

NEPENTHES BOKORENSIS, A NEW SPECIES OF NEPENTHACEAE FROM CAMBODIA

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SUMMARY

A new species of *Nepenthes* L. (Nepenthaceae) from southern Cambodia, *Nepenthes bokorensis* Mey, is described and illustrated. The relationship between this new taxon and its putative relatives, *N. kampotiana* Lecomte, *N. smilesii* Hemsl. and *N. thorelii* Lecomte is also discussed.

Key words: *Nepenthes*, Cambodia, carnivorous plants, taxonomy.

INTRODUCTION

The geographical term *Indochina* is used to refer to the south-east Asian countries located between India and China, namely Burma, Singapore, Thailand, Vietnam, Cambodia, Laos and Peninsular Malaysia. The term is often confused with *French Indochina*, which was used, from 1887 onwards, to refer to Vietnam (formerly the states of Tonkin, Annam and Cochinchine), Cambodia and Laos (Brocheux & Hemery, 2001). Thailand itself was regarded as an independent and uncolonised buffer state between French Indochina (Cambodia, Laos and Vietnam) and British Indochina (Burma).

In this work, the term *Indochina* will exclude Peninsular Malaysia and Singapore, as that region is usually treated with Borneo in the *Nepenthes* literature, and will focus on the countries of

Cambodia, Laos, Thailand and Vietnam.

This geographic area has not received thorough treatment in comparison to the better known centres of *Nepenthes* diversity such as Borneo, Sumatra or, more recently, the Philippines (Clarke, 1997, 2001; Jebb & Cheek, 1997, 2001; Nerz & Wistuba, 1995; Robinson *et al.*, 2009). In fact, the literature on Indochinese Nepenthaceae is extremely poor and almost no published research has been carried out since the late 1890s and the early 1900s.

The chronology of the Indochinese species can be summed up as follows: William B. Hemsley described *N. smilesii* Hemsl. from a Thai specimen in 1895; John M. Macfarlane described *N. anamensis* Macfarlane based on a Vietnamese type specimen in 1908; in 1909 Paul Henri Lecomte named three taxa: *N. geoffrayi* Lecomte and *N. kampotiana* Lecomte based on Camb-

odian material, and *N. thorelii* Lecomte based on some collections from Vietnam. Benedictus H. Danser synonymised *N. smilesii* with *N. mirabilis* Druce in his revision of the genus *Nepenthes* (Danser, 1928).

Since these seminal works, in particular the studies of Lecomte, recorded in *Notulae Systematicae* (Lecomte, 1909), the Indochinese *Nepenthes* flora seems to have been almost ignored, and the interest in *Nepenthes* raised by the work of Danser (1928), Harms (1936), Kurata (1976), Jebb & Cheek (1997, 2001) and Clarke (1997, 2001) inspired surprisingly little interest in Indochinese species.

In their 'Skeletal revision of *Nepenthes*', Mathew Jebb and Martin Cheek lectotypified the material of *N. thorelii*, and synonymised *N. kampfotiana* and *N. geoffrayi* with *N. anamensis* as the herbarium material of the two former species are comprised of only fragmented collections and detached inflorescences (Jebb & Cheek, 1997). They also retained *N. smilesii* as a little known taxon, indicating that its inclusion with *N. mirabilis* would have been premature without further studies.

The striking lack of study of the Indochinese Nepenthaceae can be explained by at least three factors:

- The history of Indochina has involved a great deal of internal and international conflict, and the borders of countries such as Cambodia, Laos and Vietnam have been opened relatively recently to visitors and botanists. While tourists are now welcome and many areas of natural wealth are managed for visitors, certain localities remain perilous, the landmined

regions of Cambodia being one of the best-known examples.

- Most of the type specimens are comprised of fragmented material, making it difficult to study the species from that area. Further, the location data for certain specimens is incomplete or misleading. For example, *N. geoffrayi* and *N. kampfotiana* have been recorded from "Kampfot, Cambodia", but Kampfot is both the name of a southern province and the name of its principal city.

- Finally, the Indochinese species form a group of superficially similar species. To the untrained eye, they all appear to share identical narrow leaves with clasping leaf bases and reddish lower pitchers. Their inflorescences are also similar, consisting of a raceme with one-flowered pedicels. Until recently, the delimitations of these Indochinese species were completely unknown and most herbarium specimens from Indochina were often incorrectly labelled as "*N. thorelii*", "*N. aff. Thorelii*", "*N. anamensis*" or were simply left undiagnosed.

In his forthcoming work, *Pitcher Plants of the Old World* (2009), Stewart McPherson will reinstate *N. kampfotiana* and synonymise *N. anamensis* with *N. smilesii* following the interpretation provided to him by M. Cheek (pers. comm.), an interpretation that is fully supported by the author of this text (F. Mey).

During a field trip to southern Cambodia in 2007, a new taxon was observed on Phnom (Mount) Bokor (1080 m). This plateau is located within the Preah Monivong National Park (Bokor National Park), which is located near the

town of Kampot, the main city of the eponymous province. The taxon possesses a combination of obvious, stable features that serve to distinguish it from the other Indochinese species present in Cambodia, *N. kampotiana*, *N. smilesii*, and *N. thorelii*. This taxon from Bokor National Park is described as a new species here.

Nepenthes bokorensis Mey, *spec. nov.*
– Figures. 1, 2A, 2B

Nepenthes thorelii Lecomte simile, sed foliis longioris latoris oblongis sessilibus vel subpetiolatis basaliter amplexicaulis peristomio robusto cylindrico pedicellis interdum 2-floribus differt.

– Typus: *Marie Martin 1231 bis* (holo P!), southern Cambodia, province of Kampot, Phnom Bokor, 800 m, 7.xii.1968.

Nepenthes bokorensis is most readily distinguished from its near relatives by its robust peristome, significantly broader leaves, the vaulted, orbicular lid and its occasionally 2-flowered inflorescences.

Terrestrial climber to 7 m tall. *Stem* of rosette and short shoots cylindrical in cross section, 7-9 mm diameter. Climbing stem terete to 1 cm diameter, internodes ca. 3 cm long. *Leaves* of the rosettes coriaceous, base attenuate and sessile, sometimes sub-petiolate, lamina oblong to linear-lanceolate, apex acute to obtuse, sometimes acuminate, 30-35 by 7-8 cm, clasping the stem by three-quarters of its circumference, rarely

slightly decurrent; longitudinal veins 3 on each side of the midrib in outer quarter of the lamina, pinnate veins arising obliquely from midrib, midrib 2 mm wide; tendrils straight, terete, 9-18 cm long, 2 mm in diameter; Leaves of the climbing stem as those of rosettes, but tendrils coiling occasionally, 10-14 cm long, 2 mm in diameter. *Lower pitchers* 13-20 by 4-6 cm, ovate in the lower third, narrowing above, often constricted below the middle, and cylindrical or slightly infundibular towards pitcher mouth; two alae 14-15 mm wide run down ventral exterior surface from tendril to mouth, fringed with narrow filaments up to 10-12 mm long; pitcher mouth oblique, *peristome* striate, loosely cylindrical, to 20 mm wide and bulbous, ribs to 8 mm high, spaced to 1 mm apart, occasionally raised to form a triangular point; *lid* orbicular to broadly elliptic, to 7 cm long by 6 cm wide, with a cordate base, often vaulted, lower surface without appendages, crateriform glands dense and numerous, to 0.5 mm across along midline, 0.2-0.3 mm elsewhere, glands sparse near margins; *spur* 11-12 mm long, simple but occasionally bifurcated. *Upper pitchers* variable, generally to 25 cm by 6 cm, wholly infundibular, narrowly so towards base and greatly elongated in lower third, occasionally swollen, forming a faint hip above; alae reduced to narrow ridges; pitcher mouth oblique; *peristome* striate, loosely cylindrical, to 17 mm wide, outer margin often slightly flared, ribs fine, to 0.4 mm high, spaced to 0.5 mm apart; *lid* orbicular or broadly elliptic, base cordate, to 6 cm long by 5 cm wide, often vaulted, margins

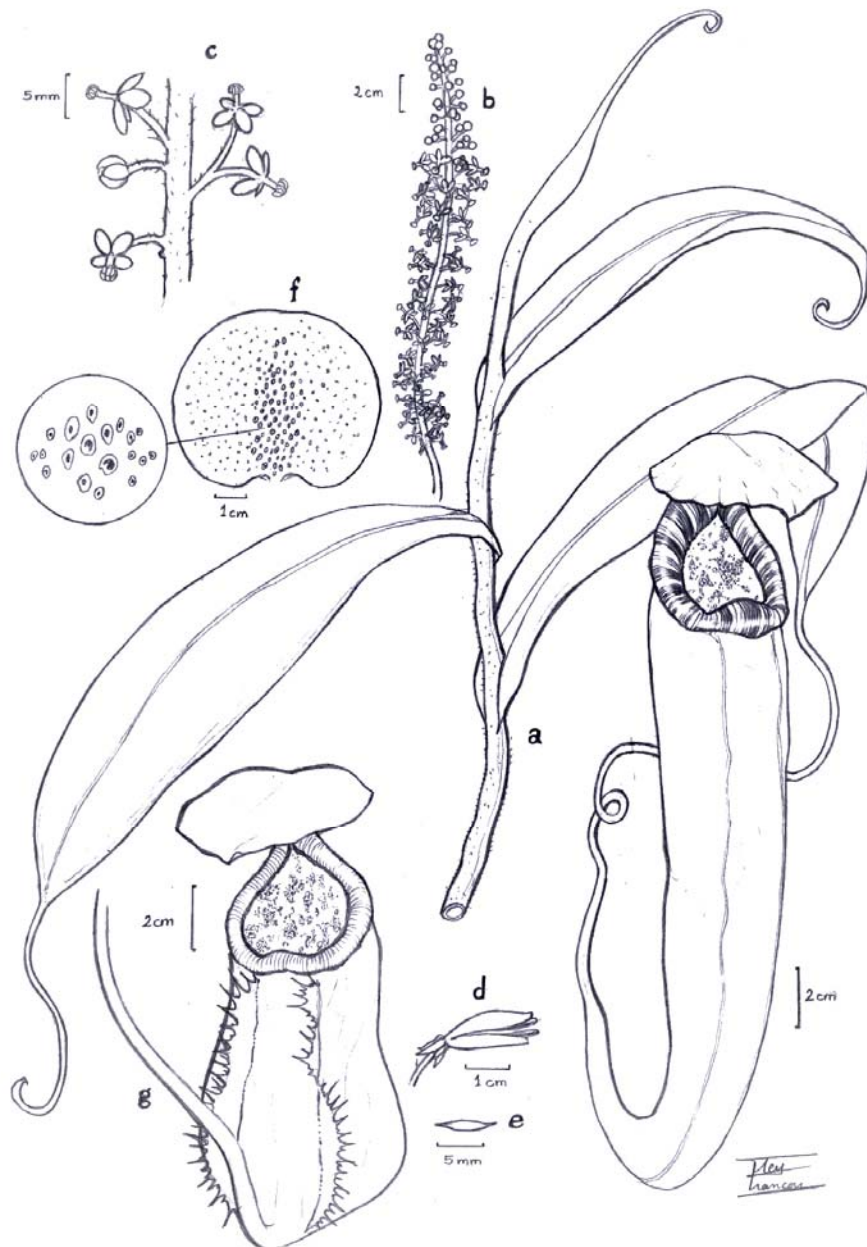


Figure 1. *Nepenthes bokorensis* Mey. a. climbing stem with upper pitcher ; b. male inflorescence; c. detail of male inflorescence; d. fruit; e. seed; f. lower surface of pitcher lid; g. lower pitcher (all from photographs). Drawing by François Mey.

frequently revolute, no appendages; *spur* as for lower pitchers. *Male inflorescence* a raceme, to c. 100 cm, peduncle 60-70 cm long, rachis 20-30 cm long with c. 80 flowers borne solitary on pedicels to 5 mm long, but occasionally on 2-flowered partial peduncles, androphore to 2 mm long; tepals orbicular to elliptic, 2 mm long. *Female inflorescence* a raceme, 60-100 cm, rachis 7-20 cm with 30-80 flowers borne solitary on pedicels to 9 mm long, occasionally on 2-flowered partial peduncles, ovary 4 mm tall; tepals orbicular to elliptic, 4 mm long; *fruit* generally 10-25 mm long; *seeds* fusi-form, ca. 50-100 per fruit, c. 7 mm long, light brown. *Indumentum* of silver or

brown hairs 0.5-1 mm long covering all parts of plant, but sometimes greatly reduced leaving foliage almost glabrous. *Colour* of living specimens: leaves green, stem, midrib and tendril yellow, green, orange or red; pitcher exterior generally red, brown or purple, with faint purple blotching or, in upper pitchers, yellow or pink; interior yellowish-green to creamy white, often blotched purple; peristome red or purple, striped with darker bands of same or, in upper pitchers, yellow to orange striped red and purple; lid as for pitcher exterior; tepals brown or red.

Specimens examined:

Nepenthes bokorensis – M. Martin 1231 bis (P!), female plant with flowers,



Figure 2A. Upper pitchers of *Nepenthes Bokorensis*

fruit and lower pitchers, Bokor Hill, 800 m: holotype. *Geoffray 324* (P!), upper pitchers with leaves, Popokvil falls, Bokor Hill, 960 m. *Geoffray 325, 328* (P!), lower pitchers with leaves, Popokvil falls, Bokor Hill, 960 m. *Middleton & Monyrak 539* (P!), two rosetted plants, Bokor Hill, 944 m. *Vidal 4780* (P!), plant with upper pitchers, Bokor Hill, altitude unknown.

Nepenthes geoffrayi – *Geoffray 84, 85, 87, 88, 91, 92, 93* (P!), Kampot, Cambodia.

Nepenthes kampfotiana – *Geoffray 89, 90, 191, 362* (P!), Kampot, Cambodia.

Nepenthes smilesii – *Charoenphol, Larsen & Warncke 4623* (P!), Phu Kradung, Loei, Thailand.

Nepenthes thorelii – *Thorel 1032* (P!),

Lo-Thieu, Vietnam: lectotype. *Thorel, 1032* (P!), Guia-Toan, Vietnam: syntype.

Nepenthes sp. – *Aug. Chevalier 36411* (P!), Damrei Mountains, Kampot province, Cambodia.

Distribution – Southern Cambodia, Phnom Bokor (Bokor Hill), from 800-1080 m altitude. Herbarium material (*Aug. Chevalier 36411* (P!)) suggests that *N. bokorensis* may be present at other locations in the Damrei Mountains (Elephant Range), but further study is required to reveal the true extent of its distribution.

Ecology – *N. bokorensis* occurs in seasonally wet upland scrub and amidst



Figure 2B. Lower pitchers of *Nepenthes bokorensis*

sparse, stunted, lower montane forest. It grows mainly in open habitats exposed to strong or direct sunlight, readily producing a stem to 7 m long that scrambles and climbs through surrounding vegetation. Some plants may also grow in bright areas beneath trees, often in damp soil covered by *Sphagnum*. Plants growing in full sun flower at an earlier stage of development, frequently flowering when less than 60 cm tall. Populations of *N. bokorensis* on Bokor Hill grow in sandy soil of pH 4.6 (Turnble & Monyrak 589 (P!)) and experience a severe dry season. In particularly exposed locations, *N. bokorensis* grows sympatrically with *Drosera peltata* Thunb., a well known species of tuberous sundew, which exhibits some months of dry dormancy. It is not known whether *N. bokorensis* produces a tuberous stem or thickened root system like its close relatives *N. kampotiana*, *N. smilesii* and *N. thorelii* but seedlings grown by the author from a seed collection on Bokor Hill demonstrate a developing taproot very similar to those developed by the aforementioned species. It seems likely that *N. bokorensis* also develops such storage organs, but additional field observations are required to ascertain this.

Etymology – The specific name refers to Bokor Hill and Bokor National Park, from where this species was first collected.

Notes –

1. *Nepenthes bokorensis* has been collected on a number of previous occasions. Herbaria in Paris (P) and Bangkok

(BKF) contain specimens mainly from Bokor Hill (from photographs taken from three herbarium specimens of *Nepenthes* collected at Bokor Hill deposited at BKF ([SN 093094, SN 098240, third number is unreadable], identified as “*N. thorelii*”), it is obvious that there are collections of *N. bokorensis* in Bangkok, too. However, it was not possible to detect the collector’s name on the herbarium label from the photograph alone). These have either been misidentified as *N. thorelii* or simply remained undiagnosed. The *N. bokorensis* holotype (*M. Martin 1231 bis* (P!)) was chosen from the Paris material. Additional Paris specimens, such as *August Chevalier 36411*(P!), include *Nepenthes* taxa from different locations in Cambodia that may fall within *N. bokorensis*.

2. *Putative relatives.* *Nepenthes bokorensis* is closely related to *N. kampotiana*, *N. smilesii* and *N. thorelii*, but differs from all of these species in that the leaf is much broader and also more oblong in shape. The occasional production of 2-flowered partial peduncles is also unusual in this group of species. It may also be distinguished from *N. kampotiana* as the foliage of that species is typically glabrous, whereas in *N. bokorensis* most parts of mature plants are usually lined with short hairs. *Nepenthes bokorensis* may be distinguished from *N. smilesii* by its pitcher morphology; the pitchers of *N. smilesii* are narrow, with a thin peristome, less colouration and shorter tendril than those of *N. bokorensis*, which are broad and have a character-

istically robust peristome. *Nepenthes bokorensis* differs from *N. thorelii* by the attachment of the leaf to the stem; in *N. bokorensis*, the lamina is sessile to sub-petiolate and clasps the stem, only ever becoming slightly decurrent, whereas in *N. thorelii* the lamina is nearly completely amplexicaul and strongly decurrent. *Nepenthes bokorensis* may also be distinguished from *N. thorelii* by its pitcher morphology: the lower pitchers of *N. thorelii* are ovate whereas those of *N. bokorensis* are ovate in the lower third and cylindrical above. *Nepenthes bokorensis* is unlikely to be confused with these three species in the wild and it is not known to occur sympatrically with any of them. Therefore, no natural hybrids including *N. bokorensis* as a parent species are known.

3. *Carnivory*. Cambodian *Nepenthes*, including *N. bokorensis*, are generally called “*ampuong sramoch*” (“*ants pithole*” in the Khmer language) by Cambodians from the province of Kampot and from the town of Pursat. Indeed, observations indicate that ants seem to be the principle prey of *N. bokorensis*. On the herbarium label of *Middleton & Monyrak 589 (P!)*, the collectors noted that the fluid of the pitchers has a pH of 2.7.

4. *Conservation*. In spite of widespread deforestation across much of Cambodia, the habitat of *N. bokorensis* in Bokor National Park has remained relatively pristine. Unfortunately, the expanding tourism industry in Cambodia is now threatening the most accessible

populations of *N. bokorensis*, particularly those on Bokor Hill, which has recently been leased by the Cambodian government for important private development. Therefore, the author considers *N. bokorensis* to be potentially vulnerable according to IUCN criteria (IUCN, 2004). The future of *N. bokorensis* in the Bokor National Park needs to be monitored and the wider distribution of this species across the highlands of southwestern Cambodia studied further.

5. *Pictures of habitat*. Photos of *N. bokorensis* have been displayed on various online forums since August 2007, documenting the known forms of the taxon and its habitat.

-CPUK: <http://tinyurl.com/bokorcpuk>
-Pitcherplants.com: <http://tinyurl.com/bokorppc>
-FloraNepenthaceae: <http://tinyurl.com/bokorfn>

To read a detailed field report on *N. bokorensis* by the author, visit the website:

<http://www.nepenthesofthailand.com/bokor.htm>

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REFERENCES

- Catalano, M. (2004-2008). <http://www.nepenthesofthailand.com/>
- Clarke, C. M. (1998). “*Nepenthes* of Borneo”. Natural History Publications (Borneo), Kota Kinabalu. Xii + 207 pp. Reprinted 2007.
- Clarke, C. M. (2001). “*Nepenthes* of Sumatra and Peninsular Malaysia”. Natural Publications (Borneo), Kota Kinabalu. X + 326 pp.
- Danser, B. H. (1931). “The Nepenthaceae of the Netherlands Indies”, *Bull. Jard. Bot. Buitenz.* Ser. 3, 9 (3-4): 249 -438. Reprinted 2006 with an Introduction by Dr Charles Clarke by Natural History Publications (Borneo), Kota kinabalu. Vi + 206 pp.
- Harms, H. A. (1936). “Nepenthaceae”, in: A. De Candolle, *Prodromus systematis universalis regni vegetabilis*, 17: 90-105.
- Hemsley, W. B. (1895). “*Nepenthes smilesii* (Nepenthaceae)”, *Kew Bulletin*: 116.
- IUCN. 2001. IUCN Red List Categories and Criteria: Version 3.1 IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, UK.
- Jebb, M. & M. Cheek. (1997). “A skeletal revision of *Nepenthes* (Nepenthaceae)”, *Blumea* 42:1-106.
- Jebb, M. & M. Cheek. (2001) “Nepenthaceae” *Flora Malesiana*, Series I, Volume 15: 1-157.
- Kurata, S. (1976). “*Nepenthes* of Mount Kinabalu”. Sabah National Park Trustees, Kota Kinabalu, Sabah. 80 pp.
- Lecomte, P. H. (1909). *Notulae Systematicae*: 59-65.
- Macfarlane, J.M. (1908). “Nepenthaceae” In: A. Engler, *Das Pflanzenreich*: 39-40.
- Robinson, A.S., A.S. Fleischmann, S.R. McPherson, V.B. Heinrich, E.P. Gironella & C.Q. Peña 2009. “A spectacular new species of *Nepenthes* L. (Nepenthaceae) pitcher plant from central Palawan, Philippines” *Botanical Journal of the Linnean Society* 159(2): 195–202.

