot or seedling of *Rheedia*, but he made no mention of the name *O. planchonianus*. The Petit-Thouars material is still extant in the general P herbarium (no accession number), and we agree that it most likely represents immature vegetation of an unidentifiable species belonging to the Rheedia group.

The authorship of *Ochrocarpos madagascariensis* has been incorrectly ascribed to de Candolle in all relevant literature since the name was first published in the *Prodromus*, despite the obvious footnote at the bottom of the first page of the Clusiaceae treatment indicating that Choisy authored the work (Choisy, 1824: 557–564). Botanists should be aware that several other Clusiaceae names published in the *Prodromus* pertaining to a number of other geographical areas have been erroneously attributed to de Candolle (for examples, consult the International Plant Names Index website, <http://www.ipni.org/index.html>).

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