

***NEPENTHES HARAUENSIS*, A NEW SPECIES OF NEPENTHACEAE FROM WEST SUMATRA**

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ABSTRACT

HERNAWATI, SATRIA, R. & LEE, C. C. 2022. *Nepenthes harauensis*, a new species of Nepenthaceae from West Sumatra. *Reinwardtia* 21(1): 19–23. — A new species of *Nepenthes* (Nepenthaceae) from the Harau region of West Sumatra is described as *Nepenthes harauensis* Hernawati, R.Satria & Chi.C.Lee. This species shares specific characteristics with both *N. bongso* and *N. singalana* but is unique in its thickly coriaceous and petiolate leaves, which are elliptic-oblong and have a distinctly peltate tendril insertion.

Key words: Harau, Nepenthaceae, *Nepenthes*, Sumatra.

ABSTRAK

HERNAWATI, SATRIA, R. & LEE, C. C. 2022. *Nepenthes harauensis*, jenis baru Nepenthaceae dari Sumatra Barat. *Reinwardtia* 21(1): 19–23. — Jenis baru *Nepenthes* (Nepenthaceae) dari kawasan Harau Sumatra Barat dipertelakan sebagai *Nepenthes harauensis* Hernawati, R.Satria & Chi.C.Lee. Jenis ini mempunyai kemiripan karakter morfologi dengan *N. bongso* dan *N. singalana* tetapi memiliki keunikan dalam tekstur daun yang tebal dan kaku, berbentuk jorong yang melonjong, mempunyai tangkai daun dan memiliki sisipan sulur yang jelas menyerupai perisai.

Kata kunci: Harau, Nepenthaceae, *Nepenthes*, Sumatra.

INTRODUCTION

Nepenthes (Nepenthaceae) belongs to the group of carnivorous pitcher plants and is one of the groups with the highest number of species consisting of at least 160–180 species worldwide (Murphy *et al.*, 2020). The island of Sumatra has long been recognized as one of the most diverse regions for the genus *Nepenthes*. Following Clarke's 2001 regional monograph, which listed 29 *Nepenthes* species for the island, eight additional taxa, all endemic, have been described: *N. izumiae* (Clarke *et al.*, 2003), *N. rigidifolia* (Akhriadi *et al.*, 2004), *N. jamban* and *N. lingulata* (Lee *et al.*, 2006), *N. flava* (Wistuba *et al.*, 2007), *N. naga* (Akhriadi *et al.*, 2009), *N. putaiguneung* (Metusala *et al.*, 2020), and *N. longiptera* (Victoriano, 2021). The steady rate of these discoveries is likely due to increased exploration of previously inaccessible regions of Sumatra. It suggests that the full diversity of *Nepenthes* on the island is far from being fully resolved.

In 2015, Robi Satria made the first observations of an unidentified *Nepenthes* species in Harau,

West Sumatra. Researchers from the *Nepenthes*-Team Padang (NP-Team Padang) visited the same locality in 2016 but found only a few individual plants that did not have pitchers. In July and September 2021, NP-Team Padang conducted repeat visits to this site and eventually successfully procured complete specimens of this *Nepenthes* that possessed both upper and lower pitchers. Upon detailed examination and comparisons with other Sumatran *Nepenthes*, it was clear that this represented a distinct taxon described herein as a new species.

MATERIALS AND METHODS

The fieldwork was carried out in July and September 2021 in Harau, West Sumatra. The locality and population distribution can be seen in Fig. 1. Morphological characters of *N. harauensis* were photographed and noted from the living plant in the wild. Measurements were made using a ruler and a Vernier calliper. Herbarium specimens were prepared and deposited at Herbarium Universitas Andalas (ANDA). The morphological characters



Fig. 1. Distribution of *Nepenthes harauensis* Hernawati, R.Satria & Chi.C.Lee

of *N. harauensis* were then compared with the collection of specimens of *N. bongso*, *N. ovata*, and *N. singalana* stored in the Herbarium of Andalas University (ANDA) Padang.

RESULTS AND DISCUSSION

Nepenthes harauensis Hernawati, R.Satria & Chi.C.Lee *spec. nov.* — TYPE: INDONESIA, West Sumatra, Lima Puluh Kota, Harau, growing terrestrially on shady sandstone cliff, 1,100–1,400 m asl, flowering and fruiting, 22 September 2021, *Nepenthes-Team Padang* (Hernawati, Havid, Ihsan), NPT 220921-1 (holotype ANDA!, isotype BO!). Fig. 2.

Nepenthes harauensis has several morphological characteristics similar to *N. bongso*, but the pitcher shape is more like the *N. singalana*. The most prominent distinguishing character is the thick and stiff coriaceous leaf structure, the peltate tendril insertion, and the sheath-like petiole, which clasps the stem for $\frac{3}{4}$ – $\frac{1}{2}$ of its circumference.

Terrestrial climber up to 3 m tall. *Rosette* not found. *Short shoots* cylindrical 0.8–1.0 cm with congested leaves (2 per cm of the stem), internodes obscured. *Climbing stem* angular 0.5 cm, internodes 4.0–6.9 cm long. *Leaves of short shoots* thickly and stiffly coriaceous, petiolate; petiole 2.0–5.9 cm long, sheath-like, clasping stem for $\frac{3}{4}$ circumference; lamina elliptic to oblong, 9.5–15.9 × 5.2–6.7 cm, apex obtuse to truncate, gradually attenuate to the base; midrib flattened

above and raised beneath, longitudinal veins 2 on each midrib, inconspicuous, pinnate veins inconspicuous; tendrils 27.0–49.5 cm long, peltate, *ca.* 0.4 cm from the apex. *Leaves of climbing stem* same as those of short shoots but petiole 3.0–4.0 cm long, clasping stem for $\frac{1}{2}$ circumference and not decurrent; lamina elliptic to oblong or slightly spatulate, 8.5–10.0 × 3.5–4.0 cm; tendrils sub-apical close to the apex, 12.0–29.0 cm long with 2–3 curls in the middle. *Lower pitchers* originating abruptly from the tendril, ovoid $\frac{1}{3}$ – $\frac{1}{2}$ in the lower half (6.1–9.0 × 3.7–5.2 cm), constricting to the hip, then cylindrical toward the mouth (8.5–12.8 × 2.7–3.9 cm); inner surface pale green on the glandular zone, pale green with dark red blotches on the waxy portion extending from the constriction of the hip to the top of the pitchers; two fringed wings present on the front of the pitcher, 2.9–4.4 × 0.1–0.2 cm, run from the mouth to the bottom, with fringed elements 0.2–0.5 cm long; mouth ovate, oblique throughout, elongated into a short neck (≤ 2 cm) toward the lid; peristome more or less cylindrical, narrow at the front (≤ 0.6 cm), widening toward the rear (≤ 1.4 cm), ribs distinct, ≤ 0.1 cm apart, raised ≤ 0.1 cm, inner margin ending in teeth *ca.* 0.2 cm long; lid cordate to orbicular 4.1–5.1 × 3.6–5.1 cm, apex obtuse, with rounded protrusions, *ca.* 0.2 cm thickness on the lower surface, spaced *ca.* 0.4 cm from the lid tip, glands more or less evenly distributed across the undersurface although larger, and more densely packed along the midrib; spur simple ≤ 0.2 cm long. *Upper pitchers* originating laterally from the tendril, narrowly ovoid in the lower third (4.3–6.0 × 2.4–2.7 cm), constricting to

Table 1. Morphological characters of *N. harauensis*, *N. bongso*, *N. ovata*, and *N. singalana*

Characters	<i>N. harauensis</i>	<i>N. bongso</i>	<i>N. ovata</i>	<i>N. singalana</i>
Stem	Cylindrical to angular	Cylindrical to angular	Cylindrical	Cylindrical, occasionally angular
Internode	Obscured on the short shoots; 4.0–6.9 cm long on the climbing stems	≤ 15 cm long on the climbing stems	≤ 15 cm long on the climbing stems	≤ 15 cm long on the climbing stems
Leaves	Stiffly coriaceous, petiolate, clasping the stem, lamina elliptic to oblong	Coriaceous, sessile, lamina spathulate to lanceolate	Coriaceous, sessile to broadly sub-petiolate, lamina lanceolate-spathulate	Thinly coriaceous, sessile, lamina lanceolate to lanceolate-spathulate
Tendrils insertion	Peltate/sub-apical	Sub-apical	Apical	Apical
Longitudinal veins	2 on each side of the midrib	2–5 on each side of the midrib	3 on each side of the midrib	3–6 on each side of the midrib
Lower pitcher	Ovoid then cylindrical on the upper part	Broadly ovoid throughout	Broadly ovoid throughout	Narrowly ovoid then cylindrical on the upper part
Peristome	Cylindrical, widening toward the rear	Cylindrical or flattened expanded toward the rear	Flattened expanded toward the rear	Cylindrical, widening to the rear, expanded to the inside
Lid	Cordate to orbicular with a simple thickened bump near the apex	Cordate to orbicular with a simple, bifid, or grossly appendage near the apex	Ovate with a pronounced appendage near the basal part	Slightly cordate to orbicular, no appendage
Upper pitcher	Narrowly ovoid cylindrical and widening above	Infundibular	Cylindrical then infundibular above	Narrowly ovoid and cylindrical above
Inflorescence	1-flowered	1-2 flowered	1-flowered	1-flowered

the hip, then cylindrical and widening toward the mouth (8.2–10.7 × 1.2–3.2 cm); inner surface same as that of the lower pitcher but the red blotches in the waxy zone are fewer and smaller; wings reduced to ribs; mouth ovate, oblique throughout, elongated into a short neck (≤ 1 cm), peristome same of those lower pitcher, but narrower (≤ 0.2 cm at the front and ≤ 0.5 cm at the rear) with three small lobes on each side, teeth ≤ 0.1 cm long; lid same of those lower pitcher, but smaller (3.7–4.8 × 2.8–4.0 cm); spur simple ≤ 0.7 cm long. *Male inflorescence* a raceme, peduncle to 11.0–13.0 cm long, rachis 10.0–12.0 cm, pedicels 0.8–1.1 cm long, each bearing a single flower with a filiform bracteole 0.5 × 0.1 cm, spaced *ca.* 0.3 cm from the base of the pedicel, tepal broad ovate 0.5–0.6 × 0.3 cm, pale green, staminal column ≤ 0.3 cm long. *Female inflorescence* is similar to the male but with a longer peduncle (19.5 cm long). *Fruits* capsule 1.1–1.6 × 0.2–0.4 cm. *Indumentum*, all parts

of the plant are glabrous. *Colour* of living specimens: stem and midrib pale green, occasionally purplish red; leaves light green above, pale green below; lower pitcher reddish-green with dark red blotches to dark red; upper pitcher pale green; peristome dark red on a lower pitcher and pale green with the dark red stripe on the upper pitcher; inflorescence pale green.

Distribution. *Nepenthes harauensis* is only known from the type locality in Harau, West Sumatra, Indonesia.

Habitat. Growing terrestrially on shady cliffs of the stunted forest of the sandstone hills around Harau. Numerous canyons in Harau are formed among flat-topped sandstone outcrops with near-vertical walls. Tropical lowland evergreen rain forests grow at the bases and summit of the outcrops. Vegetation and open areas which result



Fig. 2. *Nepenthes harauensis* Hernawati, R.Satria & Chi.C.Lee. A. Population of *N. harauensis* in the habitat. B. Habit of the short shoots. C. Leaf apex showing peltate tendril insertion. D. Lower pitcher. E. Upper pitcher. F. Male inflorescence. G. Fruits. H. Glandular zone on the lid. From *Nepenthes-Team Padang* (Hernawati, Havid, Ihsan) NPT 220921-1. Photos by Robi Satria and Havid Ramadhan.

from their structure provide important habitat for several *Nepenthes* species, including *N. adnata*, *N. albomarginata*, *N. eustachya*, *N. longifolia*, and *N. tenuis*. *Nepenthes harauensis* generally grows on cliffs above an altitude of 1,100 m asl.

Etymology. The specific name refers to the place “Harau,” a sub-district of Lima Puluh Kota Regency.

Conservation status. Based on observations, there are at least six populations in the type locality with an estimated number of young plants <100 individuals. Despite having many individuals, this species rarely produces pitchers, especially the upper pitchers. Habitats of *N. harauensis* are located in protected forest areas, so at this time, deforestation is not a serious threat to this species. Illegal collection by plant collectors can be a potential threat if there is no early management of the species. Further observations are still needed to assess the conservation status of *N. harauensis*.

Notes. This species is most readily distinguished from all other Sumatran *Nepenthes* by its unique combination of morphological characters. Particularly unusual are the strongly petiolate leaves, a feature not seen in any other Sumatran montane *Nepenthes*. The peltate tendril insertion is also unusual in the genus *Nepenthes*. In Sumatra, it is only shared with *N. rigidifolia* and *N. bongso*.

Based on the characteristics of the pitchers, *N. harauensis* is appeared to be most closely allied to *N. bongso*, *N. ovata*, and *N. singalana*, none of which occur in the Harau region. From *N. bongso* and *N. ovata*, it can be distinguished in having its pitchers either abruptly cylindrical or slightly expanded in their upper half (vs being ovoid or infundibular throughout). From *N. singalana*, it differs in having a distinctly rounded, thickened protrusion on the undersurface of the apex of the lid. Moreover, a peristome that does not expand on its inner edge. These differences are outlined in Table 1.

Although hybridization is a frequent occurrence among *Nepenthes*, the possibility of a hybrid origin for *N. harauensis* is unlikely, given that there are no putative parental species in the Harau region that could contribute morphological features that are distinct for this species. With the addition of *N. harauensis*, 11 *Nepenthes* species have now been recorded within the Harau region of West Sumatra, making it one of the most diverse localities for this genus. Although most of endemic *Nepenthes* species from Sumatra are restricted to the upper montane mossy forest of the Barisan Mountains, typically above 2,000 m, the highest peak within Harau reaches only 1,460 m. Despite this considerably lower elevation, the stunted forest of the sandstone hills around Harau may mimic certain habitat conditions of higher mountains, making it possible for montane *Nepenthes* to occur at lower altitudes. The presence of *N. inermis* evidences this, a species typically restricted to higher summits, found to grow near *N. harauensis*.

Other specimens examined. INDONESIA, Sumatra, West Sumatra, Lima Puluh Kota, Harau, 1,100–1,400 m asl., 06 July 2021, *Nepenthes-Team Padang (Hernawati, Havid, Ihsan)*, NPT 060721-1 (ANDA).

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REFERENCES

- AKHRIADI, P., HERNAWATI & TAMIN, R. 2004. A new species of *Nepenthes* (Nepenthaceae) from Sumatra. *Reinwardtia* 12(2): 141–144.
- AKHRIADI, P., HERNAWATI, PRIMALDHI, A. & HAMBALI, M. 2009. *Nepenthes naga*, a new species of Nepenthaceae from Bukit Barisan of Sumatra. *Reinwardtia* 12(5): 339–342.
- CLARKE, C. 2001. *Nepenthes of Sumatra & Peninsular Malaysia*. Natural History Publication (Borneo). Kota Kinabalu. Sabah.
- CLARKE, C., DAVIS, T. & TAMIN, R. 2003. *Nepenthes izumiae* (Nepenthaceae): A new species from Sumatra. *Blumea* 48: 179–182.
- LEE, C. C., HERNAWATI & AKHRIADI, P. 2006. Two new species of *Nepenthes* (Nepenthaceae) from North Sumatra. *Blumea* 51: 561–568.
- METUSALA, M., AL FARISHY, D. D. & JEBB, M. 2020. *Nepenthes putaiguneung* (Nepenthaceae), a new species from the highland of Sumatra, Indonesia. *Phytotaxa* 454(4): 285–292.
- MURPHY, B., FOREST, F., BARRACLOUGH, T., ROSINDELL, J., BELLOT, S., COWAN, S., GOLOS, M., JEBB, M. & CHEEK, M. 2020. A phylogenomic analysis of *Nepenthes* (Nepenthaceae). *Molecular Phylogenetics and Evolution* 144: article 106668.
- VICTORIANO, M. 2021. A new species of *Nepenthes* (Nepenthaceae) and its natural hybrids from Aceh, Sumatra, Indonesia. *Reinwardtia* 20(1): 17–26.
- WISTUBA, A., NERZ, J. & FLEISCHMANN, A. 2007. *Nepenthes flava*, a new species of Nepenthaceae from northern part of Sumatra. *Blumea* 52: 159–162.

