

# *Tournefortia kirkii* (I.M. Johnston) J.S. Mill. (Boraginaceae): A new combination for a species from Madagascar

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## ABSTRACT

A new combination, *Tournefortia kirkii*, is published, recognizing *Tournefortia puberula* var. *kirkii* as a distinct species. An increase in available collections demonstrates that this taxon is more widespread than originally supposed and that it occurs sympatrically with *T. puberula* while maintaining its distinct morphology, thus meriting recognition as a distinct species.

## KEY WORDS

*Tournefortia*,  
Boraginaceae,  
Madagascar.

## RÉSUMÉ

*Tournefortia kirkii* (I.M. Johnston) J.S. Mill. (Boraginaceae): Une nouvelle combinaison pour une espèce de Madagascar.

Une nouvelle combinaison, *Tournefortia kirkii*, est établie à la suite de la reconnaissance de *Tournefortia puberula* var. *kirkii* en tant qu'espèce distincte. L'accroissement du nombre de récoltes démontre que ce taxon est plus répandu qu'on ne le pensait et qu'il se trouve en sympatrie avec *T. puberula* tout en conservant sa propre morphologie, méritant ainsi d'être reconnu comme une espèce distincte.

## MOTS CLÉS

*Tournefortia*,  
Boraginaceae,  
Madagascar.

The genus *Tournefortia* L. (Boraginaceae, subfamily Heliotropioideae) consists of approximately 150 species (MILLER 1988) and is represented in most warm areas of the world, but the majority of the species occur in the New World tropics. Three sections have been recognized in the genus and some recent authors (e.g. MARTINS 1990; VERDCOURT 1991) have chosen to separate some species into *Argusia*

Amman, but NOWICKE & SKVARLA (1974) have shown that variation in pollen morphology does not support this distinction. Given that the vast majority of morphological complexity in *Tournefortia* occurs among the New World species, and perhaps even its distinction from *Heliotropium* L. is artificial, I have adopted a conservative generic concept, preferring to wait for further molecular evidence before

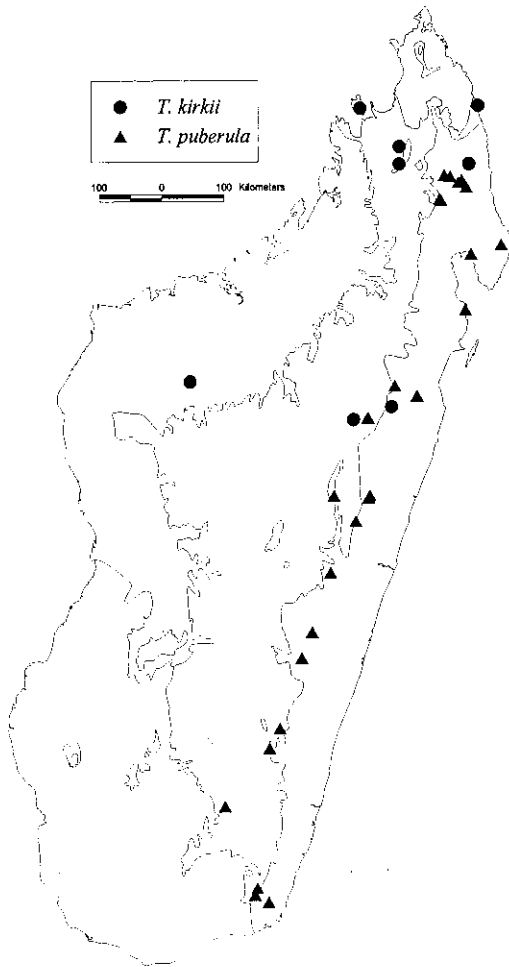


Fig. 1. — Distributions of *Tournefortia kirkii* and *T. puberula* in Madagascar.

attempting redefinition of the genera of the Heliotropioideae.

The Old World species of *Tournefortia* were treated by JOHNSTON (1935), who recognized 12 species in sect. *Tournefortia*. Four of these, *T. acuminata* DC., *T. arborescens* Lam., *T. bojeri* A. DC., and *T. puberula* Baker were from islands of the western Indian Ocean, the later being the only species of the section known from Madagascar. In his treatment, JOHNSTON (1935) also described *T. puberula* var. *kirkii* I.M. Johnston, a variety known from a small number of collections from islands off of northeastern Madagascar and the adjacent Comores. JOHNSTON distin-

guished it from typical *Tournefortia puberula* in occurring in more arid regions and having a stiff white strigose indument on the stems, petioles, and inflorescence branches, that is sometimes found on the lower leaf surface as well. The typical *T. puberula* was characterized by having minute brown puberulent stems, petioles, and inflorescence branches and occurred in moist to wet forests of central-eastern Madagascar.

These two taxa are currently known from much greater numbers of collections than were available to JOHNSTON. From recent study of these collections during preparation of an account of Boraginaceae for the Flore de Madagascar et des Comores, it is apparent that the distributions of the two taxa overlap significantly (Fig. 1) and that the morphological differences seem to be maintained even when the two grow sympatrically, such as around Ambatondrazaka and in the Zahamena National Park. Because of this, I have chosen to elevate *Tournefortia puberula* var. *kirkii* and recognize it as a distinct species necessitating the following new combination and emended descriptions.

***Tournefortia kirkii* (I.M. Johnston) J.S. Mill.,  
comb. nov.**

*Tournefortia puberula* var. *kirkii* I.M. Johnston, J. Arnold Arbor. 16: 158 (1935). — Type: *Kirk s.n.*, "Tournefortia 3", Comores, Mohilla Island, fl., Apr. 1861 (holo-, K!).

Woody vine or scrambling shrub, the twigs strigillose to hispidulous, the hairs siliceous, white. Leaves alternate, persistent; blades ovate to elliptic or narrowly elliptic, the widest point below or rarely at or slightly above the middle, 6-11 × 2-4.5 cm, the apex acuminate to acute, the base obtuse to acute or approaching rounded, the margin entire, sometimes minutely and tightly revolute, the adaxial surface moderately to sparsely strigillose, the adaxial surface densely to sparsely puberulent or nearly glabrous, but always puberulent on the midrib; venation brochidodromous, the midrib slightly impressed on the adaxial surface, raised on the abaxial surface, the secondary veins 6-8, the tertiary venation reticu-

late; petioles 5-15 mm long, canaliculate on the adaxial surface, densely to moderately strigillose or puberulent.

Inflorescences terminal, well-branched cymes 6-15 cm broad, the peduncle 3-7 cm long, the peduncle and branches strigillose to hispidulous, the hairs silaceous. Flowers bisexual; sepals 5, lanceolate, uneven, 1-2.5 × 0.3-0.7 mm, attenuate, strigillose; corolla white, tubular, 4-9 mm long, strigillose on the upper, outer surface, with 5 spreading and apically reflexed lobes, the lobes ovate, c. 1 mm long; stamens 5, the filaments 1-2 mm long, adnate to the tube for their entire length, anthers lanceoloid 1-1.5 mm long; ovary ovoid, 0.7-1 × 0.7-1 mm, the style less than 1 mm long, the stigma capitate, slightly bilobed.

Fruits drupaceous, white at maturity, ovoid, 2.5-3 × 2.5-3 mm, the exocarp thin, the endocarp bony, separating into 2, 2-seeded carpels at maturity.

DISTRIBUTION. — *Tournefortia kirkii* is known from the Comores, Nosy Be off the northeast coast of Madagascar, and from several scattered localities in northern Madagascar north of 18°S from near sea level to 1300 m in elevation.

*Tournefortia kirkii* has white, mineralized, appressed hairs, which easily separate it from *T. puberula*, which is glabrous or minutely brown puberulent. In addition, the corollas of *T. kirkii* (4-9 mm) are generally longer than those of *T. puberula* (3-5 mm).

ADDITIONAL MATERIAL EXAMINED. — MADAGASCAR: *Académie Malgache s.n.*, Ankeramadinika, fl., Nov. 1904 (P!); *Boivin 2086*, Nosy Be, 13°24'S, 48°18'E, fl., 1849 (P!); *Cours 1430*, Prov. Toamasina, station Aloatra, dist. d'Ambatondrazaka, 780 m, 17°50'S, 48°25'E, fl., Feb. 1938 (P!); *Dequaire 212*, s.loc., fl., s. date (P!); *Humbert & Cours 17651*, Prov. Toamasina, massif de l'Andrangovalu au sud-est du Lac Alaotra, Réserve Naturelle n°3 dite de Zahamena, bassin de l'Onibe, 1000-1300 m, 17°40'S, 48°45'E, fl., Oct. 1937 (P!); *Perrier de la Bâthie 1769*, Prov. Mahajanga, Ambongo, 17°18'S, 45°50'E, fr., 7 June 1904 (P!); *Perrier de la Bâthie 4547*, Prov. Antsiranana, bassin moyen de Bemarivo, Boïna, 14°12'S, 49°52'E, fl., Sep. 1907 (P!); *Perrier de la Bâthie 9084*, Prov. Antsiranana, bois fl. Bemarivo, 14°12'S, 49°52'E, fl., Aug. 1907 (P!); *Perrier de la Bâthie 9090*, Prov. Antsiranana, bords de l'Anavilava, affluent droit du

Bemarivo, 14°12'S, 49°52'E, fl., July 1905 (P!); *Perville s.n.*, Prov. Antsiranana, Île Nosy Be, 13°24'S, 48°18'E, fl., 1893 (P!); *Réserves Naturelles: RN 5080*, Prov. Antsiranana, RN 4, Tsaratanana, 13°57'S, 48°52'E, fl., 4 Apr. 1953 (P!); *Réserves Naturelles: RN 5247*, RN 4, Tsaratanana, 13°57'S, 48°52'E, fl., 4 Apr. 1947 (P!); *Richard 71*, Prov. Antsiranana, brouse à Vohemar, 13°22'S, 50°00'E, fl., s. date (P!); *Richard 89*, Prov. Antsiranana, bois à Vohemar, 13°22'S, 50°00'E, fl., s. date (P!). — COMORES: *Coulon 59*, Grande Comore, Nioumbadjeu, fl., 6 Apr. 1975 (P!); *Coulon 276*, Grande Comore, Nioumbadjeu, fl., 23 Nov. 1975 (P!).

### *Tournefortia puberula* Baker

J. Linn. Soc. London 20: 211. 1883; I.M. Johnston, J. Arnold Arbor. 16: 158 (1935). — Type: *Baron 1957*, Central Madagascar, Oct. 1882 (holo-, K!, iso-, B, BM, P!).

*Tournefortia mocquersii* A. DC., Bull. Herb. Boissier, ser. 2, 1: 581 (1901), "mocquersyi". — Type: *Mocquers 161*, Madagascar, forest at head of Antongil Bay (holo-, G-DEL).

Climbing or scrambling vine or shrub or small tree to 8 m tall, the twigs glabrous to minutely brown puberulent, the hairs not mineralized and not white. Leaves alternate, persistent; blades ovate to lance ovate or narrowly elliptic, the widest point below or occasionally at the middle, 5-12 × 2.3-6.5 cm long, the apex acuminate, the base rounded or slightly cordate to obtuse or rarely acute, the margin entire, but usually minutely and tightly revolute, both surfaces glabrous; the venation brochidodromous, the midrib even with the adaxial surface or slightly impressed, raised on the abaxial surface, the secondary veins 4-6, the tertiary veins reticulate; petioles 7-23 mm long, prominently canaliculate on the adaxial surface, glabrous to minutely brown puberulent.

Inflorescences terminal, a well-branched cyme, 7-20 cm broad, the peduncle 15-30 mm long, peduncle and branches glabrous to minutely brown puberulent. Flowers bisexual; sepals 5, triangular, somewhat uneven, 1.5-3 × 0.5-1 mm, sharply acute to attenuate at the apex, glabrous or sparsely strigillose; corolla white, tubular with 5 spreading and apically recurved lobes, 3-5 mm

long, the lobes 5, ovate, c. 1 mm long; stamens 5, the filaments 2-3 mm long, adnate to the tube for their full length, the anthers lanceoloid, c. 1 mm long; ovary ovoid 1-1.5 × 0.7-1 mm, the style less than 1 mm, the stigma capitate, somewhat bilobed.

Fruits drupaceous, white at maturity, broad ovoid, 3-6 × 5-7 mm, the exocarp thin, the endocarp bony, separating into 2, 2-seeded carpels at maturity.

VERNACULAR NAMES. — laharohy, lardy, trontaka, vahibe, varaina.

DISTRIBUTION. — *Tournefortia puberula* occurs in eastern wet forests from about 14°S, around the Marojejy massif, to the Ft. Dauphin region near 25°S from near sea level to 1700 m. It is a relatively common species along edges of forests and streams.

ADDITIONAL MATERIAL EXAMINED. — MADAGASCAR: *d'Alleizette 477*, Prov. Antananarivo, Mandraka, 18°56'S, 47°55'E, fl., fr., Oct. 1905 (P!); *Baron 2798*, Central Madagascar, fl., Oct. 1882 (K!, P!); *Baron 3106*, Central Madagascar, fl., fr., Dec. 1883 (K!, P!); *Baron 6991*, s.loc., fl., 1905 (K!); *Bosser 17114*, Prov. Toamasina, route de Moramanga-Anosibe, 19°18'S, 48°14'E, fl., Nov. 1962 (P!); *Campenon s.n.*, s.loc., fl., 20 Nov. 1889 (P!); *Cours 1087*, Prov. Toamasina, Sahalampy, dist. d'Ambatondrazaka, 700 m, 17°50'S, 48°25'E, fl., Nov. 1938 (P!); *Cours 1871*, Prov. Toamasina, entre Ambodivoahangy et les chutes, 20°02'S, 47°52'E, 700 m, fr., 14 Dec. 1944 (P!); *Cours 3665*, Prov. Antsiranana, au pied de l'Anjanaribe, 850 m, 14°43'S, 49°28'E, fr., 16 Dec. 1950 (P!); *Cours 4689*, Prov. Toamasina, Didy à Brickaville, fl., s. date (P!); *Debray 1845*, Prov. Antananarivo, Mandraka, 18°56'S, 47°55'E, fl., 2 Nov. 1972 (P!); *Decary 115*, Prov. Toamasina, Ivontaka, 16°17'S, 49°49'E, fl., fr., 29 Sep. 1920 (P!); *Decary 127*, Prov. Toamasina, Ivontaka, 16°17'S, 49°49'E, fr., 29 Sep. 1920 (P!); *Decary 18448*, Prov. Toamasina, Anosibe, sud du Moromanga, 19°18'S, 48°14'E, fl., 6 Sep. 1942 (P!); *Exposition Coloniale de Marseille s.n.*, s.loc., fl., s. date (P!); *Homolle 1871*, Prov. Toamasina, chutes du Maningory, 17°22'S, 48°48'E, fr., 14 Dec. 1944 (P!); *Humbert 3163*, Prov. Fianarantsoa, forêt à l'est d'Ivohibe, 1000 m, 22°32'S, 46°59'E, fl., 3 Nov. 1924 (P!); *Humbert 3523*, Prov. Fianarantsoa, haute vallée de la Reina, bassin du Matitanana, 1000-1400 m, 22°15'S, 47°08'E, fl., 18-22 Nov. 1924 (P!); *Humbert 6609*, Prov. Toliara, bassin supérieur du Mandrare (Sud-Est), col et sommet de Marosoui, 1000-1400 m, 24°32'S, 46°48'E, fl., 14-15 Nov. 1928 (P!); *Humbert 12056*, Prov.

Toliara, massif du Kalambatitra (Centre-Sud), Mt. Beanjavidy, 1500-1700 m, 23°22'S, 46°20'E, fl., Nov. 1933 (P!); *Humbert 22519*, Prov. Antsiranana, pentes orientales du massif de Marojejy (Nord-Est) à l'Ouest de la rivière Manantenina, affluent de la Lokoho, 1500-1700 m, 14°28'S, 49°43'E, fl., 15-25 Dec. 1948 (P!); *Humbert 22987*, Prov. Antsiranana, vallée de la Lokoho, 250-550 m, 14°32'S, 49°50'E, fr., 11 Jan. 1949 (P!); *Humbert & Saboureau 31532*, Prov. Antsiranana, partie occidentale du massif de Marojejy (Nord-Est) de la vallée de l'Ambatoharanana au bassin supérieur de l'Antsahaberoka, 1300 m, 14°23'S, 49°36'E, fl., 9 Nov.-2 Dec. 1959 (P!); *Jacquemin H577J*, Prov. Antsiranana, route d'Andapa-Doany vallée de l'Andranotsara, 14°22'S, 49°31'E, fl., 24 oct. 1967 (P!); *Jacquemin H682J*, Prov. Antsiranana, route montant d'Andasibe Maha Veriky jusqu'au col, 14°22'S, 49°31'E, fl., 4 Nov. 1967 (P!); *Keraudren-Aymonin & Aymonin 25308*, Prov. Toamasina, PK 64, route de Tananarive à Perinet, 18°56'S, 48°26'E, fl., 4 Nov. 1970 (P!); *Kotozafy 109*, Parc National de Ranomafana, Parcelle #3, Talataky, 800-1000 m, 21°15'S, 47°27'E, fl., 27 July-6 Aug. 1993 (P!); *Leandri 704*, Prov. Toamasina, forêt d'Analamazaotra, 18°56'S, 48°26'E, fr., Dec. 1932 (P!); *Lewis & Razafimandimbison 689*, Prov. Toamasina, Betampona Réserve Naturelle Intégrale, 40 km NW of Toamasina, 275-650 m, 17°31'S, 49°07'E, fl., 29 Sep. 1993 (P!); *Lowry, Rakotozafy & Nicoll 4066*, Prov. Antsiranana, Maroantsetra, disturbed cleared hillsides above and N of village of Hiaraka, ESE of Maroantsetra on NW coast of Masoala Peninsula, 50-75 m, 15°29'S, 49°54'E, fl., 10 Oct. 1986 (P!); *Major 64*, Ivohimanitra, fl., 8 Nov. 1894 (K!); *Malcomber 2187*, Prov. Toliara, NW of Tolanaro, Réserve Naturelle Intégrale #11, Andohahela, Parcelle I, NW of Eminiminy, beside river Itrotroky, 500-1000 m, 24°38'S, 46°46'E, fr., 6-13 Feb. 1993 (P!); *McPherson 14630*, Prov. Toliara, Fort Dauphin region, along road N of town towards Ranomafana, 400-550 m, 24°44'S, 46°58'E, fl., fr., 5 Dec. 1989 (P!); *Miller 3754*, Prov. Toamasina, along the road between Moramanga and Tamatave, 4 km S of the turnoff to Andasibe, 1000 m, 18°58'S, 48°25'E, fr., 19 Dec. 1988 (K!, P!); *Miller & Randrianasolo 4620*, Prov. Antsiranana, Réserve Naturelle de Marojejy, along the Manantenina river, N of the 2<sup>nd</sup> camp on the trail to the summit of Marojejy Est, 500-700 m, 14°26'S, 49°46'E, fl., fr., 26 Nov. 1989 (P!); *Perrier de la Bâthie 9081*, Prov. Toamasina, bords des chemins près d'Analamazaotra, 800 m, 18°56'S, 48°26'E, fr., s. date (P!); *Rakotozafy 198*, Prov. Fianarantsoa, Ambohiananga du Sud, 20°53'S, 47°36'E, fl., 9 Nov. 1965 (P!); *Ravelonarivo & Rabesonina 586*, Prov. Mahajanga, Sous-Préfecture de Befandriana-Nord, commune rurale de Matsoandakana, quartier de Belalona, Sud-Ouest d'Andapa, Réserve Spéciale Anjanaharibe-Sud, 1100 m, 14°42'S, 49°27'E, fr., 14 Dec. 1994 (P!)

*Réserves Naturelles: RN 1603*, Prov. Toamasina, Zahamena, 17°50'S, 48°25'E, fl., 13 Nov. 1948 (P!); *Réserves Naturelles: RN 1608*, Prov. Toamasina, Zahamena, 17°50'S, 48°25'E, fl., 13 Nov. 1948 (P!); *Réserves Naturelles: RN 6624*, Prov. Antsiranana, RN 2, PN Masoala, 15°21'S, 50°20'E, fl., 5 Feb. 1954 (P!); *Réserves Naturelles: RN 7686*, Prov. Toamasina, Monombato (Zahamena), 17°50'S, 48°25'E, fl., 1 Nov. 1955 (P!); *Réserves Naturelles: RN 9670*, Prov. Toamasina, Zahamena, 17°50'S, 48°25'E, fl., fr., 28 Oct. 1958 (P!); *Viguiet & Humbert 978*, Prov. Toamasina, Prov. d'Andovoranto, dist. Moramanga, forêt d'Analamazaotra, 950 m, 18°56'S, 48°26'E, fl., fr., 23 Oct. 1912 (P!).

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