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Cynanchum hubeiense (Apocynaceae), a new species from Hubei, China

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ABSTRACT: *Cynanchum hubeiense* Wen. B. Xu, B.S. Xia & J.Y. Shen (Apocynaceae), a new species from Luotian County, Hubei Province, China, is described and illustrated. It is similar to *C. callialatum* Buch.-Ham. ex Wight, *C. decipiens* Schneid., *C. brevipedunculatum* J.Y.Shen and *C. longipedunculatum* M.G.Gilbert & P.T.Li, but differs from them by slightly angulate follicles, the shorter peduncle, corolla white to reddish, corolla lobes ovate, planar, stems without two leaflike stipules per node, and stems sparsely puberulent. Photographs, distribution, comparison with related species, and conservation assessment are provided for this rare vine species.

KEY WORDS: Asclepiadeae, *Cynanchum callialatum, C. decipiens, C. brevipedunculatum, C. longipedunculatum.*

INTRODUCTION

In the classification for the Apocynaceae, which consists of 378 genera attributed to two grades (Rauvolfioids and Apocynoids) and three subfamilies (Periplocoideae, Secamonoideae, and Asclepiadoideae) (Endress *et al*., 2018), *Cynanchum* L. constitutes a member of the Asclepiadoideae, tribe Asclepiadeae, and subtribe Cynanchinae, and is one of the most complex genera in the Apocynaceae. It is characterized by a staminal corona originating from a ring-shaped meristem (Kunze, 1991) that can be extremely variable in shape and relationship to the gynostegium, especially in Madagascar, which is a centre of diversity for the genus. In the "classical" circumscription, a gynostegial corona with at least a basal ring-shaped part was a very good synapomorphy. In addition, the possession of small "prophylls", irregularly shaped leaflets at the nodes, are unique in *Cynanchum* (but not in all species).

Cynanchum is a large genus consisting of about 250 species (Endress *et al*., 2018), with a tropical and subtropical distribution in Africa, Madagascar, Australia, North and South America, and parts of Asia (Liede 1997). Khanum *et al*. (2016) recently proposed the inclusion of 11 further genera based on molecular and morphological data. In the Old World, the exclusion of *Vincetoxicum* Wolf as a relative of *Tylophora* R.Br. rather than of *Cynanchum* was suggested by Liede (1996), which was confirmed by subsequent studies (e.g., Rapini *et al.,* 2007; Fishbein *et al.,* 2018; Liede-Schumann *et al*., 2012, 2016).

In the Flora of China (Li *et al.*, 1995) 57 *Cynanchum* species were recorded. Of these, 21 species were supposed to transfer to *Vincetoxicum* (Jiang *et al.*, 2018). According to Khanum *et al*. (2016), the genera *Adelostemma* Hook.f., *Graphistemma* (Champ. ex Benth.) Champ. ex Benth., *Holostemma* R.Br., *Metaplexis* R.Br., *Raphistemma* Wall. and *Sichuaniav* M.G.Gilbert & P.T.Li were merged into the genus *Cynanchum*. In addition, a new species (*C. brevipedunculatum*) was described and illustrated by Shen *et al.* (2019). With these changes, the total species number of the genus *Cynanchum* in China now amounts to 45 species.

During a field investigation in Luotian County, Hubei Province, we collected an unknown species, of which the flowers have a bowl-shaped corona and five internal appendages. This species is similar to *C. callialatum* Buch.-Ham. ex Wight, *Cynanchum decipiens* Schneid., *C. brevipedunculatum* J.Y. Shen, and *C. longipedunculatum* M.G.Gilbert & P.T.Li. After a literature review as well as comprehensive morphological characters analysis, we finally confirmed that it represents a new species.

TAXONOMIC TREATMENT

Cynanchum hubeiense Wen B. Xu, B. S. Xia & J. Y. Shen, ***sp. nov.***

湖北豹藥藤 Fig. 1-2 & Tab. 1

Type： CHINA. Hubei Province, Luotian County, Bodaofeng Mountain, along roadside, 31°7′N，115°34′E，alt. 1,361 m., 3 Aug. 2020, *Xu & Xia 200209* (holotype: HIB, isotype: HITBC).

Diagnosis：*Cynanchum hubeiense* is allied to *C. callialatum*, *C. decipiens*, *C. brevipedunculatum*, and *C. longipedunculatum*, but can be distinguished by several morphological features (Table 1), including follicles slightly angulate (vs. with 2 wings especially prominent at

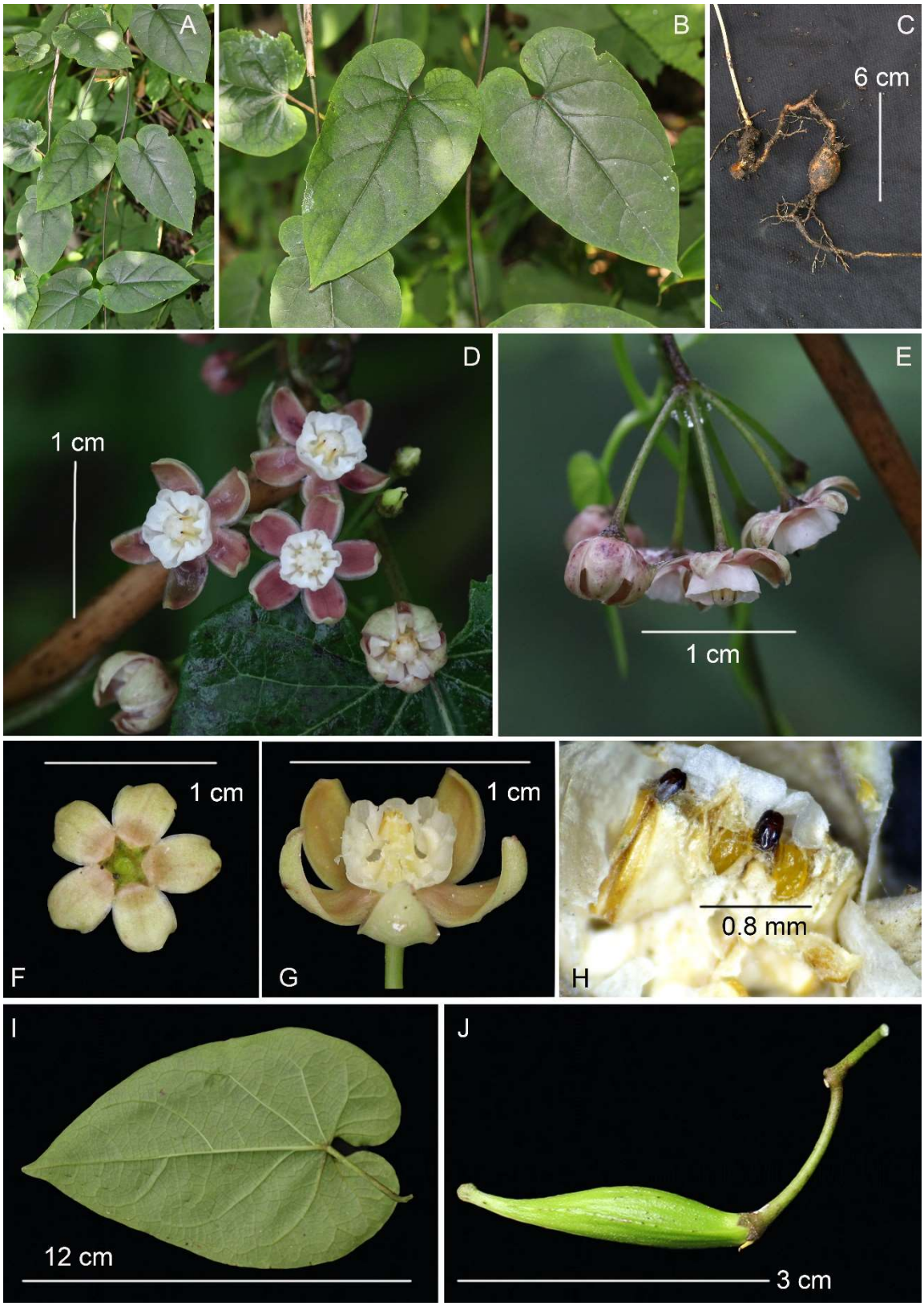

Fig. 1. ***Cynanchum hubeiense*** **A**. Trailing plant in habit. **B**. Phyllotaxy: opposite leaves. **C**. Root tuber. **D**. Inflorescence in ventral view. **E**. Sciadioidal (pseudo-umbellate) inflorescence in lateral view showing pedicels. **F**. Flower in dorsal view. **G**. Flower in lateral view. **H**. Anthers on gynostegial column showing 2 corpuscles of the pollinaria. **I**. Leaf, abaxial surface. **J**. Young follicle. Photos: Wen-Bin Xu, Yu-Xing Chen and Jian-Yong Shen.

Table 1. Morphological comparison of ***C. hubeiense***, ***C. brevipedunculatum***, ***C. callialatum***, ***C. decipiens*** and ***C. longipedunculatum***.

Characters	*C. hubeiense*	*C. brevipedunculatum*	*C. callialatum*	*C. decipiens*	*C. longipedunculatum*
Branchlets	sparsely puberulent over the whole surface	pubescent along a single line	pubescent along a single line	pubescent along a single line	pubescent along a single line
Leaf shape	ovate	ovate	oblong or ovate-oblong	ovate or ovate-lanceolate	lanceolate
Leaf size (mm)	90–150 × 60–90	120–200 × 60–110	45–80 × 20–40	50–80 × 20–40	ca. 56 × 23
Stipules	without stipules	two leaflike stipules per node	unknown	two leaflike stipules per node	two leaflike stipules per node
Peduncle（mm）	5–9	18–22	1–7	40–100	60–90
Corolla lobes	white to reddish, ovate, planar, glabrous.	green, oblong, planar to reflexed, glabrous outside, inside white puberulent when young, glabrescent.	whitish, oblong	white to reddish, oblong, reflexed, glabrous outside, whitish puberulent inside	white, oblong, erect to rotate, glabrous outside, densely pilose inside
Corona	shorter than gynostegium; margin very shallowly 5-lobed	longer than gynostegium; margin very shallowly 5-lobed	slightly longer than the gynostegium	shorter than gynostegium; margin shallowly 5-lobed	longer than gynostegium, margin shallowly 5-lobed
Follicles	slightly angulate	unknown	with 2 wings especially prominent at tip	stripes on the surface	unknown

tip in C. *callialatum*), corolla lobes ovate (vs. oblong in *C. callialatum*, *C. decipiens*, *C. brevipedunculatum*, and *C. longipedunculatum*), branchlets sparsely puberulent (vs. pubescent along a single line in *C. callialatum*, *C. decipiens*, *C. brevipedunculatum* and *C. longipedunculatum*), and absence of stipules (vs. two leaflike-stipules per node in *C. decipiens*, *C. brevipedunculatum* and *C. longipedunculatum*), peduncle 5–9 mm (vs. 40–90 mm in *C. decipiens*, 18–22 mm in *C. brevipedunculatum*, 60–90 mm in *C. longipedunculatum*).

Plants twining to 1.8 m long. **Latex** white. **Roots** with tuberous part near the middle of the roots. **Branchlets** grey-brown, terete, sparsely puberulent, sometimes subglabrous. **Leaves** opposite; petiole 30–55 mm; leaf blade ovate, 90–150 × 55–80 mm, membranous, sparsely puberulent, base cordate ± incurved, sinus 15–25 mm deep, apex acuminate to acute; adaxially sparsely puberulent, abaxially subglabrous; basal veins 5, palmate, secondary veins ca. 3 pairs, pinnate, tertiary veins reticulate, indistinct adaxially, obvious abaxially. **Inflorescences** sciadioidal, peduncle 5–9 mm, 6–10 flowered, pedicels 3–7 mm long, pubescent. **Calyx** basally fused, glabrous, sepals triangular, ca. 0.8 × 0.7 mm, apex acute. **Corolla** white to reddish, glabrous, lobes ovate, ca. 5 × 2 mm, apically acute, tube ca. 0.5 mm long. **Corona** white, bowl-shaped, slightly shorter than gynostegium, membranous, margin sinuate, adaxially with five internal appendages nearly as long as the margin. **Gynostegium** sessile, 3.5–4.0 mm long, 2 mm diam., style-head flat, indistinctly dichotomous. **Pollinarium**: corpusculum oval, black, ca. 0.30 × 0.15 mm, caudicles ca. 0.1 mm long, thickened at the insertion of the pollinia; pollinium ca. 0.4 mm long, kidney-shaped, yellow together with caudicles. Fruit: young follicles oblong-lanceolate, ca. 30 mm long, 6 mm diam., slightly angulate, calyx persistent. Seeds unknown.

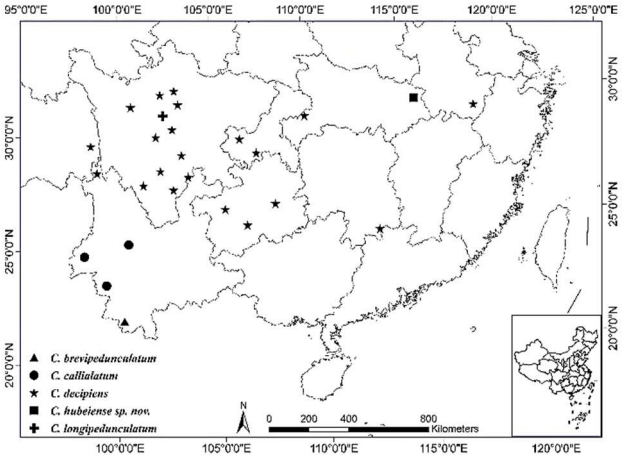

Fig. 2. The distribution of ***Cynanchum hubeiense*** and the four related *Cynanchum* species discussed in China (Drawn by Hong-Mei Li).

Distribution & habitat: At present, *C. hubeiense* is only known from the type locality. The species is found beside the road of Bodaofeng Mountain, it is surrounded by dense mixed woods, at an elevation of about 1,360 m. The common companion species are *Oplismenus undulatifolius* (Ard.) P.Beauv., *Commelina communis* L., *Polygonum nepalense* Meisn., *Hylodesmum podocarpum* (DC.) H.Ohashi & R.R.Mill, *Patrinia scabiosifolia* Fisch. ex Trevir., and *Lysimachia clethroides* Duby.

Phenology: Flowers were observed from July to August, and young fruits in August to early September.

Etymology: The new species is currently only known from the Hubei Province, China, thus the specific epithet "hubeiense" was chosen. The Chinese name is "湖北豹藥藤" (hú běi bào yào téng), which means the vine is poisonous.

Conservation assessment: Only one population with

less than 10 individuals was found in Bodaofeng Mountain, Luotian County, Hubei. We surveyed the surrounding forests very carefully, but no additional populations or individuals were located. Due to the limited population size and restricted distribution of *C. hubeiense*, it is proposed that the species should be designated as Critically Endangered (CR; criteria B1ab (i, v) + 2ab (i, v), D), according to IUCN (2012).

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