

**THREE NEW SPECIES OF *ELATOSTEMA* J.R. FORST. & G. FORST.  
(URTICACEAE) IN LIMESTONE CAVES FROM  
GUANGXI AND GUIZHOU, CHINA**

YI-GANG WEI, FANG WEN, LONG-FEI FU<sup>1</sup> AND WEN-TSAI WANG<sup>2\*</sup>

*Guangxi Institute of Botany, Guangxi Zhuang Autonomous Region and Chinese Academy of  
Sciences, Guilin 541006, China*

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**Abstract**

Three new species of *Elatostema* J.R. Forst. & G. Forst. from Guangxi and Guizhou, China are described and illustrated. They are *E. atrostriatum* W.T. Wang & Y.G. Wei, which is most similar to *E. stewardii* Merr.; *E. jingxiense* W.T. Wang & Y.G. Wei, which is most similar to *E. malacotrichum* W.T. Wang & Y.G. Wei, and *E. schizodiscum* W.T. Wang & Y.G. Wei, which is most similar to *E. angulaticaulis* W.T. Wang & Y.G. Wei.

**Introduction**

*Elatostema* J.R. Forst. & G. Forst. is a specialized genus for adapting to humid and dark habitats, e.g. dense forests, deep gorges and caves. It is one of the biggest genera in the family Urticaceae comprising at least 500 species all over the world, and mainly occur in tropical and subtropical Asia, Africa and islands of Oceania (Chen *et al.*, 2003). Accompanying with the further field investigations on South and South-west China, more and more new taxa of this genus were discovered and published, including new series, Series *Albopilosoides* Q. Lin & L.D. Duan (Lin and Duan, 2008), Series *Neriifolia* W.T. Wang & Zeng Y. Wu (Wu *et al.*, 2012), nearly 50 new species (Duan, 2010; Lin *et al.*, 2011; Wang, 2010a, b, 2011a, b, 2012; Wei *et al.*, 2011; Wei and Wang, 2011a, b; Wu *et al.*, 2011a, b, 2012) and 4 new varieties (Wang, 2010b, 2012; Wu *et al.*, 2011a). Bi *et al.* (2011) described new taxa of *Elatostema* from Thailand and India. Recently three unknown specimens belonging to the genus *Elatostema* were collected from Guangxi and Guizhou. After critical examination of these specimens and carefully consulting relevant literature, they were identified as new species.

**1. *Elatostema atrostriatum* W.T. Wang & Y.G. Wei sp. nov. (Fig. 1).**

*Type:* CHINA. Guangxi: Jiayou village, Lingyun County, 1 April 2009, Y.G. Wei 103 (*Holotype:* PE, *Isotype:* IBK).

**Diagnosis:** *Species nova haec est similis E. stewardii* Merr., *quod foliis majoribus, apice cuspidatis, capitulis pistillis receptacula majoribus, bracteis pistillatis triangulatis, dense puberulis, apice corniculatis, non striatis differt.*

Herbs perennial, terrestrial. Stems c. 3 clumping, 100-135 × 1-2 mm, erect, simple, glabrous. Stipules subulate, 1-7 × 0.1-0.3 mm. Leaves distichous, alternate, short petioled, petioles 1-4 mm long, glabrous; leaf blades 28-105 × 10-34 mm, oblique, narrowly obovate, leathery, nerves pinnate, broader-half lateral nerves 3-6, 30-70° to the midrib, narrower-half lateral nerves 4-6, 30-70° to the midrib; upper surface cystoliths dense, conspicuous or inconspicuous, rod-shaped,

\*Corresponding author. Email: wentsaiwang@yeah.net.

<sup>1</sup>College of Life Sciences, Guangxi Normal University, 541004, Guilin, China.

<sup>2</sup>State Key Laboratory of Systematic and Evolutionary Botany, Institute of Botany, The Chinese Academy of Sciences, Cn-100093 Beijing, China.

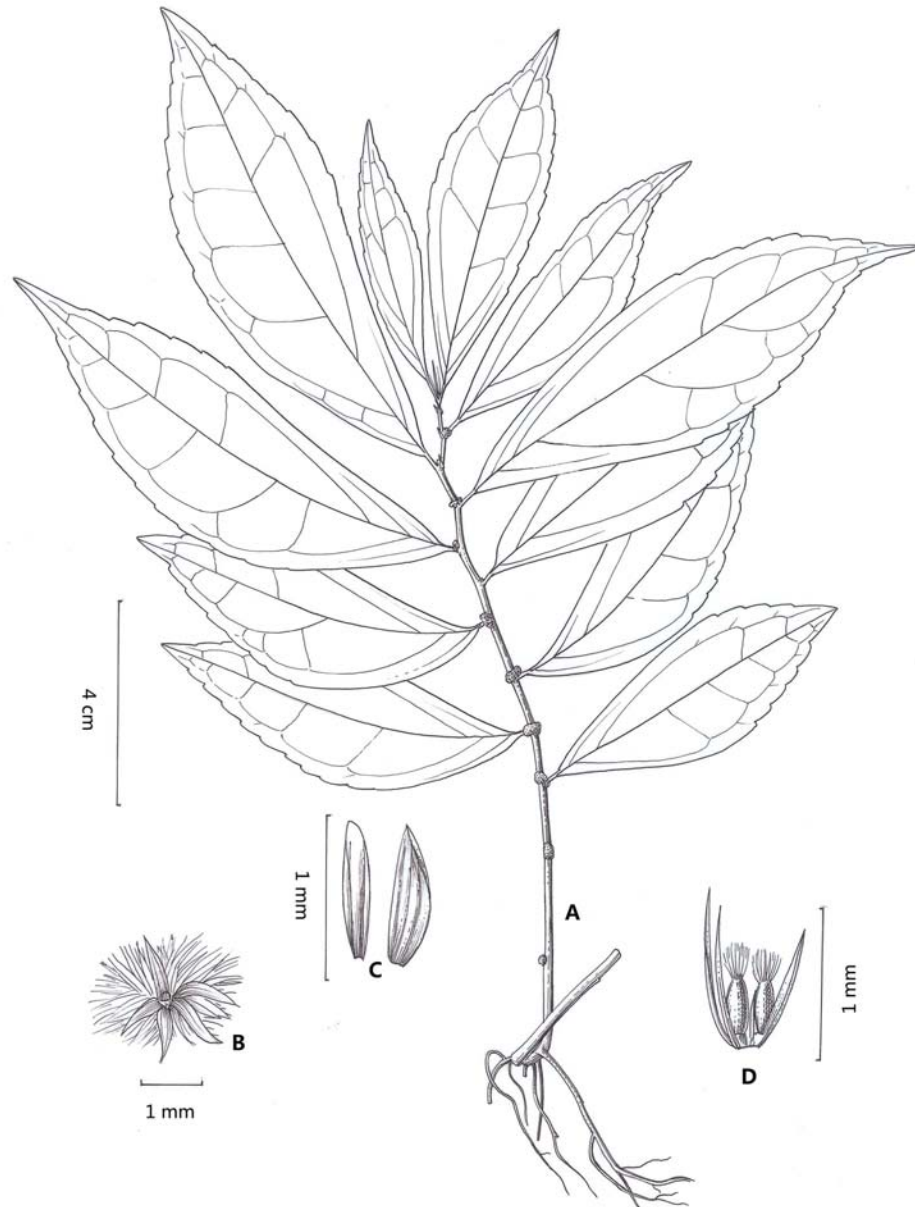


Fig. 1. *Elatostema atrostriatum* W.T. Wang & Y.G. Wei: A. flowering stem; B. pistillate capitulum; C. two pistillate bracts; D. three pistillate bracteoles and two pistillate flower (Drawn by Y.B. Sun from holotype).

0.1-0.25 mm long, lower surface cystoliths absent; base asymmetrical, broader-half rounded and narrower-half cuneate, margin entire or denticulate, basal  $\leq 1/2$  entire, apex acuminate or blunt;

Staminate capitulum not seen. Pistillate capitulum 1-3 axillary, sessile; receptacle inconspicuous; subtended by marginal bracts, bracts c. 5, equal, membranous, semi-transparent, narrowly ovate or broadly linear, 0.8-1.0 × 0.15-0.4 mm, glabrous, with 2-3 black-brown longitudinal stripes; bracteoles numerous, dense, membranous, semitransparent, narrowly linear, 0.6-1.0 mm long, glabrous, with 1 black-brown longitudinal stripe. Pistillate flower short peduncled, tepal inconspicuous; pistil c. 0.7 mm long; ovary narrowly ellipsoid, 0.4 mm long; stigma 0.3 mm long. Infructescence not seen.

*Habitat*: Limestone cave, 20 individuals.

*Etymology*: *Elatostema atrostriatum* is named after pistillate bracts with 2-3 black-brown longitudinal stripes.

*Vernacular name*: *Heiwen louticao* (China).

*Note*: *Elatostema atrostriatum* is morphologically similar to *E. stewardii* Merr. but differs in leaves, pistillate receptacle, bracts and bracteoles (Table 1).

**Table 1. Morphological comparison between *Elatostema atrostriatum* and *E. stewardii***

Characters	<i>E. atrostriatum</i>	<i>E. stewardii</i>
Leaves	28-105 × 10-34 mm, apex acuminate or blunt	70-125 × 28-45 mm, cuspidate
Pistillate receptacle	small, inconspicuous	subquadrate, c. 3 mm long
Pistillate bracts	narrowly ovate or broadly linear, glabrous, not corniculate with 2-3 black-brown longitudinal stripes	triangular, densely pubescent, corniculate with no stripes
Pistillate bracteoles	glabrous, with 1 black-brown longitudinal stripe	margin densely pubescent with no stripes

## 2. *Elatostema jingxiense* W.T. Wang & Y.G. Wei **sp. nov.**

(Fig. 2).

*Type*: CHINA. Guangxi: Jingxi, Dizhou, limestone cave, 22 March 2009, Wei Yigang g067 (*Holotype*: PE, *Isotype*: IBK).

**Diagnosis**: *Species nova haec est similis E. malacotrico* W.T. Wang & Y.G. Wei, *quod plantis totis siccitate nigrescentibus, cauli staminati foliis normaliter evolutis eis cauli pistillati majoribus cystolithis densis praeditis, involucris staminati bracteis paucioribus ca. 8 depressis orbicularibus dorso puberulis distinguitur.*

Herbs perennial, terrestrial, dioecious. Male plant: stems 150–500 × 2–3 mm, erect, dark brown when fresh, simple, densely puberulent, the hairs c. 0.1 mm long, 3-4 densely degraded microphyll at the top of the stem, underneath staminate capitulum bearing at naked nodes. Stipules lanceolate-linear, 3-4 mm long, glabrous. Leaves distichous, alternate, sessile or short petioled; leaf blades 12-14 × 4-16 mm, chartaceous, oblique ovoid, nerves pinnate, lateral nerves 4 or 6 paired, 45-60° to the midrib, upper surface sparsely hispid, hairs c. 0.5 mm long, weakly curved, appressed, cystoliths absent, lower surface nerves densely hispid, hairs c. 0.5 mm long, weakly curved, cystoliths absent; base asymmetric, broader-half oblique, broadly cuneate, narrower-half cuneate; margin dentate, apex acuminate, acumen entire. Female plant: stems 450-550 × c. 5 mm, erect, green when fresh, simple, densely puberulous, hairs c. 0.1 mm long; leaves distichous, alternate, short petioled, petiole 4-20 mm long; leaf blades 50-160 × 35-65 mm, chartaceous, oblique oblong or elliptic, nerves pinnate, lateral nerves 5 or 6 paired, 45-60° to the midrib, upper surface sparsely hispid, hairs c. 0.5 mm long, weakly curved, appressed, cystoliths absent, lower

surface nerves densely hispid, hairs c. 1 mm long, weakly curved, cystoliths absent; base asymmetric, broader-half rounded, narrower-half obliquely cuneate; margin dentate, broader-half

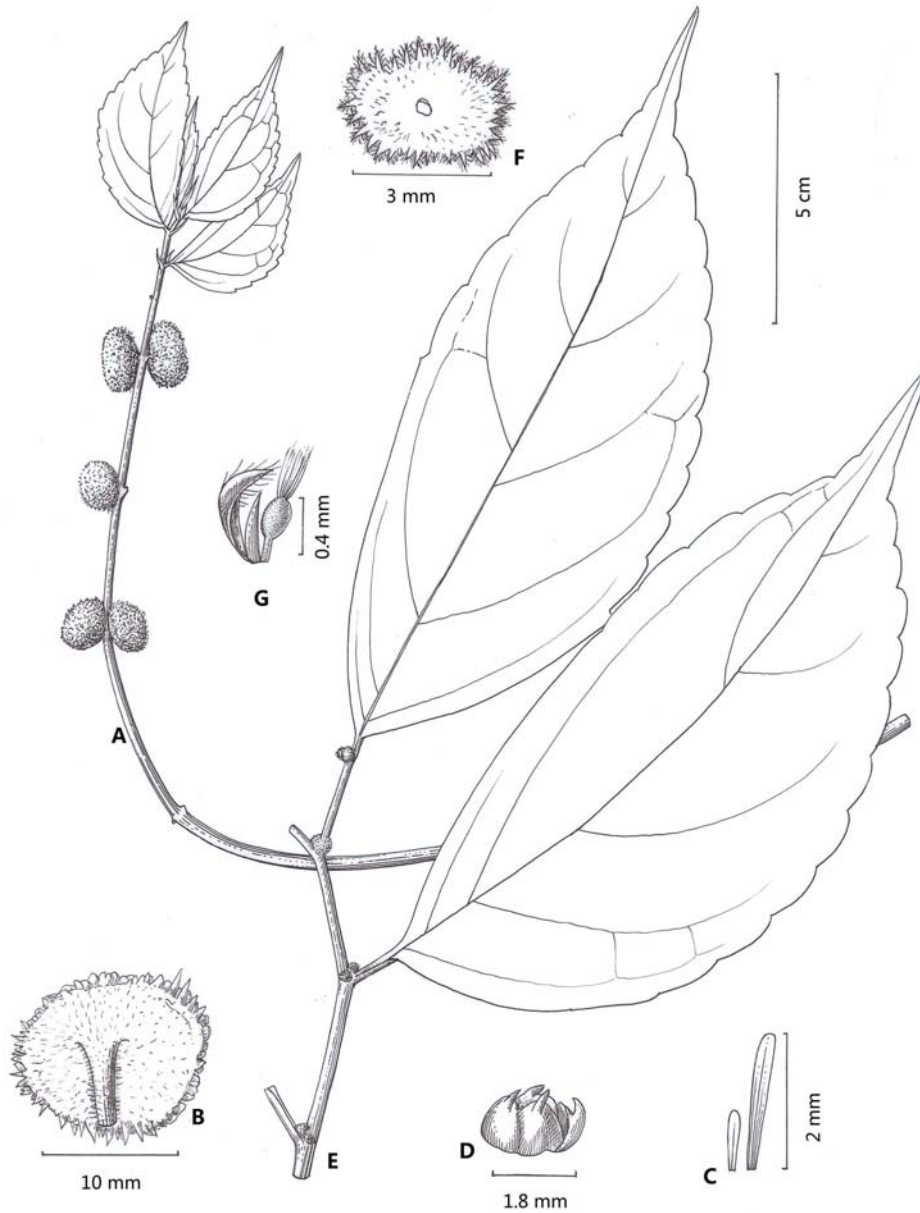


Fig. 2. *Elatostema jingxiense* W.T. Wang & Y.G. Wei: A. staminate stem; B. staminate capitulum; C. staminate bracteoles; D. staminate flower; E. upper part of pistillate stem; F. pistillate capitulum; G. two pistillate bracteoles and pistillate flower (Drawn by Y.B. Sun from holotype).

basal  $\leq 1/3$  entire, narrower-half basal  $\leq 1/2$  entire, apex acuminate, acumen entire. Staminate capitulum solitary or didymous, axillary, short pedunculate, c. 6 mm long, puberulent; receptacle subround, c. 10 mm in diam., puberulent, subtended by marginal bracts, the bracts c. 15, membranous, triangular, c. 1 mm long, glabrous; bracteoles dense, membranous, semi-transparent, linear, 0.8-2.0 mm long, glabrous, with 1-3 brown stripes. Staminate flowers short peduncled, tepals 5, broadly ovate, c. 1 mm long, subapical appendage c. 0.4 mm long, corniculate, glabrous. Pistillate capitulum didymous, axillary, sessile; receptacle elliptic, c.  $3.0 \times 2.5$  mm, puberulent, subtended by marginal bracts, bracts c. 25, narrowly triangular or linear, 0.3-0.5 mm long, puberulent or sometimes glabrous; bracteoles numerous, dense, membranous, cymbiform or linear-lanceolate, 0.5-0.8 mm long, puberulent or glabrous. Pistillate flower short peduncled, tepals inconspicuous; pistil 0.65 mm long; ovary ellipsoidal, c. 0.25 mm long; stigma 0.4 mm long.

*Habitat:* Limestone cave, 20 individuals.

*Etymology:* *Elatostema jingxiense* is named after the type locality near Jingxi County.

*Vernacular name:* *Jingxi louticao* (China).

*Note:* *Elatostema jingxiense* is morphologically similar to *E. malacotrichum* W.T. Wang & Y.G. Wei but differs in colour of whole plant when dying, leaves of male stem and staminate bract (Table 2).

**Table 2. Morphological comparison between *Elatostema jingxiense* and *E. malacotrichum***

Characters	<i>E. jingxiense</i>	<i>E. malacotrichum</i>
Whole plant turning black while dying?	no	yes
Leaves of male stem	much smaller than those of pistillate stem and lacking cystoliths	larger than those of pistillate stem and bearing numerous dense cystoliths
Staminate bracts	c. 15, triangular and glabrous	c. 8, depressed-orbicular and puberulous abaxially

**3. *Elatostema schizodiscum* W.T. Wang, & Y.G. Wei sp. nov. (Fig. 3).**

*Type:* CHINA. Guizhou Province, Anlong County, Dushan town, limestone cave, 29 March 2010, F. Wen 1036, (*Holotype:* PE, *Isotype:* IBK).

**Diagnosis:** *Species nova haec est similis E. angulaticauli* W.T. Wang & Y.G. Wei, *quod foliis eorum nervis secundariis 6-8-jugis et eorum cystolithis minoribus, 0.05-0.1 mm longis, capituli pistillati receptaculo indiviso, floribus pistillatis ad receptaculum totum dense crescentibus, stigmatibus subglobosis recedit.*

Herbs perennial, terrestrial. Stems c.  $350 \times 4$  mm, decumbent, dark green, lower part drying 4-sulcate, distal part cystoliths dense, rod-shaped, 0.1-0.4 mm long, branched, glabrous. Stipules caducous. Leaves distichous, alternate, short petioled, petioles 2 mm long, glabrous; leaf blades  $60-150 \times 30-35$  mm, oblique elliptic or oblique ovoid, chartaceous, nerves pinnate, lateral nerves 6-8 pairs,  $45-60^\circ$  to the midrib, above sunken, beneath bulged out, conspicuous, upper surface sparsely hispid, hairs c. 1 mm long, weakly curved, cystoliths small, dense, rod-shaped or punctiform, 0.05-0.1 mm long, lower surface glabrous, cystoliths absent; base asymmetrical, broader-half broadly cuneate or oblique rounded and narrower-half cuneate; margin serrate, the apex of serrate blunt or rounded; apex long acuminate or acuminate, acumen entire. Staminate inflorescence not seen. Pistillate capitulum didymous, axillary, c. 5 mm wide, sessile; receptacle white, 2-partite, glabrous, lobes oblong or subquadrate, c. 2 mm long, undivided or 3-partite, apex

bearing flowers dense, glabrous, subtended by bracts, bracts 3, white, broadly triangular, c. 1 mm long, glabrous, bracteoles white, narrow, c. 0.7 mm long, glabrous. Pistillate peduncle white, c. 0.7 mm long, glabrous, tepals c. 2, equal, narrowly linear, c. 0.3 mm long, glabrous; ovary elliptic, c. 0.22 mm long, stigma subglobose. Achene brown, narrowly ovate, c. 0.7 × 0.3 mm, with 4 longitudinal ribs; staminodium c. 3, white, narrowly ovate, c. 0.3 mm long, glabrous.

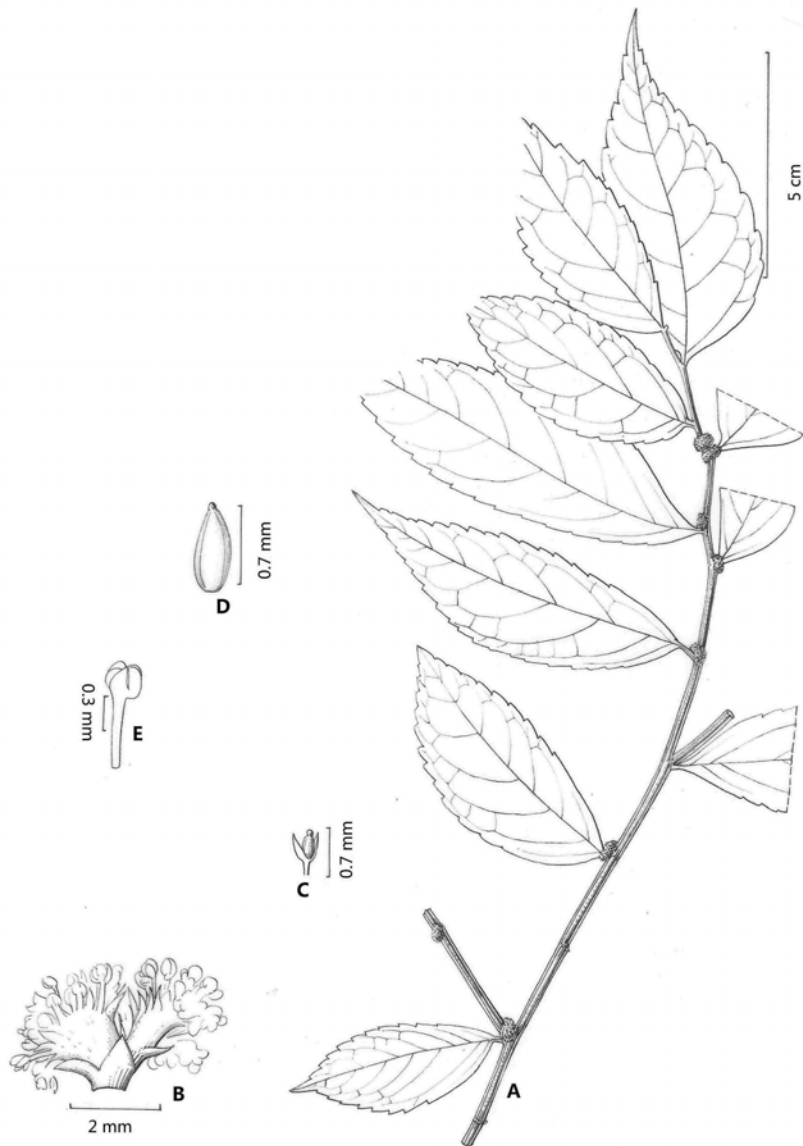


Fig. 3. *Elatostema schizodiscum* W.T. Wang & Y.G. Wei: A. flowering pistillate stem; B. pistillate capitulum; C. pistillate bracteoles and pistillate flower; D. achene; E. fruiting pedicel and staminodes (Drawn by Y.B. Sun from holotype).

*Habitat*: Limestone cave, 35 individuals.

*Etymology*: *Elatostema schizodiscum* is named after receptacle 2-parted.

*Vernacular name*: *Lietuo louticao* (China).

*Note*: *Elatostema schizodiscum* is morphologically similar to *E. angulaticaula* W.T. Wang & Y.G. Wei but differs in leaves, cystoliths, pistillate receptacle and stigma (Table 3).

**Table 3. Morphological comparison between *Elatostema schizodiscum* and *E. angulaticaula***

Characters	<i>E. schizodiscum</i>	<i>E. angulaticaula</i>
Leaves	lateral nerves 6-8 pairs	lateral nerves 4-6 pairs
Cystoliths	0.05-0.1 mm long	0.1-0.3 mm long
Pistillate receptacle	2-parted, flowers densely growing on apex of receptacle	undivided, flowers growing on the whole receptacle
Stigma	subglobose	penicillate

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