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Two new species of the planthopper genus *Eponisiella* Emeljanov from China (Hemiptera, Fulgoromorpha, Meenoplidae)

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Abstract. Two new species of the genus *Eponisiella* Emeljanov, 1984 are described and illustrated from China (Guizhou and Shandong Provinces). These are *E. dafangensis* sp. nov. and *E. shandongensis* sp. nov., giving the genus eight species in total. A key to the species of *Eponisiella* is provided as well as a map of their geographic distribution, which is briefly discussed.

Keywords. Fulgoroidea, Oriental region, Kermesiinae, taxonomy, morphology.

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Introduction

Meenoplidae Fieber, 1872 is a small family of planthoppers (Hemiptera: Fulgoromorpha), established by Fieber (1872), with currently 166 described species in 23 genera respectively counting only for 1.2% and 0.9% of the specific and generic diversity of the Fulgoromorpha Evans, 1946 (Bourgoin 2021). The family can be easily recognized from other families by the claval veins of tegmina with a paired or single row of sensory pits, the concave head apically with distinct lateral carinae, and a body length usually less than 5 mm. It contains two subfamilies (Meenoplinae Fieber, 1872 and Kermesiinae Kirkaldy, 1906) mainly distributed throughout the Old World tropics, extending into the eastern Palearctic (Emeljanov 1984; Bourgoin 1997), although being absent from the Nearctic and Neotropical bioregions (Bourgoin 2021). Kermesiinae was first established by Kirkaldy (1906) with the type genus *Kermesia* Melichar, 1903, and is characterized by the claval veins (Pcu and CuA) merging distally and the clavus with a row of sensory pits on each side of Pcu. Currently the subfamily includes 17 genera and 103 species, while in China, only six genera and 17 species occur (Wilson 1988; Hu & Yang 1993; Bourgoin 2021).

Within Kermesiinae, *Eponisiella* Emeljanov, 1984 is a small genus including six species. It was established by Emeljanov (1984) with three species previously described as *Eponisia guttulinervis* Matsumura, 1914 from Japan, *Nisia suisapana* Fennah, 1956 from China (Hubei), and *Nisia paludicola* Vilbaste, 1968, which was designed as the type species of the genus. Two years later, Tsaur *et al.* (1986) synonymized *Eponisiella paludicola* (Vilbaste, 1968) with *Eponisiella guttulinervis* (Matsumura, 1914) and described *E. matsumurai* Tsaur, Yang & Wilson, 1986 from China (Taiwan). Emeljanov (1987) added *E. casta* Emeljanov, 1987 from Russia, Hu & Yang (1993) added *E. gramina* Hu & Yang, 1993 from China (Jiangsu) and Rahman *et al.* (2014) described *E. andonga* Rahman *et al.*, 2014 from Korea.

Herein, two new species, *E. dafangensis* sp. nov. and *E. shandongensis* sp. nov. from China, are described and illustrated. As a result, the genus *Eponisiella* now contains eight species. A key based on morphological characteristics to distinguish the species is provided as well as a map of their geographic distributions.

Material and methods

The external morphology terminologies follow Bourgoin (1997) and Bourgoin *et al*. (2015) for venation and Bourgoin (1987) for the male genitalia. Body length is from apex of head to tip of tegmina. The metatibiotarsal formula LT-(T)/Mt1/Mt2 provides the number of spines on the side of the metatibia (LT) - on the apex of metatibia (T), eventually in two groups of internal (Ti) and external (Te) spines separated with a diastema (Ti-Te) / on the apex of first metatarsomere (Mt1) / on the apex of second metatarsomere (Mt2). Biogeographical terminology follows Holt *et al*. (2013). All measurements are in millimeters (mm). The genital segments were removed from the examined specimens and macerated in 10% NaOH, washed in water and transferred to glycerin. External morphology and drawings were done under a Leica MZ 12.5 stereo microscope. Photographs were taken using a NIKON SMZ 25 digital camera and multiple layers were stacked using Helicon Focus ver. 6. The photographs and illustrations were imported into Adobe Photoshop ver. 6.0 for plate composition and labeling.

The type specimens are deposited in the Institute of Entomology, Guizhou University, Guiyang, Guizhou Province, China (IEGU).

Results

Taxonomy

Class Insecta Linnaeus, 1758
Order Hemiptera Linnaeus, 1758
Infraorder Fulgoromorpha Evans, 1946
Family Meenoplidae Fieber, 1872
Subfamily Kermesiinae Kirkaldy, 1906

Genus ***Eponisiella*** Emeljanov, 1984

Eponisiella Emeljanov, 1984: 481.

Eponisiella – Tsaur *et al.* 1986: 98. — Rahman *et al.* 2014: 326.

Type species

Eponisiella guttulinervis (Matsumura, 1914), designated by Tsaur *et al.* 1986. (= *Nisia paludicola* Vilbaste, 1968, original designation, synonymized by Tsaur *et al.* 1986).

Diagnosis

Body very small. Head concave apically with a stripe medially. Vertex with two posterolateral areolets at base. Lateral carinae of frons ending at frontoclypeal suture strongly convergent apically. Lateral carinae of postclypeus absent. Pronotum without carina, mesonotum with a weak median carina. Tegmina broadened apically with blackish markings, MP_{1+2} not branched. Wings with RP not forked. Metatibiotarsal formula: (3+5)-7-5. Male genitalia with pygofer strongly produced in a dorsocaudal angle in lateral view; in caudoventral view, strongly concave medially, each side with a finger-like process with hairs lateroapically.

Distribution

Japan, Russia, Korea, China (Taiwan, Hubei, Jiangsu, Guizhou, Shandong) (Fig. 21).

Key to species of the genus *Eponisiella* Emeljanov, 1984

1. Tegmina with only longitudinal veins darkened, without transverse brown band 2
– Tegmina with longitudinal veins darkened and transverse brown band 3

2. Frons and clypeus with blurred longitudinal stripe .....***E. casta*** Emeljanov, 1987
– Frons pale yellow and clypeus brown, longitudinal stripe absent (Rahman *et al.* 2014: fig. 2c) ....***E. andonga*** Rahman *et al.*, 2014

3. Tegmina with two transverse brown bands apically 4
– Tegmina with three transverse brown bands apically 6

4. CuA vein of tegmina without a long brown stripe; only a short brown stripe on longitudinal median vein (MP) before branching (Fennah 1956: fig. 9e) ..... ***E. suisapana*** (Fennah, 1956)
– CuA vein of tegmina with a long brown stripe; a long brown stripe on longitudinal median vein (MP) before branching, and a short brown stripe on longitudinal median vein after branching 5

5. Inner side of gonostyli (Fig. 10) concave medially producing an angular production; anal tube (Fig. 10) with bifurcate curved hooks at apex in lateral view; lower part of aedeagus (Figs 10, 12) bifurcate at apex ..... ***E. dafangensis*** sp. nov.
– Inner side of gonostyli medially without an angular production; anal tube without curved hooks at apex in lateral view; lower part of aedeagus not bifurcate at apex (Hu & Yang 1993: fig. 2) .... ***E. gramina*** Hu & Yang, 1993

6. Gonostyli with three bumps near middle in caudoventral view; aedeagus bifurcate (Tsaur *et al.* 1986: fig. 10g–h) .....***E. matsumurai*** Tsaur *et al.*, 1986
– Gonostyli with one or two bumps near middle in caudoventral view; aedeagus trifurcate 7

7. Gonostyli with one bump near middle in caudoventral view; anal tube subapically with two productions, bifurcate at apex in lateral view .....***E. guttulinervis*** (Matsumura, 1914)
– Gonostyli (Fig. 19) with two bumps near middle and third in caudoventral view; anal tube (Fig. 18) subapically with two productions, not bifurcate at apex in lateral view ....***E. shandongensis*** sp. nov.

Eponisiella dafangensis sp. nov.
urn:lsid:zoobank.org:act:094B1313-C337-4DDF-9143-6B9ED1829777
Figs 1–2, 5–12

Diagnosis

The salient features of the new species include: tegmina (Fig. 8) with two transverse brown bands apically; inner side of gonostyli (Fig. 10) concave medially producing an angular production; anal tube in lateral view (Fig. 10) bifurcate with two curved hooks at apex, lateral margins bifurcate at apex in dorsal view (Fig. 7); aedeagus (Figs 10, 12) bifurcate, lower part bifurcate at apex.

Etymology

The new species is named after its collecting location in the Dafang County (Guizhou Province).

Type material

Holotype

CHINA • ♂; Guizhou Province, Dafang County; 27°19′ N, 105°61′ E; 14 Aug. 2019; Xiu-Dong Huang leg.; IEGU.

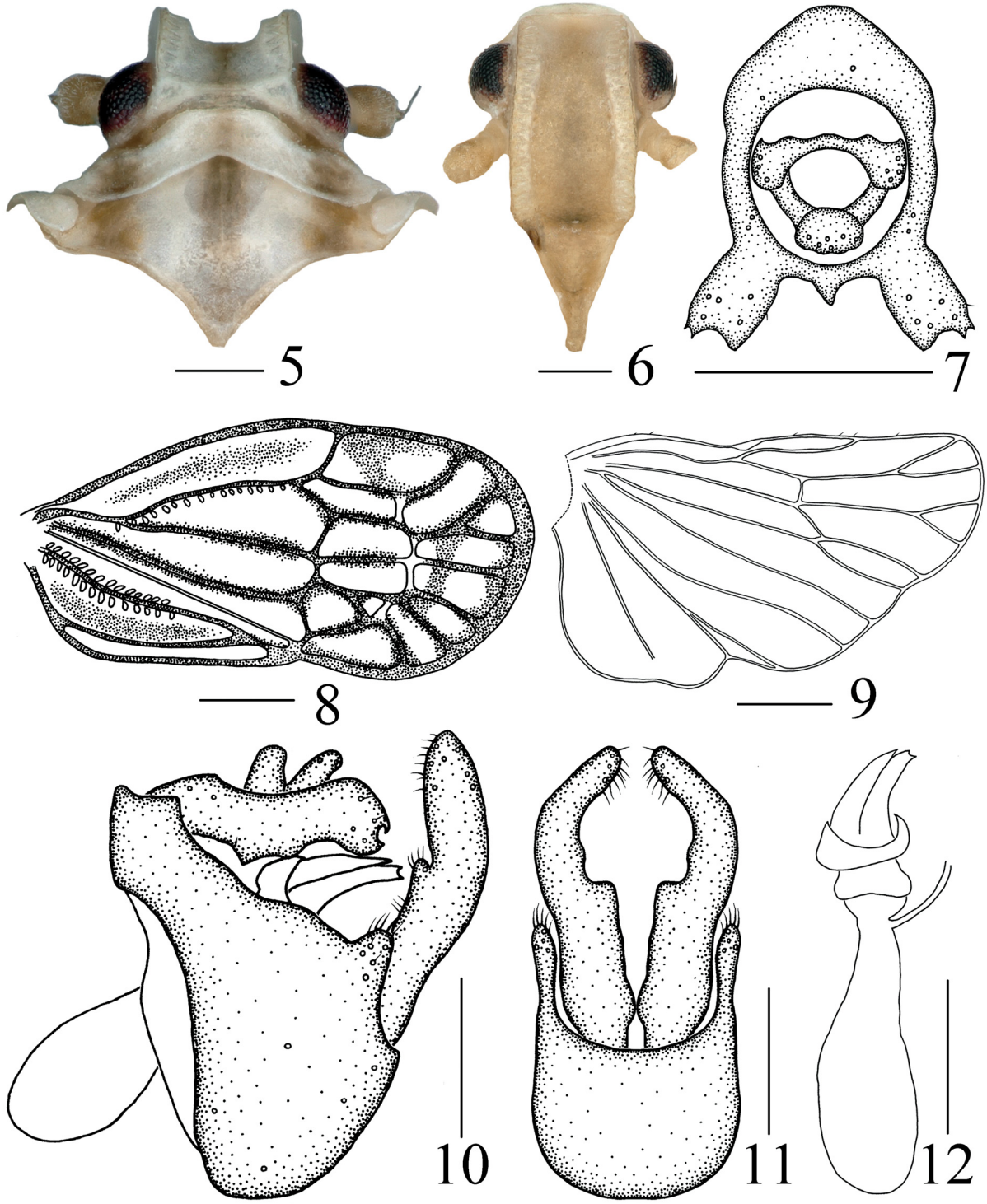
Paratypes

CHINA • 4 ♂♂, 2 ♀♀; same collection data as for holotype; IEGU.

Description

Measurements. Body length including tegmina: male 2.90–3.11 mm (N = 5), female 3.10–3.21 mm (N = 2).

Figs 1–4. *Eponisiella dafangensis* sp. nov. and *Eponisiella shandongensis* sp. nov. **1–2**. *E. dafangensis* sp. nov., ♂, holotype (IEGU), habitus. **1**. Dorsal view. **2**. Lateral view. **3–4**. *E. shandongensis* sp. nov., ♂, holotype (IEGU), habitus. **3**. Dorsal view. **4**. Lateral view. Scale bars = 0.5 mm.



Figs 5–12. *Eponisiella dafangensis* sp. nov., ♂, holotype (IEGU). **5**. Head and thorax, dorsal view. **6**. Frons, ventral view. **7**. Anal tube, dorsal view. **8**. Tegmina. **9**. Wing. **10**. Pygofer, lateral view. **11**. Gonostyli and pygofer, caudoventral view. **12**. Aedeagus, left lateral view. Scale bars: 5–7, 10–12 = 0.2 mm; 8–9 = 0.5 mm.

Coloration. General color grayish white (Figs 1–2). Eyes blackish brown. Frons pale brown, with weak blackish stripe in middle. Clypeus and antenna pale brown. Vertex, pronotum and mesonotum with brown stripe in middle, pronotum and mesonotum with two yellowish-brown patches on both sides. Tegmina with longitudinal veins and adjacent parts of membrane with dark patterns, with two transverse brown bands apically. Wings waxy white with pale veins.

Head and thorax. Head (Figs 1, 5) significantly narrower than pronotum. Vertex shorter in middle than wide at base (1 : 2.32), posterior margin slightly convex, with two triangular posterolateral areolets widely separated from each other, not nearly approaching in middle line. Frons (Fig. 6) approximately rectangular, without median carina, longer in middle line than wide at widest portion (about 1.66 : 1), lateral carinae with dense row of sensory pits along outer margin. Clypeus (Fig. 6) without lateral carinae, elevated medially, median carina present. Frontoclypeal suture nearly straight. Rostrum elongate, surpassing hind-coxae. Pronotum (Fig. 5) short, wider than maximum width of head (including eyes) (1.36 : 1), lateral carinae sinuate, median carina absent. Mesonotum (Fig. 5) about 4.08 × as long as pronotum in midline, with weak median carina. Tegmina (Fig. 8) broadened apically, longer than maximal width (2.02 : 1). A2 of wing (Fig. 9) not reaching margin. Metatibiotarsal formula: (3+5)-7-5.

Male genitalia. Pygofer (Figs 10–11) in lateral view with dorsocaudal angle strongly produced; in caudoventral view, strongly concave medially, each side with finger-like process with hairs lateroapically, slightly curved outwardly. Anal tube stout (Figs 7, 10) in lateral view, bifurcate curved hooks at apex, ventral margin waved; in dorsal view, bifurcate, lateral margins bifurcate at apex, anal style sets near base. Aedeagus (Figs 10, 12) bifurcate in lateral view, almost as long as anal tube, lower part of aedeagus slightly blunt, bifurcate at apex. Gonostyli (Figs 10–11) in lateral view, slightly curved at middle, inner side concave medially producing angular production; in caudoventral view, near middle to apex much narrower than other part, curved inwards with two bumps.

Distribution

China (Guizhou) (Fig. 21).

Remarks

This species is similar to *Eponisiella gramina* Hu & Yang, 1993, but differs from the latter in: (1) inner side of gonostyli concave medially producing an angular production (inner side of gonostyli almost equal in width without an angular production in *E. gramina*); (2) anal tube in lateral view branched at apex (anal tube in lateral view unbranched at apex in *E. gramina*); (3) lower part of aedeagus bifurcate at apex (lower part of aedeagus not bifurcate at apex in *E. gramina*).

Eponisiella shandongensis sp. nov.
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Figs 3–4, 13–20

Diagnosis

The salient features of the new species include: tegmina (Fig. 16) with three transverse brown bands apically; ventral and dorsal margins of anal tube (Fig. 18) each with a dentate productions at apex in lateral view; gonostyli (Fig. 19) with two bumps near middle and third in caudoventral view; aedeagus (Figs 18, 20) trifurcate.

Etymology

The new species is named after its collecting location in the Shandong Province.

Type material

Holotype

CHINA • ♂; Shandong Province, Yellow River Delta Nature Reserve; 37°72′ N, 118°95′ E; 4 Aug. 2014; Wei-Bin Zheng leg.; IEGU.

Paratypes

CHINA • 2 ♀♀; same collection data as for holotype; IEGU.

Description

Measurements. Body length including tegmina: male 3.01 mm (N = 1), female 3.10–3.14 mm (N = 2).

Coloration. General color grayish white (Figs 3–4). Eyes grayish brown. Frons pale brown, with weak brownish stripe in middle. Clypeus and antenna yellowish-brown. Vertex, pronotum and mesonotum with yellowish-brown stripe in middle, pronotum and mesonotum with two ocherous patches on both sides. Tegmina with longitudinal veins and adjacent parts of membrane with dark patterns, with three transverse brown bands apically. Wings waxy white with pale veins.

Head and thorax. Head (Figs 3, 13) significantly narrower than pronotum. Vertex shorter in middle than wide at base (1 : 2.11), posterior margin slightly convex, with two triangular posterolateral areolets widely separated from each other, not nearly approaching in middle line. Frons (Fig. 14) approximately rectangular, without median carina, longer in middle line than wide at widest portion (about 1.61 : 1), lateral carinae with dense row of sensory pits along outer margin. Clypeus (Fig. 14) without lateral carinae, elevated medially, median carina present. Frontoclypeal suture nearly straight. Rostrum elongate, surpassing hind-coxae. Pronotum (Fig. 13) short, wider than maximum width of head (including eyes) (1.38 : 1), lateral carinae sinuate, median carina absent. Mesonotum (Fig. 13) about 4.83 × as long as pronotum in midline, with weak median carina. Tegmina (Fig. 16) broadened apically, longer than maximal width (2.03 : 1). A2 of wing (Fig. 17) not reaching margin. Metatibiotarsal formula: (3+5)-7-5.

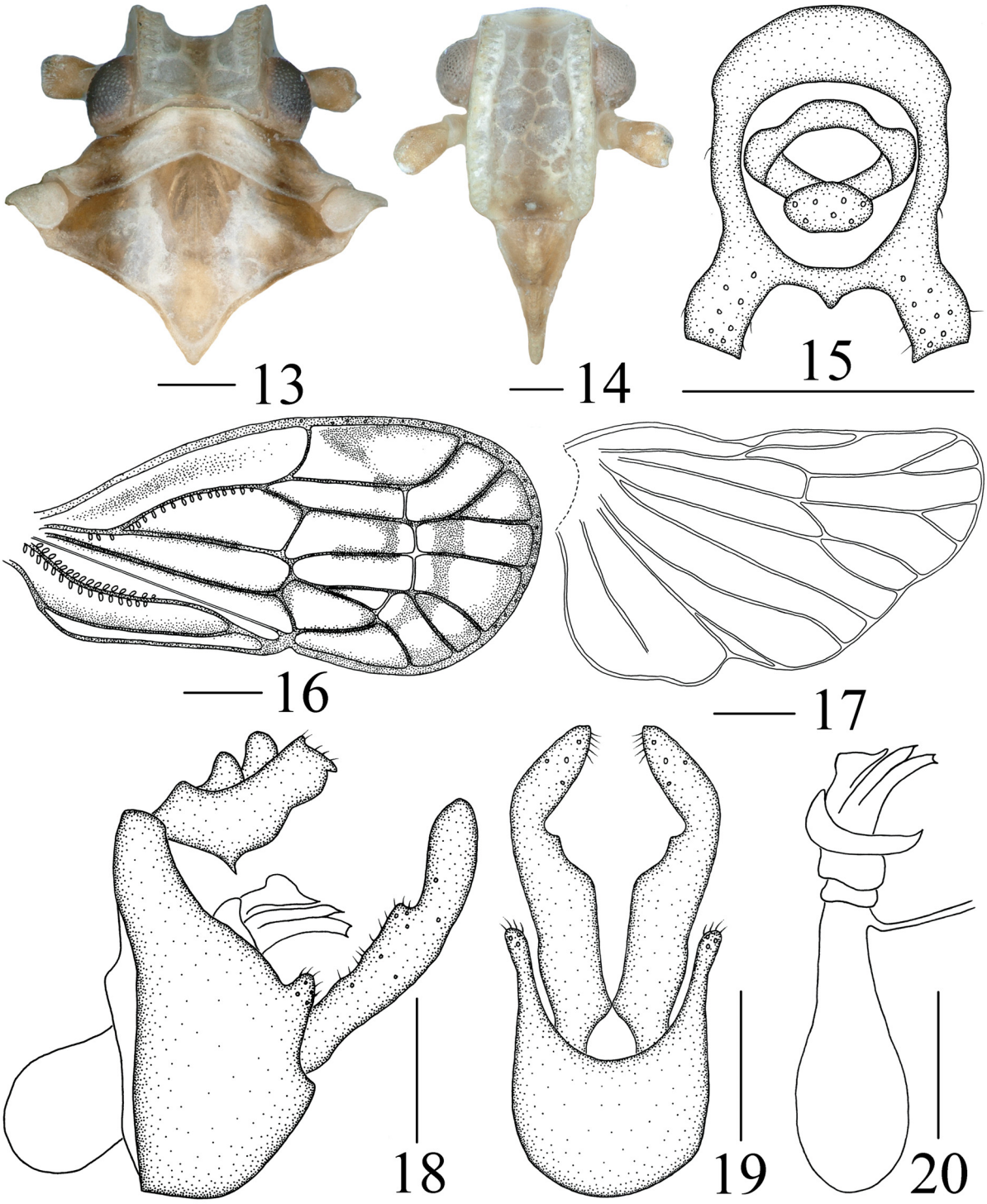
Male genitalia. Pygofer (Figs 18–19) in lateral view with dorsocaudal angle strongly produced; in caudoventral view, strongly concave medially, each side with finger-like process with hairs lateroapically, slightly curved outwardly. Anal tube stout (Figs 15, 18) in lateral view, ventral margin of anal tube waved, apex of ventral and dorsal margins each with dentate productions; in dorsal view, bifurcate; anal style short. Aedeagus (Figs 18, 20) trifurcate in lateral view, little shorter than anal tube, lower part of aedeagus slightly blunt, bifurcate at apex, upper one bends to form protrusion. Gonostyli (Figs 18–19) in lateral view, curved at middle, inner side concave medially producing angular production; in caudoventral view, two bumps near middle and third, respectively.

Distribution

China (Shandong) (Fig. 21).

Remarks

This species is similar to *E. matsumurai* Tsaur, Yang & Wilson, 1986, but differs from the latter in: (1) aedeagus trifurcate (aedeagus bifurcate in *E. matsumurai*); (2) gonostyli with two bumps near middle and third in caudoventral view (gonostyli with three bumps near middle in caudoventral view in *E. matsumurai*); (3) inner side of gonostyli medially producing an angular production (inner side of gonostyli concave medially without an angular production in *E. matsumurai*).



Figs 13–20. *Eponisiella shandongensis* sp. nov., ♂, holotype (IEGU). **13**. Head and thorax, dorsal view. **14**. Frons, ventral view. **15**. Anal tube, dorsal view. **16**. Tegmina. **17**. Wing. **18**. Pygofer, lateral view. **19**. Gonostyli and pygofer, caudoventral view. **20**. Aedeagus, left lateral view. Scale bars: 13–15, 18–20 = 0.2 mm; 16–17 = 0.5 mm.

Discussion

As for many planthoppers and particularly for the family Meenoplidae, host plants remain very poorly known. In *Eponisiella*, only *E. gramina* was noticed on *Miscanthus sacchariflorus* (Maxim.) Benth. & Hook.f. ex Franch. (Poales, Poaceae) (Hu & Yang 1993). No any other etho-ecological data are currently known for the genus.

The discovery of these two new species confirms the geographic distribution of the genus (Fig. 21) into the Sino-Japanese realm (*E. shandongensis* sp. nov.) where it appears to be the more diverse and in the Oriental one (*E. dafangensis* sp. nov.), this later fills the distribution gap with the isolated species *E. andonga* described from Korea. However, it also extends the distribution range of the genus to the north into the Palearctic realm (*E. guttulinervis*, *E. casta*). There is no doubt that the highly diverse natural conditions in China, particularly in the Oriental realm part, will bring new species of the genus to be described in the future.

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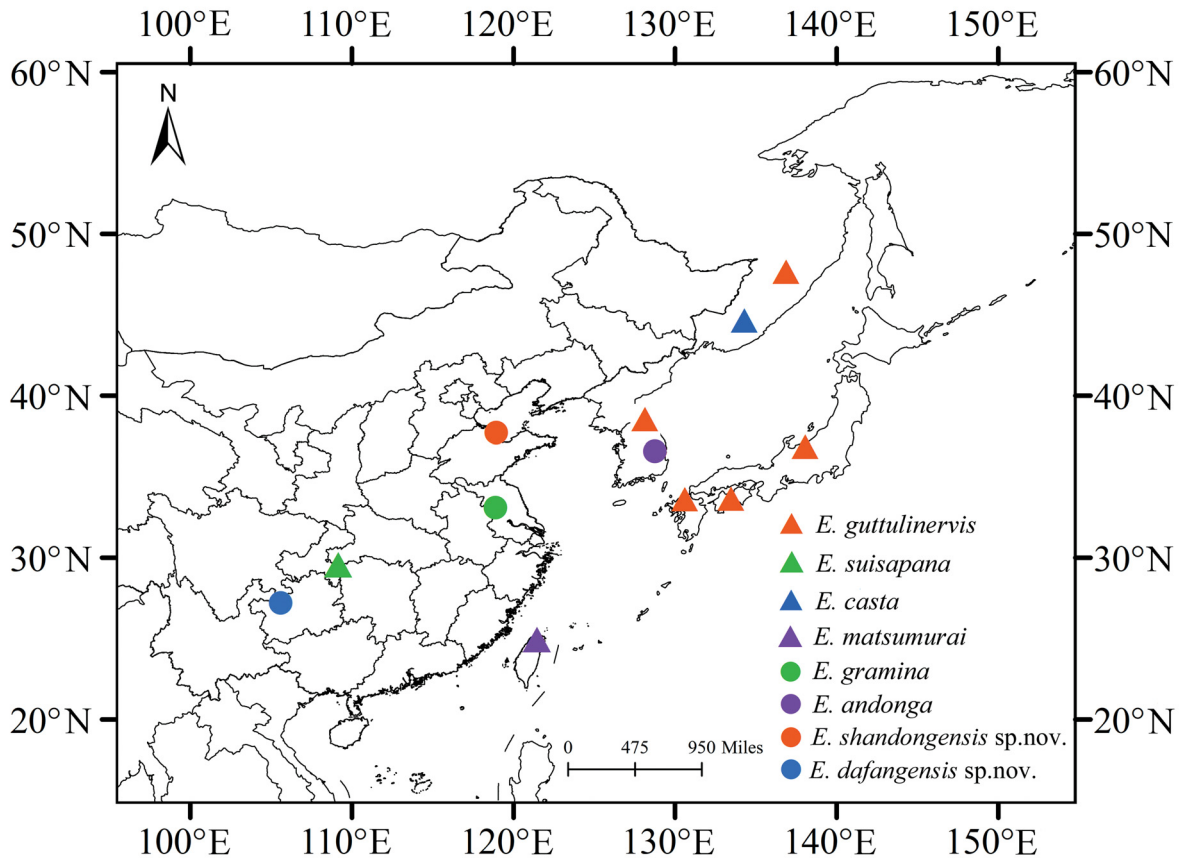

Fig 21. Geographic distribution of species of *Eponisiella* Emeljanov, 1984.

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