

has been examined in detail by several authors. Contradictory observations and theories abound in this field. New research into the roles of extra-floral nectaries promises to add considerably to our knowledge in *Nepenthes* ecology.

Published surveys of the conservation status of Bornean *Nepenthes* remain few. The most thorough estimates are provided by Simpson (1995) and by Clarke (1997), whose estimates are based on recent field observations. However, inaccuracies persist due to a continuing lack of knowledge of the distributions of several taxa. The species from Sabah, Sarawak and Brunei are reasonably well understood, but information from much of Kalimantan remains scant. Moreover, the recent effects of devastating forest fires upon the lowland species there are yet to be determined. Fortunately, most of the highland taxa from Kalimantan do not seem to have been affected by the 1997 fires, but the re-occurrence of severe fires in East Kalimantan this year, coupled with an ongoing drought, poses a further, enhanced threat. From a horticultural perspective, the role of CITES and the IUCN in the conservation of *Nepenthes* remains controversial, but often this reflects a lack of understanding of the objectives and functions of these institutions. Increased public awareness of the conservation status of *Nepenthes* is therefore essential in ensuring the preservation of remaining wild populations.

References

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Nepenthaceae in their Habitats

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Nepenthaceae (pitcher plants) are distributed especially in SE-Asia. Just single species also colonize Australia, New Caledonia, India, Sri Lanka, Seychelles and Madagascar. The highest degree of diversification is registered at the islands of Borneo and Sumatra. Nepenthaceae are usually inhabitants of poor soils in the tropics. Classically two ecological types of Nepenthaceae are distinguished: lowland species and highland species. Typical members of the lowland species are e.g. *Nepenthes mirabilis*, *Nepenthes gracilis* or *Nepenthes ampullaria*, which are growing in rather sunny and hot grassland areas, at the edge of lowland forests or swamp areas. Several of the lowland species are widely distributed. *Nepenthes mirabilis* has a vast distribution. This species can be found everywhere in SE-Asia and even in China and tropical Australia. Other species have been found just at some few locations, like *Nepenthes sumatrana* near Sibolga in Sumatra; *Nepenthes bellii* at single locations at Mindanao or *Nepenthes tomoriana* in Sulawesi. Many of these endemic lowland species are coastal, other endemic lowland species are restricted to a narrow area of limestone, as can be demonstrated e.g. at *Nepenthes northiana* or even more extremely in *Nepenthes campanulata*. Typical examples for highland species are *Nepenthes lowii*, *Nepenthes macrophylla* or *Nepenthes villosa*. These species are usually growing in between shrubs and low trees at higher altitudes on tropical mountains. Frequently they are highly endemic and have so far only been found at some very few or even single montane areas. So *Nepenthes dubia* is just recorded from one montane location in Central Sumatra; another highly endemic species is *Nepenthes aristolochioides*, which has just been recorded from some few specimens in a tiny habitat. Not all species that are known just from single locations have to be such strictly endemic. *Nepenthes ephippiata* has just been recorded from four expeditions at two locations in Central-Kalimantan, but it can be presumed that it could be rather common in that area. It remains very difficult to explore these areas. It is interesting to observe that frequently the same species shows slight but constant differences at different locations. So e.g. *Nepenthes singalana* is slightly but constantly different at nearly all known locations. It makes the taxonomy of *Nepenthes* rather complex, but it is a phantastic field to observe species diversification in

this young, vicariant family. It shall be demonstrated that the classification in highland and lowland species is rather rough. Besides these typical habitats, Nepenthaceae colonize several more ecological niches. Frequently these sites are very local and the typical *Nepenthes* species of these habitats are strictly endemic. *Nepenthes clipeata* for example is growing just at the edges of vertical cliffs at G. Kelam or *Nepenthes adnata* is growing just on shady, wet mossy walls in a tiny area in Central Sumatra. Several of these endemic species are in the meantime highly endangered or even extinct in their original habitats because of overcollection or habitat destruction. The original site of *Nepenthes campanulata* has been destroyed by fire and no other locations of it are known until now. One way to protect species of high demand from overcollection may be the artificial propagation of such species. It remains much more difficult to protect the original frequently very fragile habitats of *Nepenthes*.

References

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Nepenthes in Irian Jaya – A Field-Trip Report

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In 1994 I travelled to Irian Jaya as part of a group of 4 carnivorous-plant enthusiasts with the hope to find and study some of the very little known species of *Nepenthes* endemic to New-Guinea, such as *N. treubiana*, *N. vieillardii* (now *N. lamii*), *N. insignis*, *N. neoguineensis* and *N. danseriana*, yet undescribed at this time.

During our travel we visited various lowland habitats near Jayapura, where we found *N. neoguineensis*, *N. ampullaria*, a hybrid between both species and *N. mirabilis* which very frequently grows in open spots between secondary vegetation.

On Waigeo-Island we found the species now named *N. danseriana* by Jebb and Cheek in honour of the author of the most important work covering the genus *Nepenthes*. It was growing in a strange open habitat among lower vegetation.

The Anggi-lake-area is known for the extreme variability of *N. maxima* occurring there. We found a very impressive range of different forms of *N. maxima*, which seems to adapt to a wide variety of different habitats in the highlands of Irian Jaya. On open slopes *Drosera peltata* has also been observed occasionally.

Nepenthes insignis was found for the first time since many years, both near Tayeve, the *locus classicus* and on Biak-Island. The *N. insignis* on Biak-Island was very impressive since the habitat is located just a few hundred meters from the sea and the plants grow mainly as epiphytes in a mangrove-like forest. Plants from both locations differ slightly in size, pitcher shape and coloration.

After seeing *Nepenthes vieillardii* (now named *N. lamii* by Jebb and Cheek) in the wild on Mt. Doormans-Top it was quite obvious that the plant is not related to *N. vieillardii* from New Caledonia.

On a mountain near Mt. Doormans-Top, the location where we found *N. lamii*, a species which apparently is new to science was growing mainly at shady spots around 1800 m above sea level. Pictures of this species which is yet to be described formally will be presented during the talk.

On our trip to Mt. Doormans-Top we were unable to find *N. paniculata*, type material of which was collected on the mountain. Since our trip was on the mountain's southern slope, and the type specimen was collected by an expedition starting on the mountain's northern slope, we assume *N. paniculata* is restricted to the mountain's north face.

During the last part of our trip we studied *N. treubiana* in the McCluers-Gulf area. Plants were growing on rock faces of tiny islands just a few meters above sea-level