



## A new genus and a new species of the tribe Mithymnini (Hemiptera: Fulgoromorpha: Nogodinidae) from Namibia, with sternal sensory pits in the adult

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### Abstract

A new genus and a new species of the tribe Mithymnini – *Fovealvus nama* **sp. nov.** is described from Namibia. *Fovealvus* **gen. nov.** differs from all other genera of the tribe due to the presence of large sensory pits on VI and VII abdominal sternites in the adult.

**Key words:** Hemiptera, Fulgoromorpha, Nogodinidae, morphology, trichobothria

### Introduction

This new species has been recognized while studying accession specimens in the collection of the Natural History Museum in London. It is externally very similar to members of the family Issidae, but the structure of the ovipositor with its triangular-shaped posterior connective lamina, narrow anterior connective lamina bearing 8 teeth, and style without lateral tooth clearly show that it belongs to the family Nogodinidae (sensu Emeljanov 1999 and Gnezdilov 2003). The higher classification of the Nogodinidae was proposed by Fennah (1978, 1984). According to the habitus and general structure of the male genitalia (phallobase and style) this new species represents a new genus close to the genus *Telmosias* Fennah, 1967 which belongs to the tribe Mithymnini. The tribe was erected in the family Nogodinidae by Fennah (1967, 1984) for *Mithymna* Stål, 1861, *Xosias* Kirkaldy, 1904, *Colmadona* Kirkaldy, 1901, *Telmosias* Fennah, 1967, *Telmessodes* Fennah, 1967, and *Stilpnochlaena* Fennah, 1967. Recently the tribe was added by *Bowesdorpia* Synave, 1956 and *Bilbilis* Stal, 1861 (included provisionally) (Gnezdilov 2007). All included genera except Australian *Bilbilis* are distributed in Southern Africa. The tribe is characterized as follows (Fennah 1967, 1984 and original data): fore wings coriaceous, sometimes with hypocostal plate; ocelli distinct; ovipositor with large, flattened laterally, gonospiculum bridge; bursa copulatrix with microsculpture; gonoplacs elongated, sometimes with teeth; female gonapophyses VIII and IX and male style are of general nogodinid type. This new genus differs from all other genera of the tribe by the presence of sensory pits on the pregenital sternites of the adult and from the closely related *Telmosias* in some peculiarities of male genitalia: particularly the aedeagus without hooks, lateral margins of anal tube with processes and style with widely rounded hind margin and caudo-dorsal angle.

### Material and methods

Morphological terminology follows Gnezdilov (2003). The genital segments of examined specimens were macerated in 10% KOH and figured in glycerine jelly using light microscope. Pictures of specimens were

made using Leica MZ8 with JVC video camera KY F7OB, images are produced using the software Synoptics Automontage and CamScan MaXim 2040S Scanning Electron Microscope with variable vacuum chamber, images digitally output to CD.

Type specimens are deposited in the Natural History Museum, London, United Kingdom (BMNH) and Zoological Institute, Russian Academy of Sciences, Saint Petersburg, Russia (ZIN).

## Taxonomy

### *Fovealvus* gen. nov.

#### **Type species:** *Fovealvus nama* sp. nov.

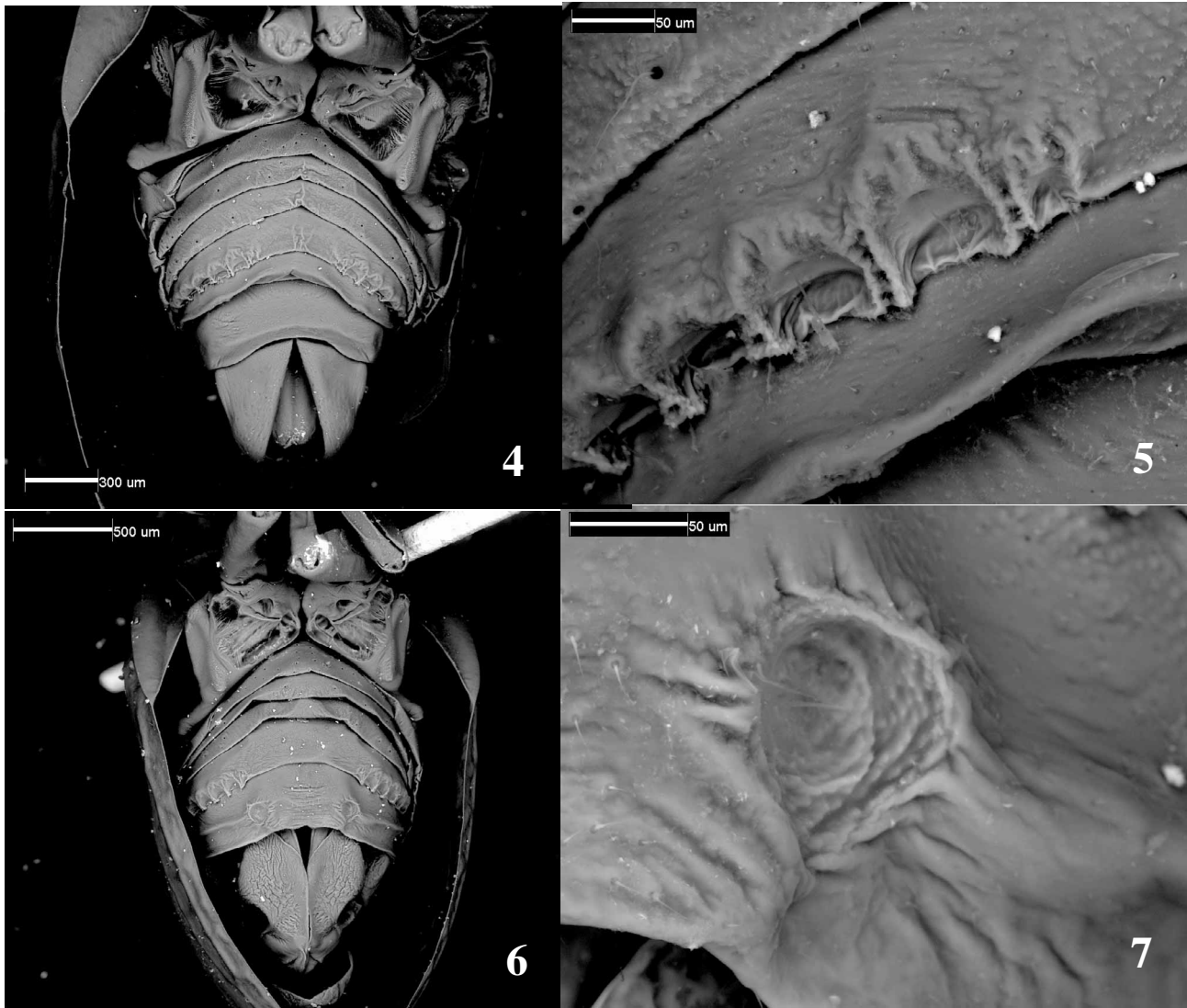
(figs 1–7, 11–23)

**Description.** Metope elongate, weakly convex, intermediate keels indistinct (fig. 3). Coryphe transverse, anterior margin weakly convex, posterior margin concave (fig. 1). Pronotum without keels. Scutellum with smooth median and lateral keels. Forewing broadly truncated apically, with wide hypocostal plate (figs 2, 4, 6). Radius, median, and cubitus anterior bifurcate (R 2 M 2 CuA 2). Hindwing rudimentary, oval, reaching hind margin of pygofer. Hind tibia with 1 lateral subapical tooth. Metatarsomere I with 6 intermediate socle setae. Male and female sternum VI with 6 pairs of sensory pits (figs 4–6). Female sternum VII with a pair of sensory pits (figs 6, 7).



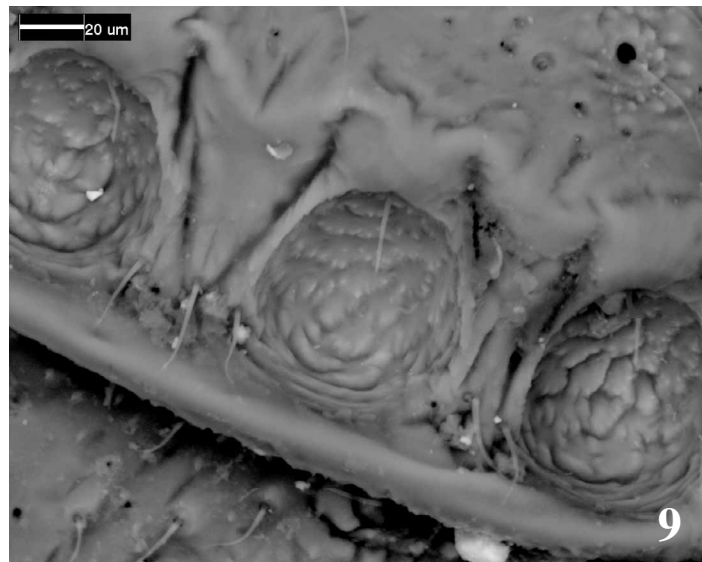
**FIGURES 1–3.** *Fovealvus nama* gen. et sp. nov. male. 1, body, dorsal view; 2, body, lateral view; 3, head, ventral view.

Male genitalia (figs 4, 11–16). Pygofer with convex hind margin (fig. 11). Anal tube elongate, enlarges to widely rounded apex (fig. 16), apical angles in shape of triangular processes directed down (figs 11); each lateral margin of tube with large triangular process medially (fig. 11). Anal column long (about 0.3 times as long as anal tube). Socle of phallobase with pair of large lobe-shaped processes proximally (fig. 13). Dorso-lateral and ventral phallobase lobes with denticles apically. Dorso-lateral phallobase lobes turned distally at right angle, weakly enlarged and not fused apically. Ventral phallobase lobe wide, relatively short, weakly narrowing apically, with concavity at apex (fig. 12). Apical aedeagal processes acuminate, support edge of phallobase, turned distally at right angle as in phallobase. Style with long and narrow capitulum without lateral tooth (fig. 15). Hind margin of style and its caudo-dorsal angle widely rounded (fig. 14).



**FIGURES 4–7.** *Fovealvus nama* gen. et sp. nov. 4, male abdomen, ventral view (SEM); 5, male sternum VI, sensory pits (SEM); 6, female abdomen, ventral view (SEM); 7, female sternum VII, sensory pit (SEM).

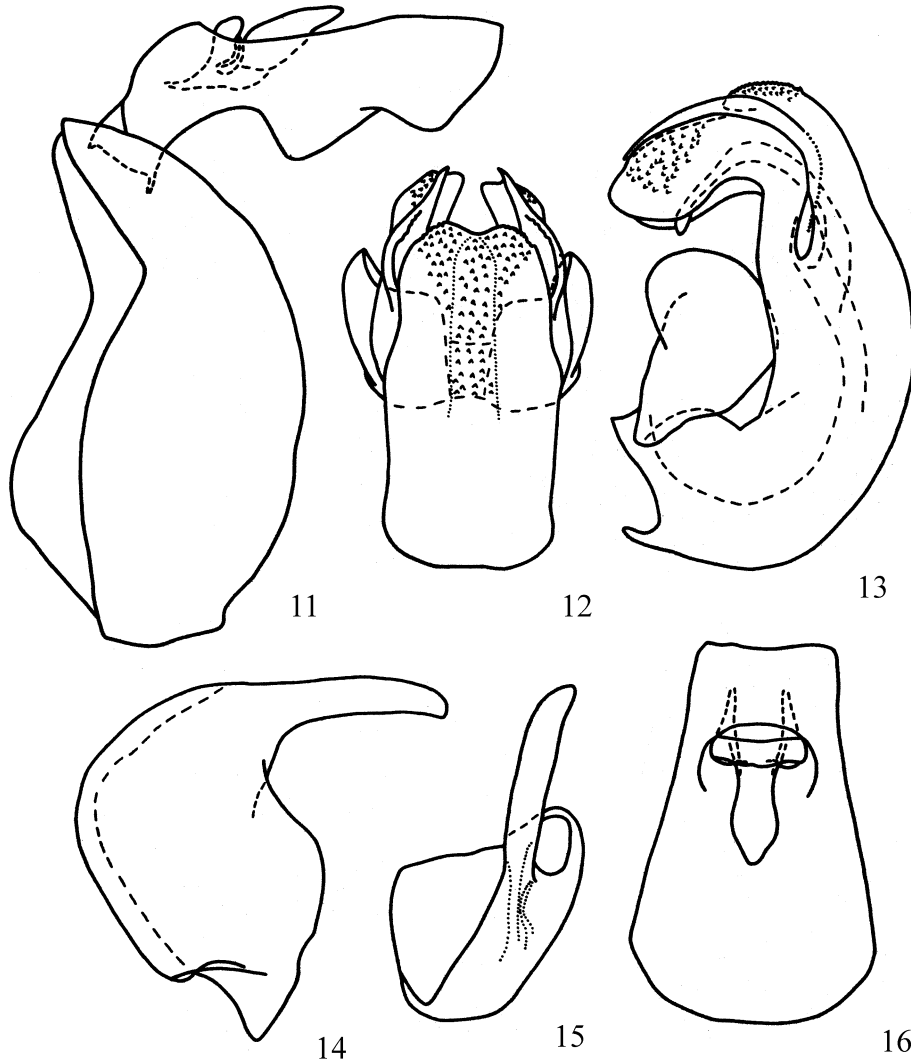
Female genitalia (figs 6, 17–23). Anal tube oval (fig. 19), convex (fig. 20). Anal column long. Gonoplags elongated vertically, with transverse lateral invaginations (fig. 6). First and second gonoplag lobes fused, with weakly sclerotized distal parts. First gonoplag lobe with row of long setae on line between well sclerotized and weakly sclerotized parts. Intergonocoxal plates massive and well sclerotized. Third gonoplag lobes well sclerotized medially, fused in shape of channel, lying in front of distal parts of posterior connective lamina. Posterior connective lamina triangular-shaped (figs 17, 18). Median field with fused lobes in shape of “oval



**FIGURES 8–10.** *Alleloplasis* spp., sensory pits. 8, 9, *A. darwini* Waterhouse, female (Western Australia, Albany): 8, sternae VI, VII (SEM), 9, sternal sensory pit; 10, *A. vespula* Fennah, female (Western Australia, Perth), sternal sensory pit (SEM).

plate” (fig. 17). Gonocoxa VIII with not protruding hind margin. Anterior connective lamina narrow, narrowing apically, with 8 teeth (6 teeth with keels) (fig. 21). Endogonocoxal process narrowing apically. Gonospiculum bridge large, flattened laterally, horseshoe-shaped (fig. 18). Bursa copulatrix with microsculpture (figs 22, 23).

**Etymology.** The generic name is derived from the combination of Latin nouns “fovea” – pit and “alvus” – belly. Gender masculine.



**FIGURES 11–16.** *Fovealvus nama* **gen. et sp. nov.**, male genitalia. 11, pygofer and anal tube, lateral view; 12, penis, ventral view; 13, penis, lateral view; 14, style, lateral view; 15, style, dorsal view; 16, anal tube, dorsal view.

***Fovealvus nama* sp. nov.**  
(figs 1–3)

**Description.** Body length. Males – 3.1–3.5 mm. Females – 3.6–3.7 mm.

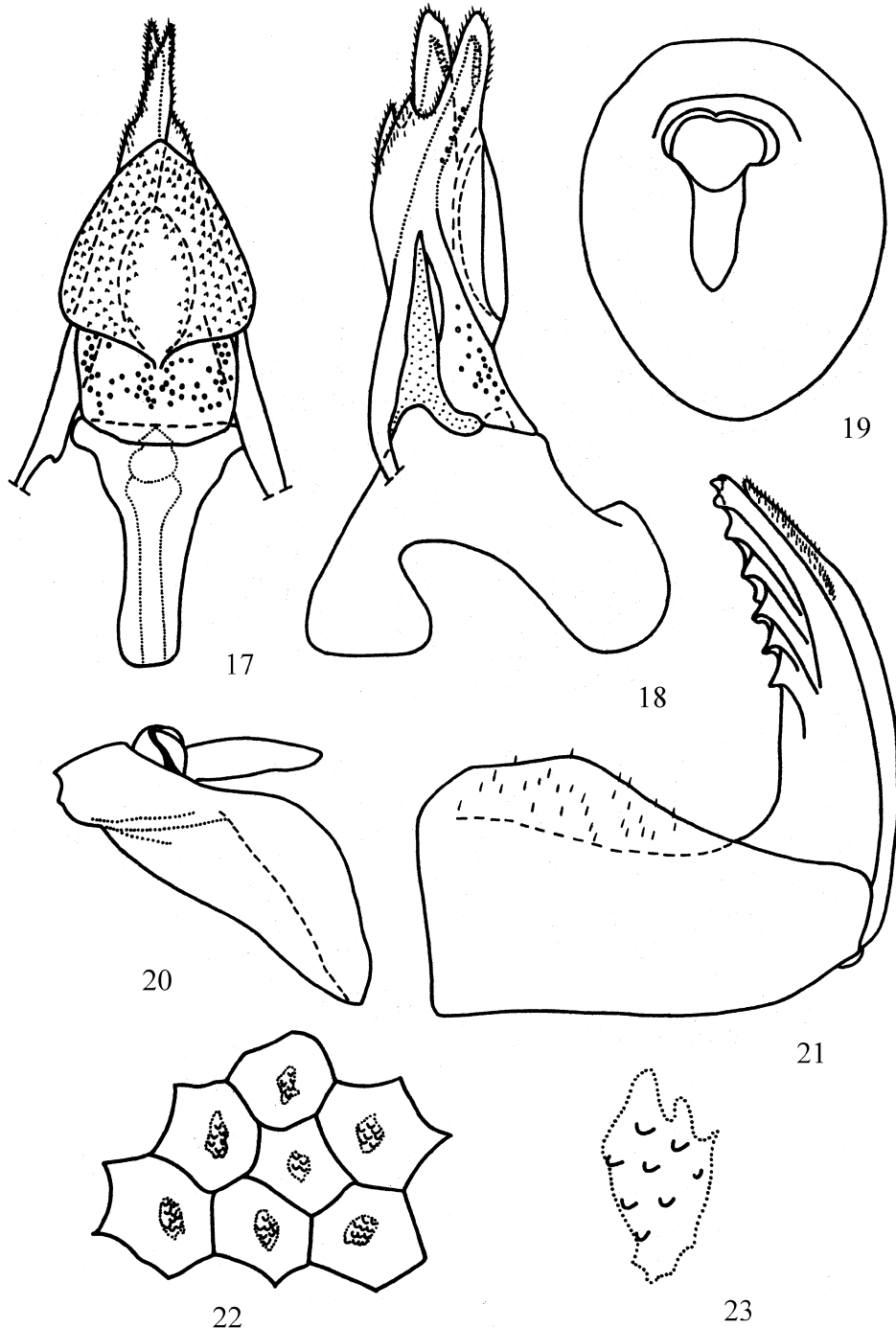
General coloration of upper side dark brown. Metope with a pair of light-yellow spots medially and light-yellow transverse stripe near clypeus. Frontal part of clypeus brown yellowish, with dark brown transverse stripes, lateral sides of clypeus dark brown. Genae under eyes and ocelli light-yellow. Pronotum dark brown yellowish. Scutellum dark brown with light-yellow median and lateral keels. Fore wing with light-yellow spots of different size. Hind wing opaque. Fore and middle legs dark brown, hind legs brown yellowish. Api-

ces of teeth and socle setae black. Abdominal tergites brown, sternites brown proximally and light-yellow or whitish distally. Male genital segments brown yellowish. Gonoplasts brown with light-yellow whitish spots. Female anal tube brown. Gonocoxa VIII with black caudo-dorsal angle.

**Material.** Holotype, Male : SW Africa [Namibia], Aus, 8–30.XI.1929, R.E. Turner leg. (BMNH).

Paratypes (BMNH and ZIN): 10 males, 3 females, as holotype; 2 males, 2 females, same locality, XII.1929; 1 male, same locality, I.1930, all leg. R.E. Turner.

**Etymology.** The species name is derived from the African ethnic group “Nama”.



**FIGURES 17–23.** *Fovealvus nama* gen. et sp. nov., female genitalia. 17, posterior connective lamina of gonapophyses IX and gonospiculum bridge, dorsal view; 18, same, lateral view; 19, anal tube, dorsal view; 20, anal tube, lateral view; 21, anterior connective lamina of gonapophyse VIII and gonocoxa VIII, lateral view; 22, 23, fragment of bursa copulatrix microsculpture.

## Discussion

In the modern Hemiptera literature there are two terms used for special receptive hairs of the body – “trichobothria” and “sensory pit”. The first one is more commonly used by heteropterists, but the second one by specialists of Auchenorrhyncha. The term trichobothria was proposed by Dahl for “a very long slender seta, set in a cup-like depression in the cuticle or on a small dome”; “the trichobothria is usually longer than the surrounding setae and oriented at more or less right angle to the cuticle, whereas most setae form an acute angle with the surrounding body surface” (Schuh 1975). A sensory pit is defined as “a small hole with horizontal seta directed inwards and diverging from its border; the length of the seta is not greater than diameter of the hole” (Emeljanov 2001). Trichobothria are commonly found in the adults of Heteroptera, but sensory pits are probably absent in the group. In Auchenorrhyncha sensory pits are specific organs in fulgoroid larvae and are very rare in adults (Emeljanov 2001); but trichobothria also present in both. *Fovealvus* gen. nov. and *Alleloplasis* Waterhouse, 1839 (Tropiduchidae sensu Gnezdilov 2007) have trichobothria and sensory pits on abdominal sternites (figs 4–10). Both structures probably are used as mechanoreceptors or receptors of atmospheric humidity (Schuh 1975; Holzinger *et al.* 2002). Sweet (1996) suggested that presence of trichobothria is an autapomorphy of Fulgoromorpha+Coleorrhyncha+Heteroptera. According to Emeljanov (2001) sensory pits are strictly of tergal nature. Until now in the Fulgoromorpha sensory pits on abdominal sternites were known only in the genus *Alleloplasis*. Two described species of the genus – *A. darwini* Waterhouse, 1839 and *A. vespula* Fennah, 1949 differ from each other in number of pits (Fennah 1949). In *Fovealvus* gen. nov. the male and female have 6 pairs of sensory pits on hind margin of 6<sup>th</sup> abdominal sternite (figs 4, 5) and the female also has a couple of pits at the middle of 7<sup>th</sup> sternite (figs 6, 7). Apparently the presence of pits on the abdominal sternites in these two genera is only analogous, because the genera *Alleloplasis* and *Fovealvus* gen. nov. clearly differ in the structure of the male and female genitalia and belong to different families (Gnezdilov 2007). Similar analogous sensory organs are known also for Cixiidae (the tribe Bennini Metcalf, for instance, *Bennaria praestans* Walker, 1857) (Holzinger *et al.* 2002, fig. 10e) and the tribe Bennarellini Emeljanov, for instance, *Noabennarella costaricensis* Holzinger & Kunz, 2006 (Holzinger & Kunz 2006, fig. 12), and Achilixiidae (*Achilixius* spp. and *Bebaiotes* spp.) (Wilson 1989, figs 4–6).

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