**Neotapirissus** gen. nov. of the tribe Issini (Hemiptera: Fulgoromorpha: Issidae) from Hainan Island

Rui MENG and Yinglun WANG

Key Laboratory of Plant Protection Resources and Pest Management of the Ministry of Education; Entomological Museum, Northwest A&F University, Yangling, Shaanxi, China

**Abstract**

*Neotapirissus* gen. nov., in the tribe Issini (Hemiptera: Fulgoromorpha: Issidae), is described from China, and type species *Neotapirissus reticularis* sp. nov. (China: Hainan) is described and illustrated. The female internal reproductive organs of the new species are also described and illustrated. The new genus is compared to the superficially similar genus *Tapirissus* Gnezdilov. The morphological diversity of the issids distributed in Hainan Island is discussed briefly.

**Key words:** female internal reproductive system, Fulgoroidea, morphology, new species, taxonomy.

**INTRODUCTION**

The family Issidae Spinola, 1839 is a worldwide distributed group, with diverse fauna in the Oriental Region represented by three tribes: Issini Spinola 1839, Hemisphaeriini Melichar, 1906 and Parahiraciini Cheng & Yang, 1991 (Gnezdilov 2013a). The tribes Hemisphaeriini and Parahiraciini are mostly restricted to the Oriental Region. The largest tribe, Issini, includes 136 genera with 727 species distributed worldwide (Gnezdilov 2013a; Chen et al. 2014; Bourgoin 2016) and is highly diverse in the Oriental region with at least 66 genera and 336 species (Gnezdilov 2013a,b, 2014, 2015; Gnezdilov et al. 2014, 2015).

In Hainan Island, all three issid tribes are represented: Hemisphaeriini with five genera and thirteen species (Che et al. 2003, 2006, 2007; Zhang et al. 2006; Meng & Wang 2012; Sun et al. 2012; Chen et al. 2014), Parahiraciini with three genera and three species (Wang & Wang 1999; Zhang et al. 2010; Chen et al. 2014; Meng et al. 2015) and Issini with three genera and four species (Ran & Liang 2006; Che et al. 2011; Chen et al. 2014; Gnezdilov et al. 2014; Meng & Wang 2016).

In the present paper, the new genus *Neotapirissus* is described from Hainan Island. It is placed in the tribe Issini.

**MATERIALS AND METHODS**

External morphology was observed under a light microscope (MZ125; Leica, Sloms, Germany). All measurements are given in millimeters (mm). Terminology used for the external morphology and the male genitalia follows Gnezdilov (2014) and female genitalia follows Bourgoin (1993). The genital segments of the examined specimens were dissected and macerated in hot 10% NaOH solution for about 1–2 min and subsequently transferred into glycerin. Photographs of the specimens were made using a light microscope (M205A; Leica) with a camera (DFC425; Leica). Images were produced using the software LAS v3.7 (Leica Application Suite). All specimens studied are deposited in the Entomological Museum of Northwest Agriculture and Forestry University (NWAFU), Yangling, China.

**TAXONOMY**

Family Issidae Spinola, 1839
Subfamily Issinae Spinola, 1839
Tribe Issini Spinola, 1839
**Neotapirissus gen. nov.**

*Type species. Neotapirissus reticularis* sp. nov.

**Diagnosis.** Head including eyes distinctly narrower than pronotum (Fig. 1). Coryphe nearly quadrangle, disc distinctly depressed, anterior and posterior margins strongly carinate, lateral margin foliately expanded, anterior margin convex, posterior margin angularly concave (Fig. 1). Metope narrow and elongate, lateral margins parallel, strongly foliately expanded, laterobasal angle strongly sharply protrudent; disc rugose with weak median carina, which runs from its upper margin to frontoclypeal suture (Figs 2,3). Frontoclypeal suture slightly curved downwards (Fig. 2). Eyes elliptical. Ocelli present. Clypeus expanded into a short nasale, roundly convex in lateral view, with distinct median carina (Figs 2,3). Rostrum long, reaching to metatrochanter. Pronotum slightly longer than coryphe, with two central pits, anterior margin distinctly convex and foliately expanded (Fig. 1); lateral lobes wide, ventral margin moderately oblique, with several small tubercules along outer margin (Fig. 2). Mesonotum more or less triangular, anterior margin concave, with three weak carinae and two rounded depressions near lateral margins (Fig. 1). Tegmina nearly elliptical, claval suture present, costal margin slightly convex at basal third, narrowly rounded apically (Fig. 3). Legs relatively long, fore and median femora foliately dilated; lateral margin of hind tibia with two lateral spines (Fig. 4). Hindwings single-lobed, longer than one-half length of tegmen, veins distinct and netlike (Fig. 5).

**Male terminalia.** Anal tube nearly triangular, widened to subapex. Anal column very short, 1/4 as long as anal tube, located beyond the middle of anal tube (Fig. 6). Pygofer with hind margin weakly convex after middle (Fig. 7). Suspensorium without processes. Dorsolateral phallobasal lobe widened near apex and twisted in lateral view. Aedeagus with a pair of ventral hooks at middle (Figs 8,9). Style with hind margin distinctly angularly excavated at middle, caudodorsal angle rounded (Fig. 7). Capitulum with pointed apex, and large lateral tooth (Fig. 7).

**Female terminalia.** Anal tube peach-shaped in dorsal view. Anal column very short, 1/3 as long as anal tube, located at basal half of anal tube (Fig. 13). Gonoplac nearly quadrangular, membranous near apex, apical margin roundly convex in lateral view, disc elevated near base in dorsal view, fork well pigmented in dorsal view (Figs 14,15). Gonapophyses IX with proximal part of posterior laminae distinctly convex (Fig. 12). Gonospiculum bridge moderately large, basal part almost as long as apical part (Fig. 12). Anterior connective laminae of gonapophysis VIII broad, in apical group with three teeth (Fig. 10). Gonocoxae VIII with hind margin concave (Fig. 10).

**Remarks.** This genus resembles *Tapirissus* Gnezdilov but differs from the latter in the following features: (i) lateral margins of coryphe and metope and apical margin of pronotum strongly foliately expanded (in *Tapirissus*, those margins are moderately keel-shaped); (ii) metope not enlarged above the clypeus, without small tubercles along the lateral margins and with weak median carina, which runs from its upper margin to frontoclypeal suture (in *Tapirissus*, the metope is enlarged above the clypeus, with rows of small tubercules along its lateral margins and with a weak median carina, which runs from its upper margin to its middle); (iii) ocelli present (in *Tapirissus*, ocelli are absent); (iv) fore and median femur foliately dilated and hind tibia with two lateral spines (in *Tapirissus*, fore and median femur are not dilated and the hind tibia has a single lateral spine); (v) suspensorium without processes, aedeagus with a pair of ventral hooks arising medially and directed to the base of phallobase (in *Tapirissus*, suspensorium with pair of narrow stick-shaped processes, aedeagus with pair of long and narrow ventral hooks, which arise basally and are directed to the apex of the phallobase).

**Etymology.** This generic name “Neotapirissus” refers to the strong resemblance to the genus *Tapirissus*. The genus is masculine in gender.

**Distribution.** China (Hainan).
Neotapirissus reticularis, sp. nov.

Description
Male length (n = 1) (including tegmen): 5.8 mm, length of tegmen: 4.8 mm; female length (n = 2) (including tegmen): 6.1–6.2 mm, length of tegmen: 5.1–5.2 mm.


Head and thorax. Coryphre 1.9 times wider at apex than length in midline (Fig. 1). Metope 2.8 times longer than widest part (Fig. 2). Pronotum 1.4 times longer than coryphre (Fig. 1). Mesonotum 2.7 times wider than long in middle line (Fig. 1). Hind wing well developed, 0.8 times length of tegmen, Sc + R forked near apex, M highly branched, CuA bifurcate near apex, CuP and Pcu simple, Pcu short, reaching middle of wing (Fig. 5). Metatibiotarsal formula 2 + 7/9/2.

Male terminalia. Anal tube with apical margin strongly triangularly convex at middle (Fig. 6). Lateral phallobasal lobe forming a wide subapical process directed outside, left side larger than right side, ventral lobe with apical margin obtusely convex, aedeagus with a pair of thick
hooks, the left one curved outside, the right one directed cephalad (Figs 8, 9).

Female terminalia. Proximal part of posterior connective lamina of gonapophyses IX rectangularly convex in lateral view, median field deeply concave at apex, lateral fields with a pair of short processes near apex in dorsal view (Figs 11, 12). Endogonocoxal process foliate, bifurcated at apex (Fig. 10); endogonocoxal lobe moderately long and weakly concave inwardly (Fig. 10). Anterior connective laminae of gonapophysis VIII with three apical obtuse teeth gradually decreasing from top to bottom and with four keeled teeth in lateral group (Fig. 10). Sternum VII with apical margin distinctly strongly convex at middle (Fig. 16).

Female internal reproductive system: Distysian. Bursa copulatrix well-developed with two pouches; first pouch smaller than second pouch, BC1 tubular; BC2 spheroidal. Vagina with posterior vagina and anterior vagina, posterior vagina relatively dumpy; anterior vagina thin and elongate, bearing anterior spermatheca and ventral common oviduct near apex. Common oviduct short and thin (not seen in figure). Spermatheca well developed, composed of five parts: orificium receptaculi weakly dilated; ductus receptaculi thin and elongate, distinctly orbicularily inflated at basal one-third; diverticulum ductus evidently saccate; pars intermediialis relatively thin with indistinct spiral fold; and glandula apicalis distinctly divided into two extremely thin ducts (mostly lost in dissection) (Fig. 17).


Etymology. The specific epithet is derived from the Latin word “reticularis”, referring to the reticulate nature of the tegmen venation.

DISCUSSION

Neotapirissus gen. nov. is very close to the genus Tapirissus Gnezdilov, 2014 described from Laos. The morphological characteristic of the metope and coryphe meeting at an obtuse angle is indicative of the tribe Parahiraciini, which usually has a frontal nasale, while the single-lobed hindwing with reticulate veins is similar to the tribe Hemisphaeriini. In consideration of the distinct veins and well-developed claval suture on the tegmen, Neotapirissus and Tapirissus belong to the tribe Issini.

This genus is also similar to Eusudasina Yang, 1994 and Euxaldar Fennah, 1978 by tegmina with reticulate venation. However, in contrast to these two close genera, Neotapirissus gen. nov. has lateral margins of coryphe and metope and apical margin of pronotum strongly foliately expanded, fore and median femora foliately dilated, froms elongate.

ACKNOWLEDGMENTS

We are sincerely grateful to Professor Murray J Fletcher (Orange Agricultural Institute, NSW Department of Primary Industry, New South Wales, Australia) for reading the manuscript. This study is supported by the National Natural Science Foundation of China (31372234, 30970388) and Fauna Sinica (2006FY120100) under the Ministry of Science and Technology of China.

REFERENCES


