



## *Peliosanthes ashihoana* and *Peliosanthes bipiniana* (Asparagaceae: Nolinoideae) - two new species from Northeastern India

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**ABSTRACT:** Two new species of *Peliosanthes* (Asparagaceae: subfamily Nolinoideae) from northeastern India are described and illustrated here as *P. ashihoana* and *P. bipiniana*.

**KEY WORDS:** flora, South and Southeast Asia, plant taxonomy, monocots.

### INTRODUCTION

*Peliosanthes* Andrews (1810) belongs to the subfamily Nolinoideae (Chase *et al.*, 2009) of Asparagaceae (APG, 2016). The genus includes approximately 72 species, distributed widely over subtropical and tropical Asia covering Nepal, Bhutan, India, Bangladesh, Myanmar, China, Cambodia, Laos, Vietnam, Taiwan, Thailand, Indonesia and Malaysia (Jessop, 1976; Nguyen *et al.*, 2017, 2020; Tanaka, 2019; Odyuo *et al.*, 2020). In the course of the study of *Peliosanthes* specimens growing in the Garden of Botanical Survey of India, Eastern Regional Centre, Shillong, Meghalaya (India) some unusual plants were found. These were overlooked during last few decades, however, when these were bloomed recently the flowers were dissected, and detailed morphological study was carried out based on the living specimens. Consultation of literature (Andrews, 1810; Baker, 1879; Hooker, 1892; Jessop, 1976; Wang and Tang, 1978; Tanaka, 1999, 2004a,b, 2018, 2019; Chen and Tamura, 2000; Chen and Shui, 2003; Averyanov, 2011; Averyanov and Tanaka, 2012, 2013; Tanaka *et al.*, 2013; Averyanov *et al.*, 2014, 2015, 2016; Vislobokov, 2016; Nguyen *et al.*, 2017, 2020; Roy *et al.*, 2017a,b; Vislobokov *et al.*, 2018; Nong *et al.*, 2019; Taram *et al.*, 2020; Odyuo *et al.*, 2020) revealed that these plants represent two new members of *Peliosanthes*. They are hence described and illustrated here, with detailed note on their taxonomic relationships.

### TAXONOMIC TREATMENT

*Peliosanthes ashihoana* D.K. Roy, N. Odyuo & N. Tanaka, *sp. nov.*

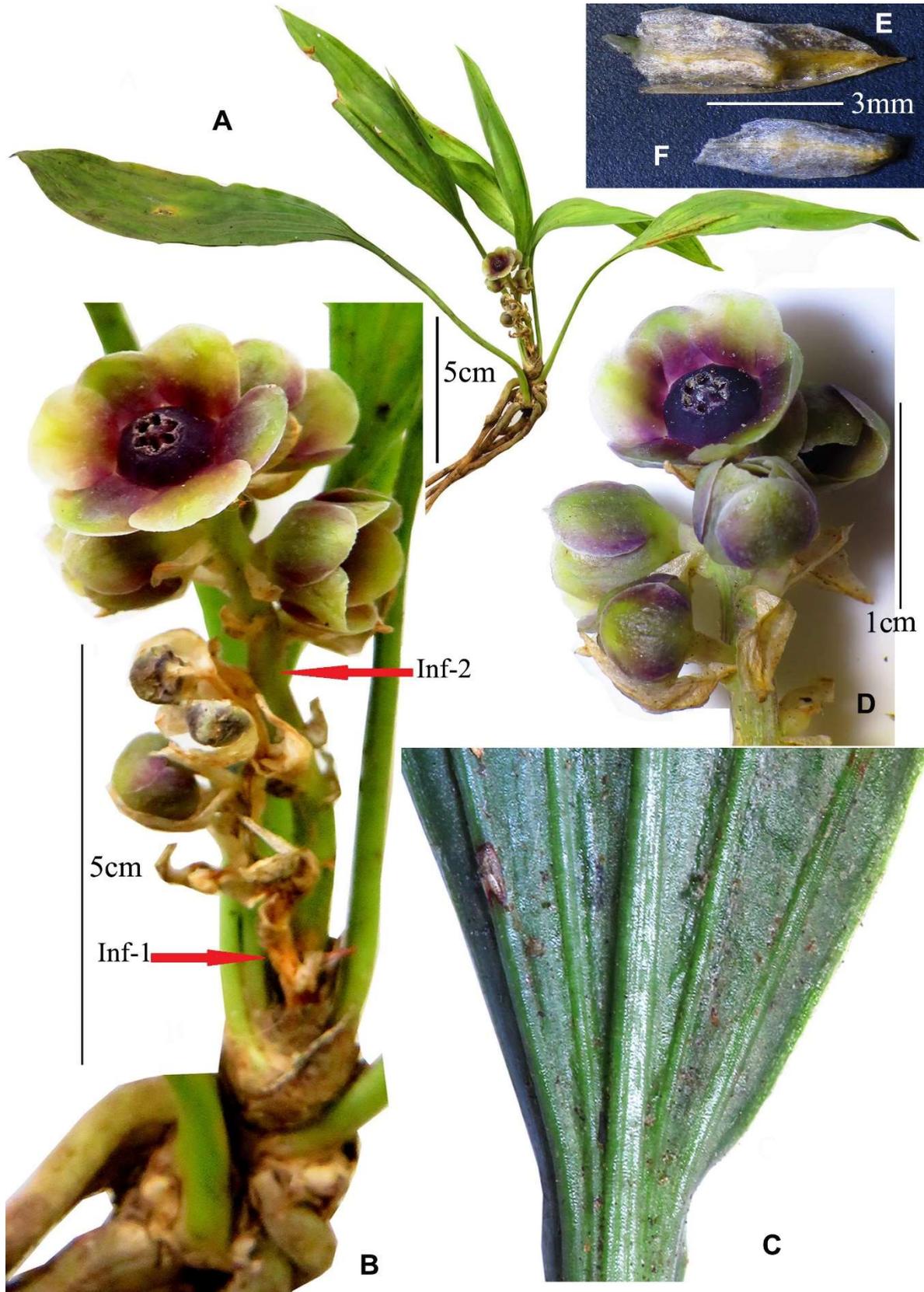
**Figs. 1 & 2**

Close to *P. khasiana* N. Tanaka (2018), but differs mainly by the middle 3 longitudinal veins not distinctly converged in advance than the rest, shorter floriferous

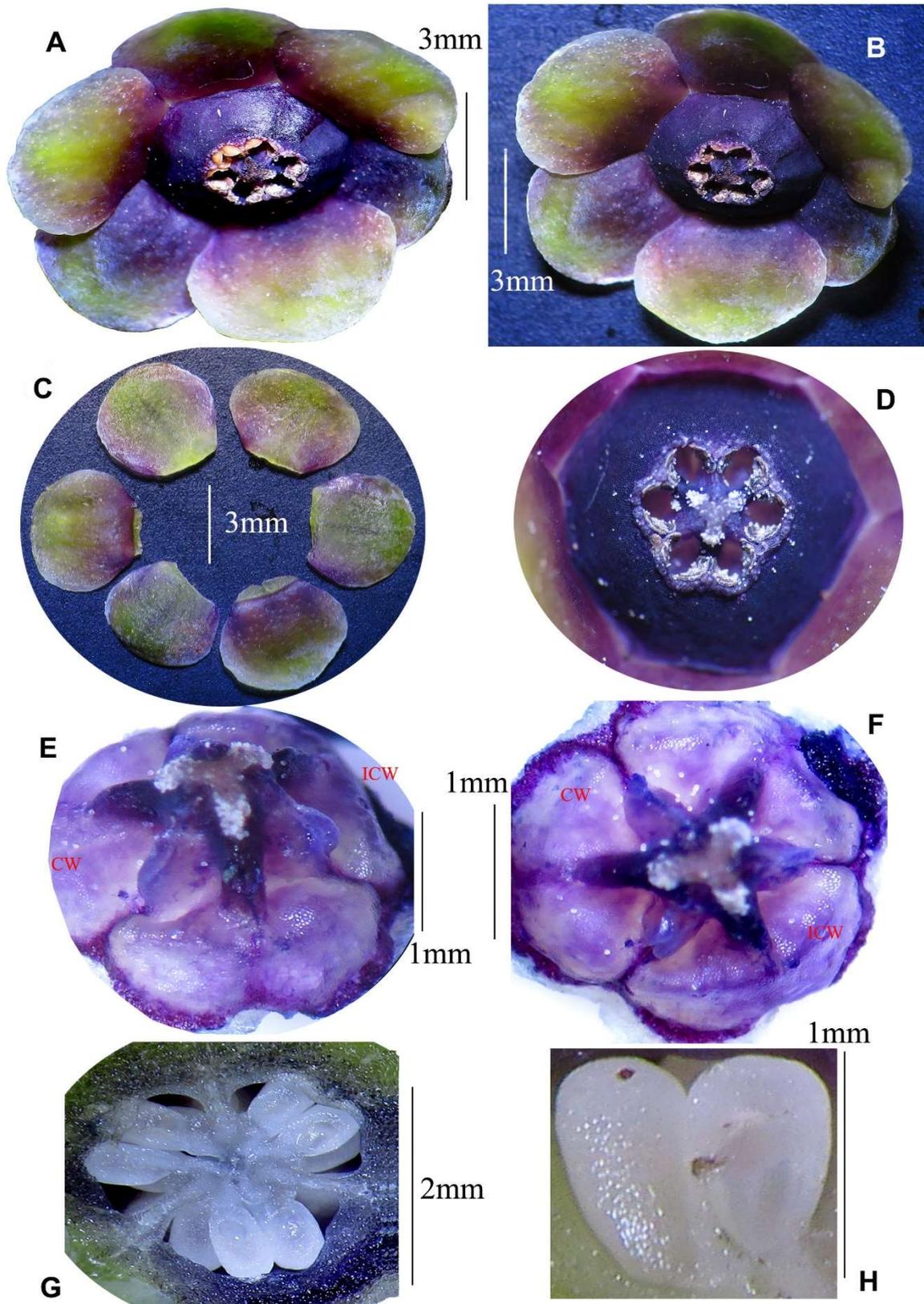
stem with fewer flowers, basipetally blooming flowers, basally hexagonal corona not flat proximally and a shorter, more broadly dilated pyramidal style with three narrower wing-like carpellary ridges and three more strongly protruded intercarpellary wings.

**Type:** India. Type herbarium specimens prepared in 16 December 2019 from plants cultivated in Garden of Botanical Survey of India (Eastern Regional Centre, Meghalaya, East Khasi Hills, Shillong, Woodland Campus), D.K. Roy 128926 (holotype, ASSAM!; Isotype, ASSAM!).

Small acaulescent rhizomatous perennial herb. Rhizome ascending, subterete or nodose, 2–2.5 cm long, 0.5–0.7 mm in diam., apical part covered with remnants of scaly leaves. Roots fibrous, stout filiform, 3–4 mm in diam. Sheath leaves (cataphylls) a few at base of foliar petiole, unequal in length, imbricate, withering into dry fibrous remnants. Leaves 4–6 per plant (1 or 2 produced per year), basal, erect to obliquely spreading; petiole subterete, 4–9 cm long; blade elliptic, 8–15 cm long, 2–3 cm wide, base attenuate, apex acute; longitudinal veins 5–9, middle 3 non-converged in advance than the rest; cross veinlets numerous, more or less parallel, closely spaced. Floriferous stem(s) 1–2, axillary, including peduncle and inflorescence rachis 3–5 cm long, erect, much shorter than petioles. Peduncle slender, 1.5–2 cm long, 2–3 mm in diam., stout, with sterile bracts distally. Sterile bracts 2–3, lanceolate, 1–1.5 cm long, membranous along margins. Raceme 5–7 cm long, 4–6-flowered. Bracts 2 per flower, lanceolate, marginally membranous; outer larger, 4–5 mm long, equal to flowers, inner (bracteole) smaller, 3–4 mm long. Flowers basipetally blooming, solitary in bracteal axil, pedicellate, broadly open, 0.8–1.3 cm across, ascending to the rachis. Pedicel 2–3 mm long, ascending to rachis. Perianths 6-cleft distally; proximal connate part obconical, 1.5–2 mm long; segments broadly ovate-orbicular, with rounded apex, 3.5–4.5 × 4–5 mm, entire, non-crenulated-erose and/or non-erose-denticulate along



**Fig. 1.** *Peliosanthes ashihoana*. **A.** Habit. **B.** Apical part of stem bearing two floriferous stems (Inf-1, -2). **C.** Basal portion of leaf blade, showing venation on adaxial surface. **D.** Raceme of basipetally blooming flowers. **E.** Floral bract. **F.** Bracteole.



**Fig. 2.** *Peliosanthes ashioana*. **A & B.** Flower (frontal view). **C.** Perianth segments. **D.** Corona, with stamens and pistil. **E & F.** Pistil, of which style has three wing-like carpellary ridges (CW) and three protruded intercarpellary wings (ICW). (E. side view, F. frontal view). **G.** T.S. of ovary, showing ovules inside ovarian locule. **H.** Ovules.

**Table 1.** Comparison of morphological characters between *Peliosanthes ashihoana*, *P. khasiana* and *P. pumila*.

Character	<i>P. ashihoana</i>	<i>P. khasiana</i>	<i>P. pumila</i>
Leaf			
Number/plant	4–6	4–19	3
Petiole	4–9 cm long	7–26 cm long	6.5–10.5 cm long
Blade	Elliptic, 8–15 cm long, 2–3 cm wide	Narrowly elliptic or narrowly oblanceolate-elliptic, 11–17.5 cm long, 2.5–3.8 cm wide	Narrowly elliptic, 6.5–11 cm long, 0.9–2 cm wide
Longitudinal veins	5–9, middle 3 non-converged in advance than the rest	5–10, middle 3 become converged shortly in advance than the rest	5–9, middle 3 non-converged in advance than the rest
Flowering stem	1–2, including inflorescence long	3–5 cm, including inflorescence	1, including inflorescence 7–8.5 cm long
Rachis	1.5–3 cm long, 4–6-flowered	3–10 cm long, 7–23-flowered	2.5–4.7 cm long, 4–9-flowered
Flowers	Basipetally blooming	Acropetally blooming	Acropetally blooming
Perianth segments	Broadly ovate-orbicular, entire along margins	Orbicular, broadly ovate or ovate, minutely crenulated-erose along distal margins	Orbicular or broadly ovate, nearly entire to minutely erose-denticulate along distal margins
Corona	Hexagonal at base, proximally incurved, not flat	Orbicular at base, flat proximally	Circular at base, proximally incurved, not flat
Style	Broadly pyramidal, ca. 0.5 mm long including stigma	Pyramidal, 0.8–1.4 mm long including stigma	Terete, ca. 1 mm long including stigma

distal margins. Staminal corona basally hexagonal, proximally incurved, 3.5–4 mm in diam., fleshy, dark purple, 6-denticulate terminally; anthers 6, sessile, introrse, oblong, ca. 0.5 mm long, creamy, bilocular. Pistil 1, tricarpellate; ovary half-inferior, 2–2.5 mm in diam., 0.5–0.7 mm high, 3-loculate; ovules borne at base of central axis of ovary, ellipsoidal, white, 0.8–1 mm long, 0.3–0.4 mm wide; style broadly pyramidal, ca. 0.5 mm long including stigma, with 3 dorsal wing-like narrow ridges of carpels and 3 intercarpellary strongly protruded wings; stigma nearly as high as apex of anthers, 3-dissected, lobes oblong, 0.2–0.4 mm long, distally descending. Fruits (seeds) unknown.

**Flowering:** November–December.

**Distribution:** The new species is known by specimens cultivated in the Garden of Botanical Survey of India, Eastern Regional Centre, Shillong, Meghalaya (India).

**Etymology:** The new species is named in honour of Dr. Ashiho Asosii Mao, Director, Botanical Survey of India, for his excellent contributions to the plant taxonomy of northeastern India.

**Taxonomic relationships:** *Peliosanthes ashihoana* closely resembles *P. khasiana* N. Tanaka (2018) and *P. pumila* N. Tanaka (2019), recently described from the state of Meghalaya, India. However, the new species differs from *P. khasiana* mainly by the middle 3 longitudinal veins not distinctly converged in advance than the rest (vs. middle 3 become converged shortly), shorter floriferous stem (3–5 vs. 8–20 cm) with 4–6-flowered rachis (vs. rachis 7–23-flowered), basipetally blooming flowers (vs. flowers acropetally blooming), basally hexagonal corona not flat proximally (vs. corona orbicular, flat proximally) and a shorter (ca. 0.5 vs. 0.8–1.4 mm) more broadly dilated pyramidal style with three narrower wing-like carpellary ridges and three more strongly protruded intercarpellary wings. The new species duly differs from *P. pumila* by the shorter floriferous stem

(3–5 vs. 7–8.5 cm), basipetally blooming flowers (vs. flowers acropetally blooming), basally hexagonal corona (vs. corona circular) and a shorter broadly pyramidal style ca. 0.5 mm long (vs. style terete, ca. 1 mm long). Morphological comparison between the new species and these two species is made elaborately in Table 1. Basipetally blooming flowers in *P. ashihoana* appear unusual among the species of *Peliosanthes*.

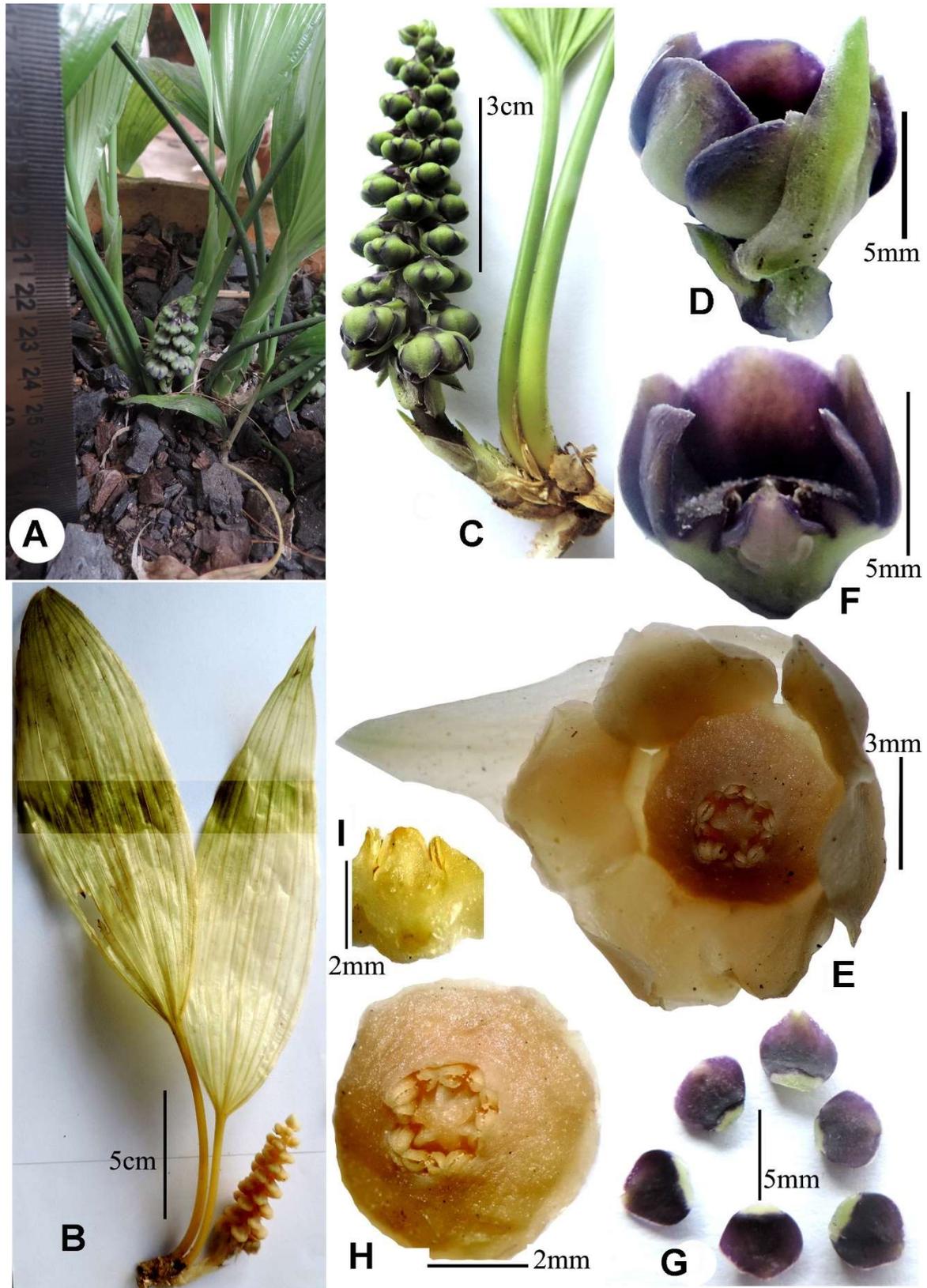
***Peliosanthes bipiniana*** D.K. Roy, N. Odyuo & N. Tanaka, *sp. nov.*

### Fig. 3

Close to *Peliosanthes subspicata* N. Tanaka (2018), but differs mainly by the shorter petiole, shorter floriferous stem, entire, externally green, internally dark purple perianth segments, and convex, 6-denticulate dark purple corona.

**Type:** India. Type herbarium specimens prepared in 26 October 2018 from plants cultivated in Garden of Botanical Survey of India (Eastern Regional Centre, Meghalaya, East Khasi Hills, Shillong, Woodland Campus) *D.K. Roy 128923* (holotype, ASSAM!; Isotype, ASSAM!).

Herb acaulescent, evergreen, perennial. Rhizome ascending to erect, subterete, 0.5–1 cm long, 0.8–1 cm thick, knobby, branched, distally covered with scarios fibrous remnants of scaly, sheath leaves. Roots cordlike, 1.5–2 mm in diam. Cataphylls several at base of foliar petiole, imbricate, unequal in length, outer ones shorter, inner longer ones lanceolate to ensiform, 3–11 cm long, 1–1.5 cm wide, membranous along margins, withering into dry fibrous remnants. Leaves produced annually in tufts of usually 2–3 at apex of shortly branched rhizome-like stem, basal, erect to obliquely spreading; petiole subterete, erect to suberect, 7–24 cm long; lamina elliptic to elliptic-lanceolate, 19–25 × 4–7.5 cm, base attenuate, margins entire, apex acute to acuminate; longitudinal veins usually 9–20, prominent; cross veinlets numerous,



**Fig. 3.** *Peliosanthes bipiniana*. **A.** Habit. **B.** Terminal annual node with inflorescence and leaves. **C.** Inflorescence. **D.** A flower, with bract and bracteole. **E.** Flower (frontal view). **F.** L.S. of flower. **G.** Perianth segments (ventral view). **H.** Pistil and corona with stamens. **I.** L.S. of pistil and corona.

**Table 2.** Comparison of morphological characters between *Peliosanthes bipiniana*, *P. subspicata* and *P. violacea*.

Characters	<i>P. bipiniana</i>	<i>P. subspicata</i> (Tanaka, 2018)	<i>P. violacea</i> (Baker, 1879; Tanaka, 2018)
Leaf blade	Elliptic to elliptic-lanceolate, 19–25 cm long, 4–7.5 cm wide, with entire margins	Narrowly elliptic or oblanceolate, 23–31 cm long, 4.5–7.3 cm wide, with entire margins	Elliptic, elliptic-oblanceolate, oblanceolate or lanceolate, 18–49 cm long, 4–11 cm wide, with finely serrulate margins
Petiole	7–24 cm long	25–50 cm long	16.5–43 cm long
Floriferous stem	6–10 cm long	13–39 cm long	6.8–38 cm long
Peduncle	2.5–3.5 cm long	6.5–13 cm long	3.8–14 cm long
Rachis	3.5–6.5 cm long, 9–30-flowered	7.5–26 cm long, many-flowered	3–24 cm long, densely many-flowered
Pedicel	Drooping, 2.5–3 mm long	Drooping, 0.5–2.5 mm long	Ascending to rachis, 2–8 mm long
Flower	Cernuous, subglobose or bowl-shaped	Cernuous, broadly obconic or bowl-shaped	Usually horizontal or ascending, obconic or broadly campanulate
Perianth segment	Externally green, internally dark purple, non-recurved distally, entire along margins	Pale yellowish green or green, minutely erose along margins	Pale green, white, or occasionally pale yellow, recurved distally, entire or sometimes slightly finely denticulate-erose along margins
Corona	Convex, dark purple, orbicular or subhexagonal at base, apically denticulate, without forming annular ridge	Proximally flat, distally abruptly raised, reddish, orbicular at base, apically entire forming annular ridge	Purple to dark purple, orbicular or subhexagonal at base, apically almost entire or slightly 6-lobed
Style	With intercarpellary wings	With intercarpellary wings	Without intercarpellary wings
Flowering	October–December	October–November	December–March
Distribution	NE India	NE India, Bangladesh	Myanmar, Thailand, Vietnam.

conspicuous, closely spaced, perpendicular or slightly oblique to longitudinal veins. Flowering stem (including inflorescence) ascending or suberect, 6–10 cm long, shorter than petioles; peduncle 2.5–3.5 cm long, 2–2.5 mm in diam. in flowering; sterile bracts on peduncle 3–5 (excluding those congested at base), antrorse, triangular-lanceolate, 0.8–1.2 × 0.3–0.6 cm, acute, membranous; rachis of inflorescence, dense with flowers, 3.5–6.5 cm long in flower. Pedicels descending, terete, 2.5–3 mm long in flower, subtended at base by 2 bracts; the lower bract lanceolate, 8–12 × 2–2.5 mm, acute; the upper (bracteole), lanceolate, 4–6 × 1–1.5 mm. Flowers 9–30 per rachis, acropetally blooming, 1 each in axils of bracts, subglobose or bowl-shaped, 10–13 mm in diam., cernuous. Perianth fleshy, 6-cleft; proximal tubular part obconic, 2–2.5 mm long; segments slightly bent inward or nearly erect, broadly ovate to ovate-orbicular, 4–4.5 mm long and wide, externally green, purplish along margins, internally dark purple, imbricate proximally, entire, rounded or obtuse at apex. Stamens 6; filaments connate, forming fleshy corona orbicular or subhexagonal at base, 5–6 mm in diam., dark purple, convex, proximally incrassate, slightly 6-denticulate along terminal margin, without forming annular ridge, orifice 2.5–3 mm in diam.; anthers sessile, dorsally attached to distal inner portion of corona-denticule, ovoid, retuse at both poles, 1–1.2 mm long, 0.8–1 mm wide, bilocular, introrse. Pistil 1, tricarpellate, distal free part subconic, 2–2.5 mm long, dark purple; ovary half-inferior, 3-loculate, 3.5–4 mm in diam.; ovules borne at base of central axis of ovary, ellipsoid; style subconoid, slightly narrowing distally, 1–1.2 mm long, obtusely trigonous, longitudinally narrowly 3-winged along connate portions between carpels; stigma nearly as high

as apex of anthers, tripartite, lobes oblong-ovate, 0.5–0.6 mm long, distally descending. Fruits (seeds) not seen.

**Flowering:** October–December.

**Distribution:** The new species is known by specimens cultivated in the Garden of Botanical Survey of India, Eastern Regional Centre, Shillong, Meghalaya (India).

**Etymology:** The new species is named in honour of Dr. Bipin Kumar Sinha from Botanical Survey of India, Kolkata and mentor of the 1<sup>st</sup> author (DKR).

**Taxonomic relationships:** In having cernuous flowers on short pedicels, *Peliosanthes bipiniana* resembles *P. subspicata* N. Tanaka (2018) recently described from NE Bangladesh (Silhet) and NE India (Meghalaya). However, the new species differs mainly by the shorter petiole (7–24 vs. 25–50 cm long), shorter floriferous stem (6–10 vs. 13–39 cm long), entire (vs. minutely erose), externally green, internally dark purple (vs. pale yellowish green on both sides) perianth segments, and corona convex (vs. proximally flat, distally abruptly raised), 6-denticulate (vs. entire), dark purple (vs. reddish). The new species also has some affinities with *P. violacea* Wallich ex Baker (1879) known from Myanmar, Thailand and Vietnam (Tanaka, 2018), but is readily distinguishable chiefly by the shorter floriferous stem (6–10 vs. 6.8–38 cm long), cernuous (vs. horizontal or ascending), subglobose or bowl-shaped (vs. obconic or broadly campanulate) flowers, much less expanded, distally non-recurved (vs. recurved), externally green, internally dark purple (vs. pale green, white, or occasionally pale yellow on both sides) perianth segments, and style with 3 intercarpellary wings (vs. without wings). Morphological comparison between the new species and these two species is presented in Table 2.



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