Russian Entomol. J. 35(3): 336–342 © RUSSIAN ENTOMOLOGICAL JOURNAL, 2026

A new genus and new species of the tribe Parahiraciini Cheng et Yang (Hemiptera: Fulgoroidea: Issidae) from northern Thailand, with the comments on the genus *Tetricodissus* Wang, Bourgoin et Zhang, 2015

Новый род и новый вид трибы Parahiraciini Cheng et Yang (Hemiptera: Fulgoroidea: Issidae) из Северного Таиланда, с замечаниями о роде *Tetricodissus* Wang, Bourgoin et Zhang, 2015

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KEY WORDS: Issinae, new combination, new genus, new species, new synonymy, Oriental Realm, systematics.
КЛЮЧЕВЫЕ СЛОВА: Issinae, новая комбинация, новый род, новый вид, новый синоним, Ориентальное царство, систематика.

ABSTRACT. A new species representing a new genus of the tribe Parahiraciini Cheng et Yang, 1991 (Issinae), *Chalix hieronymi* **gen. et sp.n.**, is described from Chiang Mai Province of northern Thailand. *Flatiforma* Meng, Qin et Wang, 2020 (in Zhang *et al.*, 2020) and *Pusulissus* Bourgoin et Wang, 2020 are placed in synonymy under *Tetricodissus* Wang, Bourgoin et Zhang, 2015, with seven new combinations proposed: *Tetricodissus guizhouensis* (Meng, Qin et Wang, 2020), **comb.n.**, *T. menglaensis* (Che, Zhang et Wang, 2020), **comb.n.**, *T. ruiliensis* (Che, Zhang et Wang, 2020), **comb.n.**, *T. phiaoacensis* (Bourgoin et Wang, 2020), **comb.n.**, *T. coronomensis* (Bourgoin et Wang, 2020), **comb.n.**, *T. quangninhensis* (Constant et Pham, 2024), **comb.n.**, *T. bachmaensis* (Constant et Pham, 2024), **comb.n.**

РЕЗЮМЕ. Новый вид, представляющий собой новый род, трибы Parahiraciini Cheng et Yang, 1991 (Issinae), *Chalix hieronymi* **gen. et sp.n.**, описан из провинции Чиангмай на севере Таиланда. *Flatiforma* Meng, Qin et Wang, 2020 (in Zhang *et al.*, 2020) и *Pusulissus* Bourgoin et Wang, 2020 сведены в синонимы к *Tetricodissus* Wang, Bourgoin et Zhang, 2015 с предложенными семью новыми комбинациями: *Tetricodissus guizhouensis* (Meng, Qin et Wang, 2020), **comb.n.**, *T. menglaensis* (Che, Zhang et Wang, 2020), **comb.n.**, *T. ruiliensis* (Che, Zhang et Wang, 2020), **comb. n.**, *T. phiaoacensis* (Bourgoin et Wang, 2020), **comb.n.**, *T. coronomensis* (Bourgoin et Wang, 2020), **comb.n.**, *T. quangninhensis* (Constant et Pham, 2024), **comb.n.**, *T. bachmaensis* (Constant et Pham, 2024), **comb.n.**

Introduction

The tribe Parahiraciini Cheng et Yang, 1991 belongs to the subfamily Issinae Spinola, 1839 of the family Issidae Spinola, 1839 sensu Gnezdilov *et al.* [2020, 2022]. It was established as the monotypical tribe (originally subfamily) [Cheng, Yang, 1991] and after intensive studies since last 20 years it is comprising currently 30 genera, with more than 100 species divided between four subtribes — Parahiraciina Cheng et Yang, 1991, Scantiniina Borgoin et Wang, 2020, Vindilisina Borgoin et Wang, 2020, and Duroidina Gnezdilov, 2025 [Gnezdilov, Wilson, 2007; Borgoin, Wang, 2020; Dmitriev *et al.*, 2022 onward; Gnezdilov, 2025]. Most part of Parahiraciini taxa are known from the Oriental Realm, with majority of taxa described from China and Vietnam [Melichar, 1906; Chen *et al.*, 2014; Zhang *et al.*, 2020; Constant, Pham, 2024a, b]. A single genus of the subtribe Duroidina is recorded from the Neotropics, and the genus *Bolbossus* Gnezdilov et Bourgoin, 2016 of the subtribe Parahiraciina is known only from the Baltic amber [Gnezdilov, 2024, 2025; Gnezdilov, Bourgoin, 2016].

Parahiraciini of Thailand are still extremely barely known — just three species of two genera of the subtribe Parahiraciina are recorded to date from the country as follows: *Flavina quadrispina* Ran et Liang, 2006, *F. dayi* Constant, 2026, and *Fortunia viridis* (Lallemand,

How to cite this article: Gnezdilov V.M. 2026. A new genus and new species of the tribe Parahiraciini Cheng et Yang (Hemiptera: Fulgoroidea: Issidae) from northern Thailand, with the comments on the genus *Tetricodissus* Wang, Bourgoin et Zhang, 2015 // Russian Entomol. J. Vol.35. No.3. P.336–342. doi: 10.15298/rusentj.35.3.06

1942) [Gnezdilov *et al.*, 2004; Ran, Liang, 2006; Constant, 2026]. Here I describe a new monotypic genus from Chiang Mai Province of northern Thailand.

Recently within the subtribe Parahiraciina *Flatiforma* Meng, Qin et Wang, 2020 [in Zhang *et al.*, 2020] was placed in synonymy under *Pusulissus* Bourgoin et Wang, 2020 [Gnezdilov, 2022]. However my repeat analysis of the morphological characters of the type species of the genera *Flatiforma* and *Pusulissus* revealed their synonymy with the monotypical *Tetricodissus* Wang, Bourgoin et Zhang, 2015 which is suggested below with seven new combinations proposed.

Material and methods

Morphological terminology follows Anufriev & Emeljanov [1988] for head and wings, with the comments by Gnezdilov & Bartlett [2018] on wing venation and Gnezdilov *et al.* [2014] on male genitalia structure.

Photographs were taken using Canon 5D Mark IV digital camera equipped with Canon MP-E 65mm f/2.8 1–5× macro lens and Canon Macro Twin Lite MT-26EX-RT flash. Images were produced using Helicon Focus v. 7.6.4 and Adobe Photoshop software.

The type specimens of the species described below are deposited in the Moravian Museum, Brno, Czech Republic (MMB) and in the Zoological Institute of the Russian Academy of Sciences, Saint Petersburg, Russia (ZIN).

Taxonomy

Family Issidae Spinola, 1839
Subfamily Issinae Spinola, 1839
Tribe Parahiraciini Cheng et Yang, 1991
Subtribe Parahiraciina Cheng et Yang, 1991

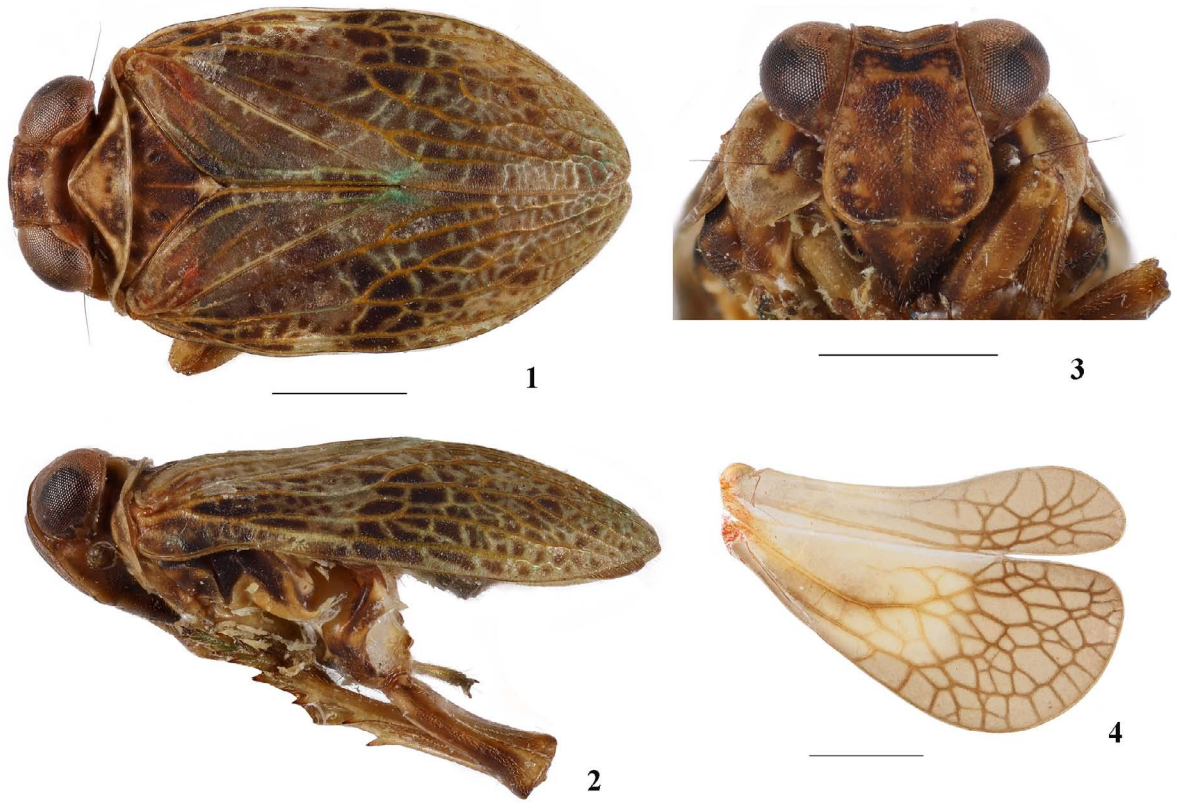
Genus *Tetricodissus* Wang, Bourgoin et Zhang, 2015

Tetricodissus Wang *et al.*, 2015: 79. Type species: *Tetricodissus pandlineus* Wang, Bourgoin et Zhang, 2015, by original designation and monotypy.

Pusulissus Bourgoin, Wang, 2020: 73, **syn.n.** Type species: *Pusulissus phiaoacensis* Bourgoin et Wang, 2020.

Flatiforma Meng, Qin et Wang, 2020 [in Zhang *et al.*, 2020: 353], **syn.n.** Type species: *Flatiforma guizhouensis* Meng, Qin et Wang, 2020 [in Zhang *et al.*, 2020].

DIAGNOSIS. Coryphe transverse. Metope with only median carina being distinct. Fore wings with simple CuA. Phallobase narrow in lateral view, ventral phallobase lobe long



Figs. 1–4. *Chalix hieronymi* **gen. et sp.n.**, habitus. 1 — holotype, dorsal view; 2 — same, lateral view; 3 — same, frontal view; 4 — male paratype, left hind wing. Scale bar — 1 mm.
Рис. 1–4. *Chalix hieronymi* **gen. et sp.n.**, габитус. 1 — голотип, вид сверху; 2 — то же, вид сбоку; 3 — то же, вид спереди; 4 — паратип, самец, левое заднее крыло. Масштаб — 1 мм.

and wide, with a peculiar spine-shaped process medially on its upper margin. Aedeagus with a pair of long ventral hooks, sometimes strongly curved, arising at its middle and directed downwards, apical aedeagal processes sharply narrowing apically. Style usually with wide neck of capitulum.

COMPOSITION AND DISTRIBUTION. Eight species known from China and Vietnam [Wang *et al.*, 2015; Bourgoin, Wang, 2020; Zhang *et al.*, 2020; Constant, Pham, 2024a, b].

Tetricodissus bachmaensis (Constant et Pham, 2024), **comb.n.**

Pusulissus bachmaensis Constant et Pham, 2024a: 54, figs 1, 2D, 32–35.

Tetricodissus coronomensis (Bourgoin et Wang, 2020), **comb.n.**

Pusulissus coronomensis Bourgoin et Wang, 2020: 80, figs 25–44.

Tetricodissus guizhouensis (Meng, Qin et Wang, 2020), **comb.n.**

Flatiforma guizhouensis Meng, Qin et Wang, 2020, fig. 140, pl. 27 a–c [in Zhang *et al.*, 2020: 354].
Pusulissus guizhouensis: Gnezdilov, 2022: 47.

Tetricodissus menglaensis (Che, Zhang et Wang, 2020), **comb.n.**

Flatiforma menglaensis Che, Zhang et Wang, 2020, fig. 141, pl. 27 d–f [in Zhang *et al.*, 2020: 355].
Pusulissus menglaensis: Gnezdilov, 2022: 48.

Tetricodissus phiaoacensis (Bourgoin et Wang, 2020), **comb.n.**

Pusulissus phiaoacensis Bourgoin et Wang, 2020: 76, figs 2–24.

Tetricodissus quangninhensis (Constant et Pham, 2024), **comb.n.**

Pusulissus quangninhensis Constant et Pham, 2024b: 52, figs 26, 27.

Tetricodissus ruiliensis (Che, Zhang et Wang, 2020), **comb.n.**

Flatiforma ruiliensis Che, Zhang et Wang, 2020, fig. 142, pl. 27 g–i [in Zhang *et al.*, 2020: 357].
Pusulissus ruiliensis: Gnezdilov, 2022: 48.

Genus *Chalix* **gen.n.**

Type species: *Chalix hieronymi* **sp.n.**, designated here.

DIAGNOSIS. Body with head in general view dorsally pebble like (Fig. 1). Coryphe slightly transverse (Fig. 5). Eyes large. Coryphe and metope fused at obtuse angle (in lateral view) (Fig. 2). Metope convex, visible from above, with transverse carina far below its upper margin and median carina running from transverse one, but not reaching metopoclypeal suture (Figs 3, 6). Fore wings elongate, gradually narrowing apically, without hypocostal plates and with CuA furcating; clavus half as long as whole wing, closed, with its apex not claw-shaped (Fig. 7). Hind wings bi-lobed, with remigial lobe twice narrower than remigio-vannal lobe, and rudimenatry anal lobe (Fig. 4). Legs not flattened neither foliated. Pygofer with strongly convex hind margins (Fig. 9). Phallobase completely covering aedeagus, deeply notched dorsally; each dorso-lateral phallobase lobe with spiny lateral processes and strongly convex ventral margin above the aedeagal hook (Figs 11, 13). Connective large, with elongate cup (Fig. 14). Style robust, with wide neck of capitulum (Fig. 15).

COMPOSITION AND DISTRIBUTION. Monotypic genus known from northern Thailand.

ETYMOLOGY. Generic name is derived from the Greek (χάλιξ) for pebble.

Chalix hieronymi **sp.n.**
Figs 1–16.

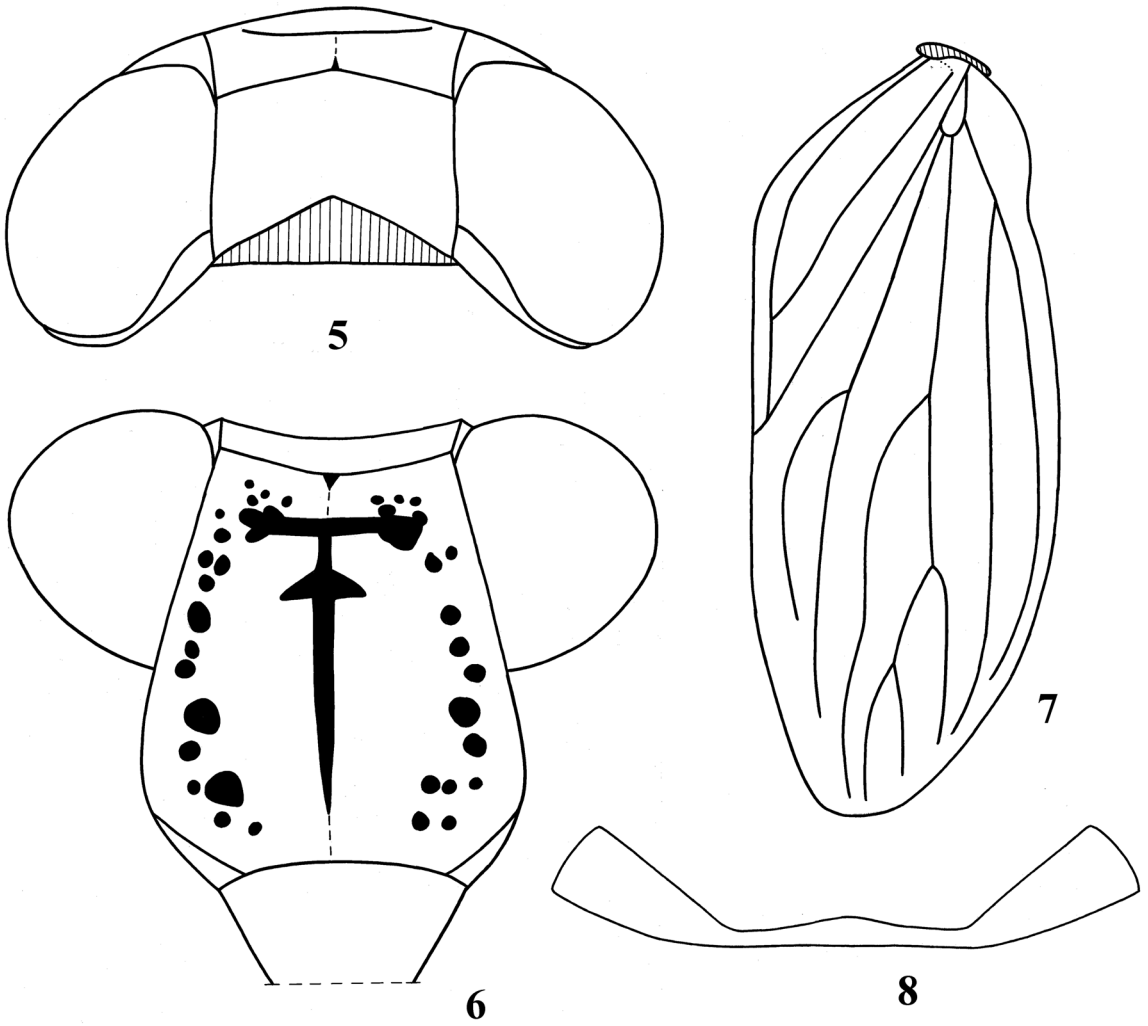
TYPE MATERIAL. Holotype, ♂: Thailand, Chiang Mai Province, 18°19`N 98°54`E, 1600 m, Doi Pui Mt., 2–6.V.1996, Vit. Kubåň leg. (MMB). Paratypes: 1 ♂: Thailand, Chiang Mai Province, 18°19`N 98°54`E, 1600 m, Doi Pui Mt., 2–6.V.1996, Vit. Kubåň leg. (ZIN); 1 ♀: Thailand, Chiang Mai Province, 18°19`N 98°54`E, 1600 m, Doi Pui Mt., 2–6.V.1996, Vit. Kubåň leg. (MMB).

DESCRIPTION. Oval in general view from above (Fig. 1). Coryphe slightly transverse, twice as wide as long medially, depressed, with keel-shaped margins; anterior margin obtusely angularly convex; posterior margin obtusely angularly concave (Figs 1, 5). Eyes large, each eye as wide as coryphe width. Coryphe and metope fused at obtuse angle (in lateral view) (Fig. 2). Metope convex, visible from above, with weakly concave upper margin (Figs 1, 6). Metope rather wide, enlarged below eyes, with transverse carina far below its upper margin and median carina running from transverse one, but not reaching metopoclypeal suture (Figs 3, 6). Metope with large pustules (traces of larval pits) laterally. Lateral margins of metope hanging over pedicels. Metopoclypeal suture weakly convex. Postclypeus large, flattened dorso-ventrally, without carinae. Rostrum stout, with 3rd segment slightly shorter than 2nd one, not narrowing apically, reaching hind coxae. Pedicels globular. Pronotum almost as long as coryphe medially, with keel-shaped margins, without carinae, angularly convex anterior margin and nearly straight posterior margin. Paradiscal fields of pronotum narrow behind eyes. Paranotal lobes of pronotum wide. Mesonotum slightly longer then pronotum medially, with median carina. Tegulae large. Fore wings elongate, gradually narrowing apically, without hypocostal plates, with distinctly convex basally costal margins (Figs 1, 2, 7). Basal cell narrow. Forewing vein branching sequence (Fig. 7): R 2, furcating basally; M 4, firstly furcating anterior to wing midpoint and its anterior branch (M_1) furcating twice apically; CuA 2, furcating anterior to wing midpoint, its posterior branch (CuA_2) far not reaching wing margin or fused with its anterior branch (CuA_1); rich transverse venation. Clavus half as long as whole wing, closed, with its apex not claw-shaped. Pcu and A_1 fused in apical third of clavus. Hind wings as long as fore wings, bi-lobed, with deep cubital cleft, remigial lobe twice narrower than remigio-vannal lobe, and rudimenatry anal lobe, main longitudinal veins multifurcate, with many transverse veins in between in its distal halves (Fig. 4). Legs not flattened neither foliated. Hind tibia with two lateral spines in its distal half and eight spines apically. First metatarsomere larger than second one, with two latero-apical and five intermediate spines arranged evenly. Arolium of pretarsus with a pair of short setae. Posterior margin of arolium convex, not surpassing claw apices (in dorsal view).

General coloration light brown to brown (Figs 1–4). Coryphe dark brown except light brown margins and midline.

Metope black below its upper margin and around median carina and dark brown to black laterally above clypeus. Postclypeus and pronotum dark brown laterally. Pedicels brown. Head dark brown laterally below antennae. Paranotal lobes of pronotum yellowish light brown, each with dark brown stripe behind pedicel. Mesonotum brown to dark brown, with pale median carina, upper angles, and scutellum. Episterna and epimera brown to dark brown or black. Fore wings with some black cells. Hind wings with dark brown veins. Femora and tibiae with longitudinal brown to dark brown stripes. Leg spines with black apices. Claws dark brown to black. Abdominal sternites IV–VII brown to dark brown in males. Abdominal sternites light yellow, except sternites IV–VI dark brown in its middle in female. Female gonoplcas and anal tube yellowish light brown.

Pygofer elongate vertically, with strongly convex hind margins (Fig. 9). Anal tube flat (in lateral view) and wide, rounded (in dorsal view) (Figs 9, 10). Anal column half as long as whole anal tube. Penis strongly curved, hourse-shoe shaped in lateral view (Fig. 11). Phallobase completely covering aedeagus, with a pair of small lobes latero-basally (Figs 11, 12, *lbl*) and with dorso-lateral lobes fused dorsally, with a deep notch (Fig. 13). Each dorso-lateral phallobase lobe with spiny subapical process and strongly convex ventral margin above the aedeagal hook (Fig. 11). Ventral phallobase lobe massive as long as dorso-lateral lobes, with a weak median notch (Fig. 12). Aedeagus with a pair of long and narrow, weakly curved, ventral hooks directed downwards and pointed apically (Fig. 11). Apical aedeagal processes long and wide, each with a large semicircular lobe projecting outside and nar-



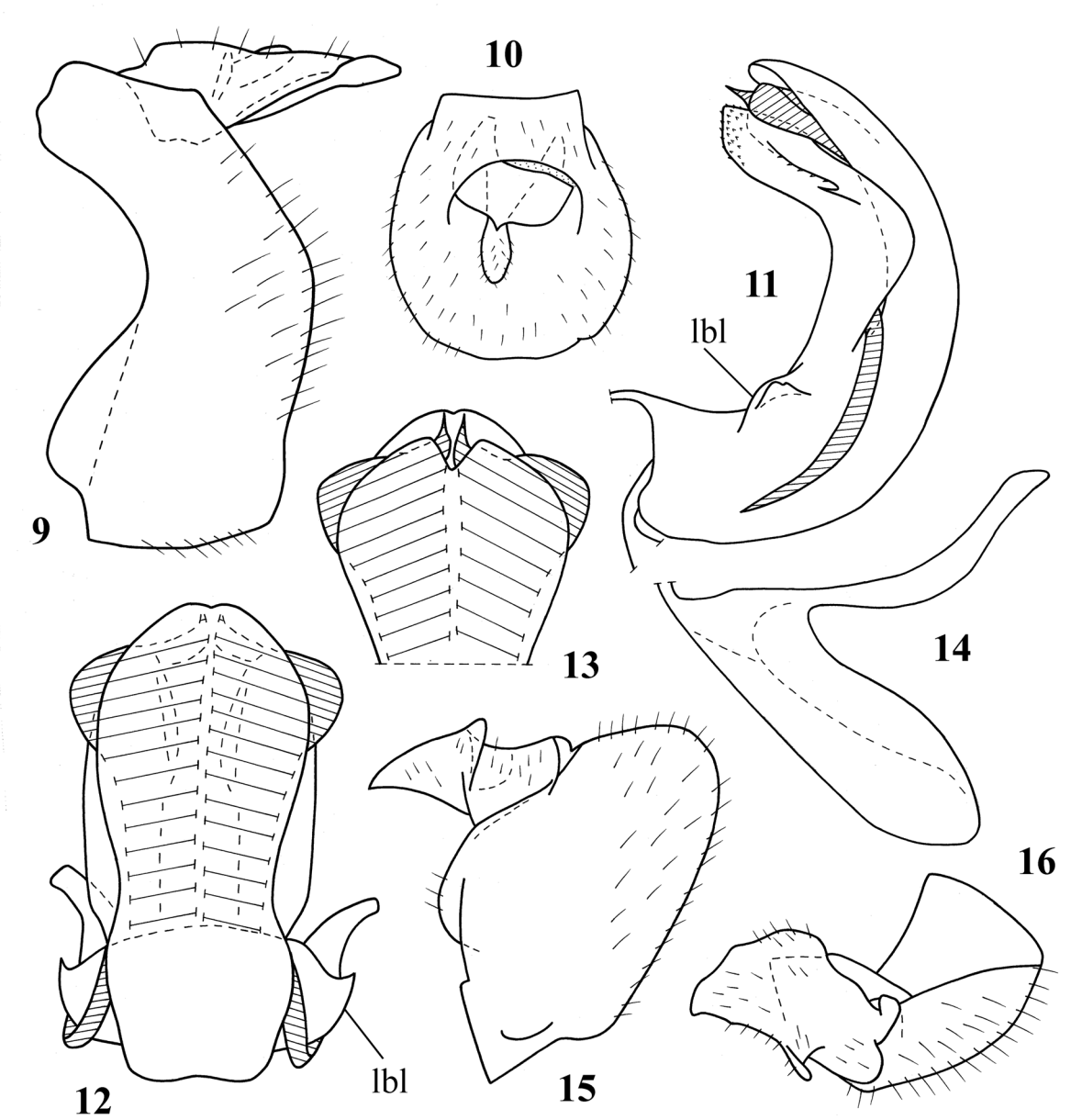
Figs 5–8. *Chalix hieronymi* **gen. et sp.n.**, habitus. 5 — holotype, head, dorsal view; 6 — same, frontal view; 7 — male paratype, left forewing; 8 — female paratype, sternite VII, ventral view. Not to scale.
Рис. 5–8. *Chalix hieronymi* **gen. et sp.n.**, габитус. 5 — голотип, голова, вид сверху; 6 — то же, вид спереди; 7 — паратип, самец, левое переднее крыло; 8 — паратип, самка, стернит VII, вид снизу. Без масштаба.

row pointed apex (Figs 11–13, shaded). Connective large, with elongate cup (Fig. 14). Style robust, with protruding margin below capitulum (Fig. 15). Capitulum on short wide neck, with a large lateral tooth, wide in dorsal view, narrowing to apical tooth (Figs 15, 16).

Hind margin of female sternite VII deeply concave (Fig. 8). Gonoplacs convex, short. Anal tube twice as long as wide medially, not narrowing apically, its lateral margins slightly turned downwards.

Total length. Males — 4.6–4.7 mm. Female — 5.3 mm.

ETYMOLOGY. The species name is derived from the name Jérôme (Hieronymus in Latin) in honour of well known Belgian entomologist, Mr. Jérôme Constant (Brussels, Belgium), who is actively investigating Oriental fauna of Issidae.



Figs. 9–16. *Chalix hieronymi* **gen. et sp.n.**, holotype, male genitalia. 9 — pygofer and anal tube, lateral view; 10 — anal tube, dorsal view; 11 — penis, lateral view (apical processes and ventral hooks of aedeagus are shaded); 12 — penis, ventral view; 13 — apex of penis, dorsal view; 14 — connective, lateral view; 15 — style, lateral view; 16 — style, dorsal view. Abbreviation: *lbl* — latero-basal lobe of phallobase. Not to scale.
Рис. 9–16. *Chalix hieronymi* **gen. et sp.n.**, голотип, гениталии самца. 9 — пигофор и анальная трубка, вид сбоку; 10 — анальная трубка, вид сверху; 11 — пенис, вид сбоку (апикальные отростки и вентральные крючки эдеагуса заштрихованы); 12 — пенис, вид снизу; 13 — вершина пениса, вид сверху; 14 — коннектив, вид сбоку; 15 — стилус, вид сбоку; 16 — стилус, вид сверху. Сокращение: *lbl* — латеробазальная лопасть фаллобазы. Без масштаба.

Discussion

The comparison of the type species of the genera *Tetricodissus* Wang, Bourgoin et Zhang, 2015, *Pusulissus* Bourgoin et Wang, 2020, and *Flatiforma* Meng, Qin et Wang, 2020 which are *Tetricodissus pandlineus* Wang, Bourgoin et Zhang, 2015, *Pusulissus phiaoacensis* Bourgoin et Wang, 2020, and *Flatiforma guizhouensis* Meng, Qin et Wang, 2020 [in Zhang *et al.*, 2020] revealed their close relationships based on the following morphological characters: fore wings with simple CuA; phallobase narrow in lateral view; ventral phallobase lobe long and wide, with a peculiar spine-shaped process medially on its upper margin; aedeagus with a pair of long ventral hooks, sometimes strongly curved, arising at its middle and directed downwards; apical aedeagal processes sharply narrowing apically; style usually with wide neck of capitulum [Wang *et al.*, 2015, figs 7, 11, 13, 14; Bourgoin, Wang, 2020, figs 10–14; Zhang *et al.*, 2020, figs 140–142]. This allowing treatment of *Pusulissus* and *Flatiforma* as junior synonyms of *Tetricodissus*. Thus taking into consideration the synonymy proposed above the genus *Tetricodissus* comprising eight species from China and Vietnam [Wang *et al.*, 2015; Bourgoin, Wang, 2020; Zhang *et al.*, 2020; Constant, Pham, 2024a, b].

By the structure of male genitalia (narrow phallobase in lateral view, with long and wide ventral lobe, aedeagus with a pair of long ventral hooks, and narrowing apically aedeagal processes) *Chalix* **gen.n.** is closely related to the genera *Tetricodissus* and *Cyclopissus* Constant et Pham, 2024, described from central Vietnam [Constant, Pham, 2024a]. However two last genera are characterized by simple CuA of fore wings. Habitually by the general shape of the body with a head in dorsal view (pebble like) and hind wings with remigial lobe twice narrower than remigio-vannal lobe *Chalix* **gen.n.** is more close to *Cyclopissus*, but clearly differs by metope without oculiform, and the style with short and wide neck. The last character brings *Chalix hieronymi* **gen. et sp.n.** close to the members of *Tetricodissus*. These three genera are closely related within the subtribe Parahiraciina Cheng et Yang and within this group *Ch. hieronymi* **gen. et sp.n.** is well distinguished by deeply notched dorsally phallobase and each dorso-lateral phallobase lobe with spiny lateral processes.

Apparently further studies of Indo-Malayan region and particularly Thailand will bring to our knowledge more taxa of the tribe Parahiraciini.

Acknowledgements. I am glad to thank Dr. Igor Malenovský (Brno, Czech Republic) for his kind permission to study the specimens and Dr. Vladimir Neimorovets (Saint Petersburg, Russia) for taking photos. My study was performed in the frameworks of the Russian State Research project No. 125012901042-9.

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