an extract from

Pitcher Plants of the Old World

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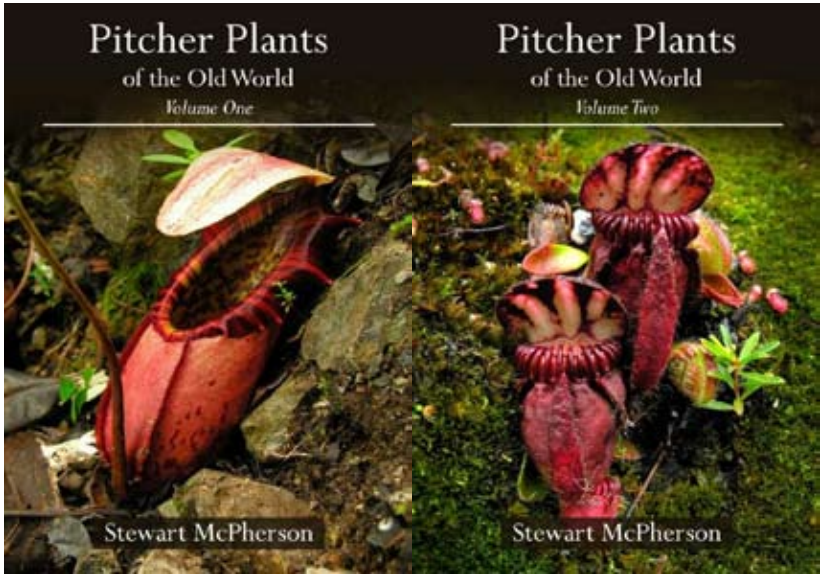

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Nepenthes khasiana Hook.f.

Original description; Hooker, J., 1873, *Prodromus systematis universalis regni vegetabilis* 17: 102 by A. De Candolle

The specific epithet refers to the Khasi Hills region of Meghalaya State in north eastern India, to which this species is endemic. *Nepenthes khasiana* occurs in East Khasi Hills District, the Jarain area of the Jaintia Hills, the Baghmara area of the Garo Hills and West Khasi Hills District, Meghalaya. It is the only pitcher plant that is native to India.

The majority of *N. khasiana* habitats have been destroyed in recent decades, and remaining populations have declined severely as a result of unsustainable poaching and indiscriminate collection (Bordoloi, 1977). During the 1970s, in an effort to protect the remaining stands of this species in the wild, the government of India banned the export of *N. khasiana* plants and listed the species as critically endangered on Appendix I of the *Convention on International Trade in Endangered Species*. Today, *N. khasiana* persists at fewer than twenty sites found between 500-1500 m altitude. The status of this species in the wild remains precarious.

Nepenthes khasiana has been described under many synonyms, including *N. melamphora*, *N. phyllamphora* and *N. rubra*. This species does not have any infraspecific taxa, and because of its geographic isolation it cannot naturally hybridise with any other *Nepenthes*. In the mountains of Meghalaya, it grows terrestrially on sandy, acidic soils at the margins of forests, among recovering secondary vegetation, on bare substrate and scrub on exposed cliffsides, landslide areas and roadside embankments, usually in strong or direct sunlight (Figure 1). It produces a branched stem up to 12 m long that scrambles and climbs through surrounding vegetation. The natural occurrences of this mountain dwelling species represents the northernmost extension of the geographic range of *Nepenthes*, but the widespread belief among horticulturists that this plant naturally experiences freezing conditions is incorrect. Bordoloi (1977) records that the habitat of *N. khasiana* experiences daytime temperatures of 18 to 28 °C.

Figure 1 (facing page). The upper pitchers of a *N. khasiana* plant growing in Meghalaya, India.

The lamina is linear, elliptic or narrowly oblong, up to 46 cm long and 10 cm wide. The apex of the leaf is acute or obtuse and the base is attenuate and sub–petiolate to petiolate (Figure 2). The petiole is winged, up to 13 cm long and 2.5 cm wide, and clasps the stem, often becoming strongly decurrent. The stem, midrib and tendril may be green, yellow, orange or red, especially in direct sunlight. The upper surface of the lamina is often dark green, whilst the lower surface is very pale.

Figure 2 (above). Note the distinctive lamina structure of *N. khasiana*.

A thin indumentum is found mainly on the midrib and veins on the underside of the lamina, the tendril, and the developing pitchers. Some hairs may also be found along the edges of the lamina. The hairs on seedling pitchers are long and uniseriate. Hairs on the inflorescence are up to 0.3 mm long and usually have basal branches. Simple to strongly branched hairs may be found on older parts of the plants. *Nepenthes khasiana* differs thus from the western outlying *Nepenthes* of Madagascar, the Seychelles, and Sri Lanka which usually only bear uniseriate hairs (Eric Schlosser, pers. comm.).

The lower pitchers are up to 12 cm tall and 4.5 cm wide. The bottom third to half of the trap is ovate and slightly swollen. The pitcher narrows above this part and becomes cylindrical towards the pitcher opening. Wings up to 1.2 cm wide run down the front of the pitcher and may be lined with narrow filaments up to 5 mm long, though such filaments are often lacking. The peristome is cylindrical, up to 5 mm wide, and of a constant width around the pitcher opening. The peristome

is glossy, lined with fine ribs up to 0.5 mm high, spaced up to 0.5 mm apart, but the ribs themselves are often hardly discernible. A gap of a few millimetres is often present in the peristome at the rear of the pitcher opening, below the lid. The lid is elliptic or sub-orbicular, often with a cordate base, up to 4.5 cm long by 5 cm wide, and lacks an appendage. The spur is unbranched and up to 6 mm long.

The exterior of the lower pitchers is yellowish green or occasionally orangey pink, sometimes mottled with faint red or orange blotches. The interior of the pitcher is yellow, orange or pink and the peristome may be yellow, green, orange, pink or red. The lid is the same colour as the exterior of the pitcher, but often has a red underside. Some plants produce pitchers with a faint orange or reddish band a few millimetres wide on the outside of the pitcher, just below the peristome.

The upper pitchers are up to 21 cm tall and 5 cm wide. The bottom fifth to quarter of the pitcher is infundibular and variably swollen. The pitcher narrows above this part, often

Figure 3 (above). Upper pitchers of a *N. khasiana* plant growing in Meghalaya, India. Note the broad peristome structure.

Figure 4 (above). Note the prominent red colouration on the underside of the lid of this upper pitcher.

forming a faint hip, and becomes cylindrical towards the pitcher opening. The pitcher also often narrows slightly immediately below the peristome (Figures 3 and 4). Wings are reduced to narrow ridges that run down the flattened front face of the upper pitchers, and may be hardly discernible.

All other parts are similar to the lower pitchers, including colouration, although the complete underside of the lid is often suffused pure red. A reddish band a few millimetres wide, on the outside of the pitcher just below the peristome, may be expressed, and often is lined with short hairs.

Nepenthes khasiana flowers from June until October. The inflorescence is a raceme consisting of 2-flowered cymes approximately 25-60 cm long, see Joseph & Joseph (1986). Some flowers may be borne singly on pedicels up to 13 mm long, with a minute, attenuate bract below. Tepals are oblong-elliptic and the anther head is borne on a column of similar length to the tepals. The male inflorescence is twice as long and denser compare to the female one. Fruits are 20-25 mm long.

Nepenthes khasiana has few distinctive characteristics that distinguish it from other morphologically similar species such as *N. distillatoria*, *N. mirabilis* and *N. vieillardii*. Since it is the only species of *Nepenthes* that naturally occurs in India and across a very small area, it cannot be confused with any other species in the wild.

It is particularly closely related to *N. distillatoria*, and distinguishing between these plants may not be straightforward. The two species differ most obviously in the form of their inflorescences; those of *N. khasiana* are more typical of *Nepenthes* in general, whereas those of *N. distillatoria* form a lax racemose panicle, with widely spaced 3- to 5-flowered partial peduncles. The lid of *N. distillatoria* is very glandular beneath and its leaves are only ever slightly decurrent, whereas in *N. khasiana* the glands are more diffuse beneath the lid and the leaves are often strongly decurrent. The shape of the lids and colouration of the pitchers also differs somewhat (see *N. distillatoria* species pages). Also,

the lower pitchers of *N. distillatoria* are usually more strongly swollen in the basal section than those of *N. khasiana* which are comparatively cylindrical. Unlike all other western outlying *Nepenthes* species *N. khasiana* produces a raceme instead of a panicle, which implies closer relation to the Southeast Asian species. Microscopic differences of taxonomic value include the indumentum and structure of the digestive and nectar glands too.

Nepenthes khasiana may also be confused with *N. tomoriana* and *N. vieillardii*, but neither species produces truly petiolate leaves, and their pitchers are generally distinct in direct comparison, though the latter species, in particular, may show high degrees of morphological variation. Certain populations of *N. mirabilis* may also produce pitchers that resemble those of *N. khasiana*, but this widespread species is not known from India and generally produces finely fimbriate leaf margins, a characteristic that is unknown in *N. khasiana*.

Nepenthes khasiana is among the most critically endangered of all *Nepenthes* and fewer than twenty populations of this plant survive in the wild (Dr. Nagulan Venugopal, pers. comm.). However, the wild population of this plant continues to decline as a result of expanding agriculture, coal mining, limestone extraction, road and bridge construction, and of course poaching (Dr. Nagulan Venugopal, pers. comm.). Various *in situ* and *ex situ* conservation measures have been implemented by the Centre of Advanced Studies in Botany, at the North Eastern Hill University, and by the Ministry of Forests and Environment. The result of these measures is that some populations of *N. khasiana* are now permanently protected, such as at the delightfully named Pitcher Plant Lake in Jarain. The potential for long term survival of this species in the wild is uncertain, but will surely depend upon the continuing efforts of the local communities to preserve those habitats that remain.