

What are true Issidae?! (Hemiptera Fulgoroidea)

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The family Issidae, as used in its widest sense, is one of the largest families of the fulgoroid planthoppers with around 2000 species and is distributed worldwide. Traditionally, the features of external morphology, in particular those of the wings, have been used for erecting the taxa of the family groups. Over the past 100 years various authors such as Melichar, Muir, Dlabola, and Fennah have distinguished tribes and subfamilies and transferred genera to other families such as Nogodinidae, while at the same time genera in other families have been recognised as Issidae s.l.

Phylogenetic analysis by Emeljanov (1990), indicates that the family Issidae s. l., including the subfamilies Issinae, Caliscelinae, Acanaloniinae, Tonginae, Trienopinae, and Bladininae, has no autapomorphies. Bourgoin with coauthors (1997) also indicated probable paraphyly of the family. Molecular and morphological data also indicate the heterogeneity of Issidae s. l. (Yeh et al., 1998; Emeljanov, 1999). Emeljanov (1999) after examination of external morphology including male and female genitalia proposed to recognise the separate families **Issidae**, **Caliscelidae**, and **Acanaloniidae** (with subfamilies Acanaloniinae, Tonginae, and Trienopinae).

Recently Gnezdilov (2002, 2003a, 2003b) suggested the family Issidae sensu stricto comprises one subfamily with 5 tribes: Issini, Parahiraciini, Hemisphaeriini, Thioniini, Colpopterini. He showed that according to the structure of ovipositor the family Issidae s. str. distinctly differs from the family Caliscelidae as well as from the families Nogodinidae, Acanaloniidae and Ricaniidae, but all are closely related according to the ovipositor structure.

The identification of true taxonomic position of species, genera or tribe is possible only on basis of examination of all available morphological features. The following diagnosis of the true Issidae is provided here:

Issidae s. str. Diagnosis (after Gnezdilov, 2003b). Adults with body more or less oval or hemisphaerical. Coryphe often short and broad. Metope often with median and sublateral keels. Frontoclypeal suture arched or almost straight. Postclypeus without lateral keels. Pronotum with large disc and narrow lateral lobes. Mesonotum relatively short or long and broad. Fore wing dull, rigid and convex (elytriform), often with hypocostal lobe and knee prominence. Hind wing normally developed or rudimentary. Legs usually short and strong (but may be more or less long), with lateral teeth. The axis of coxa – trochanter articulation of hind leg, as a rule, more or less horizontal. Metatarsomere I ventrally with a row of apical setae on high soles.

Male. Penis with a sclerotized phallobase; the latter, as a rule, with dorso–lateral and ventral lobes, the first ones often bearing teeth or processes. Aedeagus with ventral hooks or without it. Style with distinct capitulum bearing apical and lateral teeth.

Female. Gonoplags convex, sometimes with transverse keels outside, fused basally (in this case, their medial margins distinctly pigmented in form of a fork) or fused entirely along median line. Gonapophyses IX fused in proximal part and joined with scoop-shaped gonospiculum bridge. Posterior connective laminae of gonapophyses IX with convex proximal part and arcuated (or curved at angle) or straight distal parts. Median field weakly convex and often bilobed distally, or in form of a large process curved to the base of gonapophyses. Lateral fields flat or in shape of projections.

Endogonocoxal process either simple or 2-3-lobed. Anterior connective lamina of gonapophyse VIII, as a rule, in shape of relatively broad denticated plate with apical and lateral groups of teeth (these groups include 1-3 and 1-5 teeth, respectively) or narrow without teeth (*Colpoptera* sp.). Hind margin of gonocoxa VIII often protruded as a lobe over triangular sclerotized plate.

Recently two projects concerning a revision of the family Issidae were supported by the Royal Society (London, UK): “Planthoppers of the family Issidae of West Palaearctic Region” (2003) and “Systematic and biogeographic studies on world Issidae” (2005). Within these projects the issid collections of National Museum of Wales (Cardiff, UK), the Natural History Museum (London, UK), Universiteit van Amsterdam, Zoölogisch Museum (Amsterdam, The Netherlands), Museum of Natural History Naturalis (Leiden, The Netherlands), Institut Royal des Sciences Naturelles de Belgique (Bruxelles, Belgium), and Museum National d’Histoire Naturelle (Paris, France) were examined. Descriptions of new taxa, new combinations, and new data on distribution of Issidae sensu lato were provided (Gnezdilov et al., 2004; Gnezdilov & Wilson, 2005).

At present the revision of the family Issidae sensu lato is in progress on the basis of external morphological features including male and female genitalia. This includes studies of the species in the large genus *Hysteropterum*, considered as a world-wide distributed taxon, but is distributed only in the Mediterranean and Middle Europe and comprises 7 species (Gnezdilov, 2003a, 2004; Gnezdilov & O’Brien, in press). All other species described in the genus from other parts of the World belong to other genera.

References

- Bourgoin, T., Steffen-Campbell, J.D. & Campbell, B.C.** 1997. Molecular phylogeny of Fulgoromorpha (Insecta, Hemiptera, Archaeorrhyncha). The enigmatic Tettigometridae: evolutionary affiliations and historical biogeography. *Cladistics*, **13**: 207-224.
- Emeljanov, A.F.** 1990. An attempt of construction of phylogenetic tree of the planthoppers (Homoptera, Cicadina). *Entomologicheskoe Obozrenie*, **69**(2): 353-356.
- Emeljanov, A.F.** 1999. Notes on delimitation of families of the Issidae group with description of a new species of Caliscelidae belonging to a new genus and tribe (Homoptera, Fulgoroidea). *Zoosystematica Rossica*, **8**(1): 61-72.
- Gnezdilov, V.M.** 2002. Morphology of the ovipositor in the subfamily Issinae (Homoptera, Cicadina, Issidae). *Entomologicheskoe Obozrenie*, **81**(3): 605-626.
- Gnezdilov, V.M.** 2003a. Review of the family Issidae (Homoptera, Cicadina) of the European fauna, with notes on the structure of ovipositor in planthoppers. *Chteniya pamyati N.A. Kholodkovskogo (Meetings in memory of N.A. Cholodkovsky)*, St. Petersburg, **56**(1): 1- 145.
- Gnezdilov, V.M.** 2003b. A new tribe of the family Issidae (Homoptera, Cicadina) with comments on the family as a whole. *Zoosystematica Rossica*, **11**(2), 2002: 305-309.
- Gnezdilov, V.M., S. Drosopoulos & M.R. Wilson.** 2004. New data on taxonomy and distribution of some Fulgoroidea (Homoptera, Cicadina). *Zoosystematica Rossica*, **12**(2), 2003: 217-223.
- Gnezdilov, V.M.** 2004. Two new genera of the family Issidae (Homoptera, Cicadina, Fulgoroidea) from North America. *Russian Entomological Journal*, **13**(1-2): 1-2.
- Gnezdilov, V.M. & M.R. Wilson.** 2005. New genera and species of the tribe Parahiraciini (Hemiptera, Fulgoroidea, Issidae). *Acta Entomologica Slovenica*, **13**(1): 5-12.
- Gnezdilov, V.M. & L.B. O'Brien.** *Hysteropterum severini* Caldwell & DeLong, 1948, a new synonym of *Agalmatium bilobum* (Fieber, 1877) (Hemiptera: Fulgoroidea: Issidae). *The Pan-Pacific Entomologist* (in press).
- Yeh, W.-B., Yang, C.-T. & Hui, C.-F.** 1998. Phylogenetic relationships of the Tropicuchidae-group (Homoptera: Fulgoroidea) of planthoppers inferred through nucleotide sequences. *Zool. Stud.*, **37**(1): 45-55.

Taxonomic Catalogue of the Leafhoppers (Membracoidea). Part 1. Cicadellinae

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This work, derived from the Leafhoppers of the World Database, catalogues the changes to the classification of Cicadellinae (Hemiptera: Cicadellidae)—the sharpshooters— world-wide from 1956 through 2005 and provides a current list of all valid taxa and synonyms, as well as their distribution and citations of their original descriptions. All subsequent references discovered by May, 2005, were also incorporated. World Cicadellinae now consists of 2 tribes, 328 genera (62 Proconiini), and 2,259 species (421 Proconiini). Literature citations through 1955 correspond to references given in a previous bibliography of the Cicadellidae; a bibliography is provided for subsequent taxonomic publications.