

A NEW NATURAL HYBRID OF PITCHER PLANT FROM SABAH, MALAYSIAN BORNEO

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ABSTRACT. A new natural hybrid, *Nepenthes* x *ghazallyiana*, Adam & Wilcock from Telupid, Sabah, Malaysia is described and illustrated.

INTRODUCTION

The natural hybrid, *Nepenthes* x *ghazallyiana* grows together with the two putative parental species in Telupid, Sabah. Field observations show that the two putative parental species viz. *Nepenthes gracilis* Korthals grows in drier area among the *Gleichenia* vegetation on white sandy soil whereas *N. mirabilis* (Loureiro) Druce grows in swampy areas. Our observation shows that the hybrid, *N. x ghazallyiana*, occupies the transitional habitat of the two putative parental species, on the fringe of swampy area. The hybrid populations comprises of female plants only.

A detail study of the morphological characters of the hybrid shows that it possesses intermediate characters between the two putative parental species (Table 1 & Plates 1 to 10). In addition, the chromatographic patterns of leaf phenoloc profile (Table 2) of this hybrid is a complementation of its two putative parental species. This hybrid is named after Prof. Dr. Ghazally Ismail,

Nepenthes gracilis one of the putative parental species of *Nepenthes* x *ghazallyiana*, is widely distributed. It is found in Borneo, Peninsular Malaysia, Sumatra and Celebes (Adam, Wilcock & Swaine, 1992), growing on exposed areas such as on roadside clearings, secondary bushes and low canopy heath forests at low altitudes dominated by *Baeckaea frutescens*. It grows commonly below altitudes of 100m and is rarely found at higher altitudes more than 1000 m above sea level. It is a common roadside plant, climbing among *Gleichenia* thickets, secondary vegetation and heath scrub forests and at the edge of swamps in association with *N. mirabilis* and *N. rafflesiana*.

Table 1. Diagnostic characters of *N. gracilis*, *N. x ghazallyiana* and *N. mirabilis*.

Characters	<i>Nepenthes gracilis</i>	<i>Nepenthes x ghazallyiana</i>	<i>Nepenthes mirabilis</i>
Shape of upper stem	Triangular	Cylindrical	Cylindrical
Lamina of upper stem	Sessile	Sessile, shortly petiole	Petiolate
Base	Obtuse	Attenuate	Obtuse
Shape	Lanceolate	Oblanceolate	Elliptic, oblong, lanceolate
Attachment	Decurrent	Semi-amplexicaul	Semi-amplexicaul
Shape of lower stem	Triangular	Triangular	Cylindrical
Lamina of lower stem	Sessile	Sessile	Petiolate
Base	Obtuse	Attenuate	Obtuse
Attachment	Decurrent	Decurrent	Semi-amplexicaul
Pitcher glands	Exposed (Plates 1&2)	Overarched (Plate 4)	Overarched (Plate 3)
Lid glands	Sparse	Sparse	Dense
Pore size	Small (Plates 5&6)	Moderate (Plates 7&8)	Large (Plates 9&10)

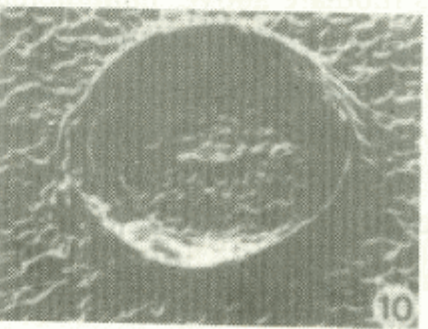
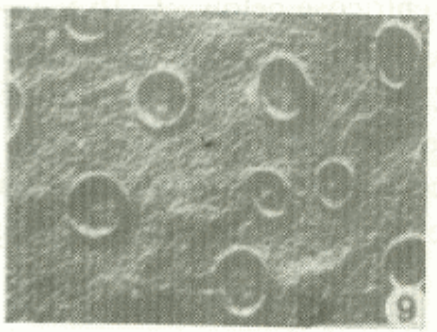
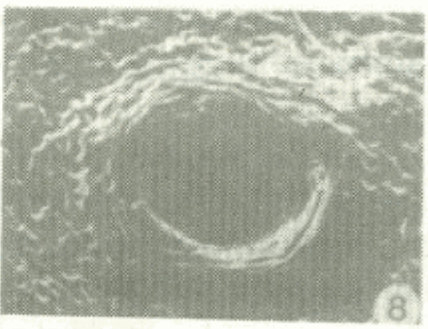
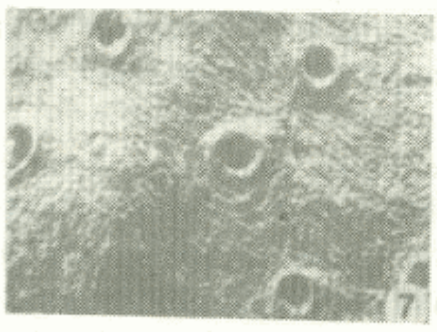
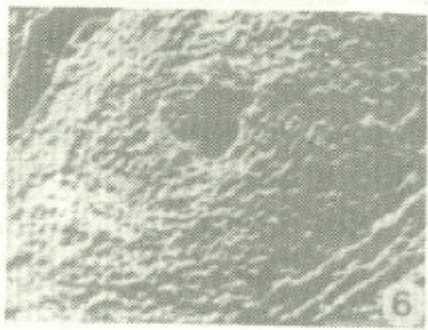
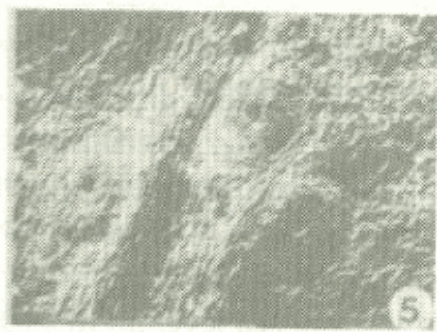
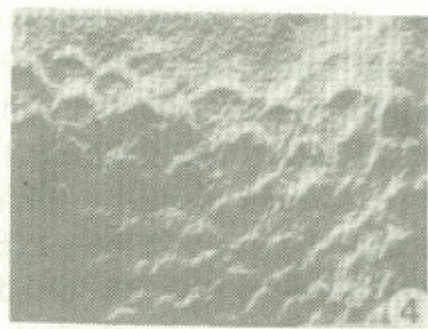
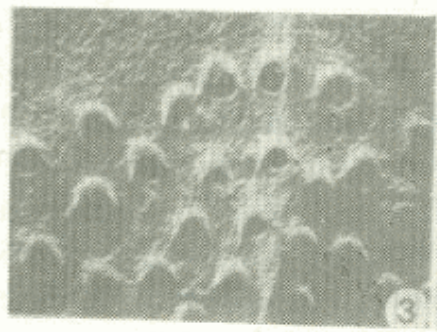
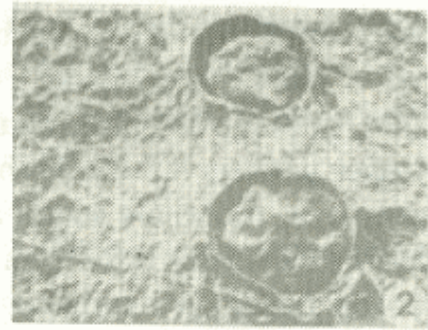
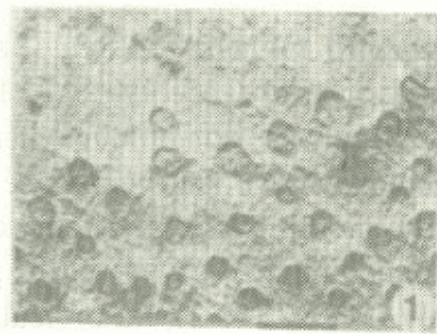
Table 2. Distribution of leaves phenolic compounds in *Nepenthes gracilis*, *N. x ghazallyiana* and *N. mirabilis*.

Taxa	1	2	3	4	5	6	7
<i>Nepenthes gracilis</i>	+	—	+	—	—	—	+
<i>Nepenthes x ghazallyiana</i>	+	+	+	+	—	+	+
<i>Nepenthes mirabilis</i>	+	+	+	+	—	—	+

Key:	+	Present	4	Kaempferol
	—	Absent	5	Luteolin
	1	Phenolic acid	6	Unknown
	2	Ellagic acid	7	Leucocyanidin
	3	Quercetin		

Description for plates on page 3:

- Plate 1.** Digestive glands on inner surface of the pitcher cavity of *Nepenthes gracilis* (bar scale 400 µm).
- Plate 2.** Digestive glands on inner surface of the pitcher cavity of *N. gracilis* (bar scale 100 µm).
- Plate 3.** Digestive glands on inner surface of the pitcher cavity of *N. x ghazallyiana* (bar scale 400 µm).
- Plate 4.** Digestive glands on inner surface of the pitcher cavity of *N. mirabilis* (bar scale 400 µm).
- Plate 5.** Lid nectar glands of *N. gracilis* (bar scale 400 µm).
- Plate 6.** Lid nectar glands of *N. gracilis* (bar scale 100 µm).
- Plate 7.** Lid nectar glands of *N. x ghazallyiana* (bar scale 400 µm).
- Plate 8.** Lid nectar glands of *N. x ghazallyiana* (bar scale 100 µm).
- Plate 9.** Lid nectar glands of *N. mirabilis* (bar scale 400 µm).
- Plate 10.** Lid nectar glands of *N. mirabilis* (bar scale 100 µm).



Nepenthes gracilis is a climber growing to 4m high; the stem is angular or triangular, leaves are sessile, coriaceous, linear-lanceolate, 3—14.6cm x 1.7—4.2cm; apex acute; base obtuse and decurrent; longitudinal nerves 4—6 pairs. Upper pitchers 4.5—13cm high, tubulose above and ventricose below, 2 ribs running over the whole length anteriorly; mouth ovate; peristome cylindrical with uniform thickness, 0.5—1mm thick; inner pitcher cavity partly glandular, with exposed glands on ventricose part only (Plates 1 & 2); lid orbiculate below with very few scattered small round and elliptic thickened-rimmed glands with small pore size (Plates 5 & 6); glandular crest absent. Male inflorescence racemose, 12—36.5cm long; each inflorescence with 72—220 flowers; pedicels 4—18 mm long, 1-flowered, bractless; sepals 4, glandular above; staminal column 1—3 mm long. Female inflorescence 13—30 cm long; each with 19—133 flowers; pedicels 3—22mm long, 1-fruited, bractless; sepal 4, glandular above. Infrutescence 11.5—25cm long; each with 54—131 fruits; pedicels 2.25mm long, 1-fruited, bractless; sepal 4, glandular above. Indumentum of most parts of plants glabrous, covered with black spots.

The second putative parental species of *N. x ghazallyiana*, *N. mirabilis* grows in swampy areas in Telupid. It is the most widely distributed species of *Nepenthes* in the world, found occurring in Borneo, Peninsular Malaysia, Sumatra, Java, Thailand, Indo-China, Southern China, Moluccas, the Philippines, Sulawesi, New Guinea and Australia (Adam, Wilcock & Swaine, 1992). The species is commonly found in Borneo, and has been most commonly collected from the western and northern parts. It grows from sea level up to 1100m, but is mostly found below 100m above sea level. It grows in abundance in swampy areas, but can also be found occasionally in drier areas, fringes of swampy areas, among secondary shrubs or roadside clearings.

Nepenthes mirabilis is a climber, up to 10m long. Stem cylindrical. Leaves petiolate; lamina oblong, elliptic, linear elliptic oblanceolate, 10—35 x 4—10.5cm; apex obtuse, acute, emarginate, round to shortly acuminate; base attenuate, obtuse or abruptly contracted and semi-amplexicaul; margin fimbriate, denticulate or entire; longitudinal nerves 4—9 pairs; petiole 3—15cm long. Upper pitchers tubulate above, infundibulate to ventricose below, 9—16 x 1—4cm, with 2 prominent anterior ribs; mouth oblique, ovate or elliptic; peristome flattened, uniform thickness; peristome finely ribbed; lids elliptic, 30—48mm x 25—36mm, densely glandular below glands with large part pore size (Plates 9 & 10); inner pitcher cavity glandular on lower ventricose or infundibulate part only, glands overarched (Plate 3). Male inflorescence racemose, 29.5—52cm long; pedicels

4–20mm long, 1-flowered, bractless; sepals 4, glandular above. Infrutescence 20–47cm long, each with 38–76 fruits; pedicels 3–19mm long, 1-fruited, bractless; sepals 4, elliptic, glandular above. Indumentum of most parts of plants covered with velvety white stellate hairs, caducous.

Nepenthes x ghazallyiana Adam & Wilcock **nothospecies nova.** (Plate 11)

Planta super alias plantas se extendens. Caulis superior cylindricus; folia sessilia vel breviter petiolata; lamina oblanceolata, raro elliptica; apex obtusus, emarginatus; basis attenuta, semi-amplexicaulis, non-decurrens; nervi longitudinales utrinque 3–7. Caulis inferior triangularis; folis sessilia; lamina elliptica; apex acutus, basis attenuata, decurrens; nervi longitudinales utrinque 2–6. Ascidium superior tubulosum cum 2 costis anticis; os orbiculatum, horizontale; peristomium cylindricum; operculum orbiculatum, infra sparsim glandulosum; pagina interior partim glandulosam; calcar simplex. Ascidium inferior supra cylindricum, infra ventricosum, cum alis anticis fimbriatis; os obliquum; peristomium cylindricum; operculum orbiculatum, infra sparsim glandulosum; pagina interior partim glandulosa; calcar simplex. Inflorescentia feminei racemosa; pedicelli uniflori, ebracteolati. Typus: Jumaat 2476, Malaysia, Sabah, Pekan Telupid, alt. 150 m, 9 February 1988 (*Holotypus*, UKMS; *isotypi* ABD, UKMS, SAN, SNP).

Plant climber 2–3 m long. Stem cylindrical, 3–6 mm thick, internode 2–7.5 cm long. **Leaves** sessile or slightly petiolate, oblanceolate, rarely elliptic, 10–19.7 x 3–4.8 cm; apex obtuse, slightly emarginate; base attenuate and semi-amplexicaul **longitudinal nerves** 3–7 on each side; **pennate nerves** running obliquely towards the outer lamina.

Lower stem triangular, 4–5 mm thick, internode 2.5–5.5 cm long. Leaves sessile, elliptic, 11–18 x 2.2–3.2 cm; apex acute, base attenuate and decurrent; **longitudinal nerves** 2–6 on each side, originate from leaves base; **pennate nerves** like in the leaves of upper stem; tendrils 4.8–7.4 cm long.

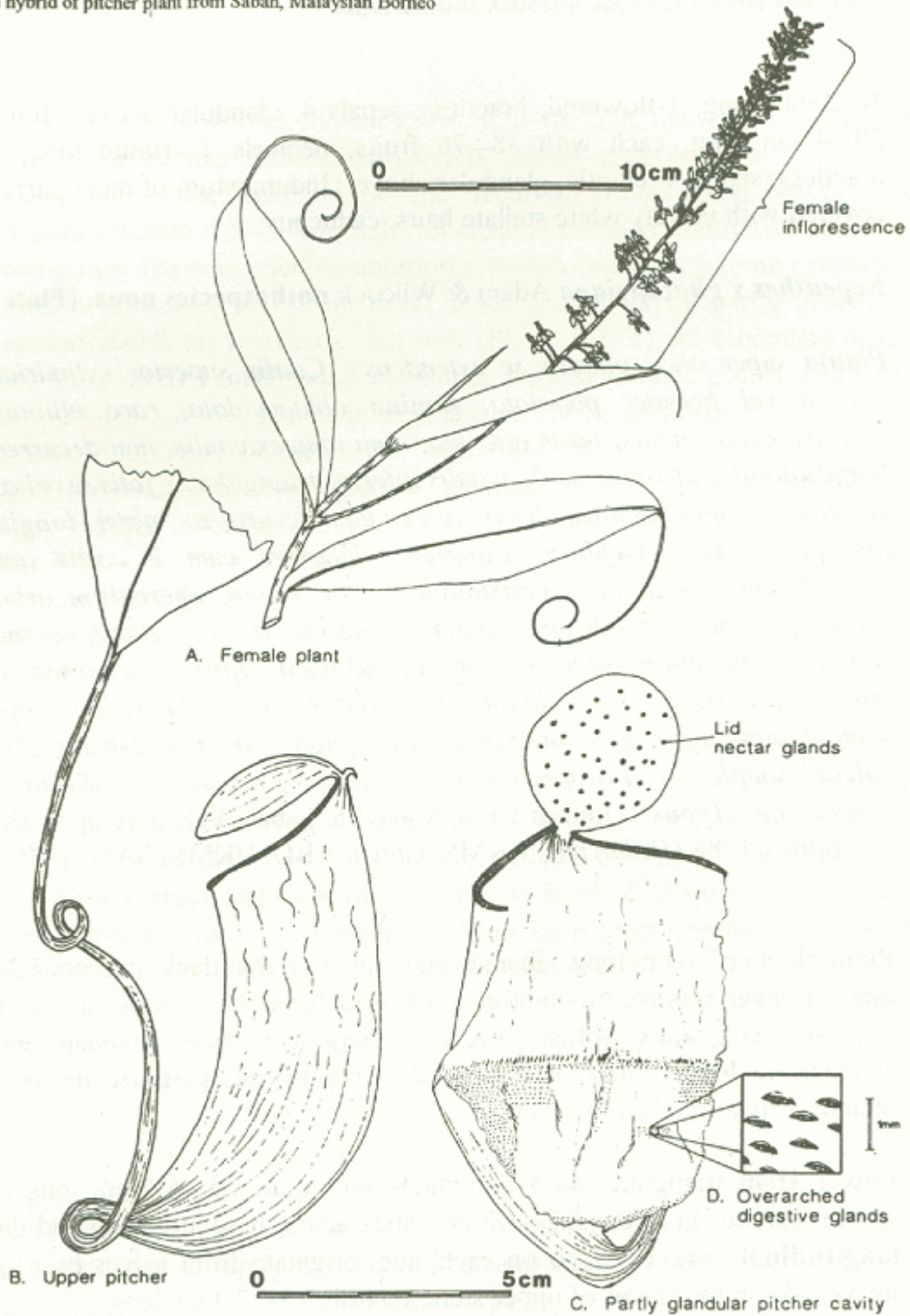


Plate 11. *Nepenthes x ghazallyiana* Adam & Wilcock. A. Female plant with fruits. B. Upper pitcher. C. Longitudinal section of a pitcher showing the partly glandular cavity. D. Overarched digestive glands. All from the holotype (Jumaat 2476).

Upper pitcher tubulose, 7—11.6 x 1.5—3.2 cm, anteriorly with 2 prominent ribs; **mouth** orbiculate 2—3 x 2—3 cm, horizontal in front; peristome 2—3 mm thick, finely ribbed, 0.2—0.3 mm apart, inner **peristome** teeth inconspicuous; **inner pitcher** cavity partly glandular with overarched glands; **lid** orbiculate, 2—3.5 x 2—3.4 cm, lower surface sparsely glandular (Plates 7 & 8); **spur** simple, 3—5 mm long.

Lower pitcher cylindrical above, ventricose below, 6.5—9 x 1.2—2.5 cm, anteriorly with 2 fringed wings, with 60—78 simple appendages; **mouth** oblique, 1.5—2.2 x 1—2.5 cm; **peristome** 1—2 mm thick, 0.2—0.3 mm apart; **lid** orbiculate 1.9—2.5 x 1.8—2.3 cm, sparsely glandular, glandular crest absent; **spur** simple, 4—5 mm long.

Female inflorescence racemose, 11—30 cm long, peduncle 2.5—12 cm long, rhachis 6—18.5 cm long with 40 - 82 flowers; pedicels 3—12 mm long, shorter towards the apex, 1-flowered, ebracteolate; sepal 4, elliptic, 2.5—4 x 1.5—2.5 mm, glandular above; ovary 2.4 x 1—2 mm.

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