A New Species of *Zingiber* (*Zingiberaceae*) from Northeast India

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A new species, *Zingiber caudatum* Biseshwori & Bipin, from Northeast India is described and illustrated.

**Key words:** Arunachal Pradesh, Assam, biodiversity, Indo-Burma hotspot, Meghalaya, new species, *Zingiber caudatum*, *Zingiber* sect. *Cryptanthium*.

The northeastern region of India is in the Indo-Burma biodiversity hotspot (Biseshwori and Bipin 2013) with tropical, subtropical, temperate and alpine habitats. There has been renewed interest in the genus *Zingiber* (*Zingiberaceae*) of this region, which has led to findings of new species and new collections. So far, 16 species have been reported from Northeast India (Baker 1982, Hajra and Verma 1996, Sabu et al. 2013, Kumar et al. 2013, Kishore and Skornickova 2013, Thongam et al. 2013, 2014, Anupam Das Talukdar et al. 2015).

During floristic exploration in the Rono Hills of Arunachal Pradesh in March 2014 by the authors, an unknown *Zingiber* from sect. *Cryptanthium* Horan. was discovered in a mixed evergreen forest under bamboo. Since the ginger was sterile and just beginning seasonal growth, portions of the rhizome were collected and established for further evaluation at the Institute of Bioresources and Sustainable Development (IBSD). The collection was accessioned as IBSD/Z–139. It flowered in September 2014 and 2015, types were vouchered under the same number.

After reviewing descriptions of all Indian species and checking available taxonomic keys for Burma (Baker 1892), Thailand (Triboun 2006) and China (Wu and Larsen 2000), this species was found to be similar to *Zingiber bipinianum* and *Z. meghalayense* but distinct in some characters (Table 1). In India it is readily recognized by the purple colour of the labellum. The most distinctive character of this species is the long, tail-like, falsely-pungent apex on each of the narrowly ovate bracts. These tips are non-imbricate and stand free from each other, unlike any other species currently known to the authors. Another unusual character is the narrow and sharply triangular lateral staminodes.

**Taxonomic treatment**

*Zingiber caudatum* Biseshwori & Bipin, sp. nov. [Fig. 1]

Similar to *Zingiber bipinianum* D. K. Roy, D. Verma & al., in creeping rhizomes, inflorescence arising from the rhizome with peduncle embedded in the ground, and white flowers with reddish-purple labellum, but differs from *Z. bipinianum* by the basally green pseudostem, the reduced petiole, the ligule with rounded apex, the ovoid spike composed of tightly arranged
Table 1. Morphological comparison between *Zingiber caudatum*, *Z. bipinianum* and *Z. meghalayense*

<table>
<thead>
<tr>
<th></th>
<th><em>Z. caudatum</em></th>
<th><em>Z. bipinianum</em></th>
<th><em>Z. meghalayense</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pseudostem</td>
<td>55–75 cm long</td>
<td>30–50 cm long</td>
<td>200 cm long</td>
</tr>
<tr>
<td>Petiole</td>
<td>reduced, villous</td>
<td>short, villous</td>
<td>short, glabrous</td>
</tr>
<tr>
<td>Ligule</td>
<td>bifid, sericeous, 0.6 cm long, apex round, light green, margin hairy</td>
<td>bifid, coriaceous, 0.5–0.9 cm, apex acute, brown ciliate</td>
<td>bifid, coriaceous, 0.5 cm, apex round, green, margin hyaline</td>
</tr>
<tr>
<td>Leaf blade</td>
<td>oblong-elliptical, 28–30 × 9–11 cm, adaxially glabrous, abaxially sericeous, base cuneate, apex acuminate</td>
<td>elliptical-lanceolate, 11.5–25.5 × 6.5–10.0 cm, adaxially glabrous or sparsely pubescent, abaxially villous, base rounded, apex acuminate</td>
<td>oblong-lanceolate, 40–45 × 7–7.5 cm, base attenuate, apex acuminate, glabrous</td>
</tr>
<tr>
<td>Inflorescence</td>
<td>radical, procumbent, 2–3 per plant</td>
<td>radical, half the length inside the soil, 1–3 per plant</td>
<td>radical, procumbent, many per plant</td>
</tr>
<tr>
<td>Peduncle</td>
<td>1.5–15 cm long, sheaths obovate, greenish–reddish, pubescent</td>
<td>5–6 cm long, sheaths broadly ovate, creamy white, glabrous</td>
<td>7–9 cm long, sheaths obovate, reddish, glabrous</td>
</tr>
<tr>
<td>Spike</td>
<td>narrowly ovoid</td>
<td>ellipsoid</td>
<td>ovoid or subglobe</td>
</tr>
<tr>
<td>Bract</td>
<td>Imbricate, narrowly ovate, 4–5.5 × 0.3–0.5 cm long, apex caudate, green-brown with red spots</td>
<td>closely imbricate, ovate-lanceolate, 4.0–5.2 cm long, apex acuminate, purple</td>
<td>loosely imbricate, linear, 3–4 cm long, apex rounded, red</td>
</tr>
<tr>
<td>Bracteole</td>
<td>narrowly ovate, 3.0 × 0.5 cm, semi-translucent greenish, externally pubescent, internally glabrous</td>
<td>lanceolate, 2.3–2.5 × 0.4–0.5 cm, sparsely hairy at base, creamy-white with light purple tinges</td>
<td>lanceolate, 2.0 × 0.6 cm, reddish, glabrous</td>
</tr>
<tr>
<td>Calyx</td>
<td>tubular, 1.5 cm, apex 3-toothed, semitranslucent white, tinged with red, entire pubescent</td>
<td>tubular, 1.6 × 0.7 cm, apex 2-toothed, creamy white, purplish tinged, glabrous</td>
<td>tubular, 1.0–1.2 cm, apex 3-toothed, pinkish white, glabrous</td>
</tr>
<tr>
<td>Corolla tube</td>
<td>slender, 3–3.5 cm, white</td>
<td>slender, 4.3 cm long creamy white</td>
<td>slender, 4–5 cm long, pinkish cream</td>
</tr>
<tr>
<td>Dorsal lobe</td>
<td>narrowly ovate, dorsal lobe 3 × 0.5 cm, lateral ones 2.3 × 0.4 cm</td>
<td>lanceolate, dorsal one 2.6–2.9 × 0.6–0.7 cm, lateral ones 2.0–2.2 × 0.4–0.5 cm</td>
<td>lanceolate, dorsal one 3.0–3.2 × 0.8 cm, lateral ones 2.5–2.8 × 0.5 cm</td>
</tr>
<tr>
<td>Labellum</td>
<td>obovate, white with heavily overlaid with dark magenta, 2.2 × 0.7 cm, apex rounded to emarginated</td>
<td>ovate-elliptic, creamy-white, blotched with purple, 2.6 × 0.7 cm, apex acuminate</td>
<td>broadly ovate, creamy light yellow, 2.50–2.75 × 1.5–2.0 cm, apex acute</td>
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<tr>
<td>Lateral Staminode</td>
<td>triangular, white, free, ca. 5–6 × 1 mm, apex acute</td>
<td>linear-lanceolate, creamy white, free, ca. 5.5 mm, apex acute</td>
<td>acute, yellow, adnate, apex acute</td>
</tr>
<tr>
<td>Anther</td>
<td>creamy white</td>
<td>creamy-white</td>
<td>yellow</td>
</tr>
<tr>
<td>Ovary</td>
<td>pubescent with brown hairs, 5 × 3 mm</td>
<td>pubescent with white hairs, 6 × 2 mm</td>
<td>glabrous, 3 × 2 mm</td>
</tr>
</tbody>
</table>
Fig. 1. Holotype of *Zingiber caudatum* Biseshwori & Bipin (Bipin IBSD/Z–139, ASSAM). Originally from Rono Hills, Arunachal Pradesh, India.
bracts with caudate, non-imbricating apices, the tri-dentate calyx, the entirely pubescent and narrowly obovate labellum, the sharply triangular staminodes, the creamy white anther, the pubescent brown ovaries against the purplish green pseudostem, the short petiole, the short ligule with acute apex, the ellipsoid spike composed of imbricating bracts, the creamy white bidentate glabrous calyx, the lanceolate-ovate labellum, the free lateral staminodes, the creamy yellow anther, and the white pubescent ovaries. (Comparison given in Table 1.)

**Type:** India. Manipur, Imphal, cultivated at Institute of Bioresources and Sustainable Development (IBSD), 20 March 2014, Bipin IBSD/Z–139 (ASSAM–holotype, Fig. 2; IBSD–isotype). Originally from India, Arunachal Pradesh, Rono Hills, 27°7.036ʺN 93°44.06ʺE, c.a. 161 m, 14 March 2014.

Deciduous perennial herb to 75 cm tall; Rhizomes ca. 1.5–2.5 cm diam., externally tan-white, internally white with two concentric rings, inner ca. 12 mm diam., outer 3 mm wide; roots numerous, fleshy, ca. 5 mm diam., tapered at apex. Leafy shoots erect, with 9–10 leaves, pseudostem ca. 1.52 cm diam.; leafless sheaths green, pubescent, leaf sheaths green, lightly pubescent with white hairs; petiole reduced to pulvinus, pubescent; ligule ca. 6 mm long, bilobed, apices rounded, light green, sericeous, margins hairy; lamina oblong-elliptical, 28–30 × 9–11 cm, adaxially light green, glabrous, plicate, abaxially light green or red on new growth, sericeous, base cuneate, apex acuminate. Inflorescence radical, procumbent, 2–3 per plant; peduncle ca. 1.5–15 cm long, ca. 1 cm diam., white, glabrous, basal sheaths 3–5, obovate, greenish or reddish, pubescent; spike narrowly ovoid, ca. 6–7 × 2 cm, composed of ca. 12 bracts, each supporting a single flower; bracts narrowly ovate, cymbiform, imbricate, ca. 4–5.5 × 0.3–0.5 cm, apices non-imbricate, caudate, green or brown with red spots, externally sericeous, internally glabrous; bracteoles narrowly ovate ca. 3 × 0.5 cm, semi-translucent greenish, externally pubescent, internally glabrous. Flowers 6–7 cm long; calyx tubular, ca. 1.5 cm with unilateral incision, semi-translucent white, apex tridentate, tinted red, entirely pubescent; floral tubes slender, protruding beyond the bracts, 3–3.5 cm long, white, externally sparsely pubescent, internally glabrous; dorsal corolla lobe narrowly ovate, ca. 3 × 0.5 cm, semi-translucent cream white, apex acute, with slight pink tinge; lateral lobes narrowly ovate, ca. 2.3 × 0.4 cm, extending beyond the labellum, apex acute, semi-translucent white; labellum obovate, ca. 2.2 × 0.7 cm, narrowing towards the base, deflexed in the upper half, overall white, heavily overlaid with a dark magenta (RHS 2016; RHS Colour Chart 61A) pattern in the upper two-thirds towards the apex, white showing through as spots, margins white, slightly undulate, irregular, apex white, rounded to emarginate, lateral staminodes narrowly sharply triangular, ca. 5–6 × 1 mm, curved, hidden by the dorsal corolla lobe, white, apex acute. Stamen ca. 2.1 cm long, white with light magenta stripes on the abaxial surface on the anther crest; filament not developed; anther ca. 10 mm long, thecae linear, ca. 10 × 1 mm (each), creamy-white, dehiscing entirely, pollen creamy-white; anther crest beak-shaped, ca. 0.9 × 1 mm; style filiform, ca. 6.5 cm long, white, glabrous; stigma white, ostiole ciliate; epignous glands 2, 4 mm long, linear, creamy-white. Ovary cylindrical 5 × 3 mm, villous with soft brown hairs, trilocular with central placentation; fruit not seen.

**Distribution:** Arunachal Pradesh, Northeast India.

Ecology: In mixed evergreen forest on dark, sandy soils covered with humus and leaf litter at altitudes of 150–600 m. Growing as undergrowth in bamboo forest, associated with fern species and other grass species.

Phenology: Flowering from August through October. Flowers open in the morning and close within 24 hours.

Etymology: Named for the long caudate bracts.
Conservation status: Unknown at this time.

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References


T. Biseshwori, K. Bipin: 北東インド産ショウガ属（ショウガ科）の1新種

インド北東部産のショウガ属（ショウガ科）の1新種、Zingiber caudatum Biseshwori & Bipin を記載した。Z. caudatum はその種形容語（種小名）が苞の先端が尾状に長く伸長することに由来し、Z. bipinianum D. K. Roy, D. Verma & al. とは、葉に短い柄があり、葉舌は錐形、花柄は無毛、花序は橈円形、苞は漸尖形、萼片には2歯があり、脣弁の先端は錐尖形、仮雄蕊はクリーム色、子房に褐色の軟毛がある点で異なり、Z. meghalayense Sushil K. Singh & al. からは、葉に短い柄があり、苞の先端が円く、小苞が赤味を帯び、萼片が無毛、脣弁はクリーム色で先端が錐形、仮雄蕊が白色で、子房が無毛である点で異なっている。

Zingiber caudatum の基準産地はインド、アルナチャル・プルデシュ州の Rono Hills で、竹林の下生えとして生育していた。

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