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

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Keywords: Elatostema; New species; China.

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. angulaticaule* 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 pistillatis receptaculis majoribus, bracteis pistillatis triangulatis, dense puberulis, apice corniculatis, non striatis differt.

   Herb 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 petiolated, 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,

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0.1-0.25 mm long, lower surface cystoliths absent; base asymmetrical, broader-half rounded and narrower-half cuneate, margin entire or denticulate, basal ≤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, semi-transparent, 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*

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

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 praeeditis, involucri staminati bracteis paucioribus ca. 8 depressa 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 microphylly 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.
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basal \( \leq \frac{1}{3} \) entire, narrower-half basal \( \leq \frac{1}{2} \) 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 × 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>
<thead>
<tr>
<th>Characters</th>
<th><em>E. jingxiense</em></th>
<th><em>E. malacotrichum</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole plant turning black while dying?</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>Leaves of male stem</td>
<td>much smaller than those of pistillate stem and lacking cystoliths</td>
<td>larger than those of pistillate stem and bearing numerous dense cystoliths</td>
</tr>
<tr>
<td>Staminate bracts</td>
<td>c. 15, triangular and glabrous</td>
<td>c. 8, depressed-orbicular and puberulous abaxially</td>
</tr>
</tbody>
</table>

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


Diagnosis: *Species nova haec est similis E. angulaticauli* W.T. Wang & Y.G. Wei, *quod foliis eorum nervis secundaris 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 × 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 × 30-35 mm, oblique elliptic or oblique ovoid, chartaceous, nerves pinnate, lateral nerves 6-8 pairs, 45-60° 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 serratae 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 subquadrature, 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 ribbs; 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).
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*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. angulaticaule* 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. angulaticaule*

<table>
<thead>
<tr>
<th>Characters</th>
<th><em>E. schizodiscum</em></th>
<th><em>E. angulaticaule</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves</td>
<td>lateral nerves 6-8 pairs</td>
<td>lateral nerves 4-6 pairs</td>
</tr>
<tr>
<td>Cystoliths</td>
<td>0.05-0.1 mm long</td>
<td>0.1-0.3 mm long</td>
</tr>
<tr>
<td>Pistillate receptacle</td>
<td>2-parted, flowers densely growing on apex of receptacle</td>
<td>undivided, flowers growing on the whole receptacle</td>
</tr>
<tr>
<td>Stigma</td>
<td>subglobose penicillate</td>
<td>penicillate</td>
</tr>
</tbody>
</table>

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**References**


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