



Peliosanthes macrophylla var. *assamensis* (Asparagaceae), a new variety from Behali Reserve Forest in Assam, Northeast India

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Key words

Asparagaceae
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taxonomy

Abstract *Peliosanthes macrophylla* var. *assamensis*, a new variety from Behali Reserve Forest in Assam, Northeast India, is described with accompanying photos and relevant taxonomic data. It differs from var. *macrophylla* from Arunachal Pradesh and Sikkim, Northeast India, mainly by the staminal corona internally protruding near the middle (vs internally upright corona without a particular inward protrusion), shorter anthers somewhat divergent distally (vs nearly upright anthers), and longer, papillulate pistils exceeding the anthers (vs glabrous pistils not exceeding the anthers).

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INTRODUCTION

Peliosanthes Andrews, belonging to subfamily *Nolinoideae* in *Asparagaceae* (Chase et al. 2009), currently comprises approximately 70 species (Tanaka 2019) distributed in south and south-eastern Asia, covering India, Nepal, Bhutan, Bangladesh, Myanmar, Thailand, Malaysia, Indonesia, Laos, Vietnam, China and Taiwan (Jessop 1976). It can be distinguished from the two related genera, *Ophiopogon* Ker Gawl. and *Liriope* Lour., in having monadelphous stamens (vs usually free stamens) and elliptic or narrowly elliptic (vs linear or sometimes narrowly elliptic), plicate or subplicate (vs non-plicate, flat) leaf blades usually with prominent transverse veinlets as well as longitudinal veins (Baker 1879, Bentham 1883, Hooker 1892, Tanaka 2018, Taram et al. 2020).

While conducting field explorations (2016–2020) in different parts of Northeast India, specimens of *Peliosanthes* were collected and brought into cultivation in Biswanath, Assam. In 2020 one specimen of this genus collected from Siang district of Arunachal Pradesh bloomed in cultivation. After comparing it with available literature and type sheets housed at regional herbaria (ARUN, ASSAM, CAL) and E, K, PE, P, it has been identified as *P. macrophylla* Wall. ex Baker (1879). This species has been known to occur in Northwest India, Nepal and Bhutan (Roy et al. 2017), and is easily distinguishable from all the other known members of the genus by the large leaf blades up to 60 cm long and 18 cm wide (vs usually up to 30 cm long and 8 cm wide) with over 50 longitudinal veins (vs usually up to c. 28) and very indistinct (vs distinct) transverse veinlets (Noltie 1994, Roy et al. 2017). This species is phenotypically so distinct

that it is currently difficult to indicate which other species of the genus is morphologically closest to it. Several specimens of a *Peliosanthes* species were collected in 2019 from Behali Reserve Forest of Assam. They, just like the cultivated specimen, largely coincided with *P. macrophylla*, but differed markedly in several floral characters. After a critical comparison of the specimens of *P. macrophylla* from Arunachal Pradesh and Assam, we concluded that the specimens from Assam should be distinguished as a new variety. We named it *P. macrophylla* var. *assamensis*. Below we describe the new variety with photos and relevant taxonomic data, comparing it with *P. macrophylla* var. *macrophylla* mainly from Arunachal Pradesh.

Peliosanthes macrophylla Wall. ex Baker

Peliosanthes macrophylla Wall. ex Baker (1879) 505. — Lectotype (designated by Roy et al. 2017): *W. Griffith 5841* (lecto P00214605), Mishmee, 1836.

Terrestrial, evergreen, perennial herbs, 60–90 cm tall. *Roots* many, soft to rigid, often profusely branched, pubescent, up to 4 mm diam. *Stem* rhizome-like, up to 8 cm long, 1–2(–4) cm diam, knobby, annually growing for 1–2 cm, covered with several loose papyraceous scales. *Leaves* few to over 20, 1 (rarely 2) per annual node, erect; petiole rigid, subterete, 15–50 cm by 3–7 mm; blade (narrowly) elliptic, 20–40 by 6–12 cm, base decurrent into the petiole, margin entire, apex acute to acuminate, glabrous, longitudinal veins more than 50, of which primary veins 10 or 11, transverse veinlets indistinct. *Flowering stem* (including peduncle and inflorescence rachis) 21–40 cm tall; peduncle erect, rigid, 5–25 cm by 1–5 mm, purplish, bearing 5–8 sterile bracts of 15–25 by 5–9 mm; inflorescence a raceme, rachis 10–22 cm long, (dark) purple, bearing loosely to densely arranged 12–50 flowers. *Floral bracts* purplish green with hyaline margins later turning brown, navicular, (broadly) subulate or linear, 5–13 by 3–7 mm, with 3 longitudinal veins; inner bracts (bracteoles) 1–4 by c. 1 mm. *Flowers* solitary in

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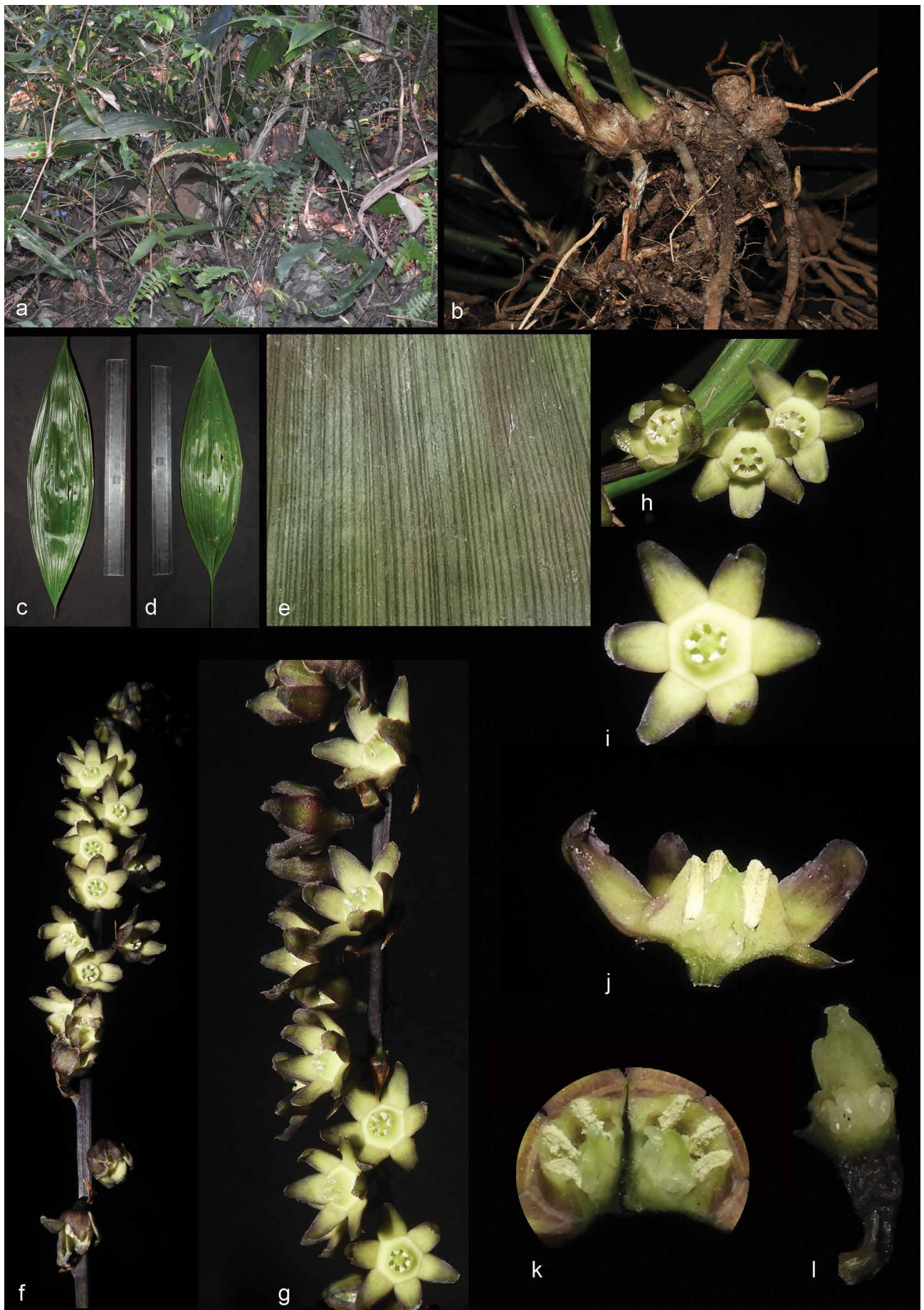


Fig. 1 *Peliosanthes macrophylla* var. *macrophylla* from Pasighat, Arunachal Pradesh, India. a. Habit; b. rhizome; c–e. leaves; f–g. inflorescence; h–i. flowers; j. longitudinal section of corona; k. orifice; l. pistil. — Photos by Momang Taram.

bracts, nodding, articulated with a (green-)purplish pedicel 3–6 mm long. *Perianth* fleshy, abaxially dark purplish, adaxially greenish yellow, distally purplish, 6-cleft; segments obliquely spreading, ovate-oblong to oblong, 4–6.5 by 2–4 mm, apex obtuse to rounded, laterally slightly revolute, somewhat incurved distally. *Androecium* monadelphous; corona conically narrowing above, 2–4 mm tall, 3.5–6 mm diam, hexagonal at base, circular distally, pale (greenish) yellow, apical opening 6-crenate, 2–4 mm diam; anthers 6, attached dorsally to inner wall of corona, sessile, oblong, 1–2.5 mm long, introrse, creamy white. *Pistil* single, half-inferior, 2–5 mm high (excluding sunken part), pale (greenish) yellow; ovary ovoid to (sub)conical, 0.6–3 mm high (excluding sunken part), 2–3 mm wide, ovules arising from base of central axis of ovary; style 1.5–3 mm long, trigonous; stigma trisected, ridged, white. *Seeds* berry-like, ellipsoid, (1–)1.5–2 by (0.5–)1–1.2 cm across, sarcotesta externally blue, internally white, fleshy, seed core ellipsoid, containing much albumen and narrowly cylindric embryo.

Distribution — E Nepal, Bhutan, NE India (Sikkim, Assam, Arunachal Pradesh).

Note — This species was first described by Baker (1879) on the basis of specimens collected by J.D. Hooker, C.B. Clarke or W. Griffith. Roy et al. (2017) designated the Griffith's collection 5841 from Mishmee (currently Mishmi hills, Arunachal Pradesh) preserved at P (P00214605) as the lectotype. The lectotype and the isolectotypes at K (K000099376) and NY (NY00319817) are in fruit.

Key to the varieties of *Peliosanthes macrophylla*

1. Staminal corona c. 2 mm tall, internally almost vertical with no particular inward protrusion; anthers 2–2.5 mm long, nearly straight and upright; pistils 2–2.5 mm tall (excluding sunken part), glabrous, stigma not exceeding anthers . . .
 a. var. *macrophylla*
1. Staminal corona 3–4 mm tall, internally connivent proximally and protruding near the middle; anthers 1–1.5 mm long, somewhat divergent distally; pistils 4–5 mm tall (excluding sunken part), papillulate below, stigma exceeding anthers b. var. *assamensis*

a. var. *macrophylla* — Fig. 1; Map 1

Stem 1–2 cm diam. *Leaves* 2–4. *Staminal corona* c. 2 mm tall, 4–6 mm diam, internally almost vertical with no particular inward protrusion, gradually thinning upwards, apical opening 2–4 mm diam; anther thecae vertical, 2–2.5 mm long. *Pistil* 2–2.5 mm high (excluding sunken part), glabrous; ovary sub-conical, (sub)hexagonal at base, c. 0.6 mm high (excluding sunken part; entire ovary c. 1.8 mm high), c. 2 mm wide; style

conical, c. 1.5 mm long, slightly longer than twice the exposed part of the ovary, intercarpellary part protruded as longitudinal wings; stigma lower in position than apex of anthers.

Distribution — E Nepal, Bhutan, NE India (Sikkim, ?Assam, Arunachal Pradesh).

Habitat & Ecology — Growing in rock crevices along stream sides in dry evergreen forest at an elevation of c. 400 m a.s.l., and the associated plants are *Melanococca* sp. (*Anacardiaceae*), *Nephrolepis cordifolia* (L.) C.Presl (*Polypodiaceae*), *Blechnum orientale* L. (*Aspleniaceae*), *Asplenium* sp. (*Aspleniaceae*), *Bauhinia variegata* L. (*Fabaceae*), *Lindenbergia hookeri* C.B.Clarke ex Hook.f. (*Orobanchaceae*), and several *Urticaceae* members. Only one population was observed so far from Bodak, East Siang district of Arunachal Pradesh with a total of more than 100 individuals. Flowering: March to April.

Additional specimens (* only seen as image). INDIA, Sikkim, Regio trop., 4000 ft., J.D. Hooker s.n. (K000099377); *ibid.*, 3000–6000 ft., Apr. 1850, J.D. Hooker s.n. (K000099378; E00894759* – <https://data.rbge.org.uk/search/herbarium/>); East Bengal, Mishmee, 1836, W. Griffith 5841 (K000099376, NY00319817* – <http://sweetgum.nybg.org/science/vh/specimen-details/?irn=606398>); Arunachal Pradesh, East Siang District, Pasighat, N27°57'38" E95°2'28", 400 m a.s.l., 16 Mar. 2020, M. Taram & D. Borah 2029 (ASSAM).

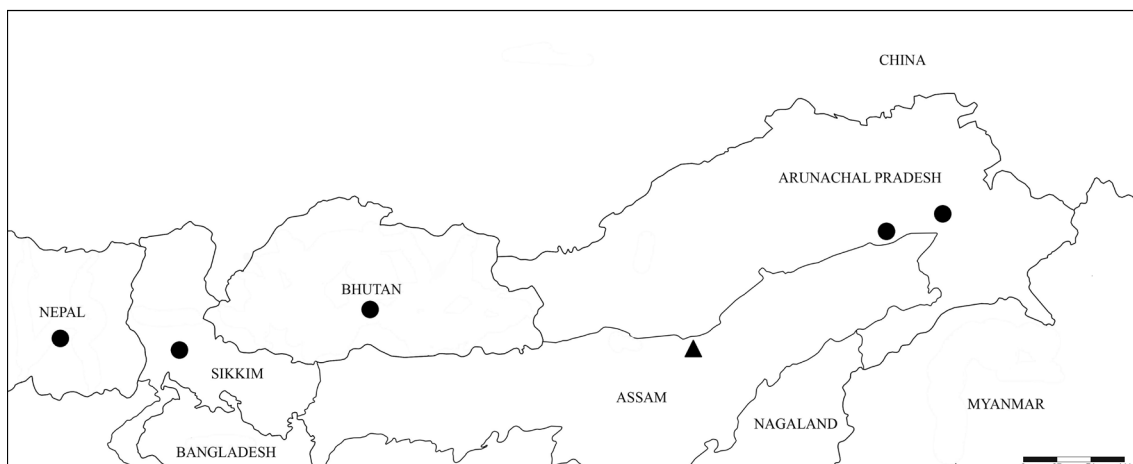
Note — *Peliosanthes macrophylla* has been reported from Assam, NE India (Hara et al. 1978, Roy et al. 2017). Since var. *assamensis* (see below) is recognized, specimens from Assam need re-examination for their identity.

b. var. *assamensis* N.Tanaka & D.Borah, var. nov. — Fig. 2, 3; Map 1

Peliosanthes macrophylla var. *assamensis* is distinguishable from var. *macrophylla* mainly by the staminal corona internally converging proximally and protruding near the middle, shorter anther thecae somewhat divergent distally, and longer, papillulate pistils exceeding anthers. — Type: D. Borah 2032 (holo ASSAM; iso ARUN), India, Biswanath District, Behali Reserve Forest, Siklibandha Tiniali, N26°54'23.9" E93°16'20.7"; 99 m, 12 Mar. 2019.

Etymology. The varietal epithet refers to the state, where the type locality belongs.

Stem 3–4 cm diam. *Roots* rigid, semi-woody, profusely branched. *Leaves* few to many (over 20). *Flowering stem* (including peduncle and inflorescence rachis) up to 35 cm tall; peduncle 5–16.5 cm by 2–5 mm; inflorescence rachis up to 18 cm long. *Perianth segments* 5.5–6.5 by 3–4 mm. *Staminal corona* 3–4 mm long, 3.5–5 mm diam, internally connivent proximally and protruding near the middle, apical opening 2–3 mm diam; anthers 1–1.5 mm long, thecae somewhat divergent distally. *Pistil* 4–5 mm tall (excluding sunken part, entirely 5–7 mm tall), papillulate towards base; ovary ovoid to conical, 1–3 mm high (excluding sunken part, entirely 2–4 mm high), 2–3 mm



Map 1 Distribution of *Peliosanthes macrophylla* Wall. ex Baker var. *macrophylla* (●) and *Peliosanthes macrophylla* var. *assamensis* N.Tanaka & D.Borah (▲).



Fig. 2 *Peliosanthes macrophylla* var. *assamensis* N.Tanaka & D.Borah from Behali Reserve Forest, Assam, India. a–b. Rhizome; c–d. leaves; e–f. inflorescence; g. sterile bract; h. fertile bract; i. bracteole; j–m. flower; n. corona with two perianth segments removed; o. corona; p. longitudinal section showing the interior structure of the corona; q. stamen; r–s. pistil; t–v. fruit. — Photos by Dipankar Borah.

Table 1 Comparison of some floral characters between the two varieties of *Peliosanthes macrophylla*.

Characters	var. <i>assamensis</i>	var. <i>macrophylla</i>
Staminal corona	Internally connivent proximally, divergent distally, somewhat abruptly narrowed distally	Internally nearly vertical, gradually thinning above
Anthers	1–1.5 mm long, slightly divergent distally	2–2.5 mm long, nearly straight and upright
Pistil (excluding sunken part)	4–5 mm long, exceeding anthers, papillulate below; style nearly equal to or slightly longer than exposed part of ovary, slightly swollen around middle, not distinctly broadened below	2–2.5 mm long, shorter than anthers, glabrous below; style more than twice as long as exposed part of ovary, broadened below with carpellary ridges and intercarpellary wings

wide; style subterete, trigonous, intercarpellary portion swollen around middle, c. 3 mm long, nearly equal to or slightly longer than exposed part of ovary; stigma exerted beyond anthers.

Distribution — NE India (Assam). Currently known only from the type.

Habitat & Ecology — A component of the semi-evergreen patches of Behali Reserve Forest of Assam. It grows on the forest floor along with *Ophiopogon micranthus* Hook.f., *Chlorophytum assamicum* D.Borah & A.P.Das, *Tupistra stoliczkanii* Kurz, *Dracaena petiolata* Hook.f. (Asparagaceae); *Achyrospermum wallichianum* (Benth.) Benth. ex Hook.f., *Clerodendrum laevifolium* Blume, *Gomphostemma niveum* Hook.f. (Lamiaceae); *Magnolia hodgsonii* (Hook.f. & Thomson) H.Keng (Magnoliaceae); *Morus macroura* Miq. (Moraceae); *Tropidia angulosa* (Lindl.) Blume (Orchidaceae) and many others. Flowering: March to April; fruiting: April to October.

Conservation status — Since this variety is only known from one locality (of more than 500 individuals scattered throughout

the forest), a preliminary conservation status of Data Deficient (DD) seems appropriate (IUCN 2019).

Notes — Because of large leaf blades with numerous longitudinal veins and very indistinct transverse veinlets, the novelty here described is no doubt close to *P. macrophylla*. The differences with the type variety are mentioned in Table 1. Our material from Arunachal Pradesh have upright long anthers 2–2.5 mm long, and comparatively short glabrous pistils not exceeding the anthers, which agree with specimens from Sikkim, India, collected by Hooker (K000099377, K000099378). In contrast, *P. macrophylla* var. *assamensis* has shorter, distally somewhat divergent anthers 1–1.5 mm long and longer, papillulate pistils exceeding the anthers.

Since *Peliosanthes* has a staminal corona that largely covers the pistil and anthers, the variation in structure inside the corona has often been overlooked. The present discovery of var. *assamensis* indicates that *P. macrophylla* is differentiated in this floral structure among populations. It appears that further studies based on living specimens from various localities are needed to elucidate the intraspecific variation of *P. macrophylla*.

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Fig. 3 Habit of *Peliosanthes macrophylla* var. *assamensis* N.Tanaka & D.Borah from Behali Reserve Forest, Assam, India. — Scale bar = 25 cm.