

Notes on the genus *Sarima* (Hemiptera: Fulgoroidea: Issidae) with description of a new genus from Sri Lanka

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GNEZDILOV V. M. 2013: Notes on the genus *Sarima* (Hemiptera: Fulgoroidea: Issidae) with description of a new genus from Sri Lanka. In: KMENT P., MALENOVSKÝ I. & KOLIBÁČ J. (eds.): Studies in Hemiptera in honour of Pavel Lauterer and Jaroslav L. Stehlík. *Acta Musei Moraviae, Scientiae biologicae* (Brno) **98(2)**: 175–182. – A redescription of the genus *Sarima* Melichar, 1903 is provided. As far as is known to the author, the genus *Sarima sensu stricto* comprises only three species (*Sarima illibata* Melichar, 1903, *S. elongata* Melichar, 1903, and *S. cretata* Distant, 1906) and is limited in its distribution to Sri Lanka. A new genus, *Pavelauterum* gen. nov., is erected for *Hysteropterum fusculum* Melichar, 1903 from Sri Lanka, which was treated earlier as a member of the genus *Sarima*. Lectotypes are designated for *Sarima illibata*, *S. elongata* and *Hysteropterum fusculum*.

Keywords. Auchenorrhyncha, Fulgoromorpha, Issini, taxonomy, new combination, lectotype designations, Oriental Region

Introduction

The genus *Sarima* was erected by MELICHAR (1903) for two species, *Sarima illibata* Melichar, 1903 (type species) and *Sarima elongata* Melichar, 1903 from Sri Lanka. Later 27 more Oriental species were added to the genus (METCALF 1958; HORI 1970, 1971).

The revision of the genus *Sarima auctorum* was started by CHAN & YANG (1994) who, describing Taiwanese fauna of the family Issidae, transferred *S. rubricans* Matsumura, 1916 and *S. matsumurai* Esaki, 1931 to the genus *Eusarima* Yang, 1994 (in CHAN & YANG 1994) and *S. pallizona* Matsumura, 1938 to the genus *Parasarima* Yang, 1994 (in CHAN & YANG 1994).

In the present study I give a diagnosis of the genus *Sarima* in a restricted sense based on the characters of the type species and erect a new genus for *Hysteropterum fusculum* Melichar, 1903 described from Sri Lanka and later transferred by MELICHAR (1906) to the genus *Sarima*. Examination of type specimens of *H. fusculum* deposited in the Museum für Naturkunde (Berlin, Germany) shows that this species does not belong to the genus *Sarima s. str.* and cannot be attributed to any other known issid genus. This leads me to erect a new genus to accommodate this species. Apparently the genus *Sarima s. str.* is limited in its distribution to Sri Lanka. Further studies are needed to clarify how many genera are now covered under the *Sarima auctorum* – currently 29 species known from the Eastern Palearctic, Oriental, and Australasian Regions are included (BOURGOIN 2012; HORI 1970, 1971).

I am happy to take this opportunity to dedicate the new genus described below to Dr Pavel Lauterer, who oversaw Melichar's collection in the Moravian Museum and studied

Central European Hemiptera intensively for many years, continuing the long tradition of natural history studies in Brno.

Material and methods

The morphological terminology herein follows ANUFRIEV & EMELJANOV (1988) for the head, EMELJANOV (2001) for the pronotum, and EMELJANOV (1971) for the hypocostal plate of the forewing. The drawings were made using a Leica M165C compound light microscope. The photographs were taken using a Leica Z16 APOA microscope with a Leica DFC490 video camera and produced with the Leica Application Suite ver. 3.7, Auto-Montage Essentials, and Adobe Photoshop software. The material examined is deposited in the following collections:

BMNH	Natural History Museum, London, United Kingdom
MMBC	Moravian Museum, Brno, Czech Republic
ZMHB	Museum für Naturkunde, Berlin, Germany

Taxonomy

Family Issidae Spinola, 1839

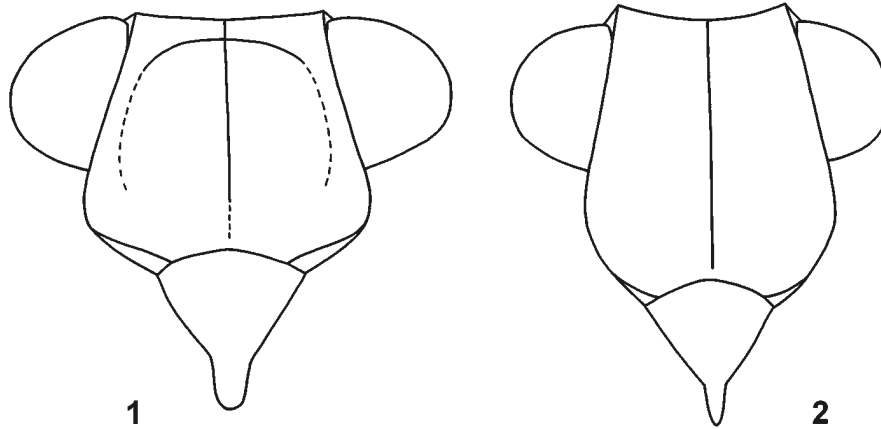
Subfamily Issinae Spinola, 1839

Tribe Issini Spinola, 1839

Genus *Sarima* Melichar, 1903

Sarima Melichar, 1903: 78. Type species: *Sarima illibata* Melichar, 1903 (by original designation).

Redescription. Metope wide, slightly convex, enlarged above clypeus, with median carina running from its upper margin to metopoclypeal suture; sublateral carinae distinct only in upper half of metope (Figs 1, 8, 10). Median and sublateral carinae joint below upper margin of metope which is slightly concave or almost straight. Lateral margins of metope keel-shaped. Postclypeus slightly flattened dorso-ventrally, with no carina. Pedicel nearly spherical. Coryphe transverse, sometimes with weak median carina; anterior margin weakly convex; posterior margin obtusely angulate (Figs 9, 11). Ocelli present. Pronotum sometimes with weak median carina, anterior margin right-angled, keel-shaped and elevated, posterior margin almost straight. Paradiscal fields of pronotum very narrow behind the eyes. Paranotal lobes of pronotum wide and rounded, flat, with no carina. Mesonotum slightly longer than pronotum, with weak median and lateral carinae. Forewings elongate (Figs 3, 5, 6), with hypocostal plate. Basal cell narrowly oval, precostal area with transverse veins in distal half of wing. Radius bifurcate, dividing near to the basal cell, anterior branch (R_1) short and fusing with posterior branch slightly basad wing mid-point, forming a loop (Fig. 3), median with 3 branches (dividing in distal half of wing), cubitus anterior bifurcate (dividing near wing mid-point); secondary transverse veins present in some cells (Fig. 3). Clavus as long as nearly 4/5 of wing



Figs 1–2. Head in frontal view: 1 – *Sarima illibata* Melichar, male lectotype; 2 – *Pavelauterum fusculum* (Melichar), female lectotype.

length, open (cubitus posterior and postcubitus + first anal vein joint apically); postcubitus and first anal vein joint at mid-point of clavus. Hind wings three-lobed, nearly as long as forewings. Hind tibia with two lateral spines in its distal half and with 6–7 apical spines. First metatarsomere with two latero-apical and 7 intermediate apical spines in complete, arc-shaped row. Female sternum VII with hind margin weakly convex. Gonoplacs convex, rounded. Female anal tube long and narrow, rounded apically, anal column short.

***Sarima illibata* Melichar, 1903**

(Figs 1, 3, 5, 8, 9)

Sarima illibata Melichar, 1903: 79.

Type material examined (MMBC). SRI LANKA: 1 ♂ (lectotype, here designated), “Ceylon, Peradeniya, 24.II.1902, leg. Dr. Uzel / Dr. Melichar (on lateral margin)” (printed, with date handwritten in ink), “Collectio Dr. L. Melichar, Moravské museum Brno” (printed), “Transcriptio (printed), *Sarima illibata* sp. n. ♂ (handwritten in ink), L. Melichar det. 1903 (printed, with date handwritten in ink), “Syntypus” (red, printed), “Invent. č. 3834 / Ent., Mor. muzeum, Brno” (printed, with number handwritten in ink); 1 ♂ (paralectotype), “Ceylon, Peradeniya, 9.I.1902, leg. Dr. Uzel / Dr. Melichar (on lateral margin)” (printed, with date handwritten in ink), “Collectio Dr. L. Melichar, Moravské museum Brno” (printed), “*illibata* (handwritten in ink) det. Melichar. (printed)”, “Typus” (red, printed), “Transcriptio (printed), *Sarima illibata* sp. n. ♂ (handwritten in ink), L. Melichar det. 1903 (printed, with date handwritten in ink), “Syntypus” (red, printed), “Invent. č. 3830 / Ent., Mor. muzeum, Brno” (printed, with number handwritten in ink); 1 ♀ (paralectotype), “Ceylon, Peradeniya, Jan. 1902, leg. Dr. Uzel / Dr. Melichar (on lateral margin)”, “Collectio Dr. L. Melichar, Moravské museum Brno” (printed), “*illibata* (handwritten in ink) det. Melichar. (printed)”, “Syntypus” (red, printed), “Invent. č. 3828 / Ent., Mor. muzeum, Brno” (printed, with number handwritten in ink).

Supplementary description. Pro- and mesonotum with median carina. Forewings with quite wide hypocostal plate. General coloration light yellow-greenish. Metope with two light brown (in males) or brown (in female) bands. Forewings with light brown corium below radius and the whole clavus light brown. Hind wings matt, with brown or dark brown veins. Leg spines black. Total length: males – 5.0 mm; females – 5.5 mm.

Note. MELICHAR (1903) mentioned several localities for the type series. I have examined the specimens from Peradeniya and Heneratgoda (both in central Sri Lanka, Kandy District) collected by Dr. Uzel and deposited in MMBC. The specimen from Heneratgoda differs from the specimens from Peradeniya in coloration and may represent another species. Here I designate the lectotype for the male from Peradeniya according to the ICZN (1999: Art. 74) to stabilize the nomenclature in the genus.

***Sarima cretata* Distant, 1906**

Sarima cretata Distant, 1906: 344.

Type material examined (BMNH). SRI LANKA: 1 ♂ (holotype), “Type” (red circle, printed), “*Sarima cretatus* Dist type” (handwritten in ink), “Pundalu-oya. Ceylon (printed), 5–03 (handwritten in pencil)”, “1617” (handwritten in ink), “Distant Coll. 1911–383.” (printed).

Comparison. The specimen examined appears very similar to *S. illibata*; it differs, however, in much darker coloration, which looks artefactual.

Note. According to the original description, DISTANT (1906) was working with a single specimen from Pundalu-oya (central Sri Lanka, Kandy District).

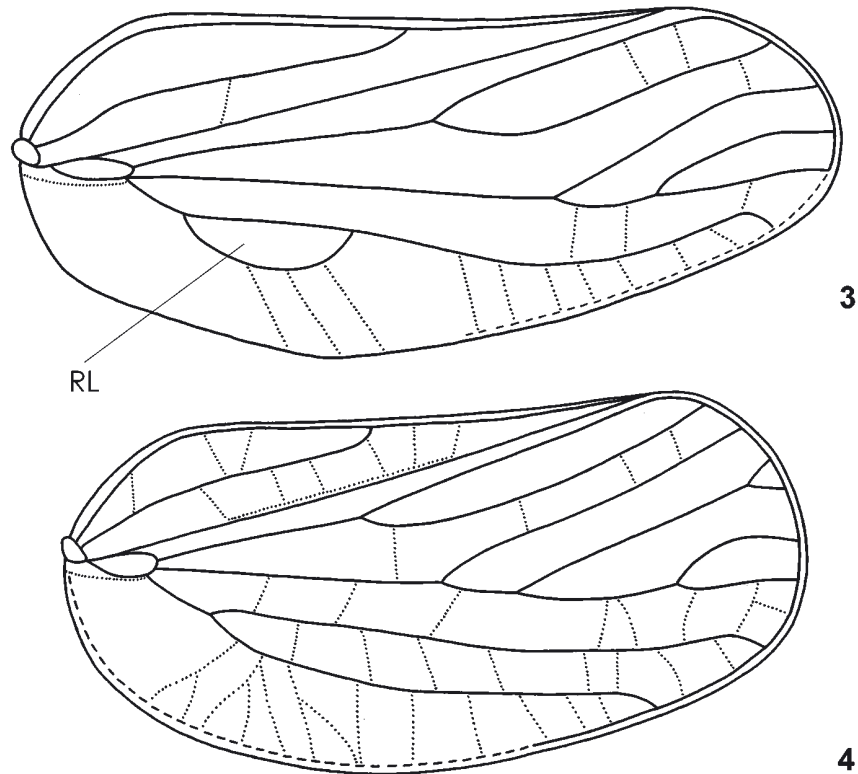
***Sarima elongata* Melichar, 1903**

(Figs 6, 10, 11)

Sarima elongata Melichar, 1903: 80.

Type material examined (ZMHB). SRI LANKA: 1 ♂ (lectotype, here designated), “Type” (red, printed), “6188” (printed), “Ceylon Nietner” (handwritten in ink), “*elongata* (handwritten in ink) det. Melichar. (printed)”, “*Sarima elongata* Melichar *” (handwritten in ink), “Mus. Berol.” (printed); 1 ♂ (paralectotype), “Type” (red, printed), “Cat No. 6188” (handwritten in ink), “Ceylon Nietner” (handwritten in ink), “*elongata* (handwritten in ink) det. Melichar. (printed)”, “*Sarima elongata* Melichar *” (handwritten in ink), “Mus. Berol.” (printed); 1 ♀ (paralectotype), “Type” (red, printed), “Cat No. 6188” (handwritten in ink), “Ceylon Nietner” (handwritten in ink), “*Sarima elongata* Melichar *” (handwritten in ink), “*elongata* (handwritten in ink) det. Melichar. (printed)”, “Mus. Berol.” (printed).

Supplementary description. Pro- and mesonotum with no median carina or with very weak carina. Forewings with narrow hypocostal plate. General coloration light yellow-greenish. Forewings with vague light brown patches between median and cubitus anterior in distal half of the wing and on clavus. Males sometimes with 3 whitish spots between median and cubitus anterior distally and with one whitish spot in distal part of clavus. Hind wings matt, with light brown veins. Leg spines black. Total length: males – 5.7 mm; female – 6.0 mm.



Figs 3–4. Forewing in lateral view: 3 – *Sarima illibata* Melichar, male lectotype; 4 – *Pavelauterum fusculum* (Melichar), female lectotype. RL –loop of anterior branch of radius.

Note. MELICHAR (1903) mentioned three specimens deposited in the Museum für Naturkunde (Berlin) as the type series. Here I designate the lectotype for a male according to the ICZN (1999: Art. 74) to stabilize the nomenclature in the genus.

Genus *Pavelauterum* gen. nov.

Type species: *Hysteropterum fusculum* Melichar, 1903.

Description. Metope quite narrow, slightly convex, weakly enlarged above clypeus, with distinct median carina running from its upper margin to metopoclypeal suture, and no sublateral carinae (Figs 2, 12). Upper margin of metope weakly concave. Postclypeus

slightly flattened dorso-ventrally, with no carina. Ocelli present. Pedicel nearly spherical. Coryphe transverse, twice as wide as long at centre, anterior margin weakly convex, posterior margin obtusely angulate (Fig. 13). Pronotum with anterior margin right-angular, keel-shaped and elevated, posterior margin almost straight. Paradiscal fields of pronotum very narrow behind eyes. Paranotal lobes of pronotum wide and rounded, flat, with no carina. Mesonotum slightly longer than pronotum, with weak median carina and distinct lateral carinae. Forewings quite wide, widely rounded (almost truncate) apically (Figs 4, 7), without hypocostal plate. Basal cell oval, precostal area with transverse veins. Radius bifurcate (dividing near basal cell), median with 4 branches (dividing in distal half of wing), cubitus anterior bifurcate (dividing near wing mid-point); many secondary transverse veins present in most cells (Fig. 4). Clavus as long as nearly 4/5 of wing length, open (cubitus posterior and postcubitus + first anal vein joint apically); postcubitus and first anal vein joining at mid-point of clavus. Hind wings possibly three-lobed (feature not readily visible), nearly as long as forewings. Hind tibia with two lateral spines distally and 8 apical spines. First metatarsomere with two latero-apical and 7 intermediate apical spines forming a complete, arch-shaped row. Female sternum VII with hind margin weakly convex. Gonopods convex, rounded. Female anal tube long and narrow, rounded apically, anal column short.

Comparison. The new genus differs from *Sarima* in the absence of sublateral carinae from the metope (Figs 2, 12), wider forewings without hypocostal plate and without the unique loop in anterior branch of radius (Figs 4, 7). Externally the genus is similar to *Darwallia* Gnezdilov, 2010 which also has the metope without sublateral carinae and forewings widely rounded apically with median vein dividing into 4 branches. However, *Darwallia* is distinguished by its elongate coryphe and carinate clypeus (GNEZDILOV 2010).

***Pavelauterum fusculum* (Melichar, 1903) comb.nov.** (Figs 2, 4, 7, 12, 13)

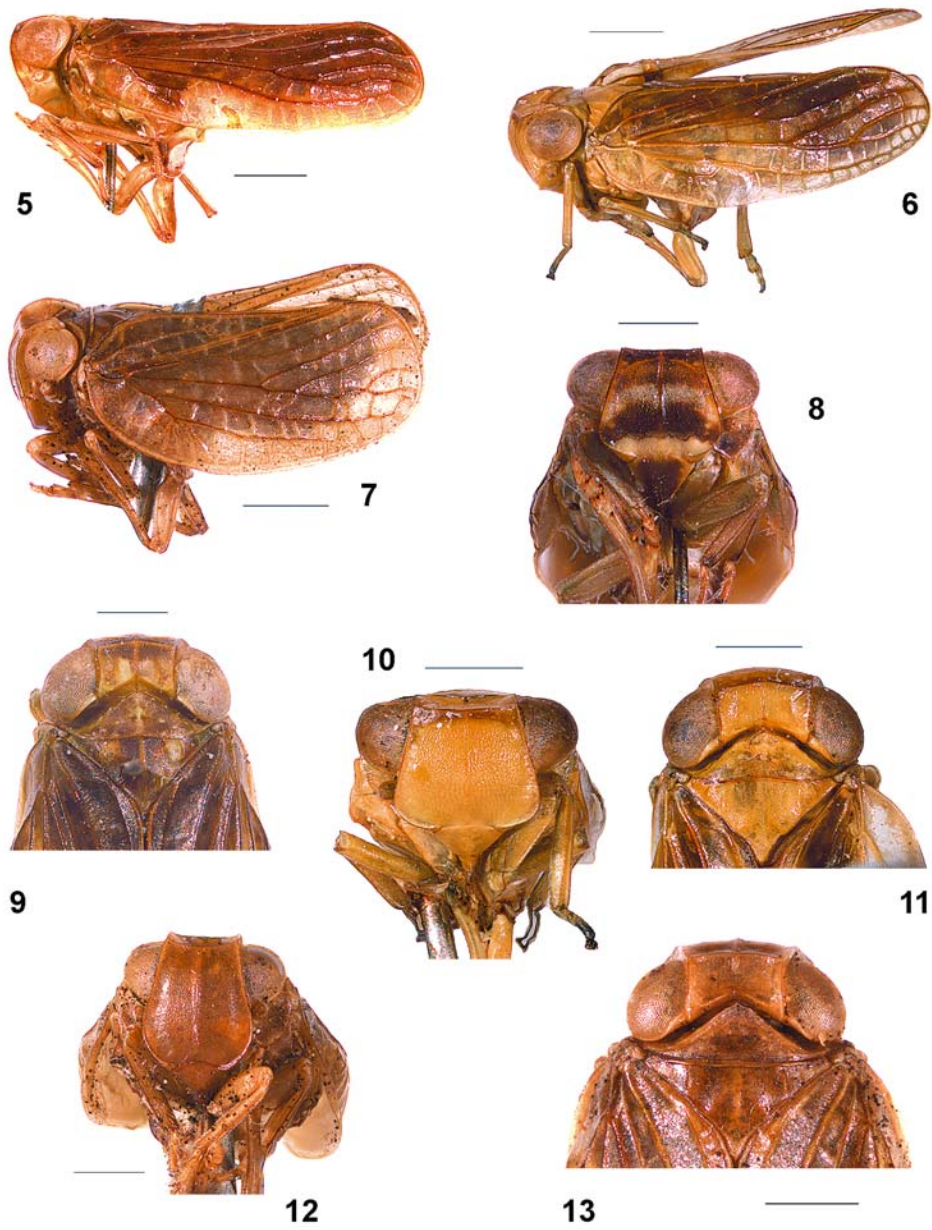
Hysteropterum fusculum Melichar, 1903: 77.

Sarima fuscula, MELICHAR (1906): 302.

Type material examined (ZMHB). SRI LANKA: 1 ♀ (lectotype, here designated), "Type" (red, printed), "Ceylon Nietn." (yellow, handwritten in ink), "*fusculum*" (handwritten in ink), "*Hysteropterum fusculum* Melichar *" (handwritten in ink), "Mus. Berol." (printed); 1 ♀ (paralectotype), "Type" (red, printed), "Cat. No. 7034" (handwritten in ink), "Ceylon Nietner" (handwritten in ink), "*fusculum* (handwritten in ink) det. Melichar. (printed)", "*Hysteropterum fusculum* Melichar *" (handwritten in ink), "Mus. Berol." (printed), "*Sarima fuscula*" (handwritten in ink).

Supplementary description. General coloration light brown. Hind wings matt, with dark brown veins. Leg spines black. Total length: females – 4.7 mm.

Note. MELICHAR (1903) mentioned two specimens deposited in the Museum für Naturkunde (Berlin) as the type series. Here I designate a female lectotype according to the ICZN (1999: Art. 74) to stabilize the nomenclature.



Figs 5–13. Habitus, lateral view: 5 – *Sarima illibata* Melichar, female paralectotype; 6 – *Sarima elongata* Melichar, male lectotype; 7 – *Pavelauterum fusculum* (Melichar), female lectotype. Head, frontal (8, 10, 12) and dorsal (9, 11, 13) view: 8–9 – *Sarima illibata* Melichar, female paralectotype; 10–11 – *Sarima elongata* Melichar, male lectotype; 12–13 – *Pavelauterum fusculum* (Melichar), female lectotype. Scale bar: 1 mm.

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References

- ANUFRIEV G. A. & EMELJANOV A. F. 1988: Podotryad Cicadinea (Auchenorrhyncha). [Suborder Cicadinea (Auchenorrhyncha).] Pp. 12–495. In: LER P. A. (ed.): *Opredelitel' nasekomykh Dal'nego Vostoka SSSR v shesti tomakh. Vol. 2. Ravnokrylye i poluzhestkokrylye. [Keys to the insects of the Far East of the USSR in six volumes. Volume II Homoptera and Heteroptera.]* Nauka, Leningrad, 972 pp (in Russian).
- BOURGOIN T. 2012: FLOW (Fulgoromorpha Lists on The Web): a world knowledge base dedicated to Fulgoromorpha. Version 8, updated 30 June 2013. Available online at <http://flow.snv.jussieu.fr/> (last accessed on 1 July 2013).
- CHAN M. L. & YANG C. T. 1994: *Issidae of Taiwan (Homoptera: Fulgoroidea)*. Chen Chung Book, Taichung, 188 pp.
- DISTANT W. L. 1906: *Rhynchota. – Vol. III (Heteroptera–Homoptera). The Fauna of British India, including Ceylon and Burma*. Taylor and Francis, London, 503 pp.
- EMELJANOV A. F. 1971: Novye rody tsikadovykh fauny SSSR iz semeystv Cixiidae i Issidae (Homoptera, Auchenorrhyncha). (New genera of planthoppers of the families Cixiidae and Issidae (Homoptera, Auchenorrhyncha) from the fauna of the USSR.) *Entomologicheskoe Obozrenie* **50**: 619–627 (in Russian with English summary; English translation published in *Entomological Review* **50**: 350–354).
- EMELJANOV A. F. 2001: Larval characters and their ontogenetic development in Fulgoroidea (Homoptera, Cicadina). *Zoosystematica Rossica* **9**: 101–121.
- GNEZDILOV V. M. 2010: Three new genera and three new species of the family Issidae (Hemiptera: Fulgoromorpha) from Borneo and Sumatra. *Tijdschrift voor Entomologie* **153**: 41–52.
- HORI Y. 1970: Genus *Sarima* Melichar of Japan, with the description of a new Ryukyu species (Hemiptera: Issidae). *Transactions of Shikoku Entomological Society* **10**(3–4): 79–83.
- HORI Y. 1971: Notes on some Philippine Issidae (Hemiptera). *Transactions of Shikoku Entomological Society* **11**(2): 60–70.
- ICZN (International Commission on Zoological Nomenclature) 1999: *International Code of Zoological Nomenclature. Fourth Edition*. The International Trust for Zoological Nomenclature c/o the Natural History Museum, London, XXIX + 306 pp.
- MELICHAR L. 1903: *Homopteren-fauna von Ceylon*. Verlag von Felix L. Dames, Berlin, 248 pp.
- MELICHAR L. 1906: Monographie der Issiden (Homoptera). *Abhandlungen der K. K. Zoologisch-botanischen Gesellschaft in Wien* **3**(4): 1–327.
- METCALF Z. P. 1958: *General catalogue of the Homoptera. Fasc. IV. Fulgoroidea. Part 15. Issidae*. Waverly Press, Baltimore, 561 pp.