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Two more new species of Prockiopsis Baill. (Achariaceae) from Madagascar

George E. Schatz & Porter P. Lowry II

Abstract

SCHATZ, G. E. & P. P. LOWRY II (2013). Two more new species of Prockiopsis Baill. (Achariaceae) from Madagascar. *Candollea* 68: 277-283. In English, English and French abstracts and keys.

Recent gatherings from 2009 made on the Ampasindava peninsula in northwestern Madagascar and to the west of Fort Dauphin reveal two new species of the endemic Malagasy genus *Prockiopsis* Baill. *(Achariaceae).* In contrast to the three heretofore known species, all of which possess six petals, one of the new species, *Prockiopsis razakamalalae* G. E. Schatz, Lowry & Rakotovao, possesses only four petals, whereas the other one, *Prockiopsis grandis* G. E. Schatz & Lowry, possesses eight (or nine) petals. Both new species are given preliminary conservation assessments of "Critically Endangered". A key to the five species of *Prockiopsis* is provided in English and French.

Key-words

ACHARIACEAE – *Prockiopsis* – Madagascar – Conservation

Résumé

SCHATZ, G. E. & P. P. LOWRY II (2013). Encore deux nouvelles espèces de Prockiopsis Baill. (Achariaceae) de Madagascar. *Candollea* 68: 277-283. En anglais, résumés et clés anglais et français.

Des récoltes récentes datant de 2009, faite sur la Presqu'île d'Ampasindava dans le nord-ouest de Madagascar et à l'ouest de Fort-Dauphin, représentent deux nouvelles espèces du genre endémique *Prockiopsis* Baill. *(Achariaceae).* Alors que les trois espèces reconnues jusqu'a présent possèdent six pétales, l'une des nouvelles espèces, *Prockiopsis razakamalalae* G. E. Schatz, Lowry & Rakotovao, possède seulement quatre pétales, tandis que l'autre, *Prockiopsis grandis* G. E. Schatz & Lowry, en possède huit (ou neuf). Une évaluation préliminaire du statut de conservation indique que les deux nouvelles espèces sont «En Danger Critique». Une clé d'identification des cinq espèces de *Prockiopsis* est fournie, en anglais et en français.

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Introduction

The endemic Malagasy genus *Prockiopsis* Baill. was last treated by Schatz & Lowry (2003), who reviewed the history of the genus and the clarification of the diagnostic features of the calyptriform calyx and tardily dehiscent fruit (Baillon, 1886; Gilg, 1925; Capuron, 1968; Perrier de la Bâthie, 1946), summarized the recent molecular phylogenetic study that places the genus in the family *Achariaceae* (Chase & al., 2002), and described two new species. Recent collections made in 2009 from the Ampasindava peninsula gathered by botanists from the Conservatoire et Jardin botaniques de la Ville de Genève, and from west of Fort Dauphin gathered by staff of the Missouri Botanical Garden and collaborators from Rio Tinto-QMM S.A. in conjunction with ongoing inventory associated with the QMM mining project, have revealed two more new species of *Prockiopsis*, which we here describe. These novelties conform to the *Prockiopsis* archetype in having axillary, pseudo-umbellate inflorescences and an entire, calyptrate calyx that tears irregularly; but whereas the three currently recognized species of *Prockiopsis* (*P. calcicola* G. E. Schatz & Lowry, *P. hildebrandtii* Baill., and *P. orientalis* G. E. Schatz & Lowry) all possess six petals, one of our new species (*P. grandis* G. E. Schatz & Lowry) has eight (or nine) petals, and the other one (*P. razakamalalae* G. E. Schatz, Lowry & Rakotovao) has only four petals, thus significantly expanding the range in petal number known for the genus. With the description of these two new species, *Prockiopsis* now comprises five species that can be distinguished from one another by the following key.

Taxonomic treatment

Key to the species of *Prockiopsis*

1. Stems gray puberulous; margins of leaves entire; inflorescences 1-flowered; inflorescence bracts arranged in 14 or 15 decussate, tightly imbricate pairs; pedicels golden villous; calyx exterior densely golden sericeous ..... ***P. orientalis***

1a. Stems glabrous or glabrescent; margins of leaves crenulate-serrate, sometimes spinose, rarely entire; inflorescences 2- to 10-flowered; inflorescence bracts not distinctly decussate-imbricate; pedicels glabrous or glabrescent to sparsely or moderately tan puberulous; calyx exterior with sparse appressed indumentum 2

2. Leaves narrowly elliptic with a length to width ratio of greater than 3:1; petals 4, linear, 4.5-6.5 mm long..... ***P. razakamalalae***

2a. Leaves elliptic with a length to width ratio usually less than 3:1; petals 6 or 8 (or 9), obovate, greater than 11 mm long 3

3. Petals 8 (or 9), 17-29 mm long; fruit obovoid, to 43 mm tall, 32 mm in diameter..... ***P. grandis***

3a. Petals 6, 11-14 mm long; fruit globose or ovoid, 7-17 mm tall, 7-14 mm in diameter..... 4

4. Inflorescence bracts triangular to ovate, densely sericeous at anthesis, arranged in distinct groups along an elongate axis, separated by visible internodes; calyx exterior with a distinct tuft of dense, erect, encircling trichomes at the base ..... ***P. calcicola***

4a. Inflorescence bracts acicular to narrowly triangular, sparsely sericeous at anthesis, clustered on a contracted axis, nearly always obscuring the internodes; calyx exterior lacking a tuft of encircling trichomes at the base ... ***P. hildebrandtii***

Clé des espèces de *Prockiopsis*

1. Tiges à pubérulence grise; feuilles à marge entière; inflorescences à une fleur; bractées de l'inflorescence disposées en 14 ou 15 paires décussées et fortement imbriquées; pédicelles velus à indument doré; extérieur du calice densément soyeux et doré..... ***P. orientalis***

1a. Tiges glabres ou glabrescentes; feuilles à marge crénulée-serretée, parfois épineuse, rarement entière; inflorescences avec 2 à 10 fleurs; bractées de l'inflorescence pas distinctement décussées-imbriquées; pédicelles glabres ou glabrescents ou faiblement à modérément brun-pubérulents; extérieur du calice avec un indument épars apprimé..... 2

2. Feuilles étroitement elliptiques, avec un rapport longueur-largeur dépassant 3:1; pétales 4, linéaires, de 4,5 à 6,5 mm de long ..... ***P. razakamalalae***

2a. Feuilles elliptiques, avec un rapport longer-largeur généralement inférieur à 3:1; pétales 6 ou 8 (ou 9), obovales, de 11 mm de long ou plus 3

3. Pétales 8 (ou 9), 17-29 mm de long; fruit obovoïde, jusqu'à 43 mm de haut et 32 mm de diamètre ..... ***P. grandis***

3a. Pétales 6, 11-14 mm de long; fruit sphérique ou ovoïde, 7-17 mm de haut et 7-14 mm de diamètre 4

4. Bractées de l'inflorescence triangulaires à ovales, densément soyeuses à l'anthèse, clairement disposées en groupes le long d'un axe allongé, séparées les unes des autres par des entre-nœuds visibles; extérieur du calice portant à la base une touffe circulaire dense de trichomes érigés ..... ***P. calcicola***

4a. Bractées de l'inflorescence aciculaires à étroitement triangulaires, faiblement soyeuses à l'anthèse, groupées sur un axe court, cachant presque toujours les entre-nœuds; extérieur du calice sans une touffe circulaire de trichomes à la base ..... ***P. hildebrandtii***

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Prockiopsis grandis G. E. Schatz & Lowry, **spec. nova** (Fig. 1-2).

Typus: Madagascar. Prov. Antisiranana: Ampasindava, forêt d'Andranomatavy, 13°40'40''S 47°59'12''E, 145 m, 25.XI.2009, fl., *Ammann, Madiomanana & Tahinarivony 386* (holo-: G [G00180703]!; iso-: K, MO-6440864!, P [P04782036]!, TEF).

Differing from all other species of Prockiopsis by possessing eight (or nine) petals, and having an obovoid fruit that is more than twice as large as that of the two Prockiopsis species for which fruit is known, i.e., P. calcicola and P. hildebrandtii.

Tree to 15 m tall, 18 cm DBH. *Stems* glabrous. *Stipules* 4 × 1 mm, linear to narrowly triangular, caducous. *Leaves* (3.7-)9.6-14.7 × (2.7-)2.9-5.9 cm, elliptic to narrowly elliptic, coriaceous, glabrous on both surfaces, base acute to cuneate, margins with 8 to 10 crenulate-serrate teeth, apex acuminate, the acumen to 2 cm, midrib slightly raised above, raised below, glabrous, venation semicraspedodromous, 6 to 9 secondary veins per side, slightly raised on both surfaces, tertiary venation distinctly raised on both surfaces; petioles 2-4 mm, glabrous. *Inflorescences* axillary, subtended by a pair of narrowly triangular, slightly concave bracts, 2 × 1.5 mm, pseudo-umbellate, 4- or 5-flowered, the peduncle/rachis not visible at anthesis, ca. 1 mm long, ca. 2 mm in diam., the peduncle and rachis elongating post anthesis and into fruit such that the internodes between flowers and their subtending bracts become distinctly visible, the peduncle 4 mm long, 2 mm in diam., the rachis 2.5 mm long. *Pedicels* subtended by 3 overlapping triangular to ovate-concave, keeled bracts (2 inner and opposite, 1 outer), each 2-2.5 × 1.5 mm, moderately to densely golden tomentose outside, glabrous inside, above which sits a distinct torus of sparse trichomes surrounding the base of the pedicel; pedicels 23-50 mm at anthesis, slender, to 1 mm in diam., crowned by a flange, 1 mm tall, 5 mm in diam., initially with sparse appressed white indumentum, glabrescent by anthesis; pedicels becoming stout in fruit, 1.5 mm in diam. at base, increasing to 2.5 mm at apex. *Calyx* in bud 9-11 × 4.5 mm in diam., ellipsoid, base truncate, apex acute, entire, calyptriform and tearing irregularly, caducous, thin and tissue-like, with sparse appressed white indumentums outside, glabrous inside. *Petals* 8 (or 9), of variable size and shape, pale lavender in vivo, the larger ones to 29 × 7-11 mm, spatulate-obovate, sometimes deeply cleft and therefore bilobed, distinctly clawed, the claw 4-5 mm limb, tissue-like with visible venation, glabrous outside, moderately densely beige lanate inside, indumentum persisting towards the rounded apex, the acumen sometimes blunt, the smaller petals to 17 × 4 mm, linear, glabrous outside, moderately densely beige lanate inside, all petals rapidly caducous. Stamens 25 to 30, arranged in two series united into a single ring at their base; filaments 3.5-6.5 mm long, densely white lanate; anthers 4.5-6.0 × 0.5 mm, yellow in vivo. *Ovary* not seen. *Fruit* a tardily dehiscent capsule, to 43 mm tall, 32 mm in diam., obovoid, glabrous, smooth "in vivo", verrucose when dried, crowned by the blunt apiculate stylar remnant, 1-4 mm; seed not seen.

Notes. – *Prockiopsis grandis* is known only from two gatherings made ca. 4 km apart from one another at 145 and 310 m elevation on the northern and southern margins of the forêt d'Andranomatavy on the Ampasindava peninsula, which straddles the dry and subhumid bioclimatic zones of Cornet (1974; see Schatz, 2000). The forest encompasses an area of isolated hilly topography up to 668 m elevation in the subhumid zone, and is described as «Forêt dense humide sempervirente» on the label of *Ammann & al. 489*, the gathering from the northern margin of the forest. The remaining forests in the northern part of the Ampasindava peninsula have been classified by Humbert (1965) as «Forêt ombrophile du Sambirano», a region with a high level of local endemism to which *P. grandis* is a further addition. The new species can easily be distinguished from *P. hildebrandtii*, with which it is sympatric, as well as from the other member of the genus for which fruit is known *(P. calcicola),* by its fruit that is over two times larger than those of *P. calcicola* and *P. hildebrandtii*, and by its more numerous petals (8 or sometimes 9 versus 6 in *P. calcicola*, *P. hildebrandtii,* and *P. orientalis* and 4 in *P. razakamalalae*), which are also larger (17 to 29 mm long versus 4.5 to 16 mm long in the other four species).

Conservation status. – The forêt d'Andranomatavy encompasses at most 40 km^2 on the Ampasindava peninsula, some of which is fragmented and degraded as a result of human activities. Although a conservation management plan is currently being formulated for the forest, in the absence of effective protection it is unlikely that the forest will persist beyond 3 generations of *P. grandis* (ca. 45 years). Thus, its risk of extinction can be assessed as "Critically Endangered" (CR A3c) following the IUCN Red List Categories and Criteria (IUCN, 2012).

Paratypus. – **Madagascar. Prov. Antisiranana:** Ampasindava, forêt d'Andranomatavy, 13°38'22''S 47°59'09''E, 310 m, 15.XII.2009, fr., *Ammann, Madiomanana & Tahinarivony 489* (G, K, MO, P, TEF, WAG).

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Fig. 1. – Holotype of *Prockiopsis grandis* G. E. Schatz & Lowry.
[*Ammann, Madiomanana & Tahinarivony 386*, G]

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Fig. 2. – Flower of *Prockiopsis grandis* G. E. Schatz & Lowry.
[Photo: M. Y. Ammann]

Prockiopsis razakamalalae G. E. Schatz, Lowry & Rakotovao, **spec. nova** (Fig. 3).

Typus: Madagascar. Prov. Toliara: Anosy Region, Taolagnaro, Sarisambo, Ambohivola, forêt d'Ambatotstirongorongo, 25°05'00''S 46°46'41''E, 151 m, 22.II.2009, fl., *Razakamalala & al. 4296* (holo-: MO-6440808!; iso-: G [G00341306]!, K!, P [P05528356]!, TAN).

Differing from all other species of Prockiopsis by possessing four small, linear petals, and by its narrowly elliptic leaves with a length to width ratio greater than 3:1.

Tree to 10 m tall. Young *stems* with sparse, minute appressed indumentum, soon glabrescent. *Stipules* 0.75 × 0.2 mm, narrowly triangular, glabrous, caducous. *Leaves* 3.1-7.3 × 0.9-2.0 cm, narrowly elliptic, subcoriaceous, glabrous on both surfaces, base narrowly cuneate, margins with 5 to 8 crenulate-serrate teeth, apex narrowly acute, the acumen rounded, midrib flat above, raised below, glabrous, venation semicraspedodromous, 8 to 10 secondary veins per side, slightly raised on both surfaces, tertiary venation distinctly raised on both surfaces; petioles 3.5-6 mm, with sparse, minute appressed indument, glabrescent. *Inflorescences* axillary, pseudo-umbellate, 4- to 7-flowered, the peduncle at anthesis 2.5-3 mm long, 1 mm in diam., the rachis at anthesis 0-2.5 mm, peduncle and rachis with dense, light tan, appressed indument. *Pedicels* subtended by 3 overlapping, narrowly triangular, concave, minute bracts (2 inner and opposite, 1 outer), each 0.5-1 × 0.5 mm, densely tan puberulent outside, glabrous inside, above which sits a distinct torus of dense trichomes surrounding the base of the pedicel; pedicels 16-25 mm, slender, to 0.5 mm in diam., with sparse to moderate, appressed tan indumentum. *Calyx* in bud 4.5-6 × 1.5-2 mm in diam., ellipsoid, base truncate, apex acute to rounded, entire, calyptriform and tearing irregularly, persistent through anthesis, thin and tissue-like, with sparse appressed tan indumentums outside, glabrous inside. *Petals* 4, equal, 4.5-6.5 × 0.7-1.1 mm, linear, glabrous outside, densely light ferruginous lanate inside, caducous. Stamens 9 to 12; filaments 1.5-4 mm long, sparsely light ferruginous lanate; anthers 2-2.8 × 0.5 mm. *Ovary* 2-3 mm tall, 1.5-2 mm in diam., ellipsoid, nearly black "in seco", with very sparse, appressed white trichomes, style 3-3.6 mm, stigma bifid or trifid, lobes 0.2 mm. Mature *fruit* not seen.

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Fig. 3. – Holotype of *Prockiopsis razakamalalae* G. E. Schatz, Lowry & Rakotovao.
[*Razakamalala & al. 4296*, MO] [© Missouri Botanical Garden, Saint Louis. Reproduced with permission]

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Etymology. – The species epithet honors our colleague Richard Razakamalala, whose sharp eyes have spotted many novelties that are contributing significantly to our ever-increasing knowledge of the Malagasy flora. Our colleague Charles Rakotovao, who collected the type specimen with Richard, first pointed out the possible novelty that we describe here and joins us as a co-author of this species.

Notes. – *Prockiopsis razakamalalae* is known only from a single gathering in the tiny fragments of the forêt d'Ambatotstirongorongo ca. 18 km west of Fort Dauphin in the transitional area between the humid and subarid bioclimatic zones of Cornet (1974; see Schatz, 2000). It can be easily distinguished from all other members of the genus by its narrowly elliptic, crenulate-serrate leaves with a length to width ratio of greater than 3:1, and by its four small, linear petals.

Conservation status. – The forêt d'Ambatotstirongorongo was briefly inventoried as a potential offset site for the QMM mining project, but currently is unprotected. Ongoing threats to the remaining tiny fragments of forest from human-set fires and cutting for fuelwood render the likelihood of persistence of *P. razakamalalae* extremely low over the next 3 generations (ca. 45 years). Thus, its risk of extinction can be assessed as "Critically Endangered" (CR A3c) following the IUCN Red List Categories and Criteria (IUCN, 2012).

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