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Euroxenus vayssieresi (Bonfils, Attie et Reynaud, 2001) (Hemiptera, Auchenorrhyncha: Issidae) in Western Africa

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Abstract—The Reunion planthopper *Euroxenus vayssieresi* (Bonfils, Attie et Reynaud, 2001) is recorded from continental Africa for the first time. Sexual dimorphism in coloration and fifth instar larva of *Eu. vayssieresi* are described and the distribution pattern (chorotype) of this species is discussed.

Keywords: adventive species, chorotype, Ghana, larval morphology, planthopper, Sarimini, sexual dimorphism

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The planthopper family Issidae is a worldwide distributed group of Auchenorrhyncha with more than 1000 species described (Gnezdilov, 2013a; Bourgoin, 2022). This group is well represented in the subtropical and tropical regions of both hemispheres, except Equatorial Africa, from where only a few taxa of the subfamily Issinae Spinola (the tribes Issini Spinola and Chimetopini Gnezdilov) have been so far known (Gnezdilov, 2013a, 2017; Gnezdilov et al., 2020, 2022). In particular, only *Kovacsiana niger* Gnezdilov, 2017 from Nigeria is known from the whole of Equatorial Western Africa (Gnezdilov, 2017). During our field trip to Ghana in April–May 2022, a member of the tribe Sarimini Wang, Zhang et Bourgoin, *Euroxenus vayssieresi* (Bonfils, Attie et Reynaud, 2001), was discovered in numbers on herbs and trees in the open areas of the rainforest and savanna regions of the country (Fig. 1). The fifth instar larva of *Eu. vayssieresi* is described herein for the first time based on the specimens collected.

Euroxenus vayssieresi was originally described from Reunion Island of the Mascarene Archipelago (Bonfils et al., 2001) as *Borbonissus vayssieresi* Bonfils, Attie et Reynaud, 2001. Later, *Borbonissus* Bonfils, Attie et Reynaud, 2001 was placed in synonymy under *Thabena* Stål, 1866, and a new genus, *Euroxenus* Gnezdilov, 2009, was erected (Gnezdilov, 2009) to accommodate *B. vayssieresi*. Recently, *Eu. vayssieresi* was recorded also from the Hawaii (Gnezdilov and Bartlett, 2022). According to Gnezdilov (2009), the issid fauna of Reunion Island has an Oriental genesis, and the monotypical *Euroxenus* is closely related to the Oriental genus *Eusarima* Yang, 1994, with more than 30 species described (Gnezdilov, 2013a; Gnezdilov et al., 2022).

Larval terminology adopted in this paper follows that in Emeljanov (2001). The material listed below is in the collection of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia.

Photographs are taken using Canon EOS 5D Mark IV camera with the lens Canon-MP-E-65mm f/2,8 1-5x Macro and the flash Canon Macro Twin-Lite MT-26EX-RT and SEM Hitachi TM3000. Images were produced using Helicon Focus v. 7.6.4 and Adobe Photoshop CC 2019 software.

Family **ISSIDAE** Spinola

Subfamily **ISSINAE** Spinola

Tribe Sarimini Wang, Zhang et Bourgoin

Euroxenus vayssieresi
(Bonfils, Attie et Reynaud, 2001)
(Figs. 2–7)

Description. Fifth instar larva. *Structure.* Metope elongate, with distinct median and sublateral carinae

Fig. 1. Habitats of *Euroxenus vayssieresi* (Bonfils, Attie et Reynaud, 2001) in Ghana: (*1*, *2*) Ankaful, (*3*) Sekondi, (*4*) Shai Hills (© V.M. Gnezdilov).

joined at its upper margin (Fig. 3, Fig. 7); with lateral margins slightly foliate below eyes. Median carina of metope running on postclypeus. Sublateral carinae of metope not reaching metopoclypeal suture. Metope with 15–18 sensory pits between its lateral margins and sublateral carinae on either side (Fig. 3, Fig. 6, Fig. 7). Coryphe with convex (acutely angulate) anterior margin and concave (obtusely angulate) posterior margin; lateral margins subparallel (Fig. 2). Rostrum protruding beyond hind coxae, narrowing apically, 2nd and 3rd segments equal in size. Pronotum with 14 or 16 sensory pits arranged in three rows (8/9 + 4/5 + 2) in every discal-paradiscal group and with four sensory pits (3 + 1) in every paranotal group (Fig. 4, Fig. 6, Fig. 7). Mesonotum with five sensory pits in every median paradiscal group (Fig. 6). Metanotum with three sensory pits in every median paradiscal group. Forewing pads each with 6 sensory pits in two rows (2 + 4). Tergite III with two lateral sensory pits, tergites IV–VII with four lateral sensory pits, tergite VIII with three lateral sensory pits, and tergite IX without sensory pits (Figs. 4–7). Abdominal segment VIII with two wax-pore plates (Fig. 5, Fig. 7). Hind tibia with two lateral and six apical spines. Metatarsomere I with two lateroapical and nine intermediate spines. Metatarsomere II with only two lateroapical spines.

Coloration. General coloration light greenish yellow. (Figs. 2–5). Metope brown above metopoclypeal suture, with a pair of brown spots medially at sides of median

Fig. 2. *Euroxenus vayssieresi* (Bonfils, Attie et Reynaud, 2001), 5th instar larva, dorsal view: (*1*) Ankaful, (*2*) Shai Hills. Scale bar – 1 mm.

carina. Coryphe with brown margins. Coryphe and pronotum with reddish medial line. Rostrum with brown apex. Sensory pits with partly black margins. Paradiscal fields of pronotum dark brown behind eyes. Mesonotum dark in some specimens. Metanotum with dark brown spots near apices of forewing pads. Forewing pads with brown areas posteriorly. Femora with subapical dark brown bands. Apices of leg spines black. Claws dark brown. Abdominal tergites with two obscure longitudinal dark brown to black stripes.

Fig. 3. *Euroxenus vayssieresi* (Bonfils, Attie et Reynaud, 2001), 5th instar larva, Ankaful: (*1*) frontal view, (*2*) head, lateral view. Sclae bar – 1 mm.

Fig. 4. *Euroxenus vayssieresi* (Bonfils, Attie et Reynaud, 2001), 5th instar larva, Ankaful: (*1*) lateral view (apical part of head not shown), (*2*) head, pro- and mesonotum, dorsal view. Sclae bar – 1 mm.

Total body length. 2.6–2.7 mm.

Material. Ghana. *Western Region*: Takoradi, 4°56.170′N, 1°45.557′W, 80 m, at light, 27–29.IV.2022 (V.M. Gnezdilov), 2 ♀; Sekondi, 4°58.979′N, 1°43.091′W, 34 m, forest margin, sweeping trees, 1.V.2022 (V.M. Gnezdilov and Z. Assan), 4 ♂, 1 ♀. *Central Region*: Ankaful, 5°09.332′N, 1°18.996′W, 31 m, sweeping herbs, 27.IV.2022 (V. M. Gnezdilov and Z. Assan), 14 ♂, 12 ♀, 3 larvae; Komenda Junction, 5°04.875′N, 1°30.654′W, 129 m, forest margin, 2.V.2022 (V.M. Gnezdilov, P.N. Kuupiel and Z. Assan), 2 ♂, 1 ♀. *Greater Accra Region*: Shai Hills Resource Reserve, 5°56.282′N, 0°03.311′E, 70 m, savanna, sweeping herbs and trees, 8–10.V.2022 (V.M. Gnezdilov, Z. Assan, K. Asante and F. Nsekpah), 33 ♂, 26 ♀, 1 larva; Accra, Ghana University campus, 5°38.691′N, 0°11.353′W, 142 m, sweeping trees, 13.V.2022 (V.M. Gnezdilov), 2 ♂, 1 ♀.

DISCUSSION

It is hypothesized that the Issidae is a recent group of Fulgoroidea most probably of the Oriental origin with a

Fig. 5. *Euroxenus vayssieresi* (Bonfils, Attie et Reynaud, 2001), 5th instar larva, caudal view, Shai Hills. Sclae bar – 1 mm.

subsequent dispersal into the Palaearctic Region, tropical Africa, New World, and Australia (Gnezdilov, 2016a; Gnezdilov et al., 2022). The scarcity of Issidae in Equatorial Africa, with the absence of issid taxa in the South and Southeast Africa, in Madagascar, and neighboring islands (except for two adventive species of the Oriental origin in Mascarene Archipelago), in New Zealand, and in Tasmania, confirms the hypothesis of a recent radiation of the family (Gnezdilov, 2009, 2013a, 2013b). Apparently the colonization of the Afrotropical Region by issids occurred later than such colonization events by other planthopper families, e.g., Tropiduchidae, Ricaniidae, Nogodinidae, and Caliscelidae (Gnezdilov, 2016a, 2016b). It is still possible to expect the presence of some undiscovered issid taxa in the canopy of Equatorial African forests as it was shown for South

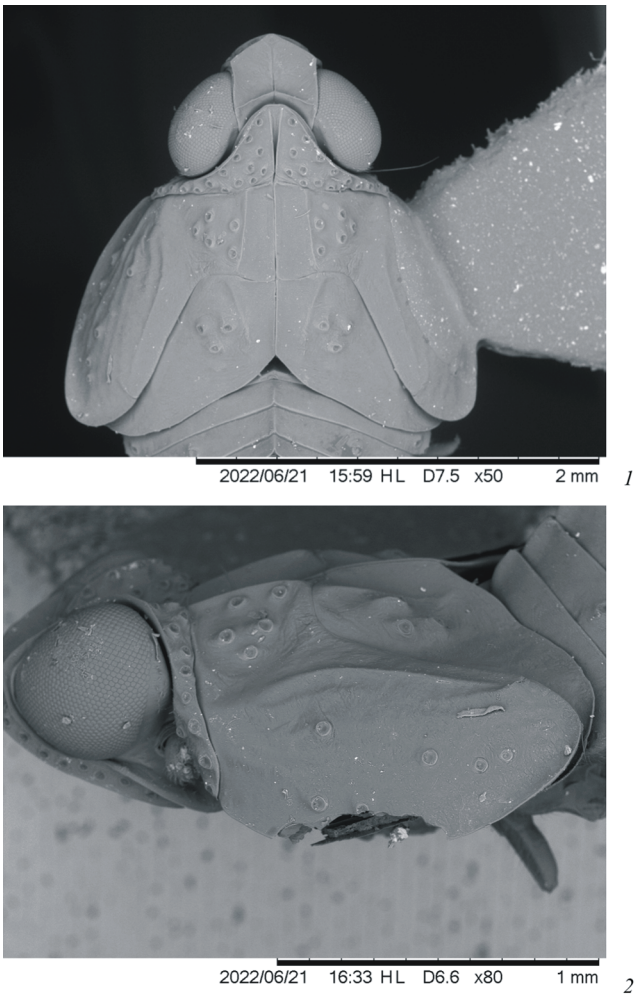

Fig. 6. *Euroxenus vayssieresi* (Bonfils, Attie et Reynaud, 2001), 5th instar larva, SEM photos, Shai Hills: (*1*) head, pro-, meso-, and metanotum, dorsal view, (*2*) same, lateral view (forewing pad margin is damaged).

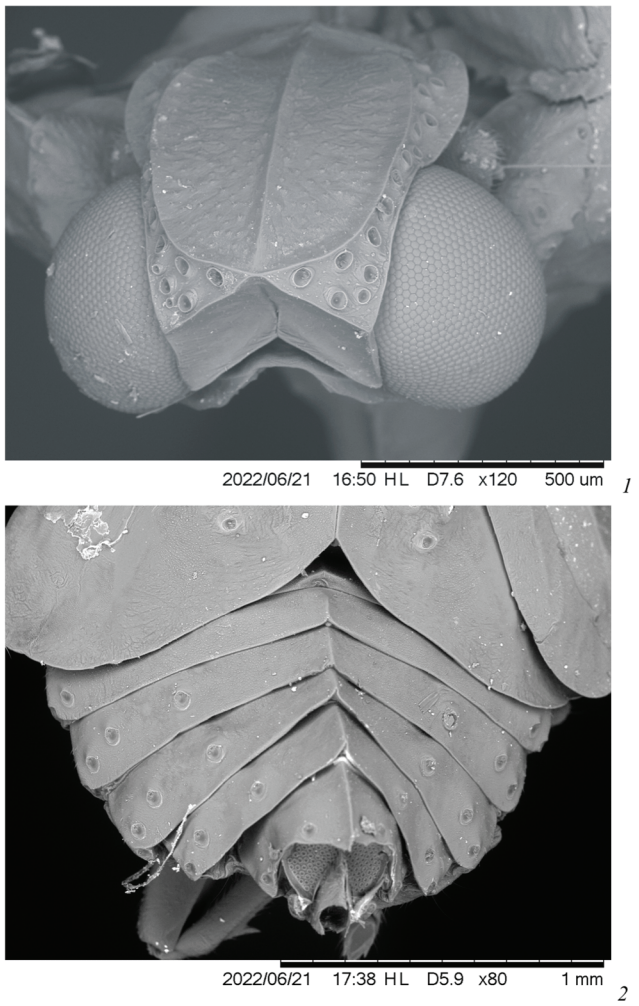

Fig. 7. *Euroxenus vayssieresi* (Bonfils, Attie et Reynaud, 2001), 5th instar larva, SEM photos, Shai Hills: (*1*) head and paranotal lobes, frontal view, (*2*) abdomen, dorsal view.

American canopies where issids are very abundant (Barringer et al., 2019). However, our two day sweeping in the Kakum National Park canopies at a 40 m height above ground did not give such confirmation, even though an issid-like tropiduchid, *Togoda africana* Melichar, 1906, was collected confirming the presence of subbrachypterous taxa in the canopy. Further intensive canopy collecting is needed.

In Ghana *Eu. vayssieresi* was collected in numbers on herbaceous plants and lower branches of trees in open areas including those in the University campus in Accra. Thus, apparently this new finding of *Eu. vayssieresi* in Western Africa is the result of human agency, such as cargo transportation with plant materials as was already postulated for this species in Hawaii (Gnezdilov and Bartlett, 2022). Perhaps, this species is much more widely distributed in tropical Africa than it is documented here.

Euroxenus vayssieresi is characterized by a clear sexual dimorphism in coloration: males are uniformly brown to dark brown while the females have wide dark brown band on each forewing corium (Gnezdilov and Bartlett, 2022, figs. 1, 4). Sexual dimorphism in Issidae is usually expressed in the size and weight of the individuals (females are larger) (Burrows, 2009), or sometimes in structure (reticulate venation of forewings in females of *Issus coleoptratus* (F.)) (Gnezdilov et al., 2014a, plate 12, figs. b, c). Thus, this is the first case of sexual dimorphism in coloration for Issidae confirmed for a long series of specimens from different regions: the Hawaiian Archipelago and Ghana.

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COMPLIANCE WITH ETHICAL STANDARDS

Statement on the welfare of animals. All the applicable international, national, and institutional guidelines for the care and use of animals were followed. All the procedures performed in studies involving animals were in accordance with the ethical standards of the institution or practice at which the studies were conducted.

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