



Cheirostylis acuminata (Orchidaceae; Cranichideae; Goodyerinae): a new species from Yunnan Province, China

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Introduction

Cheirostylis Blume (1825: 413) is characterized by a column with two stelids, two well-separated stigma lobes and connate sepals that form a tube. There are about 55 species, mainly distributed in tropical Africa, through Southeast Asia, Japan, Indonesia and Pacific islands to Australia (Pridgeon *et al.* 2003, Chen *et al.* 2009, Bhattacharjee 2012, Govaerts *et al.* 2012). There are 18 species reported from China, of which 8 species are believed to be endemic (Averyanov *et al.* 2009, Chen *et al.* 2009, Lin & Lin 2009, Yang *et al.* 2013).

Hayata considered species with an entire lip to comprise a distinct genus, *Arisanorchis* Hayata (1914:109), but they conform to *Cheirostylis* in other respects (sepals basally fused and forming a tube, column with two elongate stelidia, rostellum deeply bifid) and may be a peloric form (Chen *et al.* 2009). Therefore, a taxonomic revision of this genus is highly desirable to clarify the interspecific relationship.

During our fieldwork in Mengla County of Xishuangbanna, southeastern Yunnan, a new species of *Cheirostylis* was found in the limestone forest and is described below.

Taxonomy

Cheirostylis acuminata Z.L.Liu & Q.Liu, *sp. nov.* (Figs. 1,2)

Cheirostylis acuminata is close to *C. clibborndyeri* Yu & Barretto (1976: 15) (Barretto *et al.* 2011) and *C. rubrifolius* Lin & Lin (2009: 327), but differs by a shorter inflorescence (2–7 cm long), fewer flowers (1–3), pubescent ovary and outer surface of sepals, acuminate apex of lip and different size and structure of seed from *C. clibborndyeri* and be distinguished from *C. rubrifolius* by not having a saccate hypochile and no keel and papillae in the hypochile.

Type:—CHINA. Yunnan: Mengla County, Mengyuan town, Paozhuqing village, limestone forest, 21°50.21'N, 101°22.25'E, 800 m, 7 January 2015, Liu 12 (holotype: HITBC!).

Lithophytic herbs, 4–11 cm tall. Rhizome creeping, green, tinged with brown, 2–10 cm long, with 3–9 nodes, internodes slight narrowing, at the nodes, 4.5 mm in diameter; roots hair-like, in rows along rhizome internodes. Stem erect, 1.0–2.2 cm long, 2–5 leaves, occasionally withered at anthesis. Leaves cauline, 3–4, well-spaced, lanceolate, 1.0–2.0 × 0.5–1.2 cm, glabrous, base rounded to truncate, apex acute, adaxially pale green, marked with indistinct deeper green veins; petiole present. Inflorescence, 2–7 cm long, hairy, with 2–3 sterile bracts, 0.8–1.4 cm long, pale pink, pubescent; rachis 1–3-flowered; floral bracts lanceolate, abaxially hairy, apex acuminate, 0.7–0.9 cm long, shorter than ovary. Flowers slightly opened; ovary and pedicel pubescent, minutely papillose, 0.8 cm; sepals 5 mm long, basal about 1/2 connate and forming a tube, outer surface pubescent, base of the tube greenish, free apical lobes pink, 2 mm long; petals appressed to dorsal sepal, white, obliquely falcate, 5.5 × 1.3 mm; lip simple, white, margin entire, 5.3 × 1.8 mm, apex acuminate, extending slightly beyond sepal tube; column 3 mm long; rostellum arms elongate, 1.8 mm long; stelidia obtuse triangle, parallel to rostellum, shorter than 0.5 mm; polinarium 2.5 mm long; anther ovoid, ca. 1.3 mm; viscidium approximate to clavate, 1.6 mm long.

Distribution:—Known only from the type locality in Mengla County, Yunnan, China.

Habitat, Phenology and Ecology:—*Cheirostylis acuminata* occurs in a shady limestone forest valley at 800 m and creeps on damp rock surfaces. It flowers from the middle of December to the end of January. Although the new species had flowers that barely opened, the fruiting rate was high in the natural populations. Its reproductive biology needs further study.

Etymology:—Named for the lip apex with a tiny ligule.

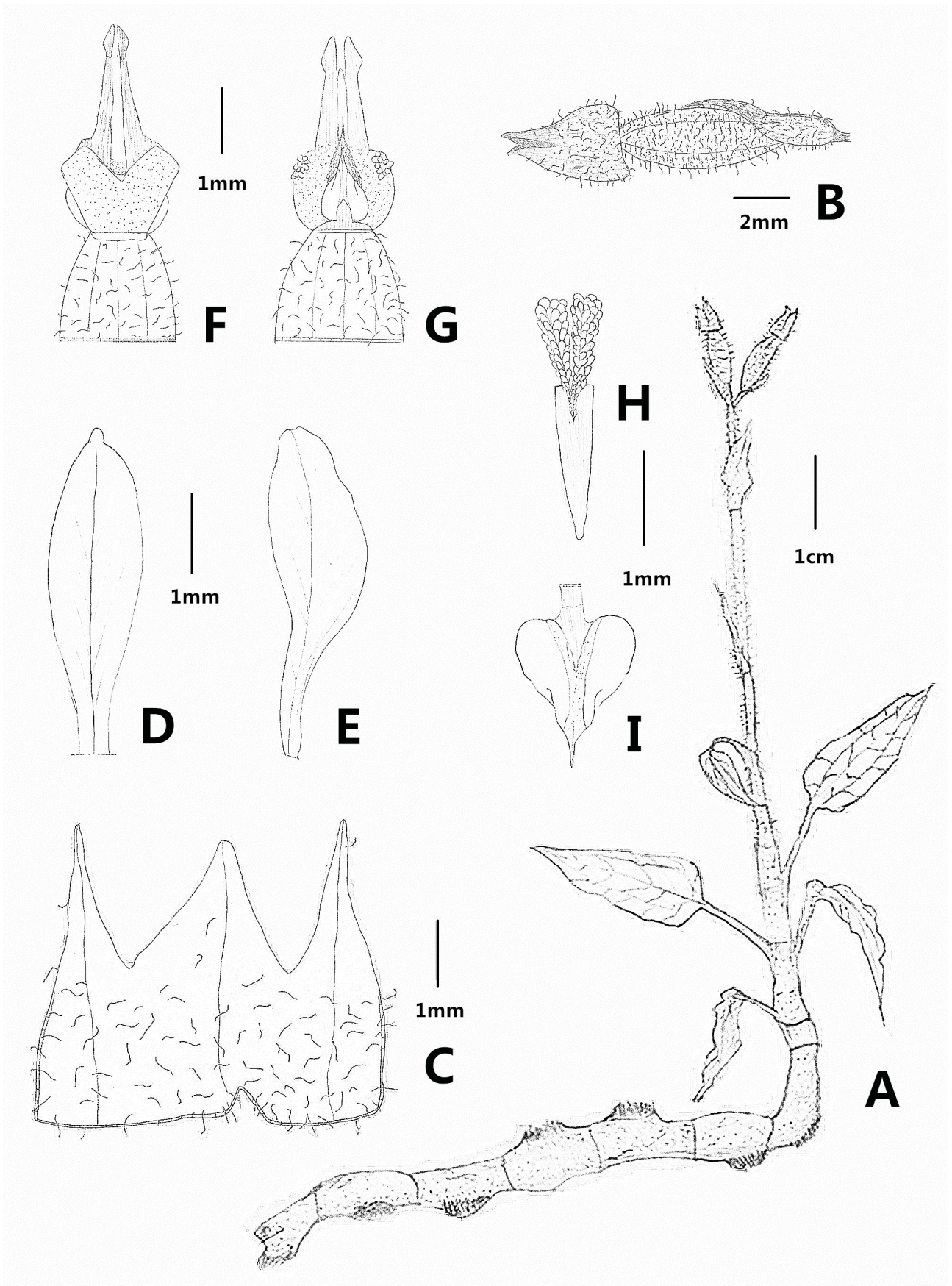


FIGURE 1. *Cheirostylis acuminata*. A. Plant habit. B. Lateral view of flower. C. Sepal. D. Lip. E. Petal. F. Abaxial side of column. G. Adaxial side of column. H. Pollinia. I. Anther. All drawn by Zhi-Long Liu from the holotype.

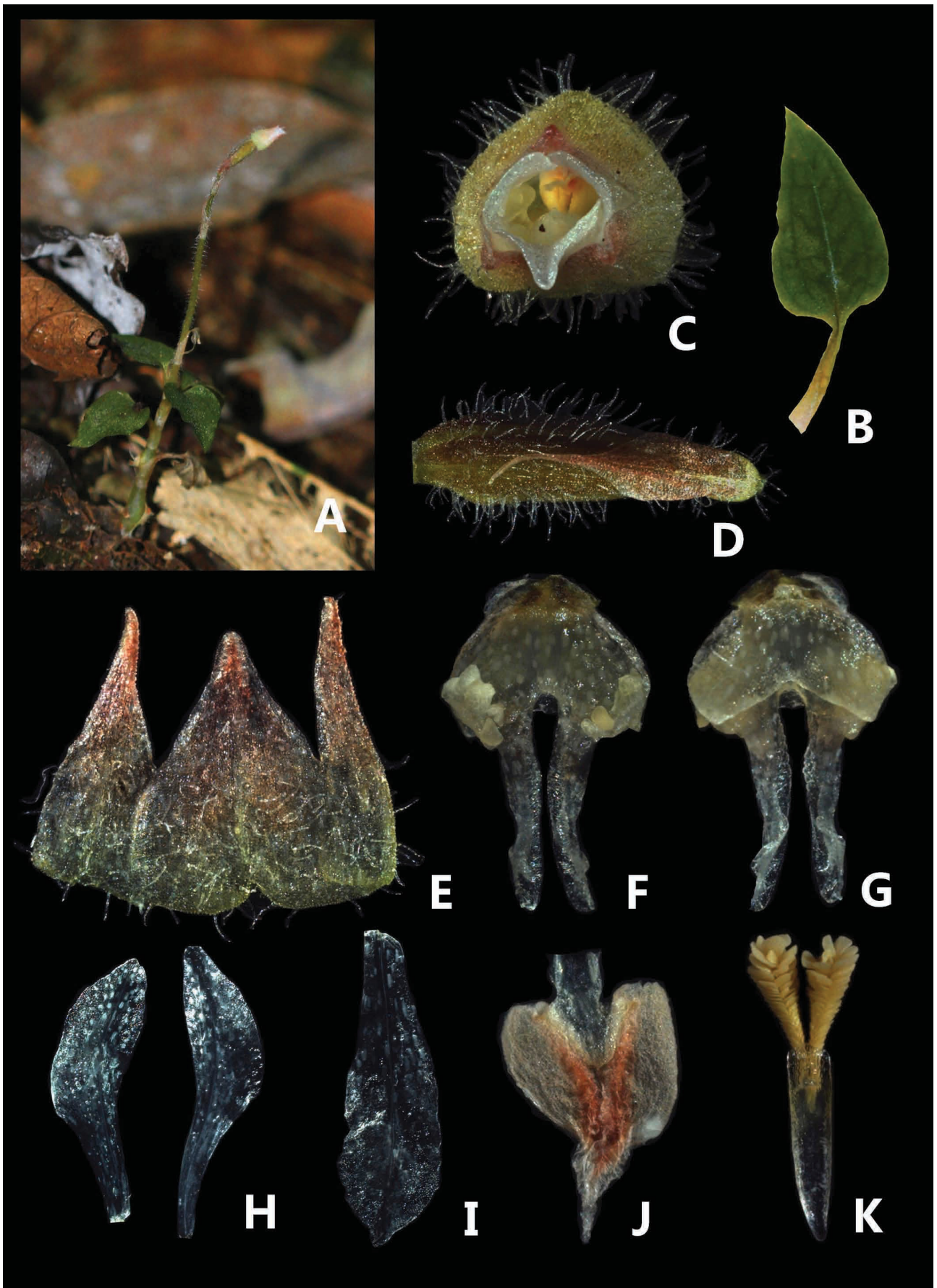


FIGURE 2. *Cheirostylis acuminata*. A. Plant habit. B. Leaf. C. Frontal view of flower. D. Ovary and floral bracts. E. Sepal. F. Adaxial side of column. G. Abaxial side of column. H. Petal. I. Lip. J. Anther. K. Pollinia. Photographed by Zhi-Long Liu.

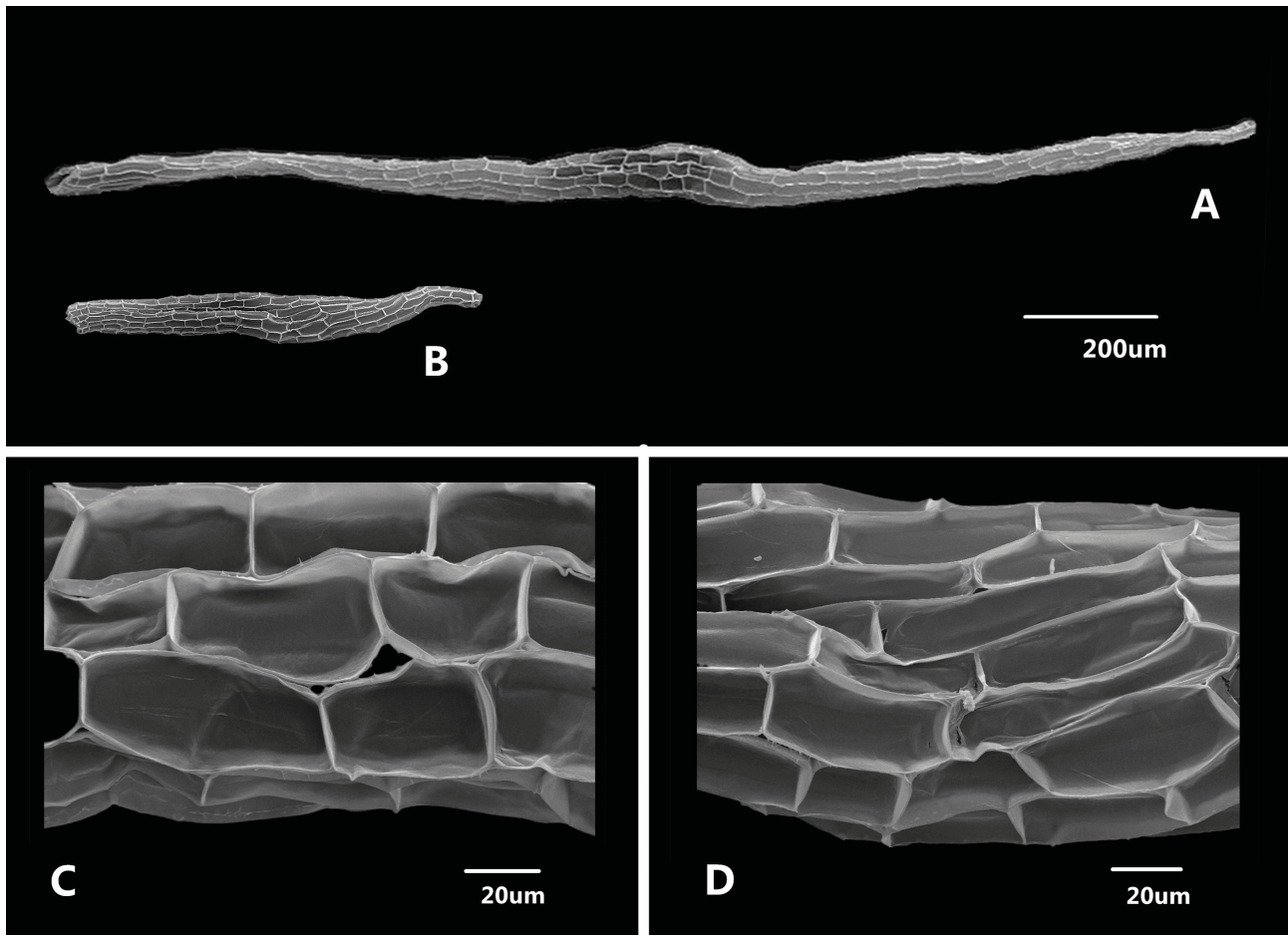


FIGURE 3. Seed micromorphology (SEM). A. *Cheirostylis acuminata*. B. *Cheirostylis clibborndyeri*. C. Median cells of *C. acuminata*. D. Median cells of *C. clibborndyeri*.

Taxonomic notes:—Morphologically, the new species is similar to *C. clibborndyeri* and *C. rubrifolius*, but differs as noted above and below (Table 1,2).

TABLE 1. Morphological comparison of *Cheirostylis acuminata* and related species.

Character	<i>C. acuminata</i>	<i>C. clibborndyeri</i>	<i>C. rubrifolius</i>
Leaf shape	lanceolate base rounded to truncate	ovate base cordate	linear-ovate or lanceolate base rounded to truncate
Inflorescence length	2–7 cm	10–15 cm	8cm
Flower numbers	1–3	5–6	5
Sterile bract length	0.8–1.4 cm	0.3 cm	-
Sterile bract surface	hairy	glabrous	hairy
Floral bract surface	pubescent	glabrous	hairy
Ovary surface	pubescent	glabrous	hairy
Sepal surface	pubescent	glabrous	hairy
Hypochile structure	plain without callus and keel	plain without callus and keel	saccate with callus and keel
Lip apex shape	apex acuminate	apex obtuse	oblong in outline
Flowering period	December to January	March to April	February

TABLE 2. Seed micromorphology comparison of *Cheirostylis acuminata* and *C. clibborndyeri*.

Species	Length (µm), mean±SD	Width (µm), mean±SD	L/W ratio, mean±SD	Number of cells	Volume (mm) 3×10 ⁻³	shape
<i>C. acuminata</i>	1906 ± 198	99 ± 10	19 ± 3	33–39	4 ± 1	filiform
<i>C. clibborndyeri</i>	673 ± 37	97 ± 9	7 ± 0.5	21–28	2 ± 0.5	fusiform

L, length; SD, standard deviation (representing the variation of the species); W, width.

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