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Source: Willdenowia, 43(1) : 107-111

Published By: Botanic Garden and Botanical Museum Berlin (BGBM)

URL: <https://doi.org/10.3372/wi.43.43112>

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Abstract

Cheek M. & Jebb M.: *Nepenthes ramos* (*Nepenthaceae*), a new species from Mindanao, Philippines. – Willdenowia 43: 107–111. June 2013. – Online ISSN 1868-6397; © 2013 BGBM Berlin-Dahlem.
Stable URL: <http://dx.doi.org/10.3372/wi.43.43112>

Nepenthes ramos Jebb & Cheek, sp. nov. is described and illustrated from Surigao Province, Mindanao, Philippines, and placed in the *N. alata* Blanco group. An updated key to the species of the group is provided. The new species is characterized by the subcylindric upper pitchers which are more or less equally wide at base and apex, only slightly and gradually constricted in the middle and lacking in fringed wings, and by the lower surface of the lid having a well-developed basal appendage almost lacking glands, the lid surface having dimorphic nectar glands, large perithecoïd glands along the midline and much smaller non-perithecoïd but bordered glands on the rest of the lid. The species is assessed as Critically Endangered using the IUCN 2001 standard. Logging and open-cast mining are thought to be threats to this species.

Additional key words: conservation, *Nepenthes alata* group, threatened, ultramafic

This paper forms part of studies towards a World Monograph of *Nepenthes* L., building on a Skeletal Revision of *Nepenthes* (Jebb & Cheek 1997) and the Flora Malesiana account (Cheek & Jebb 2001). In an earlier paper the *N. alata* Blanco group of species, confined to the Philippines, was characterized and a key was provided to the species (Cheek & Jebb 2013).

The species newly described in this paper as *Nepenthes ramos* also belongs to the *N. alata* group since it possesses: a basal appendage on the lower surface of the pitcher lid; a terete stem, a distinct, but winged petiole, the petiole wings patent and spreading, decurrent from the blade; the peristome finely ridged, the outer edge not or only slightly lobed, the inner surface lacking conspicuous teeth; the mouth ovate, oblique, without a well-developed column (Cheek & Jebb 2013).

Nepenthes ramos can be separated from other species of the *N. alata* group using the key below, modified and updated from Cheek & Jebb (2013).

Key to the species of the *Nepenthes alata* group

1. Lower surface of lid, including appendage, densely and evenly covered with uniformly minute circular nectar glands (0.15–0.2 mm in diam.) 2
- Lower surface of lid with nectar glands either absent from the appendage and/or sparse, large or dimorphic (larger glands 0.35–0.4 mm diam. or larger). Visayas & Mindanao 3
2. Stems glabrous, rarely glabrescent; outer pitcher surface lacking stellate hairs. Southern Luzon to Mindanao *N. graciliflora* Elmer
- Stems persistently pubescent; outer pitcher surface >50 % covered with grey stellate hairs. Northern Luzon *N. alata* Blanco
3. Petiole appearing cylindric, wings inrolled; blade abruptly contracting into petiole: longitudinal nerves arising from petiole. Mindanao
..... *N. mindanaoensis* Sh. Kurata

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Table 1. The more important diagnostic characters separating *Nepenthes negros*, *N. ramos* and *N. mindanaoensis*.

	<i>Nepenthes negros</i>	<i>Nepenthes ramos</i>	<i>Nepenthes mindanaoensis</i>
Upper pitcher, shape	widest at base, tapering inconspicuously towards middle and apex	± equally wide at base and apex, slightly narrower at middle	widest at globose base, abruptly constricted above into a cylinder
Upper pitcher, ventral fringed wings	present on upper 1–3 cm of pitcher only	absent	present on whole length of pitcher
Upper pitcher, lid shape	orbicular (broadest at middle)	ovate (broadest in proximal part)	orbicular (broadest at middle)
Lid appendage shape and presence of nectar glands (upper pitcher)	well-developed, hooked; nectar glands dense	well-developed, hooked; nectar glands absent or very few	reduced to an inconspicuous ridge; nectar glands present
Nectar glands on lower lid surface (upper pitchers)	monomorphic, c. 0.12 mm in diam., larger along midline, 0.15–0.4 mm in diam.	dimorphic: non-perithecoid glands 0.3–0.6 mm, numerous except along midline; perithecoid glands elliptic, 1.25–1.16 × 0.7–0.8 mm, dense along midline, thinly scattered in distal half	dimorphic: rimmed glands 0.4–0.7 mm in diam., sparsely scattered; non-rimmed glands 0.2–0.3 mm in diam., dense
Indumentum of stem and lower surface of leaf blade	grey or red dendritic or bushy hairs 0.1–0.5 mm long, glabrescent	bright white, dense, mixture of stellate hairs 0.25–0.5 mm in diam. and simple hairs 0.5–1 mm long, persistent	reddish brown, sparse bristle-like hairs 1–1.5 mm long on young parts, glabrescent
Petiole	wings patent (at least in distal part); leaf blade decurrent into petiole	wings patent (at least in distal part); leaf blade decurrent into petiole	appearing cylindric because of inrolled wings; leaf blade contracting abruptly into petiole

- Petiole with wings patent; blade gradually contracting into petiole; longitudinal nerves mostly arising from midrib 4
- 4. Stem internodes winged from decurrent petiole bases. Mindanao: Sarangani *N. saranganiensis* Sh. Kurata
- Stem terete, lacking wings 5
- 5. Upper pitchers funnel-shaped, i.e. widest at mouth and progressively narrowing towards base. Mindanao: Mts Apo & Matutum . . *N. copelandii* Macfarl.
- Upper pitchers not funnel-shaped, but subcylindric, widest at base 6
- 6. Upper pitchers widest at base, contracting slightly above into a narrower cylinder with fringed wings. Negros & Biliran Islands . *N. negros* Jebb & Cheek
- Upper pitchers equally wide at base and apex, contracting slightly at the middle, lacking fringed wings. Mindanao: Surigao *N. ramos* Jebb & Cheek

In practice, within the *Nepenthes alata* group, *N. ramos* is most likely to be confused only with *N. mindanaoensis* Sh. Kurata, which also occurs in Surigao Province, and sometimes at similar altitudes, and with *N. negros* Jebb & Cheek, which occurs just to the north, on neighbouring Negros and Biliran islands. These species have broadly similarly-sized and shaped pitchers, and also have hairy stems and lower blade surfaces. They also share 2-flowered partial-peduncles. The three species can be distinguished from each other using the characteristics given in Table 1.

Nepenthes ramos is most similar to, and geographically adjacent to *N. negros*, suggesting a possible shared ancestry. In addition to the differential characters shown in Table 1, *N. ramos* also differs from *N. negros* in characters of the inflorescence. *Nepenthes ramos* has peduncles longer, 32.5–36 cm (vs 19.5–26 cm in *N. negros*), pedicels longer, 11–16 mm (vs (7–)8–10(–12) mm), tepals larger and broader, c. 4 × 3 mm (vs 3(–4) × 2(–2.5) mm, and androphores longer (4–5 mm), glabrous their entire length (vs 2(–3.5) mm, hairy in proximal half).

The two gatherings described and cited here as *Nepenthes ramos* have not previously been brought into one place before, and the distinctive characters have therefore evaded researchers. Neither gathering has been cited in the literature and of the six specimens seen, only two bear identifications, both as *N. alata*, which we now know to be restricted to northern Luzon (Cheek & Jebb 2013). Key differences between *N. ramos* and *N. alata* are given in the diagnosis below.

While the mature stages of *Nepenthes ramos* are described here (upper pitcher, male and female inflorescences, fruit and seed), thanks to the high-quality herbarium material available, it is desirable that juvenile stages are found and recorded, e.g. rosette stems and lower pitchers, and that more detailed populational and ecological data be obtained. This description is based on all the herbarium specimens cited.

Nepenthes ramos Jebb & Cheek **sp. nov.**
Holotypus: Philippines, Mindanao Island, Surigao Prov-

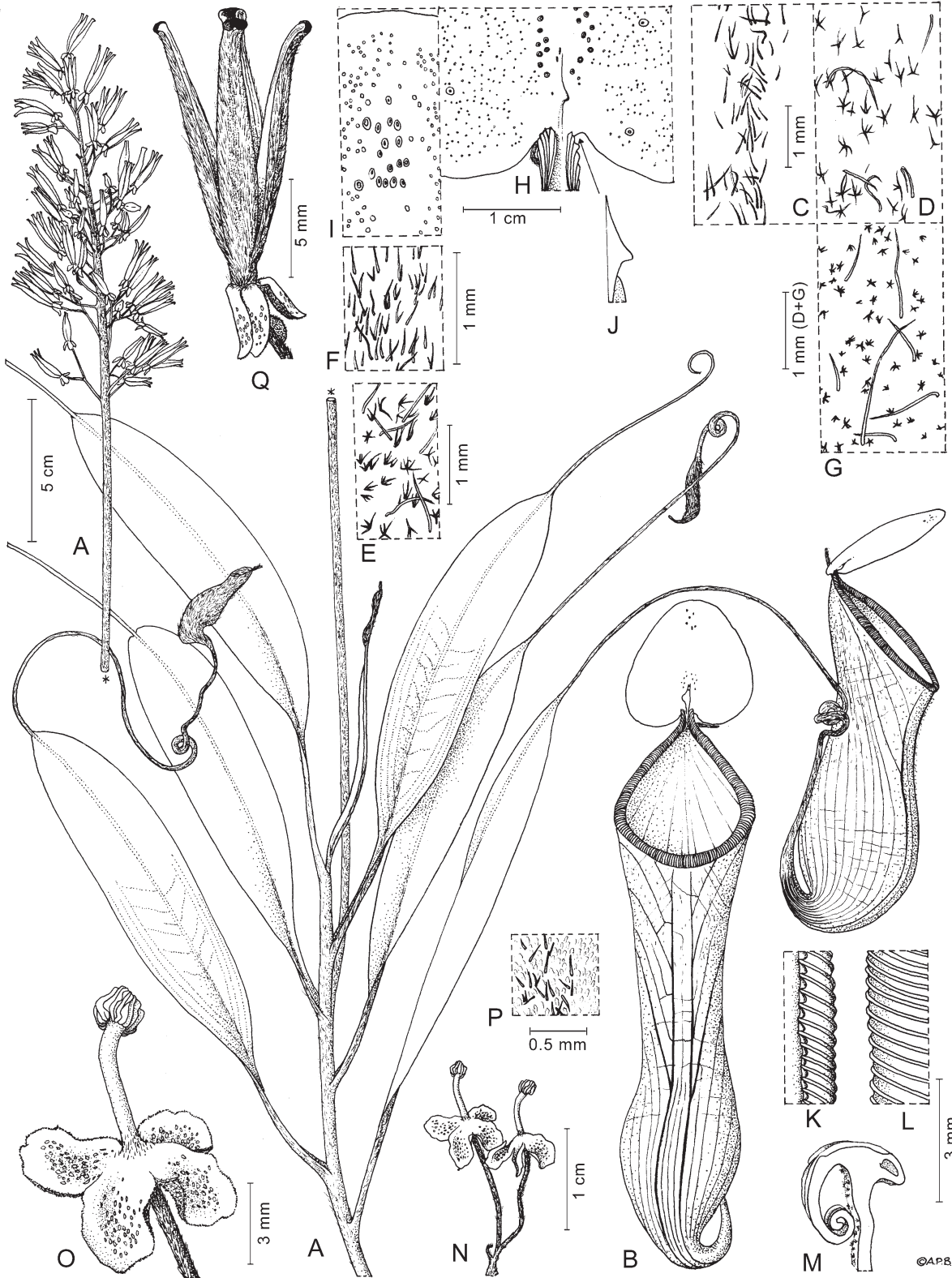


Fig. 1. *Nepenthes ramosa* – A: habit, with infructescence; B: upper pitcher; C: hairs on adaxial midrib; D: hairs on abaxial leaf blade; E: stem indumentum; F: rhachis indumentum; G: indumentum of outer surface of pitcher; H: basal part of lid, lower surface; I: distal part of lid lower surface; J: basal appendage of lid, profile view; K: inner edge of peristome, near lid; L: peristome, near lid, viewed from above; M: peristome, transverse section, outer surface to left, inner to right; N: male 2-flowered partial peduncle; O: male flower; P: tepal, outer surface; Q: fruit. – A, C, D, F, G, K–M, Q from holotype, *Ramos & Pascasio 34500*; B, E, H–J, N–P from paratype, *Ramos & Pascasio 34499*. – All drawn by Andrew Brown.

ince (precise locality not known), female inflorescence, Apr 1919, *Ramos & Pascasio* 34500 (K!; isotypi: AA!, PH!, US!) – Fig. 1.

Diagnosis — Differs from *Nepenthes alata* Blanco in the upper pitchers lacking fringed wings; the peristome flattened, not cylindrical; the lower surface of the lid with strongly dimorphic nectar glands, not uniform; the inflorescences with partial peduncles 2-flowered, not 1-flowered.

Description — *Terrestrial climber*, height unknown; stems terete, 6–8 mm in diam.; internodes 22–60 mm long; axillary buds spike-like, 3–5 mm long, inserted 4–8 mm above axil, indumentum persistent (to at least 5th internode from stem apex), of bright white hairs covering surface, of two types: simple erect curled hairs 0.5–1 mm long, and stellate 3–6-armed appressed hairs 0.25–0.5 mm in diam. *Leaves* spirally inserted, coriaceous; leaf blade narrowly elliptic-oblong or narrowly oblong, 13.5–22 × 3.0–3.7 cm, base obtuse-acute, decurrent into petiole, apex acute; longitudinal nerves 2 pairs, within 6–7 mm from margin, moderately conspicuous; pennate nerves inconspicuous to obscure; upper surface glossy, soon glabrous; lower surface drying brown, c. 40 % covered with white hairs of two types, as stem: simple patent hairs 1–1.5 mm long, c. 1 per mm², and stellate hairs 0.25–0.5 mm in diam., 3–5 per mm²; sessile glands drying black, c. 0.1 mm in diam., 5–8 per mm²; midrib densely pubescent. *Petiole* winged-canaliculate, (3.8–)4.5–10 × 0.3–0.4(–0.5) cm; wings erect proximal to stem but patent in distal part towards leaf blade, clasping stem for c. ½ its circumference, decurrent as a low ridge for 0.5–1 cm. *Lower and intermediate pitchers* unknown. *Upper pitchers* (tendrils coiled) subcylindric, (12.5–)14–20 × 3.8–4.5 cm, ± equally wide at base and apex, gradually constricting midway to 2.8–3.3 cm wide; outer surface sparsely and inconspicuously c. 10 % covered with dull red-black hairs of two types: curved simple hairs 1–1.5 mm long, 0–3 per mm², and shortly stipitate 3–6-armed bushy stellate hairs 0.05–0.15 mm in diam., c. 10 per mm²; fringed wings absent, reduced to ridges running length of pitcher; mouth ovate, oblique, 4–5.2 × 3.2–5 cm; peristome cylindric-flattened, c. 3 mm wide at front, c. 5 mm wide at sides, c. 3.5 ridges per mm, ridges c. 0.1 mm high, inner edge without conspicuous teeth at margin but with holes visible at column, outer edge not lobed; column short, not strongly developed; lid ovate, 4.3–5.1 × 4.1–4.7(–5) cm, base cordate, sinus c. 5 mm deep, apex rounded; lower surface of lid with basal appendage well-developed, slightly hooked, 2–3 × 2–3 mm, situated about middle of a ridge 7–10 mm long and 1–2 mm high; nectar glands strongly dimorphic, mostly absent from midline, except distal part with a cluster of 15–25 large longitudinally elliptic raised perithecoid glands 1.25–1.6 × 0.7–0.8 mm, central lacunae c. 0.5 × 0.25 mm, about same number of these nectar glands

also scattered thinly throughout distal half of lid, among dense smaller circular volcano-like nectar glands which cover 30–40 % of lower lid surface, these 0.3–0.6 mm in diam., 1–3 per mm²; upper surface of lid with same indumentum as outer pitcher; spur inserted c. 5 mm below junction of lid and pitcher, unbranched, cylindric, 9–13 × c. 1 mm, surface with dense white appressed simple and stellate hairs, apex rounded. *Male inflorescence* with peduncle 32.5–36 cm long, 4–5 mm diam. at base, indumentum as stem; rachis 39–40 cm long, bearing c. 320 partial peduncles evenly scattered along its length; partial peduncles 0.1–4 mm long, 2-flowered from base to apex of inflorescence; bracts inserted midway along partial peduncle, patent, filamentous, 1–1.5 mm long; pedicels not strongly divergent, 11–16 mm long; rachis to lower surface of tepals densely pubescent with white mainly appressed simple hairs c. 0.5 mm long together with stellate hairs covering 60–80 % of surface. *Tepals* 4, elliptic, c. 4 × 3 mm, apex obtuse; lower surface completely covered with translucent pale brown papillae mixed with bright white simple hairs c. 0.2 mm long (covering c. 20 % of surface); upper surface with 6–10 elliptic nectar glands, drying black, glabrous apart from hairs at base. *Androphore* 4–5 mm long, glabrous, but base surrounded by dense patent red-brown hairs. *Anther* head white, ovoid, c. 2 × 1.5 mm. *Female* inflorescence as male but peduncle (18–)24–36 cm long; rachis 7–19 cm long, bearing 20–50 partial peduncles; partial peduncles 5–10 mm long; pedicels 8–9 mm long; tepals c. 4 × 1.5 mm, enlarging in fruit; ovary sessile, ovoid, c. 4 × 2 mm, densely white and brown hairy; stigmas 4. *Infructescences* (slightly immature) as female inflorescences. *Fruit* valves 4, narrowly oblong, c. 18 × 4 mm, outer surface moderately densely appressed silky bronze hairy. *Seeds* pale brown, filamentous, c. 9 mm long; seed body central, c. 2 × 0.5 mm.

Distribution — Known only from Philippines, Mindanao, Surigao Province.

Ecology — Probably in forest on ultramafic soils, “on ridges alt. 670 m” (handwritten note on PH sheet of *Ramos & Pascasio* 34499).

Additional specimens examined (paratypes) — PHILIPPINES, MINDANAO, Surigao Province (precise locality not known), male inflorescence, Apr 1919, *Ramos & Pascasio* 34499 (PH!, US!).

Etymology — The specific epithet is a noun in apposition. It commemorates the first of the two Philippine botanical collectors who made the well-pressed, high-quality specimens on which this species is based. Maximo Ramos of the Bureau of Science, Manila, was among the most expert plant explorers in the history of the Philippines and a prolific collector of high-quality herbarium specimens.

Conservation — *Nepenthes ramos* appears to be known from a single location, since, although material is abundant (six sheets), it derives from two gatherings with adjacent numbers suggesting that they were collected one after the other in a single location. The next number in the sequence is a specimen of another rare species, the ultramafic-specific *N. merrilliana* Macfarl., which may have also been at the location. Surigao and neighbouring provinces have seen extensive forest destruction for logging and open-cast mining for metals to the extent that one recently described species of *Nepenthes* from Mindanao is considered already to be possibly extinct in the wild (Cheek 2011). *Nepenthes ramos* is known only from the material cited, which derives from a maximum of six mature individuals and possibly as few as two. Accordingly, it is here assessed as IUCN category Critically Endangered (CR) based on criterion D (IUCN 2001). The species has not been recorded since 1919 despite much exploration in recent years in Mindanao specifically for *Nepenthes*. It is to be hoped that such exploration continues and that *N. ramos* is rediscovered, is found at other locations and can be protected.

Acknowledgements

The authors are grateful to Janis Shillito for typing the manuscript.

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