

***Grewia hispidissima* Wahlert, Phillipson & Mabb., sp. nov. (Malvaceae, Grewioideae): a new species of restricted range from northwestern Madagascar**

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Published on 24 June 2016

Wahlert G. A., Phillipson P. B., Mabberley D. J. & Lowry II P. P. 2016. — *Grewia hispidissima* Wahlert, Phillipson & Mabb., sp. nov. (Malvaceae, Grewioideae): a new species of restricted range from northwestern Madagascar. *Adansonia*, sér. 3, 38 (1): 117-121. <http://dx.doi.org/10.5252/a2016n1a7>

ABSTRACT

A new species of *Grewia* L. endemic to the Sambirano phytogeographic region of northwestern Madagascar is described. Specimens of this species were annotated by René Capuron over 40 years ago as "*Grewia hispidissima*", which he evidently believed represented a species new to science, but the name has not been validly published. Our taxonomic work on the genus in Madagascar, including a careful study of Capuron's annotated specimens and a wealth of new material, has confirmed that this plant deserves recognition at the species level. A suite of characters clearly distinguishes *Grewia hispidissima* Wahlert, Phillipson & Mabb., sp. nov. from all other species in Madagascar, including its large acuminate leaves and the mix of simple and stellate ferruginous trichomes that densely cover its stems, petioles, inflorescence axes, pedicels and sepals. Illustrations, a distribution map, and a preliminary conservation assessment using the IUCN Red List criteria are provided for the new species.

KEY WORDS

Conservation,
Madagascar,
Malvaceae,
Grewioideae,
Grewia,
René Capuron,
new species.

RÉSUMÉ

Grewia hispidissima (Malvaceae, Grewioideae): une nouvelle espèce avec une distribution restreinte au nord-ouest de Madagascar.

Une nouvelle espèce de *Grewia* L., endémique de la région phytogéographique du Sambirano, au nord-ouest de Madagascar est décrite. Des spécimens de cette espèce avaient été annotés par René Capuron il y a plus de 40 ans comme « *Grewia hispidissima* », qu'il considérait manifestement comme une espèce nouvelle pour la science, mais dont le nom n'a pas été validement publié. Notre travail taxonomique sur ce genre à Madagascar, y compris une étude attentive des spécimens annotés de Capuron et d'une quantité importante de nouveau matériel, a confirmé que cette plante mérite d'être reconnue au niveau spécifique. Un ensemble de caractères distingue clairement *Grewia hispidissima* Wahlert, Phillipson & Mabb., sp. nov. de toutes les autres espèces à Madagascar, dont ses grandes feuilles acuminées et la présence d'une pubescence dense ferrugineuse sur ses tiges, pétioles, axes d'inflorescence, pédicelles et sépales, formé d'un mélange de poils simples et stellés. Des illustrations, une carte de distribution et une évaluation préliminaire de son statut de conservation selon les critères de la Liste Rouge de l'UICN sont fournies pour la nouvelle espèce.

MOTS CLÉS

René Capuron, conservation, Madagascar, Malvaceae, Grewioideae, *Grewia*, espèce nouvelle.

INTRODUCTION

The Old World genus *Grewia* L. comprises *c.* 150 species of trees, shrubs, and lianas, with species occurring in a wide variety of vegetation types, including humid rainforests, seasonally dry forests, scrub vegetation, and savannas (Chung 2005; Randrianasolo *et al.* 2013). *Grewia* is a modestly important genus ecologically and economically, and some species have a restricted distribution while others are widespread and a few are problematic invasives (Tews *et al.* 2009). In Madagascar, the genus is represented by 67 currently recognized species and an estimated additional *c.* 25 that are as yet undescribed, with members occurring in a wide variety of habitats and bioclimatic regions (Schatz 2001; Madagascar Catalogue 2015; Capuron & Mabberley unpubl. ms.).

Grewia has not been treated in the *Flore de Madagascar et des Comores* series, but René Capuron (1921-1971) actively worked towards a taxonomic revision of the Malagasy members of the genus. A treatment of *Grewia* subg. *Grewia* sect. *Axillares* Burret (Capuron 1964) was completed and published within Capuron's lifetime, and two further parts were published posthumously: *Grewia* subg. *Vincentia* (Benth.) Capuron (Capuron & Mabberley 1999) and *Grewia* subg. *Burretia* (Hochr.) Capuron (Mabberley & Capuron 1999). Later, one of us (DJM) produced a draft manuscript treating *Grewia* subg. *Grewia* sect. *Grewia* based on Capuron's unpublished taxonomic studies, in which 45 species were to be recognized, including 24 new to science (Capuron & Mabberley unpubl. ms.). A significant amount of work will be necessary to revise and update this lengthy manuscript in its entirety, especially given the large amount of additional material that has been collected in recent years, which has revealed that some of Capuron's species circumscriptions will need to be reevaluated. Rather than letting this situation persist, we felt that it would be preferable to publish a series of articles treating individual new species or species complexes for which there is now adequate information and a satisfactorily clear taxonomic interpretation. The new species of *Grewia* described here is the second to be

published from among those included in Capuron's original manuscript and based on herbarium specimens annotated by Capuron himself as well as recently collected material. We provide a full description, accompanied by an illustration and distribution map, and a preliminary risk of extinction assessment using the IUCN Red List criteria (IUCN 2012).

SYSTEMATICS

Grewia hispidissima Wahlert, Phillipson & Mabb., sp. nov. (Fig. 1)

Grewia hispidissima Wahlert, Phillipson & Mabb., sp. nov. differs from all other Malagasy members of the genus by its large acuminate leaves that are up to 30 cm long and 11.5 cm wide, and by its mixed simple and stellate ferruginous trichomes that densely cover the stems, petioles, inflorescence axes, pedicels and sepals.

TYPUS. — **Madagascar.** Prov. Antsiranana, Sambirano, Vallée de la Beandrona à l'Est d'Ambanja, 13°40'58"S, 48°29'28"E, 50-150 m, 29.X.1954, fl., *Service Forestier (Capuron) 11397* (holo-, P[P00375156]!; iso-, G!, MO!, P[P00375157]!), TAN).

PARATYPES. — **Madagascar.** Prov. Antsiranana, Reg. DIANA: Fiv. Ambanja, Fir. Ambodimanga-Ramena, Fkt. Antsahabe, south east of village of Mandrizavona, river Bepaka, close to junction with Ramena, 13°51'02"S, 48°47'54"E, 516 m, 12.XI.2001, bud, fl., *Antilahimena et al. 785* (G!, MO!, P!, TAN, TEF). — Ramena valley from Betaindambo to Maevatanana, Fkt. Antsahabe, Fir. Ambodimanga, Fiv. Ambanja, 13°52'01"S, 48°49'54"E, 500 m, 9.X.1998, bud, fl., *Birkinshaw et al. 536* (MO!, P!, TAN). — Ambilobe, Commune Rurale Beramanja, Chaîne Galoka, Mont Galoka, Fkt. Anketrabe-Belinta, Galoka Relevé 1, 13°34'55"S, 48°43'06"E, 680 m, 19.II.2005, imm. fr., *Callmander et al. 341* (G!, MO!, NEU!, TEF). — Besinkara, Ambalafary, 1^{er} marigot sur le chemin d'Ambodisakoana (Andavakevany), 14°04'S, 48°17'E, 300 m, 4.XI.1997, bud, fl., *Derleth 161* (G, K, MO!). — Besinkara, chemin d'Ambalafary au Bekolosy, avant le gué de l'Andavakeva, 14°04'S, 48°17'E, 450 m, 27.VIII.1997, bud, fl., *Gautier et al. 3196* (G, K, MO!, P). — East of Ankaramy, RS Manongarivo, Bekolosy, 14°02'S, 48°19'E, 800-1000 m, 7-12.XII.1992, bud, fl., *Malcomber et al. 1952* (G, K, MO!, P!, TAN, US). — Fiv. Ambanja, Fir. Ambodimanga-Ramena, Fkt. Antsahabe, Antsaharatsy,



FIG. 1. — *Grewia hispidissima* Wahlert, Phillipson & Mabb., sp. nov.: **A**, flowering branch; **B**, flower; **C**, immature fruit. **A-C**, Service Forestier (Capuron) 11397 (holotype P[P00375156]). Drawn by Roger Lala Andriamiarisoa. Scale bars: 1 cm.

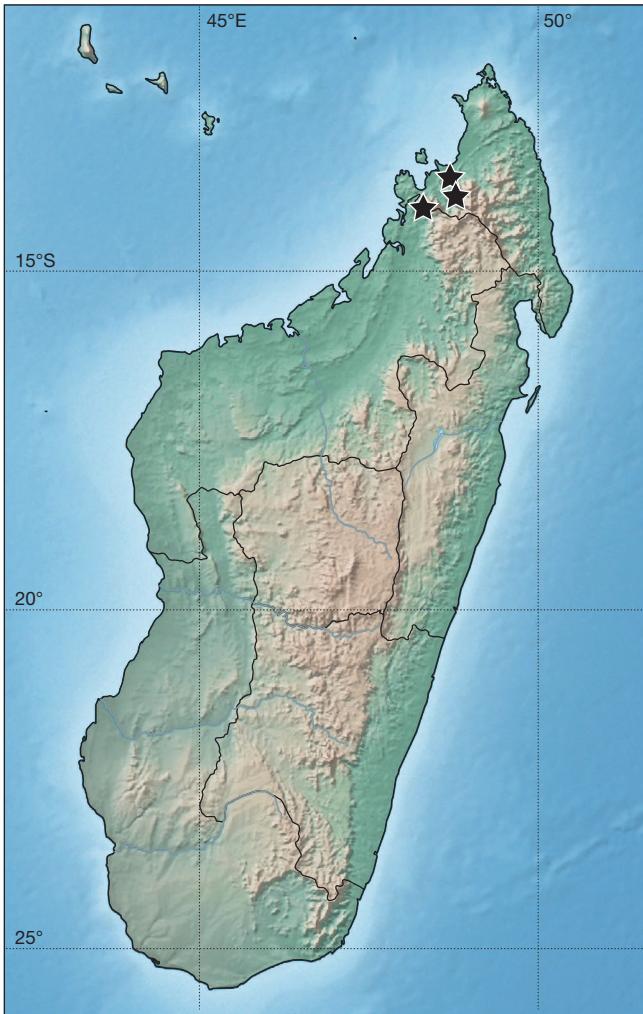


FIG. 2. — Geographic distribution of *Grewia hispiddissima* Wahlert, Phillipson & Mabb., sp. nov. (★) in northwestern Madagascar.

13°48'35"S, 48°47'36"E, 600 m, 14.IV.2000, bud, *Rabenantoandro et al.* 182 (G, MO!, P!, TAN). — RS Manongarivo, à l'est d'Ankaramibe, Bekolosy, 14°03'05"S, 48°17'07"E, 600-800 m, 5.XII.1993, bud, fl., *Rakotomalala & Malcomber* 35 (G!, MO!, P!, TAN). — Ambilobe, Beramanja, Anketrabe, forêt de Kalabenono, Chaîne de Galoka, 9 km au SE d'Anketrabe, 13°38'30"S, 48°40'53"E, 976 m, 23.XI.2006, bud, fl., *Razafitalama & Torze* 1091 (MO!, P!, TAN). — Ambilobe, Commune Rurale Beramanja, Chaîne Galoka, Mont Galoka, Fkt. Anketrabe-Belinta, Galoka Relevé 1, 13°34'56"S, 48°43'06"E, 647 m, 19.II.2005, bud, *Wohlhauser et al.* SW-750 (G!, MO!, NEU, P!, TEF).

HABITAT AND DISTRIBUTION. — The new species is known from three mountain ranges in the Sambirano biogeographic region, viz. Manongarivo, Tsaratanana, and Galoka, at elevations of 50-976 m. It has been recorded from primary humid forest and in savoka and other disturbed areas, including one collection (*Birkinshaw et al.* 536) from a cultivated field of cannabis (Fig. 2).

PHENOLOGY. — Flowering material has been collected between August and December.

ETYMOLOGY AND VERNACULAR NAME. — The specific epithet "*hispiddissima*" refers to the dense hispid indument covering most parts of the plant. The vernacular name '*valovembaka*' in the Sakalava dialect was recorded on two collections (*Derleth* 161 and *Gautier et al.* 3196).

DESCRIPTION

Shrub or small tree up to 10 m tall, bark fibrous, young parts mostly with a hispid indument composed of long (*c.* 2 mm) golden to ferruginous simple but often tufted trichomes together with very short (< 0.2 mm) simple or stellate gray or beige trichomes; stems square in cross-section, weakly fluted, densely villous, lacking visible lenticels; stipules 7-12 mm long, lanceolate to narrowly triangular, caducous, abaxial surface densely hispid with long simple trichomes only, adaxial surface glabrous. Leaves alternate; petioles 6-30 mm long, densely hispid; blades 9-30 × 4-11.5 cm, elliptic-oblong, sub-palmatinerved but appearing penninerved, with 7 to 11 pairs of secondary veins, the basal two subopposite and extending upwards $\frac{1}{3}$ - $\frac{1}{2}$ the length of the blade, midvein and secondary veins raised abaxially, sunken adaxially, tertiary venation scalariform, lacking domatia, abaxial surface hispid, adaxial surface sparsely to moderately hispid, the indument most dense along the midvein and secondary veins on both surfaces, base cuneate to obtuse, margins doubly or irregularly serrate, apex acute or acuminate, acumen 1.5-4 cm long. Inflorescence a terminal or leaf-opposed, 4- to 10-flowered umbellate cyme, peduncles 6-18 cm long, 0.7-1 mm in diam., densely hispid; pedicels 11-20 mm long, densely hispid, bracts narrowly triangular, lanceolate to linear, sometime deeply bifid, 1-2.2 mm long, caducous, densely hispid on both surfaces. Flowers bisexual, pentamerous. Sepals valvate, strongly reflexed at anthesis, 11-18 × 2.5-4 mm, oblong, abaxial surface with an indument comprising a dense covering of minute stellate trichomes and conspicuously tufted long simple trichomes, adaxial surface glabrous, base truncate, margins entire, scarious, undulate, apex acute, yellow or green *in vivo*. Petals 6-9 × 1.6-2.2 mm, lanceolate, glabrous on both surfaces, base truncate, margins entire, apex subacute to acute, yellow *in vivo*; the basal abaxial portion of the petal bearing a cordiform nectariferous pad, 0.6-1.2 × 1.7-2.0 mm, the lateral and apical portions with a membranous scale extending 0.2-0.5 mm above the apex of the pad, the scale margin densely hirsute with simple pale beige trichomes (*c.* 1 mm long); androgynophore 1.1-2 mm long, slightly dilated toward the apex, weakly fluted in cross-section, glabrous but with 5 tufts of simple beige trichomes at the apex. Stamens 25 to 100, yellow *in vivo*, filaments 8-14 mm long, filiform; anthers 0.5-0.6 × 0.5-0.6 mm, subspherical. Ovary *c.* 1-2 × 1-2 mm, ovoid, 4-lobed, densely hirsute, the surface completely obscured by simple beige trichomes, locules 4, ovules 1 per locule, style 9-14 mm long, glabrous, stigma capitate, shallowly 5-lobed. Fruits, green *in vivo* when young, mature fruit unknown.

REMARKS

Grewia hispiddissima Wahlert, Phillipson & Mabb., sp. nov. is readily distinguished from all other Malagasy members of the genus by its very large, acuminate leaves and the dense hispid indument comprising long golden to ferruginous trichomes and short stellate trichomes on its stems, petioles, inflorescence axes, pedicels and sepals. Mature fruiting material is not known, and without it we are unable to assign this new species to an infrageneric group. Capuron evidently

considered it to be closely related to two additional entities, as indicated by the fact that he annotated three *Service Forestier* collections in the Paris herbarium from Ankarana and Marotaolana in the dry north of Madagascar (SF 23130 [2 sheets], SF 23158 [1 sheet], and SF 23344 [1 sheet]) as “*Grewia hispidissima* var. *septentrionalis*” and *Service Forestier* 18918 [3 sheets] from near Ambanja in the sub-humid north-west as “*Grewia hispidissima* var. *parvifolia*.” These unpublished infraspecific names were not mentioned under “*Grewia hispidissima*” in Capuron’s original manuscript. After careful examination of this material, we conclude that none of it is conspecific with the new species we here describe as *G. hispidissima* Wahlert, Phillipson & Mabb., sp. nov., but rather differs by its much smaller and differently-shaped leaves and smaller flowers. Moreover, although the stems and leaves of these specimens are also hispid, the indument is not ferruginous as in *G. hispidissima* Wahlert, Phillipson & Mabb., sp. nov. and the distribution of simple and stellate trichomes on various parts also differs. While the status of these two undescribed entities requires further clarification, they both appear to be morphologically similar to certain collections associated by Capuron with *G. cuneifolia* Juss., differing mainly by their hispid indument, which is lacking in *G. cuneifolia*, a taxon characterized by a finer indument of stellate trichomes. The widespread *G. cuneifolia* species complex, in which Capuron was planning to recognize six forms, is clearly in need of taxonomic revision.

CONSERVATION STATUS

Grewia hispidissima Wahlert, Phillipson & Mabb., sp. nov. has three known locations representing three subpopulations, two of which are situated at the edge of well-established protected areas (Manongarivo Special Reserve and Tsaratanana Strict Nature Reserve) and the third within a site (Galoko-Kalobinono) that has recently been accorded permanent protection within Madagascar’s enlarged protected area network. Based on the currently available data, the Extent of Occurrence (EOO) of the species is estimated to be 1108 km², a significant proportion of which is not under protection, and its estimated Area of Occupancy (AOO) is 80 km². Continuing decline can be projected both for the extent and quality of the available habitat due to ongoing land clearance for agriculture in areas that are not currently under protection and the significant negative impact on habitat at the margins of protected areas resulting from burning in adjacent open areas for grazing. *Grewia hispidissima* Wahlert, Phillipson & Mabb., sp. nov. is therefore assigned a preliminary conservation status of Endangered [EN B1ab(i,ii,iii)+2ab(i,ii,iii)].

Acknowledgements

We wish to thank Richard Chung (KEP) for his valuable comments that have improved the manuscript, and the editorial staff of *Adansonia*. We also thank Anne-Elizabeth Wolf for curating the many herbarium specimens of *Grewia* at the Paris herbarium, which facilitated the study of material examined for this paper. Roger Lala Andriamiarisoa (MBG-Madagascar) provided the excellent illustration of the new species. Ehoarn Bidault (MBG-P) assisted with the translation of the abstract. The Curators at G, MO, P, TAN and TEF kindly provided access to herbarium specimens. Financial support was provided through grants to Missouri Botanical Garden from the U.S. National Science Foundation (0743355, PPL as Co-PI) and from the Andrew W. Mellon Foundation. SimpleMappr (Shorthouse, David P. 2010), was used to produce the distribution map presented in Figure 2 (<http://www.simplemappr.net>).

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Submitted on 17 March 2015;
accepted on 23 December 2015;
published on 24 June 2016.