Transfer of Madagascan Glochidion to Phyllanthus (Euphorbiaceae s.l. or Phyllanthaceae)

Petra Hoffmann

The Herbarium, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AB, United Kingdom, p.hoffmann@rbgkew.org.uk

Gordon McPherson

Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri 63166, U.S.A. gordon.mcpherson@mobot.org

ABSTRACT. Seven endemic Madagascan species previously assigned to the genus Glochidion J. R. & G. Forster by Leandri are re-examined morphologically and found to belong to Phyllanthus L. (Euphorbiaceae s.l. or Phyllanthaceae). As a consequence, the following five new combinations are made: Phyllanthus ankaratrae (Leandri) Petra Hoffmann & McPherson, P. humbertii (Leandri) Petra Hoffmann & McPherson, P. lichenisilvae (Leandri) Petra Hoffmann & McPherson, P. marojejiensis (Leandri) Petra Hoffmann & McPherson, and P. perrieri (Leandri) Petra Hoffmann & McPherson.

Key words: Euphorbiaceae, Glochidion, Madagascar, Phyllanthus.

The Euphorbiaceae–Phyllanthoideae volume of the Flore de Madagascar et des Comores (Leandri, 1958) treated seven species in the genus Glochidion J. R. & G. Forster, distinguishing them from Phyllanthus L. by their reduced, or small and entire styles. Leandri described the first of these seven species, G. perrieri, in 1934 and placed it in section Heteroglochidion Muller Argoviensis. This section is typified by the New Caledonian species G. baladensis (Baillon) Muller Argoviensis, which has long, free styles and is today again considered a species of Phyllanthus (Schmid & McPherson, 1991). In 1937, Leandri described G. lichenisilvae and transferred two of his own Phyllanthus species, P. oreichtitus and P. sambiranensis, to Glochidion. Three further species, G. ankaratrae, G. humbertii, and G. marojejiense, were described in 1957 (Leandri, 1957).

Glochidion and Phyllanthus are both members of subtribe Flueggeineae (tribe Phyllanthaceae), the largest and most difficult group in subfamily Phyllanthoideae, or family Phyllanthaceae sensu APG (e.g., Savolainen et al., 2000, Chase et al., 2002). The last complete treatment of this group at species level was published by Muller Argoviensis (1866), who combined Glochidion with Phyllanthus. Bentham and Hooker (1880) followed Muller in this but most later authors (e.g., Hooker, 1887, Pax & Hoffmann, 1931, Webster, 1994, Radcliffe-Smith, 2001) have regarded Glochidion as a separate genus.

Phyllanthus is an extremely diverse pantropical group of ca. 800 species that may not be monophyletic (Webster, 1994, Wurdack et al., in prep.). Molecular analyses are under way as a collaboration between the University of Vienna and the Royal Botanic Gardens, Kew, to shed light on the position of Glochidion, which Webster (1994: 46) considered to “represent a specialized offshoot from ancestral taxa within Phyllanthus.” Glochidion is generally recognized as being restricted to Asia and Australasia (Webster, 1994), sometimes with the exception of the Madagascan species (Radcliffe-Smith, 2001).

Webster (1994) and Radcliffe-Smith (2001) distinguished the two genera mainly on the basis of the following characters: floral disc (usually present in Phyllanthus, totally absent in Glochidion) and seed morphology (dry and not ventrally invaginated in Phyllanthus, usually fleshy (with sarcotesta) and ventrally invaginated in Glochidion). Stuppy (1996) confirmed the importance of seed characters in separating the two taxa.

Examination of the material in Paris (including all types) showed that all seven Madagascan species must be referred to Phyllanthus on the basis of both disc and (where available) seed characters. Brunel (1987) was the first to come to this conclusion when examining Glochidion oreichtitum and G. sambiranense. He found the pollen of these two species to be tricolporate whereas Glochidion has steganocolporate pollen (Webster, 1994). Brunel suggested an affinity with Phyllanthus subg. Kirgania for the species with free stamens, and with Phyllanthus subg. Gomphidium for the species with conn...


Known from the type only.


Known from the type only.


Selected further collections. MADAGASCAR. Antsiranana Province: Réserve Spéciale de Manongarivo, Bekolosy, 14°02’S, 48°18’E, vallon en amont de la chute de la rivière Bekolosy, 1100 m, Derleth 117 (G, K, MO); Réserve Spéciale de Manongarivo, Besinkara, 14°04’S, 48°17’E, Ambalafery, 500 m en-dessous du hameau, 300 m, Gautier & Chatelain 2326 (G, K, MO); Réserve Spéciale de Manongarivo, Besinkara, 14°04’S, 48°17’E, Ambalafery, 250 m, Gautier 3009 (G, MO); Réserve Spéciale de Manongarivo, above Ambodisakaona, 1100–1200 m, McPherson & van der Werff 16407 (MO, TAN).

As mentioned above, two of the species listed under Glochidion by Leandri (1958) do not need new combinations because Leandri had initially published them in Phyllanthus. One of them was first published under the illegitimate name P. monticola (1934) but given a nomen novum, P. oreichtitus, a year later. The correct citations are as follows:

Phyllanthus orichititum and G. sambiranense were previously published as Phyllanthus and have valid combinations in that genus, the remaining five species have no valid names outside Glochidion. We were first presented with this problem when identifying Euphorbiaceae collections (cited below under the respective species) made during the recently published botanical inventory (Gautier, 2002) of the Réserve Spéciale de Manongarivo by the Conservatoire et Jardin Botaniques de la Ville de Genève (G). We again encountered the problem while reviewing the Euphorbiaceae chapter in the Generic Tree Flora of Madagascar (Schatz, 2001), and when preparing an overview of the Euphorbiaceae of Madagascar for the Natural History of Madagascar (Hoffmann & McPherson, 2003).

To correct the false impression that the Asian and Australasian genus Glochidion is present in Madagascar, we propose the following new combinations. This paper is intended to clarify the generic boundaries and to make information on the species concerned available to researchers outside the Paris Herbarium. Where necessary, lectotypification will be undertaken in the course of a post-graduate study currently in progress at the University of Antananarivo and the Royal Botanic Gardens, Kew, that will result in a full taxonomic revision of Madagascan Phyllanthus.


Selected further collections. MADAGASCAR. Antsiranana Province: Réserve Spéciale de Manongarivo, Bekolosy, 14°02’S, 48°18’E, vallon en amont de la chute de la rivière Bekolosy, 1100 m, Derleth 117 (G, K, MO); Réserve Spéciale de Manongarivo, Besinkara, 14°04’S, 48°17’E, Ambalafery, 500 m en-dessous du hameau, 300 m, Gautier & Chatelain 2326 (G, K, MO); Réserve Spéciale de Manongarivo, Besinkara, 14°04’S, 48°17’E, Ambalafery, 250 m, Gautier 3009 (G, MO); Réserve Spéciale de Manongarivo, above Ambodisakaona, 1100–1200 m, McPherson & van der Werff 16407 (MO, TAN).

As mentioned above, two of the species listed under Glochidion by Leandri (1958) do not need new combinations because Leandri had initially published them in Phyllanthus. One of them was first published under the illegitimate name P. monticola (1934) but given a nomen novum, P. oreichtitus, a year later. The correct citations are as follows:

Selected further collections. MADAGASCAR. Antsiranana Province: Reserve Spécielle de Manongarivo, Ambahatra, cours supérieur, 13°59'S, 48°26'E, au bord du bras de l'Ambahatra, 900 m à l'O du point côte 1037, 700 m, Gautier et al. 3499 (G, K, MO); Reserve Speciale de Manongarivo, Ambahatra, cours supérieur, 13°59'S, 48°26'E, an bord des rocs, quartzites, H. Perrier de la Bathie 13670 (P.), same locality and collector 9917 (P).


Selected further collections. MADAGASCAR. “Chiefly from North-West Madagascar.” Baron 5625 (K). Antsiranana Province: Réserve Spécielle de Manongarivo, Belokosy, 14°02'S, 48°18'E, Crête 1 km du sommet, 1390 m, Gautier & Chatelain 2714 (G, K, MO); Réserve Spéciale de Manongarivo, Belokosy, 14°02'S, 48°18'E, sommet du Belokosy, 1490 m, Gautier & Delreth 2568 (G, K, MO); Réserve Spéciale de Manongarivo, Ambahatra, cours supérieur, 13°39'S, 48°26'E, crête entre les deux bras de l'Ambahatra, crête principale, 200 m au NNE du point côte 1037, Gautier et al. 3489 (G, K, MO).

Evaluation of these seven taxa is made difficult by the scarcity of material. Because very few specimens exist outside the Paris herbarium, the main characters are briefly described here. They are woody plants with triangular, non-auriculate cataphylls. All except for Phyllanthus oreichtitus are completely glabrous. Leaf shape and size vary greatly between the species, from large (up to 9 × 4 cm) ovate leaves in P. humbertii to small (ca. 0.5 × 0.15 cm), falcate leaves in P. marojejiensis that give the plant a distinctly ericoid habit. All seven species are monoecious; the cymbules are bisexual (P. humbertii), or unisexual with staminate and pistillate flowers found on separate branches (P. sambiranensis) or the same branch (remaining five species).

The number of sepals in African Phyllanthus is usually stable and of diagnostic value (cf. Keay, 1958: 384). Brunel (1987) used this character to define infrageneric groups (series) in Phyllanthus. Of the seven species in question, Phyllanthus oreichtitus always has six sepals, P. ankaratrae has five sepals in staminate and six sepals in pistillate flowers, and the remaining species have five sepals in both sexes. The shapes of the staminate sepals and disc are similar in all seven species; discrete alternisepalous disc glands are always developed.

Androecium morphology divides the seven species under consideration in two groups. The first group comprises Phyllanthus ankaratrae, P. humbertii, P. lichenisilvae, and P. marojejiensis with completely connate stamens, and in this way resembles true Glochidion. Phyllanthus ankaratrae and P. humbertii have three stamens with non-apiculate anthers, whereas the androecium of P. lichenisilvae consists of four stamens with a central apiculum, and P. marojejiensis has five stamens with individual apicula. The remaining three species have free stamens, numbering five in P. perrieri and P. sambiranensis, and six in P. oreichtitus. Anthers are much longer than wide in all species and always dehisce longitudinally.

Pistillate pedicels of these seven species vary greatly in length from 1 to 15 mm. The pistillate disc is extremely reduced to lacking (Phyllanthus ankaratrae and P. humbertii), distinct and annular-pentalgal (P. lichenisilvae), irregularly dissected (P. oreichtitus), or consists of discrete, minute alternating lobes (P. marojejiensis, P. perrieri, and P. sambiranensis). The ovary is uniformly glabrous and three-locular.

Great variation is found in styles and stigmas. Phyllanthus perrieri stands out in having erect, terete, entire styles up to 1.5 mm long that appear to be fused at least apically. It was the first Madagascar species to be described as Glochidion (Leandri, 1934), mainly because of the fused styles, as is the case in true Glochidion. The styles and stigmas of the remaining six species classified as Glochidion by Leandri (1958) are free and no more than 0.5 mm long, and of two principal shapes. In the first three species of this group, the short styles are more or less terete and bifid. In P. ankaratrae and P. oreichtitus, they are inserted centrally and are apically reflexed, whereas the styles of P. lichenisilvae arise off-center and lean inward. In the remaining three species under consideration the styles seem to be reduced and there are three rather large, entire, flat stigmas. In P. humbertii and P. marojeji-
sis these arise centrally and are spread flat against the ovary, whereas *P. sambiranensis* has similar but excentric, inward-leaning stigmas.

Fruits and seeds are unknown in *Phyllanthus ankaratrae* and *P. lichenisilvae*, and no seed has been seen of *P. marojejiensis*. Where known, fruits are smooth capsules, and the seeds are uniformly triquetrous with a distinct elliptical, usually slightly impressed but not invaginated chalaza and a smooth dry seed coat.

It is obvious from this morphological discussion that the Madagascan species of *Phyllanthus* united by Leandri as *Glochidion* show considerable diversity. They represent distinct species with unique combinations of characters although the distinctiveness of the infraspecific entities *G. oreichtitum* subsp. *tsaratanense* Leandri and *G. sambiranense* var. *trapezophyllum* Leandri is questionable.

Acknowledgments. We thank the staff of the Laboratoire de Phanérogame, Museum National d'Histoire Naturelle, Paris (P), for giving us access to their collection, and Laurent Gautier and his team (G) for first drawing our attention to the problem with their collections from Manongarivo.

Literature Cited


