

Revisionary notes on some tropical Issidae and Nogodinidae (Hemiptera: Fulgoroidea)

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Abstract. Thioniini Melichar, 1906 is placed in synonymy with Issini Spinola, 1839. The genus *Thabena* Stål, 1866 (Issidae: Issini) is redescribed and *Gelastyra* Kirkaldy, 1904, *Gelastyrella* Yang, 1994, and *Borbonissus* Bonfils, Attié & Reynaud, 2001 are placed in synonymy with *Thabena*. *Issus literosus* Walker, 1857, *I. ovalis* Walker, 1857, *I. biplaga* Walker, 1851, *Gelastyra decipiens* Melichar, 1906, *G. latifrons* Melichar, 1906, *G. diversa* Melichar, 1906, *Gelastyrella hainanensis* Ran & Liang, 2006, *G. yunnanensis* Ran & Liang, 2006, and *Borbonissus brunnifrons* Bonfils, Attié & Reynaud, 2001 are transferred to the genus *Thabena*. *Euroxenus* gen. nov. is erected for *Borbonissus vayssieresii* Bonfils, Attié & Reynaud, 2001 (Issidae: Issini). *Nepalius* Dlabola, 1997 is placed in synonymy under *Eusarima* Yang, 1994 (Issidae: Issini). *Devagama insularis* Distant, 1913, *D. maculata* Distant, 1913 and *Atylana parmula thalna* Fennah, 1958 are synonymised with *Devagama fasciata* Distant, 1913, which is transferred to the genus *Atylana* Melichar, 1906 (Nogodinidae: Tongini). *Issella* Metcalf, 1952 and *Buehleria* Lallemand & Synave, 1953 are placed in synonymy under *Oryxana* Distant, 1910, *Sutteria* Lallemand & Synave, 1953 under *Tonga* Kirkaldy, 1900, *Okissus* Matsumura, 1916 and *Ecapelopterum* Chan & Yang, 1994 under *Lollius* Stål, 1866 (all Nogodinidae: Tongini), *Darumara* Metcalf, 1952 under *Gergithoides* Schumacher, 1915, *Daruma nitobei* Matsumura, 1916 under *Gergithoides carinatifrons* Schumacher, 1915 (all Issidae: Hemisphaeriini), and *Dolia* Kirkaldy, 1907 under *Flavina* Stål, 1861 (Issidae: Parahiraciini). New data on the distribution of some species are provided.

Key words. Issini, Hemisphaeriini, Parahiraciini, Tongini, taxonomy, new synonyms, new combinations, Afrotropical Region, Australasian Region, Oriental Region

Introduction

Planthoppers of the families Issidae and Nogodinidae are distributed worldwide. Many species are flightless and the overall morphological similarities of the two groups render their separation and diagnosis difficult. The revision of Issidae *sensu lato* was started by FENNAH (1978, 1982), who transferred some genera to the families Nogodinidae and Tropicuchidae. According to EMELJANOV (1999) and GNEZDILOV (2003a,b), Issidae *s. l.* should be treated as three distinct families – Issidae *sensu stricto*, Caliscelidae and Acanaloniidae. The taxonomic system of Issidae, Tropicuchidae, Nogodinidae, Caliscelidae and Acanaloniidae is not stable yet, mostly due to the absence of well-defined apomorphies for these taxa (GNEZDILOV 2008). Recently, the tribe Tongini, previously treated as Issidae by FENNAH (1954) and as Acanaloniidae by EMELJANOV (1999), has been transferred to the Nogodinidae based on the structure of male and female genitalia (GNEZDILOV 2007). The genitalic characters seem to be more useful than external morphological features, which seem to be more homoplastic, for the identification of relationships between these groups. However, much work on morphological and molecular analyses is still needed for a detailed phylogenetic analysis of this assemblage of planthoppers.

During a study of type specimens and unidentified accessions in the European Museums listed below, I have discovered several generic and species synonyms in the Issidae and Nogodinidae from the Afrotropical, Oriental, and Australasian Regions. They are discussed in this paper.

Material and methods

The morphological terminology follows EMELJANOV (1995) for the head and body, GNEZDILOV (2003b) for the male genitalia, and BOURGOIN (1993) and GNEZDILOV (2002) for the female genitalia.

The genital segments of examined specimens were macerated in 10% KOH and figured in glycerine jelly using a compound light microscope. Photographs of the specimens were made using a Leica MZ8 stereomicroscope with a JVC KY F70B video camera, and the Synoptics Automontage software.

The material examined is deposited in the following collections:

- BMNH Natural History Museum, London, United Kingdom;
- HNHM Hungarian Natural History Museum, Budapest, Hungary;
- IRSNB Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium;
- MMBC Moravian Museum, Brno, Czech Republic;
- MNHN Muséum National d'Histoire Naturelle, Paris, France;
- MSNG Museo Civico di Storia Naturale, Genova, Italy;
- NHMB Naturhistorisches Museum, Basel, Switzerland;
- NMWC National Museum of Wales, Cardiff, United Kingdom;
- ZIN Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia;
- ZMAN Universiteit van Amsterdam, Zoölogisch Museum, Amsterdam, The Netherlands;
- ZMHB Institut für Systematische Zoologie, Museum für Naturkunde, Humboldt-Universität, Berlin, Germany.

Taxonomy

Family Issidae Spinola, 1839

Currently, the family Issidae comprises one subfamily with five tribes (GNEZDILOV 2003a). The traditional classification of the family is based mostly on the characters of fore and hind wings and in particular on the development or reduction of hind wings. However, the state of reduction seems to vary within genera and the reduction is likely to have evolved independently several times in different taxa of the Issidae (GNEZDILOV, in prep.). For these reasons, I consider the presence of the trilobed hind wing as an insufficient character for the definition of a separate tribe Thioniini (MELICHAR 1906, GNEZDILOV 2003a) and place *Thabena* Stål, 1866 and *Euroxenus* gen. nov. in the tribe Issini. I suggest treating Thioniini Melichar, 1906 as a junior synonym of Issini Spinola, 1839.

Subfamily Issinae Spinola, 1839

Tribe Issini Spinola, 1839

Issini Spinola, 1839: 204. Type genus: *Issus* Fabricius, 1803.

Thioniini Melichar, 1906: 3 (as Thioniinae), **syn. nov.** Type genus: *Thionia* Stål, 1859.

Genus *Thabena* Stål, 1866

Thabena Stål, 1866a: 208. Type species: *Issus retractus* Walker, 1857, by subsequent designation (STÅL 1866b: 393).

Cibyra Stål, 1861: 209 (preoccupied). Type species: *Issus testudinarius* Stål, 1854 (= *Issus spectans* Walker, 1858), by original designation.

Gelastyra Kirkaldy, 1904: 280, **syn. nov.** New name for *Cibyra* Stål, 1861.

Gelastyrella Yang, 1994 in CHAN & YANG (1994): 90, **syn. nov.** Type species: *Gelastyrella litaensis* Yang, 1994 in CHAN & YANG (1994), by original designation.

Borbonissus Bonfils, Attié & Reynaud, 2001: 217, **syn. nov.** Type species: *Borbonissus brunnifrons* Bonfils, Attié & Reynaud, 2001, by original designation.

Redescription. Body wide in dorsal view (Fig. 1). Metope wide, weakly enlarged towards clypeus, with median keel crossed by transverse keel below upper margin (Fig. 3). Coryphe transverse, with keeled margins, anterior margin convex or obtusely angulate, posterior margin concave (Fig. 4). Pronotum and scutellum without keels. Fore wings narrowing apically, without hypocostal plate, clavus with cuspidal caudo-dorsal angle (Fig. 2). Radius bifurcate, median tri- or tetrafurcate, cubitus anterior simple or bifurcate (vein formula R 2 M 3–4 CuA 1–2). Hind wings almost equal in length to fore wings, bilobed, with well-developed remigium and vannus, separated by deep cleft, with many transverse veins, costal margin concave, anal lobe of vannus rudimentary. Hind tibia with two lateral spines distally. First metatarsomere apically with 8–33 intermediate spines arranged in several rows. Female sternum VII with large median process on posterior margin.

Differential diagnosis. *Thabena* is distinguished within the Issini by the combination of the following characters: metope wide with median keel crossed by transverse keel inferior to its upper margin; clavus of fore wing with cuspidal caudo-dorsal angle; hind wing bilobed with well-developed remigium and vannus, separated by deep cleft, with many transverse veins, and rudimentary anal lobe of vannus.

Comments. Examination of the type species of the genera *Thabena* Stål, 1866 and *Gelastyra* Kirkaldy, 1904 has revealed that both species are congeneric. The genus *Gelastyrella* erected by Yang (in CHAN & YANG 1994) differs from *Thabena* Stål (= *Gelastyra* Kirkaldy) in the large number of intermediate spines on the first metatarsomere, but other external morphological features, such as the shape of and keels on the metope, the shape and venation of fore and hind wings, and the structure of male genitalia, suggest that *Gelastyrella* species can be accommodated under *Thabena* as well. However, *Issus patulus* Walker, 1857 (= *Issus sobrinus* Walker, 1857), which has been treated as belonging to *Thabena* (METCALF 1958, LIANG 2001), differs from other *Thabena* species in having a narrow metope, elongate coryphe, trilobed hind wings (with well-developed anal lobe of vannus) and different structure of the male genitalia, and should be included in a distinct genus (GNEZDILOV, in prep.).

The genus *Borbonissus* Bonfils, Attié & Reynaud, 2001, erected for two species from Réunion Island (BONFILS et al. 2001), is a polyphyletic group. The type species of the genus, *Borbonissus brunnifrons* Bonfils, Attié & Reynaud, 2001, belongs to *Thabena* based on the characters listed in the generic diagnosis above. The other species, *Borbonissus vayssièresi* Bonfils, Attié & Reynaud, 2001, is not related to *B. brunnifrons* and should be included in a separate genus, *Euroxenus* gen. nov., which is probably closely related to the Oriental *Eusarima* Yang, 1994 in CHAN & YANG (1994).

Thabena thus now includes 13 species distributed in continental China, Indonesia, Malaysia, Philippines, Singapore, Taiwan, Thailand and Réunion Island. The centre of speciation and apparently the centre of origin of this genus are probably situated in Southeastern Asia, where nine species are distributed. *Thabena brunnifrons* (Bonfils, Attié & Reynaud, 2001), comb. nov., is the only species of *Thabena* known from outside the Oriental Region. Besides Réunion Island, it is newly recorded here also from Singapore.

Thabena retracta (Walker, 1857)

(Figs. 1–4, 16–24)

Issus retractus Walker, 1857: 152.

Thabena retracta: STÅL (1866b): 393.

Type material examined. HOLOTYPE: ♂, Borneo (BMNH).

Additional material examined. MALAYSIA: SARAWAK: Kalulong Mt., 1800 ft, new forest, 4.xi.1932, 1 ♀, B. M. Hobby & A. W. Moore lgt., Oxford University Exp. (BMNH); Dulit Mt., 1 ♂, E. Mjorberg lgt. (BMNH); foot of Dulit Mt., junction of rivers, primaeval forest, 16.viii.1932, 1 ♀, Tinjar & Lejok lgt., B. M. Hobby & A. W. Moore lgt., Oxford University Exp. (BMNH). SABAH: Samawang, near Sandakan, jungle, 14.vii.1927, 1 ♀ (BMNH); Bukit Monkobo, 51°48' N 116°58' E, base-camp, stunted hill forest, 900 m a.s.l., 7.viii.1987, light trap, 1 ♂, A. H. Kirk-Spriggs lgt., NMW Sabah Expedition (NMWC). SINGAPORE: 1 ♀, H. N. Ridley lgt. (BMNH).

Supplementary description (Figs. 1–4). Median keel of metope not reaching its upper margin. Postclypeus with median groove. Coryphe 2.3 times as wide as long, with short median keel from its posterior margin, anterior margin weakly convex. Fore wings with median trifurcate and cubitus anterior simple (vein formula M 3 CuA 1). First metatarsomere with 8–10 intermediate spines arranged in two rows.

Male genitalia (Figs. 16–24). Hind margin of pygofer with basal incision in lateral view (Fig. 24) and, in caudal view, with a pair of large triangular processes with apices directed

inwards (Fig. 23). Anal tube in dorsal view narrow basally and very wide medially, weakly narrowing to truncate apex; lateral margins turned down (Figs. 21–22). Anal column short. Phallobase strongly curved in lateral view (Fig. 16), with pair of bulges proximally (Fig. 17). Each dorso-lateral lobe of phallobase with proximal concavity on ventral margin and a pair of distal processes in lateral view; apical process narrow, long, with denticles on lower margin, weakly sclerotised and covering phallosome, subapical process short, well sclerotized with denticles on upper margin (Figs. 16, 18). Ventral lobe of phallobase long and wide, weakly enlarged towards widely concave apex (Fig. 17). Aedeagus with pair of long ventral hooks (half as long as aedeagus) narrowing apically and bearing denticles on external margins. Apical processes of aedeagus enlarged apically in lateral view. Posterior margin of style straight or convex (Fig. 19). Capitulum of style situated on long neck, hastate in dorsal view (Fig. 20); lateral tooth shaped as wide lobe, apical tooth distinct.

Female genitalia. Posterior margin of sternum VII with large rectangular process medially. Gonoplares rounded, without keels. Furca weakly sclerotized, with long basal part. Anal tube wide, truncate apically. Anal column short. Each distal part of posterior connective lamina of gonapophyses IX straight, with apical lobe-shaped process. Median field of lamina shaped as single lobe bearing pair of lateral triangular processes. Each lateral field of lamina with long bifurcated process. Gonocoxa VIII with high lobe-shaped posterior margin proximally. Endogonocoxal process bifurcated apically. Anterior connective lamina of gonapophysis VIII with three teeth in apical group and two large teeth in lateral group.

Comments. The male specimen from Sabah differs from the specimen from Sarawak in having a tooth-shaped median process on the posterior margin of pygofer (absent in the specimen from Sarawak) and a convex posterior margin of style (straight in the specimen from Sarawak). I treat these differences as intraspecific variability.

Thabena biplaga (Walker, 1851) comb. nov.

Issus biplaga Walker, 1851: 367.

Gelastyrus biplaga: FENNAH (1956): 511.

Type material examined. HOLOTYPE: ♀, Hong Kong (BMNH).

Supplementary description. Coryphe with anterior margin strongly convex. First metatarsomere with eight intermediate spines. Female sternum VII with large median oval process.

Thabena brunnifrons (Bonfils, Attié & Reynaud, 2001) comb. nov.

Borbonissus brunnifrons Bonfils, Attié & Reynaud, 2001: 218.

Type material examined. PARATYPES: ♂ ♀, Réunion, la Saline, embouchure de la ravine des Trois-Bassins, 7.ix.1988, sur *Dictostachys cinerea*, B. Reynaud lgt. (RR 203) (MNHN).

Additional material examined. SINGAPORE: Sungei Buloh, swamp forest, 27.vii.2005, Malaise trap, 2 ♂♂ 1 ♀ (IRSNB, ZIN); same data but mangrove, 5.viii.2005, 1 ♂ 1 ♀ (IRSNB; ZIN); same data but mangrove, 19.viii.2005, 1 ♀ (IRSNB); same data but mangrove, Malaise trap, 28.ix.2006, 1 ♂ (IRSNB), all P. Grootaert lgt.; Bukit Timah, Malaise trap, 16.ix.2005, 1 ♀, P. Grootaert lgt. (IRSNB).

Comments. The identification of the specimens from Singapore is based on the examination of male genitalia and comparison with the male paratype.

***Thabena decipiens* (Melichar, 1906) comb. nov.**

Gelastyra decipiens Melichar, 1906: 264.

Type material examined. HOLOTYPE: Malacca, Perak (examined from images only) (HNHM).

***Thabena diversa* (Melichar, 1906) comb. nov.**

Gelastyra diversa Melichar, 1906: 263.

Type material examined. HOLOTYPE: ♀, Tenasserim, Thagata, Fea, April 1887 (examined from images only) (MSNG).

***Thabena hainanensis* (Ran & Liang, 2006) comb. nov.**

Gelastyrella hainanensis Ran & Liang, 2006: 65.

***Thabena latifrons* (Melichar, 1906) comb. nov.**

Gelastyra latifrons Melichar, 1906: 264.

Type material examined. SYNTYPES (2 spec.): Minhla, Birmania, 1883, D. Comotto lgt.; Mentawai, Sipora, Sereinu, v.–vi.94, Modigliani lgt. (sexes unknown, examined from images only) (MSNG).

***Thabena litaensis* (Yang, 1994) comb. nov.**

Gelastyrella litaensis Yang, 1994 in CHAN & YANG (1994): 90.

Material examined. TAIWAN: Kaohsiung, Nanfengshan, 17.vi.1989, 1 ♂, Y. F. Hsu lgt. (BMNH); Shanping Forest Research Station, 9 km SE Liouquei, 700 m a.s.l., 23.vi.2004, 1 ♂; Shanping Forest Research Station, Ajiyong Road ca. 6 km, 1200 m a.s.l., 24.vi.2004, 1 ♂ 6 ♀♀; Taichung, Cu Kuang Tai Dian Road ca. 1 km S Rt. 8, 1000 m a.s.l., 26.vi.2004, 1 ♀; all D. A. Dmitriev lgt. (ZIN).

Comments. *Thabena litaensis* can be distinguished from its relatives by the median keel of metope reaching its upper margin and crossing the transverse keel, and by the large number of intermediate spines arranged in three rows on the first metatarsomere.

***Thabena literosa* (Walker, 1857) comb. nov.**

Issus literosus Walker, 1857: 154.

Tetrica literosa: METCALF (1958): 469.

Type material examined. HOLOTYPE: ♀, Sarawak (BMNH).

Supplementary description. Coryphe with anterior margin obtusely angulate. Fore wings with median tetrafurcate and cubitus anterior bifurcate (vein formula M 4 CuA 2).

Coloration. General coloration light brown, with brown spots on fore wings. Upper angles of metope dark brown. Hind wings light brown.

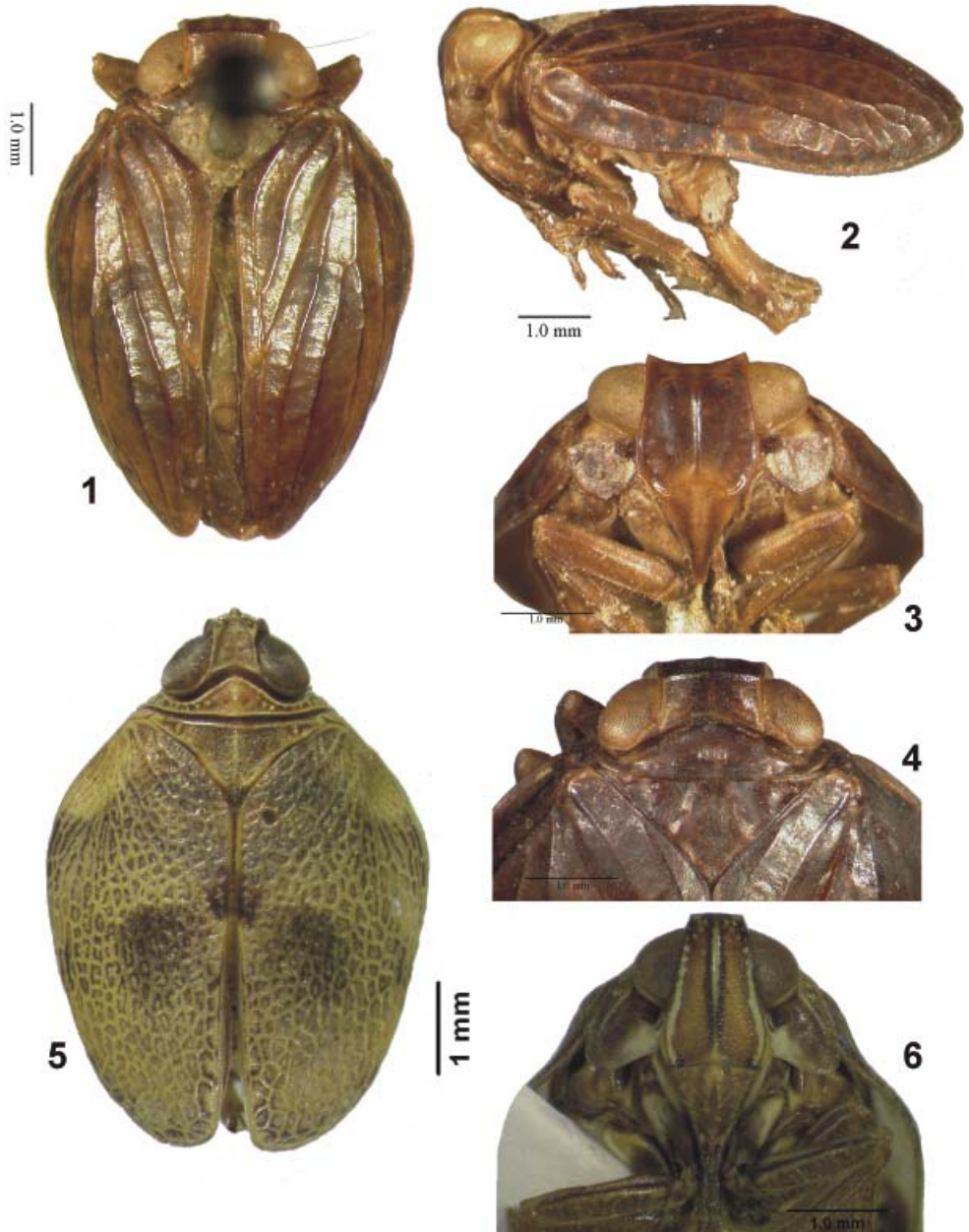
Comments. WALKER (1857) mentioned a male in the original description but a female is labelled as the only type specimen in BMNH.

***Thabena ovalis* (Walker, 1857) comb. nov.**

Issus ovalis Walker, 1857: 154.

Tetrica ovalis: METCALF (1958): 470.

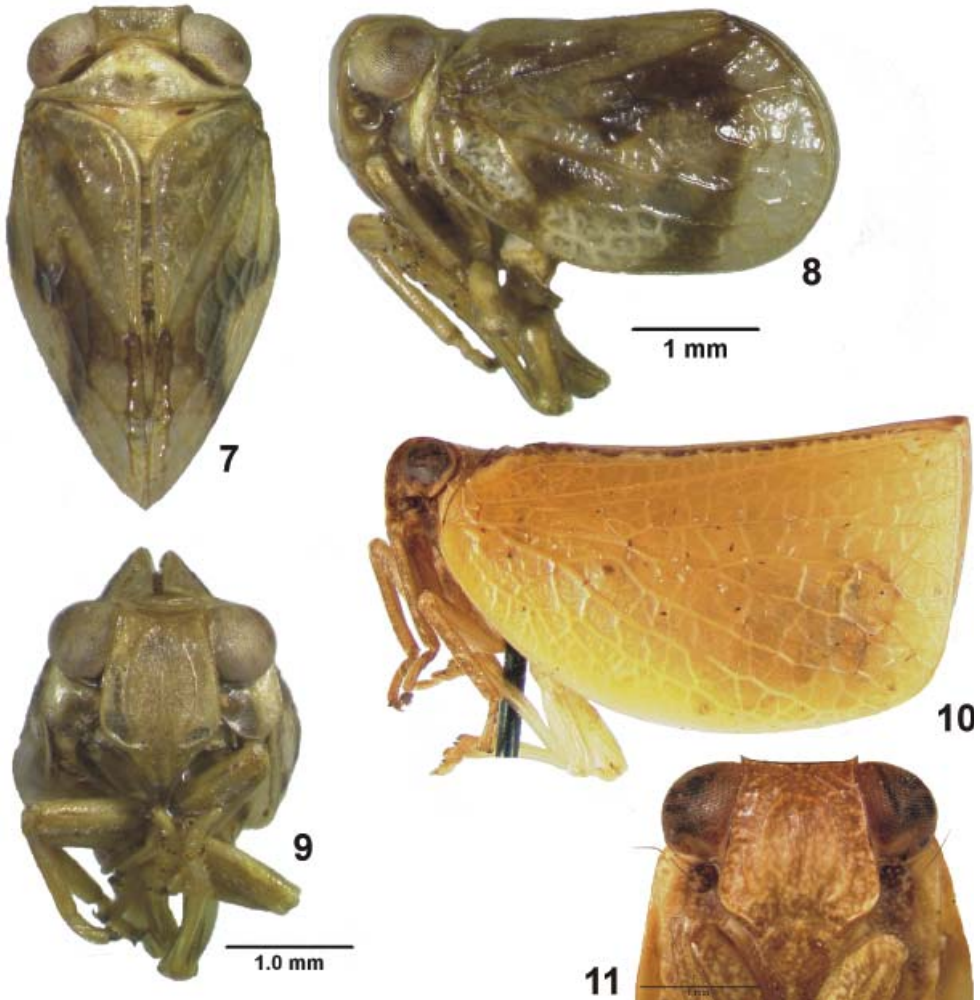
Type material examined. HOLOTYPE: ♀, Sarawak (BMNH).



Figs. 1–6. 1–4 – *Thabena retracta* (Walker, 1857), specimens from Sarawak: 1 – ♂, holotype, dorsal view; 2 – same, lateral view; 3 – same, face; 4 – ♀, head, dorsal view. 5–6 – *Gergithoides carinatifrons* Schumacher, 1915, specimens from Taiwan: 5 – ♂, dorsal view; 6 – ♀, frontal view.

Additional material examined. MALAYSIA: SABAH: Kawang, 24.i.[19]59, on *Cocoa*, 1 ♂ 1 ♀ (BMNH); 4.xii.1984, on cocoa leaves, 1 ♀, C. H. Sim lgt. (BMNH); Bukit Monkobo, 51°48' N 116°58' E, stunted hill forest, 1200 m, 9.–17.viii.1987, Malaise trap, 1 ♂, A. H. Kirk-Spriggs lgt., NMW Sabah Expedition (NMWC).

Supplementary description. Metope convex, visible from above. Anterior margin of coryphe weakly convex. Fore wings with median trifurcate and cubitus anterior simple (vein formula M 3 CuA 1). First metatarsomere with five intermediate spines. Female sternum VII with large median oval process bearing deep apical incision.



Figs. 7–11. 7–9 – *Atylana fasciata* (Distant, 1913), specimen from Henderson Island: 7 – ♂, dorsal view; 8 – same, lateral view; 9 – same, frontal view. 10–11 – *Oryxana rabana* (Lallemand & Synave, 1953): 10 – ♀, paratype, lateral view; 11 – same, frontal view.

Coloration. General coloration brown yellowish, fore wings of some specimens with green veins. Hind wings dark brown. Hind legs with spines black apically.

Comments. WALKER (1857) mentioned a male in the original description but a female is labelled as the only type specimen in BMNH.

***Thabena testudinaria* (Stål, 1854) comb. nov.**

Issus testudinarius Stål, 1854: 246.

Gelastyra testudinaria: METCALF (1958): 430.

Type material examined. HOLOTYPE: ♀, Java (BMNH).

Additional material examined. INDONESIA: JAVA: Depok, 18.xii.1949, 1 ♂ 1 ♀ and 27.xi.1947, 1 ♀, all C. van Nidek lgt. (ZMAN).

Supplementary description. Female sternum VII with large rectangular process, apex convex.

***Thabena yunnanensis* (Ran & Liang, 2006) comb. nov.**

Gelastyrella yunnanensis Ran & Liang, 2006: 67.

Genus *Euroxenus* gen. nov.

Type species. *Borbonissus vayssièresi* Bonfils, Attié & Reynaud, 2001, here designated.

Description. Metope relatively wide, enlarged towards clypeus, with distinct median and sublateral keels joining at its upper margin. Coryphe nearly quadrate, anterior margin obtusely angulate. Pronotum with median keel. Scutellum with median and lateral keels. Fore wings relatively short, with long clavus nearly reaching wing apex, without hypocostal plate. Radius, median and cubitus anterior bifurcate (vein formula R 2, M 2 and CuA 2), with many transverse veins. Hind wings with well-developed vannus and anal lobe. Radius (R_1 very short) and postcubitus bifurcate, median, cubitus posterior and anal veins simple, cubitus anterior trifurcate (CuA_1 and CuA_2 short); vein formula R 2, M 1, CuA 3, CuP 1, Pcu 2, A_1 1 and A_2 1. Radius, median, and cubitus anterior connected by transverse veins. Cubitus anterior (CuA_3) and cubitus posterior fused, not thickened. Hind tibia with two lateral spines. First metatarsomere with apically arched row of 9–13 intermediate spines.

Each dorso-lateral lobe of phallobase with bifurcate subapical process with long lower branch directed basally and shorter upper branch directed apically. Aedeagus with pair of ventral hooks. Style with weakly concave posterior margin. Capitulum of style, in dorsal view, elongate, not narrowing apically, with wide lateral tooth.

Female sternum VII with posterior margin convex medially.

Differential diagnosis. *Euroxenus* gen. nov. is closely related to *Eusarima* Yang, 1994 in CHAN & YANG (1994) based on the completely developed median and sublateral keels of metope and the presence of an elongate apical process on each dorso-lateral lobe of phallobase. *Euroxenus* differs from *Eusarima* in the shorter fore wings with bifurcate median vein (tri- or tetrafurcate in *Eusarima*) and in the bifurcate apical processes of the phallobase (simple in *Eusarima*) (CHAN & YANG 1994: Figs. 45–72).

Etymology. Derived from the combination of Greek ‘εὐρος’, eastern wind, and ‘ζένοσ’, guest; ‘*Euroxenus*’ = eastern guest. Gender masculine.

***Euroxenus vayssieresi* (Bonfils, Attié & Reynaud, 2001) comb. nov.**

Borbonissus vayssieresi Bonfils, Attié & Reynaud, 2001: 220.

Material examined. RÉUNION: La Possession, La Grande-Chaloupe, 25.iv.1999, sweeping, 1 ♂ 1 ♀, J.-F. Vayssières lgt., RVA 1184 (MNHN).

Genus *Eusarima* Yang, 1994

Eusarima Yang, 1994 in CHAN & YANG (1994): 108. Type species: *Eusarima contorta* Yang, 1994 in CHAN & YANG (1994), by original designation.

Nepalius Dlabola, 1997: 309, **syn. nov.** Type species: *Nepalius hellerianus* Dlabola, 1997, by original designation.

Supplementary description. Metope with complete median and sublateral keels joining below or at its upper margin. Fore wing sometimes with hypocostal plate, radius and cubitus anterior bifurcate, median tri- or tetrafurcate (vein formula R 2 M 3–4 CuA 2). Hind wing with two clefts; radius and first anal vein bifurcate, median, cubitus posterior, postcubitus, and second anal vein simple, cubitus anterior bi- or trifurcate; vein formula R 2, M 1, CuA 2–3, CuP 1, Pcu 1, A₁ 2 and A₂ 1. Each dorso-lateral lobe of phallobase with elongate apical process. Style with small capitulum.

Comments. The examination of the type species of the genus *Nepalius*, *N. hellerianus*, known from Nepal (DLABOLA 1997), showed that this species shares with *Eusarima* a similar pattern of keels on the metope, venation of fore and hind wings and structure of male genitalia. I therefore consider *Nepalius* as a junior synonym of *Eusarima*. The genus *Eusarima* with 29 described species has been known so far only from Taiwan (CHAN & YANG 1994). *Eusarima helleriana*, comb. nov., differs from the Taiwanese species by the intermediate keels of metope joining at its upper margin and the presence of a hypocostal plate on the fore wings.

***Eusarima helleriana* (Dlabola, 1997) comb. nov.**

Nepalius hellerianus Dlabola, 1997: 310.

Material examined. NEPAL: 10 km NNE Dolalghat, 1478 m a.s.l., 8–13.v.2000, 1 ♂ 1 ♀, M. G. Volkovich lgt. (ZIN).

Tribe Parahiraciini Cheng & Yang, 1991

Genus *Flavina* Stål, 1861

Flavina Stål, 1861: 209. Type species: *Flavina granulata* Stål, 1861, by original designation.

Dolia Kirkaldy, 1907: 95, **syn. nov.** Type species: *Hiracia walkeri* Signoret, 1861, by original designation.

Comments. I have examined the holotype of *Flavina granulata*, the type species of the genus *Flavina* (see GNEZDILOV & WILSON 2007: Figs. 5–6) and compared it with the original description of *Hiracia walkeri*, the type species of the genus *Dolia* (SIGNORET 1861: 57, pl. 2, Figs. 3, 3a, 3b). Both species share the following features: elongate metope with a median and two short sublateral keels joining at its upper margin, beetle-like and convex fore wings, and hind tibia with 5–6 lateral spines. Accordingly, I consider them congeneric. *Hiracia walkeri* was described from India and erroneously cited by METCALF (1954) from Senegal.

***Flavina walkeri* (Signoret, 1861) comb. nov.**

Hiracia walkeri Signoret, 1861: 57.

Tribe Hemisphaeriini Melichar, 1906

Genus *Gergithoides* Schumacher, 1915

Gergithoides Schumacher, 1915: 126. Type species: *Gergithoides carinatifrons* Schumacher, 1915, by original designation.

Daruma Matsumura 1916: 103 (preoccupied). Type species: *Daruma nitobei* Matsumura, 1916, by original designation.

Darumara Metcalf, 1952: 227, **syn. nov.** New name for *Daruma* Matsumura, 1916.

Comments. The original description of *Gergithoides carinatifrons* (SCHUMACHER 1915) and the images of a hind wing of a syntype (the only part that remains from two syntypes in ZMHB) were compared with the images of the male lectotype of *Daruma nitobei* Matsumura, which are available on Hokkaido University website (ANONYMOUS 2008). The species was redescribed by CHAN & YANG (1994, Fig. 5). The synonymization is based on the following features (Figs. 5–6): metope elongate with strong median keel; coryphe elongate and narrow with acutely angulate anterior margin; fore wings with relief reticulate venation; hind wings almost equal in length to fore wings and with reticulate venation.

***Gergithoides carinatifrons* Schumacher, 1915**

(Figs. 5, 6)

Gergithoides carinatifrons Schumacher, 1915: 126.

Daruma nitobei Matsumura, 1916: 104, **syn. nov.**

Darumara nitobei: METCALF (1952): 227.

Gergithoides carinatifrons: CHAN & YANG, 1994: 17, Fig. 5.

Type material examined. SYNTYPE: FORMOSA, Hoozan, 10.ix., H. Sauter S.G. lgt. (ZMHB) (examined from images only).

Additional material examined. TAIWAN: Taoyuan, Shangbaling, 28.vi.1987, 1 ♂, M. L. Chan lgt. (BMNH); Nantou, Chinglaian, 24.viii.1989, 1 ♀, W. B. Yeh lgt. (BMNH).

Family Nogodinidae Melichar, 1898

Tribe Tongini Kirkaldy, 1907

Genus *Atylana* Melichar, 1906

Atylana Melichar, 1906: 198 (as subgenus of *Tylana* Stål, 1860). Type species: *Tylana intrusa* Melichar, 1906, by subsequent designation (FENNAH 1950: 94).

Comments. Examination of the type specimens of *Devagama fasciata* Distant, 1913, *D. insularis* Distant, 1913 and *D. maculata* Distant, 1913 has revealed that all of them differ from *D. rana* Distant, 1906 (type species of the genus *Devagama* Distant, 1906) and are rather close to members of the genus *Atylana* Melichar, 1906 (sensu FENNAH 1950, 1967) in the following features (Figs. 7–9): metope only with distinct sublateral keels joining at its upper margin; coryphe transverse; subbrachypterous; hind wings well developed; hind tibia with two lateral spines distally; first metatarsomere with entire row of intermediate spines.

***Atylana fasciata* (Distant, 1913) comb. nov.**

(Figs. 7–9)

Devagama fasciata Distant, 1913: 556.*Devagama insularis* Distant, 1913: 556, **syn. nov.***Devagama maculata* Distant, 1913: 556, **syn. nov.***Atylana parmula thalna* Fennah, 1958: 218, **syn. nov.**

Type material examined. *Devagama fasciata*: HOLOTYPE: ♂, South Pacific, Henderson Is., David R. Tait (1913–41) (BMNH). *Devagama insularis*: HOLOTYPE: ♀, South Pacific, Henderson Is., David R. Tait (1913–41) (BMNH). *Devagama maculata*: HOLOTYPE: ♂, South Pacific, Henderson Is., David R. Tait (1913–41) (BMNH). *Atylana parmula thalna*: PARATYPE: ♂ (without abdomen), Pitcairn I., 500 feet, 14.vi.[19]34, S. Side, Gloclidion (BMNH).

Comments. I have examined the type specimens of all four species and found them conspecific. All four species were described from the Pitcairn Islands in South Pacific (DISTANT 1913, FENNAH 1958).

Genus *Oryxana* Distant, 1910*Oryxana* Distant, 1910: 320. Type species: *Flata subacuta* Walker, 1870, by original designation.*Issina* Melichar 1906: 209 (preoccupied). Type species: *Issina suturalis* Melichar, 1906, by original designation.*Issella* Metcalf, 1952: 227, **syn. nov.** New name for *Issina* Melichar, 1906.*Bühleria* Lallemand & Synave, 1953: 249 (incorrect original spelling, cf. ICZN 1999: 32.4, 32.5.2).*Buehleria* Lallemand & Synave, 1953: 249 (corrected original spelling, cf. ICZN 1999: 32.5.2.1), **syn. nov.** Type species: *Buehleria rabana* Lallemand & Synave, 1953, by original designation.

Comments. I have examined the type species of all mentioned genera and found them congeneric as they share the following features (Figs. 10–11): metope wide, widest above clypeus, with weak incomplete median keel and four joined sublateral keels forming a double-horseshoe shape; coryphe transverse, twice as wide as long, anterior margin weakly convex; fore wings wide, with long clavus reaching wing apex, without hypocostal plate; hind wings well developed; hind tibia with two lateral spines distally.

Oryxana subacuta* (Walker, 1870)Flata subacuta* Walker, 1870: 179.*Oryxana subacuta* Distant, 1910: 320.**Type material examined.** HOLOTYPE: ♂, Mys, Wallace Igt. (BMNH).***Oryxana suturalis* (Melichar, 1906) comb. nov.***Issina suturalis* Melichar, 1906: 210.*Issella suturalis*: METCALF (1952): 227.**Type material examined.** SYNTYPE: ♀, Indonesia, Sumbawa (MMBC).***Oryxana rabana* (Lallemand & Synave, 1953) comb. nov.**

(Figs. 10–11)

Buehleria rabana Lallemand & Synave, 1953: 249.

Type material examined. HOLOTYPE: ♂, Indonesia, Sumbawa, Raba, 20.v.1949, Dr. Bühler & Dr. Sutter Igt. (NHMB). PARATYPE: ♀, same data as holotype (NHMB).

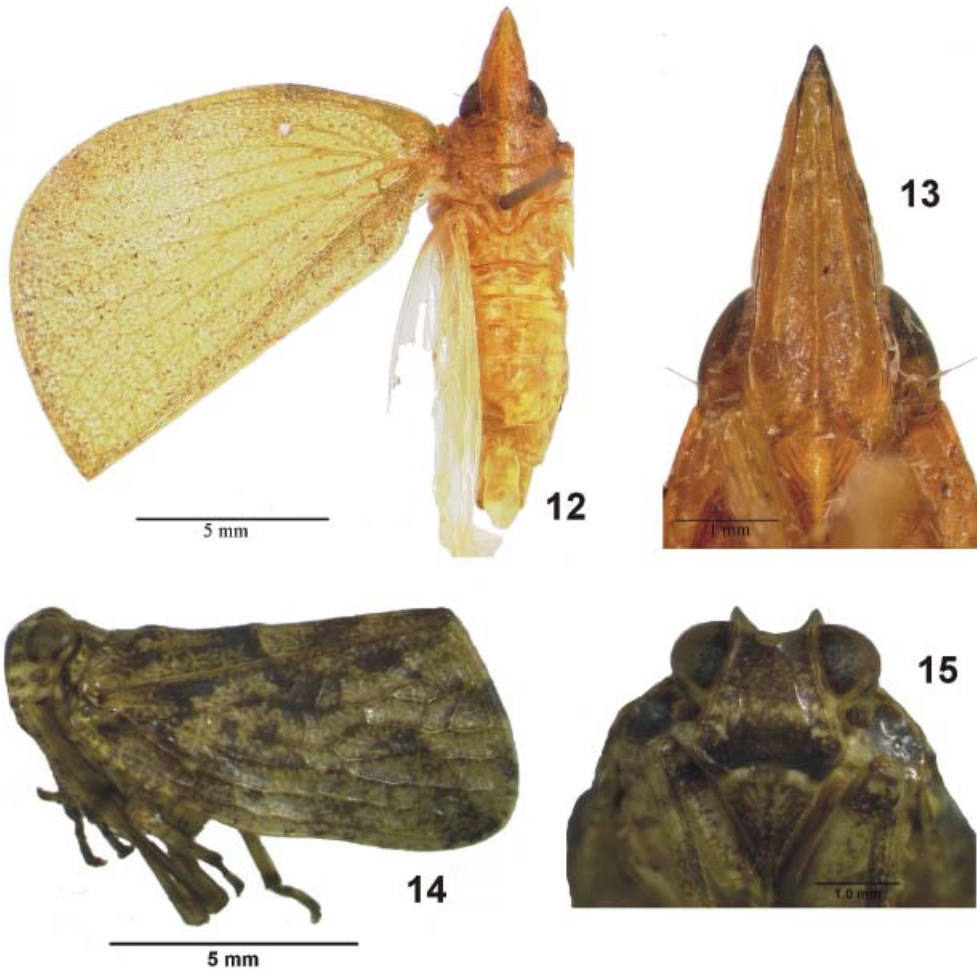
Genus *Tonga* Kirkaldy, 1900

Cyrene Westwood 1845: 35 (preoccupied). Type species: *Cyrene guttulata* Westwood, 1845, by original designation.

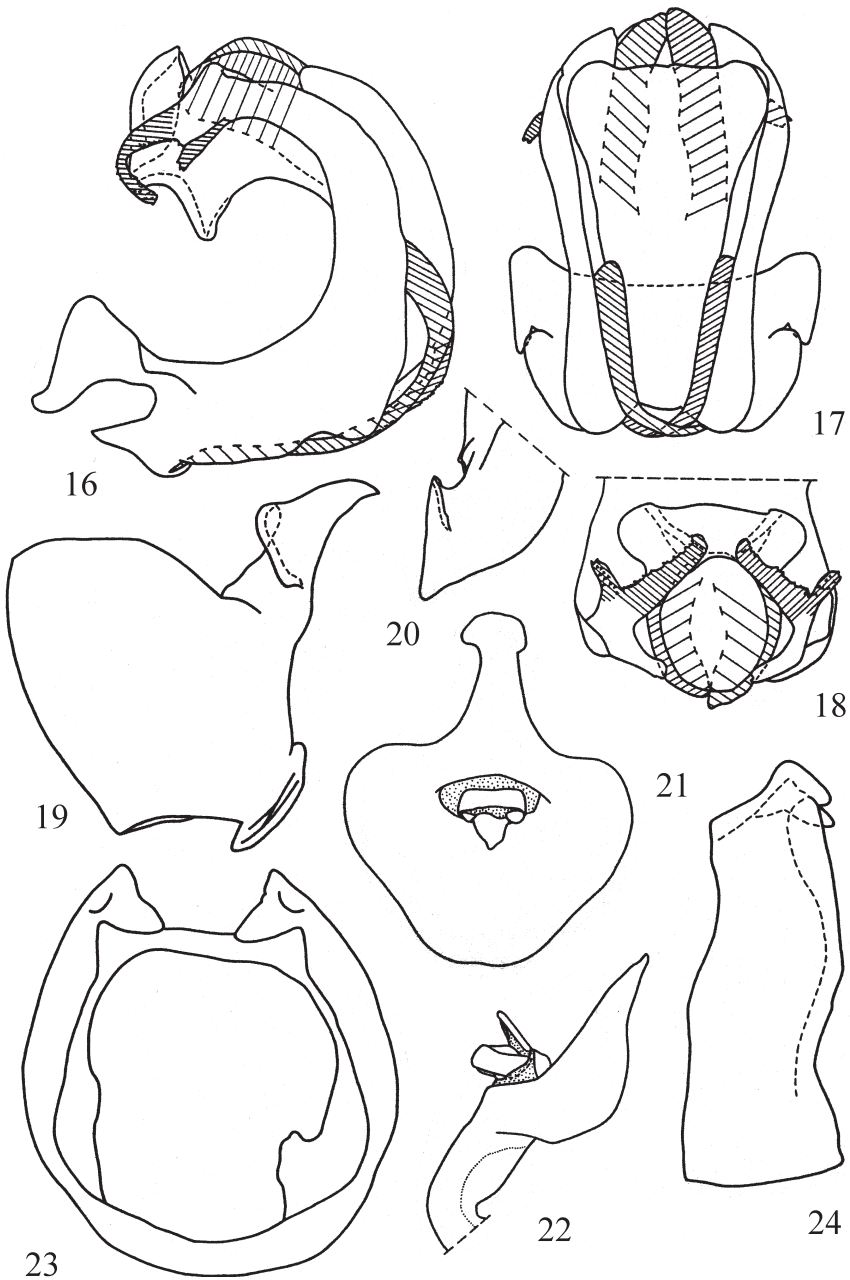
Tonga Kirkaldy, 1900: 242. New name for *Cyrene* Westwood, 1845.

Sutteria Lallemand & Synave, 1953: 247, **syn. nov.** Type species: *Sutteria baingensis* Lallemand & Synave, 1953, by original designation.

Comments. The synonymization of *Sutteria* and *Tonga* is based on the following features (Figs. 12–13): metope and coryphe long, narrowing apically; metope with distinct median



Figs. 12–15. 12–13 – *Tonga baingensis* (Lallemand & Synave, 1953): 12 – ♀, holotype, dorsal view; 13 – same, frontal view. 14–15 – *Lollius kuroiwae* (Matsumura, 1916), specimen from Iriomote Island: 14 – ♀, lateral view; 15 – same, frontal view.



Figs. 16–24. *Thabena retracta* (Walker, 1857), specimen from Sarawak, male genitalia: 16 – penis, lateral view; 17 – penis, ventral view; 18 – penis, caudo-dorsal view; 19 – style, lateral view; 20 – capitulum of style, dorsal view; 21 – anal tube, dorsal view; 22 – anal tube, lateral view; 23 – pygofer, caudal view; 24 – pygofer, lateral view.

and sublateral keels; fore wings wide, with long clavus reaching wing apex, with hypocostal plate and blister-like microsculpture; hind wings well developed; hind tibia with two lateral spines distally.

***Tonga baingensis* (Lallemand & Synave, 1953) comb. nov.**

(Figs 12–13)

Sutteria baingensis Lallemand & Synave, 1953: 248.

Type material examined. HOLOTYPE: ♀, Indonesia, O. Sumba, Baing, Wai Lekabe, 28.vi.1949, Dr. Bühler & Dr. Sutter lgt. (NHMB).

Comments. LALLEMAND & SYNAVE (1953) mentioned in the original description that the species has hind tibia without lateral spines, but the holotype has hind tibia with two lateral spines distally.

Genus *Lollius* Stål, 1866

Lollius Stål, 1866a: 209. Type species: *Lollius australicus* Stål, 1870, by subsequent designation (STÅL 1870: 763).

Okissus Matsumura, 1916: 104, **syn. nov.** Type species: *Okissus kuroiuae* Matsumura, 1916, by original designation.

Ecapelopterus Cheng & Yang, 1991. Nomen nudum.

Ecapelopterus Chan & Yang, 1994: 74, **syn. nov.** Type species: *Ecapelopterus mirum* Chan & Yang, 1994, by original designation.

Comments. The synonymization is based on a comparison of the drawings of *Lollius australicus* published by FENNAH (1954: Fig. 13), the images of female lectotype of *Okissus kuroiuae* available on Hokkaido University website (ANONYMOUS 2008), and the original description of *Ecapelopterus mirum* (CHAN & YANG 1994: Fig. 31). *Lollius* is characterized by the following features (Figs. 14–15): metope enlarged towards clypeus, with two sublateral keels joining in the shape of inverse letter ‘V’; coryphe with angular, convex anterior margin and keel-shaped lateral margins; fore wings with long clavus reaching wing apex, without hypocostal plate; hind wings well developed; hind tibia with two lateral spines distally.

***Lollius kuroiuae* (Matsumura, 1916) comb. nov.**

(Figs. 14–15)

Okissus kuroiuae Matsumura, 1916: 106.

Material examined. JAPAN: RYUKYUS: Hoshidate Iriomote I., 25.vi.1992, on *Ficus*, 1 ♂ 1 ♀, M. Hayashi lgt. (NMWC); Miyako I., vii.1935, 1 ♂, Nakamura lgt. (ZIN).

***Lollius mirus* (Chan & Yang, 1994) comb. nov.**

Ecapelopterus mirum Chan & Yang, 1994: 75.

***Lollius yehyuensis* (Cheng & Yang, 1991) comb. nov.**

Ecapelopterus yehyuensis Cheng & Yang, 1991: 228.

Discussion

The presence of two issid genera closely related to the Oriental fauna, *Thabena brunnifrons* (Bonfils, Attié & Reynaud, 2001), comb. nov., and *Euroxenus vayssièresi* (Bonfils, Attié & Reynaud, 2001), comb. nov., on Réunion Island may be caused by an introduction to the island with a cargo from Asia rather than reflect any historical connection of Réunion with Southeastern Asia: the Mascarenes are volcanic islands which arose about 3 million years ago (ANONYMOUS 2009). Currently, only the two issid species are known from the region of Madagascar and the neighbouring islands. All other previous records of 'Issidae' from the Mascarenes, Madagascar and the Seychelles, i.e., the genera *Lollius* Stål, 1866, *Trienopa* Signoret, 1860 and *Tylana* Stål, 1861 (WILLIAMS 1982, HOLZINGER et al. 2008), actually belong to the Nogodinidae: Tongini and the Tropicuchidae: Trienopini (GNEZDILOV 2007). The tribe Tongini is widely distributed in the Oriental and Australasian Regions, whereas the Trienopini is an endemic tribe of the Afrotropical Region. A detailed phylogenetic analysis of the family Issidae and related groups is needed to better understand the relationships between the genera and the patterns of their distribution.

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