Two New Species of *Dombeya* (Malvaceae) from Madagascar

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**Abstract.** Two new Malagasy species of *Dombeya* Cavanilles subgen. *Xeropetalum* (Delile) K. Schumann (Malvaceae) are described. *Dombeya asymmetricala* Applequist is native to Mananara-Nord in northeastern Madagascar, and *D. rianensis* Applequist to the Matatana River basin. *Dombeya rianensis* is placed within subseries *Troxy Arènes*. *Dombeya asymmetricala* is tentatively placed within subseries *Repandae Arènes*; the species is distinguished by its long, narrow lanceolate leaves with asymmetrical apices.


**Key words:** *Dombeya*, IUCN Red List, Madagascar, Malvaceae.

*Dombeya* Cavanilles is one of the larger genera of Malvaceae s.l. (formerly Sterculiaceae; cf. Bayer et al., 1999), with over 200 species recognized, and is an important component of the Malagasy flora. The last complete revision of *Dombeya* in Madagascar and the Comores recognized 187 species (Arènes, 1958, 1959) in two well-distinguished subsuckerae, whereas 19 species are recognized in Africa (Seyani, 1991), with one extending to Arabia, and 14 inhabit the Mascarenses (Friedmann, 1987). Since the publication of Arènes' (1959) treatment, further taxonomic efforts related to the Malagasy species of *Dombeya* have been limited (Barnett & Dorr, 1986; Dorr, 2001). Examination of herbarium specimens at P has led to the discovery of two specimens not referable to previously described species, both of which are herein described as new. Both species are native to humid forests of eastern or northeastern Madagascar; their provisional conservation status according to IUCN Red List criteria (IUCN, 2001) must be described as Data Deficient (DD), since virtually nothing is known of their ranges or population size.

1. *Dombeya asymmetricala* Applequist, sp. nov.
**TYPE:** Madagascar. Prov. Toamasina: forêt d’Ilboda (NW Antananarivo), Mananara-Nord, [16°23'S, 049°44'E?], 22 Feb. 1990 (fl.), *Raharimalala* 190 (holotype, P). Figure 1.

Fruit ses usque ad 6 m altus: ramuli novelli confertim lepidoti. Folia petiolum 7–10 mm longa, confertim lepidoto; lamina lanceolata basi cuneata vel rotundata-cuneata apice asymmetrica acuminata, 8–17.5 cm longa et 1.6–3.9 cm lata, infra sparsim lepidota supra sparsis lepidota vel glabra, venatione campodromata tenui. Inflorescentia pauciflora pedunculo sparsim lepidoto usque ad 4.5 cm longo insidens; bracteae lanceolatae ca. 3 mm longae basilater dilatae confertim lepidota; pedicelli 6–8 mm longi confertim lepidoti. Sepala 5, 5–6.5 mm longa basilater connata lepidota plerumque non reflexa; petala 5 late obovata, 6.5–7 mm longa et ca. 5 mm lata, alba; stamina ca. 10 basilater connata faciens coronam brevem, filamentis (1–)1.5–2(–2.5) mm longis, antheris anguste oblongis; staminodia linearis ca. 3 mm longa excedentia stamina fertilia; gynoecium 3-carpellare, ovario lepidoto, stylo 3–3.5 mm longo basilater lepidoto ramis 1–1.3 mm longis.

Shrub 6 m high; small twigs densely lepidote with fringed scales. Leaves lanceolate, 8–17.5 × 1.6–3.9 cm; petiole 7–10 mm, densely lepidote; base cuneate or occasionally rounded; apex usually asymmetrically acuminate; venation pinnate, campodromous, secondary veins numerous, narrow and inconspicuous especially on adaxial surface; both surfaces very sparsely lepidote, with scales mostly near midrib, sometimes becoming glabrous on adaxial surface. Inflorescences with very few flowers, on slender peduncles to 4.5 cm long; peduncle and rachis lepidote; floral bracts ca. 3 mm, lanceolate, widening at the base, densely lepidote; pedicels 6–8 mm, densely lepidote. Sepals 5, ca. 5–6.5 mm, fused basally, densely lepidote, the lobes not reflexed; petals 5, white, 6.5–7 mm, ca. 5 mm broad, broadly obovate, margins asymmetrically curved inward; stamens ca. 10, basally fused into a short corona; filaments (1–)1.5–2(–2.5) mm long, unequal, anthers narrowly oblong, 1–1.3 mm, staminodes linear, ca. 3 mm, longer than fertile stamens; gynoecium 3-

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carpellate; ovary lepidote; stylar column 3–3.5 mm, basally lepidote, with 3 curled branches 1–1.3 mm long. Fruit unknown.

Habitat and distribution. The holotype is apparently from coastal forest or humid forest near the coast in northeastern Madagascar in the region of Mananara-Nord.

Phenology. Flowers have been collected in February.

Vernacular name. Rondróo (rondro).

Discussion. The holotype specimen of Dombeya asymmetrica is remarkable for its long, narrowly lanceolate leaves with more or less asymmetrically acuminate apices; this leaf shape is virtually unknown in Dombeya, despite the exceptional range of variation within the genus. The species belongs to subgenus Xeropetalum (Delile) K. Schumann, which is characterized by gynoecia with fewer than five carpels. The
inflorescences of the only known specimen are very small and in poor condition. One appears to have been a reduced cyme with at least three buds, which, following Arènes' (1958, 1959) classification, would place it in section Xeropetalum. However, the possibility that other specimens might be keyed out to section Decastemon Planchon (umbellate, geminate or solitary flowers), perhaps even correctly so, cannot be discounted. Section Decastemon, a distinctive and probably monophyletic group, frequently has lanceolate leaves and slender, few-flowered inflorescences, as does this species. On the other hand, lepidote pedicels and sepals, such as are seen in *D. asymmetica*, represent a very rare character in section Decastemon, which most often has glabrous and glandular, or occasionally stellate-pubescent, sepals. The species is tentatively placed in section Xeropetalum because of the apparently cymose inflorescence and lepidote indument, but the collection of more and better material would be highly desirable.

Once referred to section Xeropetalum, *Dombeya asymmetica* is placed by Arènes' (1958, 1959) classification within subsection Floribundae Arènes (leaves bearing small scales not totally covering the surface), series Epilasae Arènes (ovary lepidote), subseries Repandae Arènes (sepal not reflexed), and would be identified by his key as *D. sahatayensis* Arènes. As discussed below, Arènes' complex infrageneric classification, with many subgroups defined by single characters that vary repeatedly, probably includes many nonmonophyletic subgroups; thus, even if the inflorescences of *D. asymmetica* are correctly interpreted, the predictive value of placement within subseries Repandae is unclear. *Dombeya asymmetica* can be differentiated from all currently recognized species in subseries Repandae by its distinctive leaf shape and its small, slender inflorescences with only one order of branching; in fact, almost all species of section Xeropetalum normally have better developed inflorescences. Though the leaves of *D. sahatayensis* are sometimes asymmetrical, they never have acuminate apices; *D. asymmetica* also has shorter pedicels and smaller flower parts, including petals, staminodes, and styles (though this must be interpreted with caution given the possibly poor condition of the holotype). Within subseries Repandae, *D. asymmetica* should also be distinguished in particular from the widespread *D. laurifolia* (Bojer) Baillon, which has leaves that are highly variable but normally not lanceolate (being usually widest above the midpoint), asymmetrical, acuminate, or exceeding 13.5 cm long.

If a specimen of *Dombeya asymmetica* were keyed out as belonging to section Decastemon, it would be identified as belonging to subsection Decantherae Arènes (peduncles longer than pedicels), series Lepidota Arènes (ovaries lepidote), which is presently a monotypic series including only *D. capuroniana* Arènes. That species has long narrow leaves, but the leaves are oblansect to oblong or elliptical, with acute, often shallowly toothed, more or less symmetrical apices. *Dombeya asymmetica* is also distinguished by its flowers, which may be slightly smaller and are of different conformation (anthers oblong and at least 1 mm long vs. oval and less than 1 mm; style 3–3.5 mm long with short branches vs. about 1.5 mm long with branches to 4 mm long). The leaf shape and lepidote reproductive indument suffice to distinguish *D. asymmetica* from all currently recognized species in section Decastemon.

### 2. Dombeya rieptsensis Applequist, sp. nov.

**TYPE:** Madagascar. Prov. Fianarantsoa: haute vallée de la Rienana (bassin du Matitianana [= Matatana]), [22°14’S, 047°07’E], forêts, 1000–1400 m, 18–22 Nov. 1924 (£1.), Humbert 3524 (holotype, P). Figure 2.

Haece species *Dombeya gracileyronia* Arènes stipulis longioribus longamassatis, infloroscentibus minoribus saepe umbelliformibus, pedicellis brevioribus, corona staminali breviore, petalis minoribus, staminibus numerosioribus atque style breviore differt.

Tree; twigs grayish to tan, lepidote when young. Leaves obovate to oblanceolate, 4.5–9.2 × 2.1–4.3 cm; petiole 5–13 mm, densely lepidote; base cuneate to rounded-cuneate; apex ± rounded, occasionally slightly emarginate or cuspidate; margins entire to very slightly undulate; venation pinnate, camptodromous, secondary veins 5 to 8 (to 9) pairs, alternate in middle portion of leaf, sometimes pale; both surfaces lepidote with small scales, often sparsely so in larger leaves especially on the adaxial surface; stipulesawl-shaped with a broadened base, 4–6 mm, lepidote, ± caducous. Inflorescences few-flowered cymes, often umbelliform, lateral, borne near twig apices; peduncles 1.4–2.6 cm; inflorescence bracts 2–4 mm, lanceolate, caducous; pedicels ± angular, articulated, 5–9(–12) mm; floral bracts 3, borne slightly below base of flower, deltoid, 1.5–2 mm, caducous; inflorescences lepidote throughout. Sepals narrowly lanceolate, 4.8–7 mm, lepidote, mostly reflexed after anthesis, short-cornate at immediate base and the adaxial surface of fused portion bearing small patches of pale, possibly glandular tissue; petals white, 6.2–8 × 3.2–4.5 mm, obovate to obdeltoid with asymmetrical apex; androecial corona 1.2–1.6 mm; fertile stamens opposite petalous, 20(to 25), in groups of 4(to
filaments 0.8–1.4 mm; anthers oblong, 0.9–1 mm; staminodes narrowly spatulate, 3.6–4.5 mm, exceeding stamens; gynoecium 3- to 4-carpellate; ovary lepidote, inner surfaces of locules glabrous; style lepidote only at base, ca. 1.2–1.8 mm; style lobes recurved, 1.5–2.5 mm; ovules not winged. Fruit unknown.

*Habitat and distribution.* The type collection was from humid forest in southeastern Madagascar, in the upper valley of the Rienana at a relatively high altitude (over 1000 m).

*Phenology.* Flowers have been collected in November.

*Discussion.* This species' sometimes 3-carpellate, not 5-carpellate gynoecium and characteristic small flowers place it in *Dombeya* subgen. *Xeropetalum*. The 4-carpellate condition seen in some flowers of the holotype is unusual but does occur, at least as an
abnormal condition, within other species of that subgenus. According to Arènes’ (1958, 1959) classification, it would be placed within section Xeropetala, subsection Floribundae, series Epiloeae, subseries Trohy Arènes (sepal reflexed).

Many of Arènes’ (1958, 1959) infrageneric groups are probably not monophyletic, as key characters occur repeatedly in his definitions of various infrageneric groups. For example, the presence or absence of reflexed sepals is the single character given to separate subseries Trohy from subseries Repandae within series Epiloeae in Dombeya, and also the single character separating the monotypic subseries Subsquamosae Arènes from subseries Dichotomae Arènes within the hispid-ovariated series Piloseae Arènes (also within subsection Floribundae). Likewise, within section Xeropetala alone there are two pairs of sister series differentiated by having scaly versus stellate-pubescent ovaries. It is to be hoped that a molecular systematic study now in progress (Skema, pers. comm.) will identify major monophyletic lineages. Despite the serious limitations of the existing classification, D. riananensis does generally resemble and seems to be reasonably placed with the three previously described species of subseries Trohy, which are likewise native to humid forests of eastern Madagascar.

Those three species (Dombeya oblongipetala Arènes, D. gracilicyma Arènes, and D. trohy Arènes) are not well known; they were described from only one specimen each, with few collections added since. However, D. riananensis can be differentiated from all three. Firstly, D. riananensis is distinguished from D. oblongipetala and D. trohy by its obviate to oblanceolate leaves with rounded apices; D. oblongipetala has obviate-oblong to oblong leaves with obtuse apices, while D. trohy has oblong to elliptical leaves, to 14 cm long with petioles to 3 cm long. Dombeya riananensis also has significantly smaller flowers than either of these species (petals 6.2–8 mm long vs. ca. 12–13 mm long) and more stamens (borne in groups of four or more, giving a minimum number of 20 vs. 15 or sometimes 10 in D. oblongipetala).

Dombeya riananensis most closely resembles D. gracilicyma, as both may have obviate leaves of similar size, but has much smaller inflorescences, larger and differently shaped stigmas if such are present, greater stamen number (20 or more vs. 15), and smaller floral parts (pedicels less than 12 mm vs. 15–20 mm long; style less than 2 mm vs. 3–4 mm long; and androecial corona coroniform rather than tubuliform). Its petals may also be smaller (less than 8 mm, vs. a reported petal length of 9–11 mm in D. gracilicyma), but this character is often rather variable within species of Dombeya.

Dombeya riananensis can also be easily confused with the widespread, variable eastern species D. laurifolia, mentioned above. Arènes (1959) listed the type specimen of D. riananensis among examined material of D. laurifolia, which was placed within subseries Repandae. The leaves of D. laurifolia are sometimes similar to those of D. riananensis, but—in addition to the non-reflexed sepals—D. laurifolia has only five or five to 10 (to 20) ovules, a very short (0.5–1 mm) style, and short (3–4 mm) calyx lobes.

Notably, the type of Dombeya riananensis has small patches of short, possibly glandular trichomes on the adaxial sepal surfaces at the extreme base, inside the very short fused portion of the calyx. A similar character is present in all species of the related genus Helmiopsis H. Perrier (Applequist, 2009), to which the type specimen has also once been referred. However, small glandular patches are also present in several species of Dombeya subg. Dombeya (pers. obs.) and may be present, although overlooked, in some other species of Dombeya not yet examined. Helmiopsis, whose members usually have a lepidote indument throughout, is differentiated from Dombeya by its usually winged seeds, often oppositipetalous stamens, and sometimes glandular petals; the stigmas of Helmiopsis are small and immediately caducous. All but one, apparently derived species of Helmiopsis are 5-carpellate. Dombeya riananensis, which has unwinged ovules, oppositipetalous stamens, and relatively large, occasionally persistent stipules, is clearly properly placed within Dombeya, as traditionally circumscribed, rather than Helmiopsis.

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