ANNALES ZOOLOGICI (Warszawa), 2012, 62(4): 571-576

REVIEW OF THE FAMILY ISSIDAE (HEMIPTERA: FULGOROMORPHA) IN VIETNAM WITH DESCRIPTION OF A NEW SPECIES

VLADIMIR M. GNEZDILOV[1] and JÉRÔME CONSTANT[2]

[1]*Zoological Institute, Russian Academy of Sciences, Universitetskaya nab.1, 199034 St. Petersburg, Russia. E-mail: vmgnezdilov@mail.ru, vgnezdilov@zin.ru*
[2]*Royal Belgian Institute of Natural Sciences, Department of Entomology, rue Vautier 29, B-1000 Brussels, Belgium; E-mail: jerome.constant@naturalsciences.be*

Abstract.— A list of 18 species of the planthopper family Issidae known from Vietnam is given. *Pseudochoutagus rubens* **sp. nov.** is described from Northern Vietnam. New records for *Macrodaruma pertinax* Fennah, 1978 and *Euxaldar jehucal* Fennah, 1978 are provided. Convergence in body shape for the issid genera *Pseudochoutagus* Che, Zhang et Wang, 2011 and *Choutagus* Zhang, Wang et Che, 2006 and for the genus *Philagra* Stål, 1863 (Aphrophoridae) is mentioned for the first time.

Key words.— taxonomy, faunistics, new species, new records, convergence

INTRODUCTION

During a field trip to Vietnam, a new species of the genus *Pseudochoutagus* Che, Zhang et Wang, 2011 was collected. The monotypic genus *Pseudochoutagus*, with type species *P. curvativus* Che, Zhang et Wang, 2011, was described from Hainan Island of China (Che *et al.* 2011). Thus the new species described below is a first record of the genus from the continent and a new issid record for the Vietnamese fauna (Fig. 16).

The Issidae of Vietnam are still poorly known. Melichar (1906) and Lallemand (1942) described and recorded four species from the country. The main contribution to knowledge of Vietnamese Issidae was made by R. G. Fennah who published a monograph on the Fulgoroidea of Vietnam based on material collected in the northern part of the country and deposited in the Institute of Zoology of the Polish Academy of Sciences (Fennah 1978). He described two new genera and five new species and gave new records for five species. Recently four more species were described and one new record was provided (Constant and Pham 2011, Gnezdilov *et al.* 2004, Gnezdilov 2011, Ran and Liang 2006).

Below we describe one new species and list new material for *Macrodaruma pertinax* Fennah, 1978 and *Euxaldar jehucal* Fennah, 1978 previously known only from type specimens (Fennah 1978).

MATERIAL AND METHODS

Morphological terminology of the head follows Emeljanov (1995). The tribal system of the family Issidae follows Gnezdilov (2003) with modifications made by him later (Gnezdilov 2009). Photographs of the specimen were made with a Nikon video camera SMZ 1500 and images were produced using the software ACT-2U Combine Z5. The distribution map was produced using the software CFF 2.1, including the data of Che *et al.* (2011) for *Pseudochoutagus curvativus*.

The holotype of the species described below is deposited in the Royal Belgian Institute of Natural Sciences, Brussels, Belgium – RBINS. Other material examined deposited in the following collections:

PL ISSN 0003-4541 © Fundacja *Natura optima dux*
doi: 10.3161/000345412X659632

MMBC – Moravian Museum, Brno, Czech Republic;
ZIN – Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia;
ZMMU – Zoological Museum of Moscow State University, Moscow, Russia.

RESULTS

Pseudochoutagus rubens sp. nov.
(Figs 1–6)

Diagnosis. From the closely related *Pseudochoutagus curvativus* Che, Zhang et Wang, 2011, *P. rubens* differs by brown reddish general coloration and straight in lateral view apical part of the head.

Description. Head with elongate and narrow apical part which is straight in lateral view (Fig. 2). Metope long, narrowing apically, with median and sublateral carinae both distinct apically and very weak above the clypeus (Fig. 3). Median and sublateral carinae joint apically. Apex of metope asymmetrical. Metope rugose between sublateral carinae. Metopoclypeal suture convex. Pedicel cylindrical, without any processes. Coryphe long, narrowing apically, with fine median carina, posterior margin weakly concave (Fig. 1). Pronotum shorter than mesonotum, with granules on surface. Anterior margin of pronotum convex, posterior margin straight, paradiscal fields relatively wide. Each paranotal lobe with 3 carinae. Mesonotum with fine median carina. Tegulae flat. Fore wing narrowing apically, without hypocostal plate, with many transverse veins (Fig. 4). Clavus half as long as whole wing, with cuspidal caudo-dorsal angle. Radius with short stem. Radius and media bifurcate, cubitus anterior simple (R 2 M 2 CuA 1). Hind wings well developed, trilobed, with rudimentary anal lobe and deep cleft between remigium and vannus (Fig. 5). Hind tibia with 2 lateral spines on its distal half. First metatarsomere nearly twice as long as second one, with 2 latero-apical and 5–6 intermediate spines.

General coloration brown reddish. Metope and clypeus brown or dark brown. Fore wings with dark brown band medially and red transverse veins. Hind wings dark brown or black.

Female genitalia. Hind margin of sternum VII with massive long rounded median process (Fig. 6). Anal tube parallel-sided, nearly rectangular, about twice as long as wide, with almost straight apical margin. Anal column short. Gonoplacs nearly triangular (in lateral view), convex.

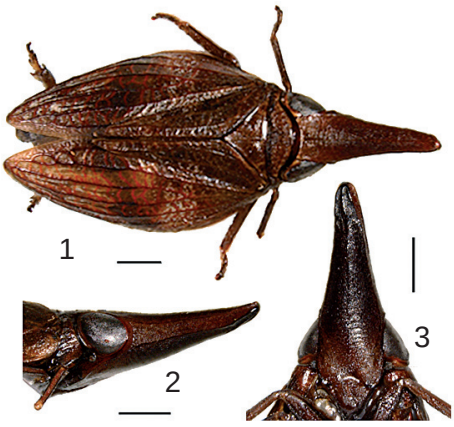
Total length. 9.2 mm.

Type material. Holotype, ♀: Vietnam, Me Linh, 20–24.VIII.2010, "Day Catch I.G.31.668", J. Constant and P. Limbourg legs (RBINS).

Coordinates of Me Linh: 21°23'38"N 105°42'56"E.

Etymology. The species name is derived from the Latin "rubens" which means "red" or "ruddy" and refers to the coloration of the species.

Biological data. The holotype was collected on lower vegetation, in a zone of secondary forest densely crossed by streams (Fig. 15).



Figures 1–3. *Pseudochoutagus rubens* sp. n., female holotype: (1) dorsal view; (2) head, lateral view; (3) head, ventral view. Scale bars = 1 mm.

Key to species of the genus *Pseudochoutagus*

1. Apical part of the head curved in lateral view. General coloration light brown or pale . . . . . ***P. curvativus*** Che, Zhang *et* Wang
–. Apical part of the head straight in lateral view (Fig. 2). General coloration reddish brown (Figs 1–3) . . . . . ***P. rubens*** sp. nov.

Checklist of issid species known from Vietnam

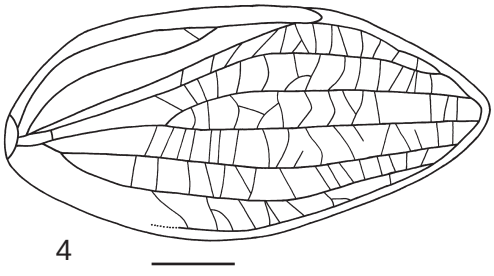
Family Issidae Spinola, 1839
Subfamily Issinae Spinola, 1839

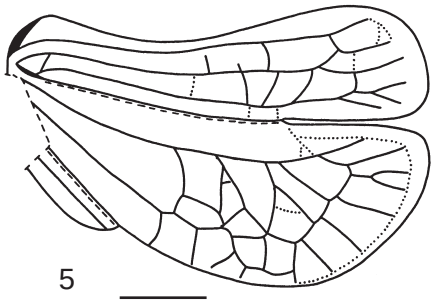
Tribe Issini Spinola, 1839

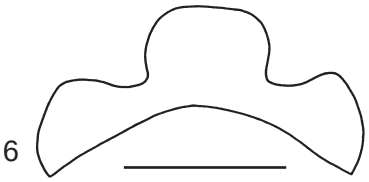
Euxaldar jehucal Fennah, 1978
(Figs 7–9)

Recorded distribution. Ninh Binh Province (Fennah 1978).

New material examined. 1♂, 70 km NWW of Ha Noi, Ba Vi, 24.XI.1990, S.A. Belokobylskij leg. (ZIN); 1♀, Vinh Phuc Province, Tam Dao, 100 km NW Ha Noi, 1000 m, 10.XI.1990, S.A. Belokobylskij leg. (ZIN); 1♀, same data, E.P. Narchuk leg. (ZIN); 1♀, Hoa Binh Province, Da Bac Tuly, 22.X.1990, S.A. Belokobylskij leg. (ZIN); 1♂, Haiphong Province, Cat Ba I., coppice surrounded by high herbs, 7.I.1989, V. Yakushev leg. (ZMMU).







Figures 4–6. *Pseudochoutagus rubens* sp. n., female holotype: (4) fore wing with tegula; (5) hind wing; (6) VII sternum, ventral view. Scale bars = 1 mm.

Pseudochoutagus rubens sp. nov.

Recorded distribution. Vinh Phuc Province.

Tetrica philo Fennah, 1978

Recorded distribution. Ninh Binh Province (Fennah 1978).

Tribe Parahiraciini Cheng et Yang, 1991

Bardunia curvinaso Gnezdilov, 2011

Recorded distribution. Hoa Binh Province (Gnezdilov 2011).

Fortunia byrrhoides (Walker, 1858)

Recorded distribution. Ninh Binh Province (Fennah 1978).

F. viridis (Lallemand, 1942)

Originally described by Lallemand (1942) as *Prosonoma viridis*. New generic combination was provided by Gnezdilov *et al.* (2004).

Recorded distribution. Hoa Binh Province (Lallemand 1942), Ha Noi (Gnezdilov *et al.* 2004).

Flavina acuta Ran et Liang, 2006

Recorded distribution. Lam Dong Province (Ran and Liang 2006).

Tribe Hemisphaeriini Melichar, 1906

Macrodaruma pertinax Fennah, 1978
(Figs 10–13)

Recorded distribution. Vinh Phuc Province (Fennah 1978).

New material examined. Vinh Phuc Province, Tam Dao: 1♂, 11–12.I.1994; 1♂, 11.VI.1994; 1♂, 2♀, 800 m, 18.V.1995; 2♂, 2♀, 19.V.1995, all leg. E.S. Sugonyaev (ZIN); 3♂, 4♀, 17.V.1995, A.V. Gorokhov leg. (ZIN); 4♂, 1♀, 21°27'N 105°39'E, 900–1200 m, 1–8.VI.1996, Dembický and Pacholátko legs (MMBC); Hoa Binh Province, Mai Chau: 2♂, Pa Co, 1100–1200 m, 19–27.IV.2002; 1♀, Pa Co, Xa Linh, 22–24.IV.2002; 1♂, same locality, 1120 m, 23–24.IV.2002; 2♂, 1♀, Hang Kia, 1300 m, 25–26.IV.2002, all leg. S.A. Belokobylskij (ZIN).

Note. *M. pertinax* was photographed on lower vegetation, in moist evergreen low mountain forest (Fig. 14).

Gergithus gravidus Melichar, 1906

Recorded distribution. Northern Vietnam (Melichar 1906), Hoa Binh Province (Lallemand 1942).

G. iguchii Matsumura, 1916

Recorded distribution. Ninh Binh Province (Fennah 1978).

Hemisphaerius bipunctatus Melichar, 1906

Recorded distribution. Hoa Binh Province (Lallemand 1942).

Figures 7–14. *Euxaldar jehucal*, holotype: (7) dorsal view; (8) head, frontal view; (9) lateral view (photographs by A. Stroiński); (10–13) *Macrodaruma pertinax* in Tam Dao National Park, 27.vii.2011 (photographs by J. Constant); (14) Biotope of *Macrodaruma pertinax* in Tam Dao National Park (photograph by J. Constant).

H. cattienensis Constant et Pham, 2011

Recorded distribution. Dong Nai Province (Constant and Pham 2011).

H. hippocrepis Constant et Pham, 2011

Recorded distribution. Dong Nai Province (Constant and Pham 2011).

H. lygaeus Melichar, 1906

Recorded distribution. Hoa Binh Province (Lallemand 1942).

H. lysanias Fennah, 1978

Recorded distribution. Nghe An Province (Fennah 1978).

H. palaemon Fennah, 1978

Recorded distribution. Ninh Binh Province (Fennah 1978).

H. rufovarius Walker, 1858

Recorded as *H. scymnoides* Walker, 1862 by Fennah (1978). The synonymy of *H. rufovarius* and *H. scymnoides* was established by Liang (2001).

Recorded distribution. Hoa Binh Province (Fennah 1978).

H. signifer Walker, 1851

Recorded distribution. Hoa Binh Province (Fennah 1978).

Discussion

The whole list of issids known from Vietnam comprises just 18 species, including *P. rubens* described above, which belong to 9 genera from 3 tribes. For comparison, the well documented issid fauna of Taiwan comprises 24 genera with 90 species (Chan and Yang 1994). Most of the species known from Vietnam are recorded from its northern part and many species only known from their original descriptions. According to ecological studies in Tam Dao forest (Northern Vietnam) by Novotný (1992, 1993), the Issidae occupies the third position in the list of 17 Auchenorrhyncha families arranged in accordance to the number of collected species. Novotný (1993) postulated that "Tam Dao values of species diversity belong to the highest ones found in Auchenorrhyncha samples from tropical climax forests". Thus the current knowledge of Vietnamese Issidae is in its infancy. Apparently we may expect high diversity and richness of Vietnamese fauna.

Figure 15. Type locality of *Pseudochoutagus rubens* sp. nov. (photograph by J. Constant).

The general body shape with beetle-like fore wings and long apically narrowing head which is observed in the genus *Pseudochoutagus* Che, Zhang et Wang, 2011 is characteristic also for the genus *Choutagus* Zhang, Wang et Che, 2006 from the tribe Hemisphaerini in Issidae and for the genus *Philagra* Stål, 1863 from the family Aphrophoridae in Cercopoidea. All mentioned genera are distributed in the Oriental Region. We can not give any rational explanation of such convergence, however, it is not a single case of "following each other" within the Auchenorrhyncha. Hamilton and Thompson (2007) described the convergence in coloration for two South American species from the families Aphrophoridae and Cercopidae accordingly.

Acknowledgements

We thank Mr Laurent Fauvre (Paris, France) for the photos of *Pseudochoutagus rubens* and Prof. Dr

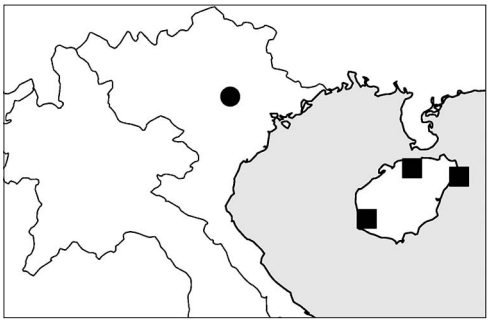


Figure 16. Distribution map of the genus *Pseudochoutagus* Che, Zhang et Wang.

Thierry Bourgoin (Paris, France) for his hospitality in the Muséum national d'Histoire naturelle (Paris, France), Dr Andrej L. Ozerov (Moscow, Russia) and Dr Igor Malenovský (Brno, Czech Republic) for the opportunity to examine the material, Dr Adam Stroiński (Warsaw, Poland) for his photos of *Euxaldar jehucal* and Dr Yvan Barbier (Mons, Belgium) for preparation of the map for Fig. 16. The first author was sponsored by a grant from the Muséum national d'Histoire naturelle (Paris, France) for invited scientists. The study in the collection of the Zoological Institute of the Russian Academy of Sciences was financially supported by the Ministry of Education and Science of the Russian Federation (project No. 16.518.11.7070) and the Programme of the Presidium of the Russian Academy of Sciences "Living Nature" (subprogramme "Biodiversity: state and dynamics"). The second author's collecting trip was supported through a grant issued by the capacity building Programme of the Belgian Global Taxonomic Initiative National Focal Point that runs with financial support from the Belgian Directorate-General for Development Cooperation.

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Received: June 4, 2012
Accepted: October 10, 2012