

**Proposal of a new tribe for *Hornietus ventralis* (Horn, 1887)  
(Coleoptera: Scarabaeidae: Aphodiinae)**

Lukasz MINKINA

os. Polana Szaflarska 4/39, 34-400 Nowy Targ, Poland.  
e-mail: klekel@interia.eu

**Taxonomy, new tribe, description, Coleoptera, Scarabaeidae, Aphodiinae, Hornietini, *Hornietus*, USA**

**Abstract.** A new tribe for *Hornietus ventralis* (Horn, 1887) is proposed and discussed. Its correlations with other tribes among Aphodiinae are discussed. The species is reported for Indiana for the first time. Some information about biology is noted.

INTRODUCTION

*Hornietus ventralis* (Horn, 1887) was originally described as a species of *Pleurophorus* Mulsant, 1842 (Psammodiini Mulsant, 1842). Next Chapin in 1940 transferred the species to genus *Saprosites* Redtenbacher, 1857 (Eupariini Schmidt, 1910). Next in the world catalogue of Aphodiinae by Dellacasa M. (1987) it was treated as *Platytomus* Mulsant, 1842 (Psammodiini). In the end Stebnicka in 2000 based on personal observations and cladistic analysis erected a new genus for the species and placed it in tribe Aphodiini Leach, 1815. I agree with Stebnicka that the species deserves a separate genus, but in my opinion, observations of Stebnicka connected with classification of *H. ventralis* to Aphodiini were wrong. A lot of features used in cladistic analysis need additional comment, and re-examination. The genus was not included in the key to type species of Aphodiini in Dellacasa, Bordat & Dellacasa (2001) because its classification most probably was unknown for authors. However, Gordon and Skelley in their monograph of the Aphodiini of the United States and Canada (2007) agree with classification proposed by Stebnicka and give an additional feature (unmodified pygidium) as proof of good classification of *Hornietus* Stebnicka, 2000. The following studies are aimed at clarification of the taxonomic status of the genus *Hornietus* Stebnicka, 2000, thorough analysis of body shape, and possible evolutionary relationships of this most probably relict genus.

MATERIAL AND METHODS

The specimen were observed with a Nikon SMZ-U stereoscopic microscope. The photos published here were taken by the use of the Canon EOS 5D Mark III connected with Canon MP-E 65mm macro lens. Photos were edited in the Helicon Focus programme.

For morphological terms used in the description of specimens I follow mainly Dellacasa et. al. (2001).

The examined specimen is deposited in private collection of the author.

## DESCRIPTION OF THE NEW TRIBE

### **Hornietiini trib. nov.**

(Figs. 1-7)

**Type genus.** *Hornietus* Stebnicka, 2000.

**Material examined:** 1 ♀.: USA: Indiana, Brown Co., Dewar Ridge Road, 39.1345, 86.3277, 30.v.2015, on fungi, leg. Gareth S. Powell.

**Description.** Dorsum (Fig. 1). Body length 3.8 - 4.2 mm. Elongate, cylindrical, moderately convex, dark brownish to blackish, shiny, glabrous, with microreticulation.

Head (Fig. 4). Moderately, regularly convex, shiny, transverse, clypeus anteriorly truncate, on sides widely rounded, gently, not widely bordered; frontal suture distinctly visible, without gibbositities; genae small; with simple punctation.

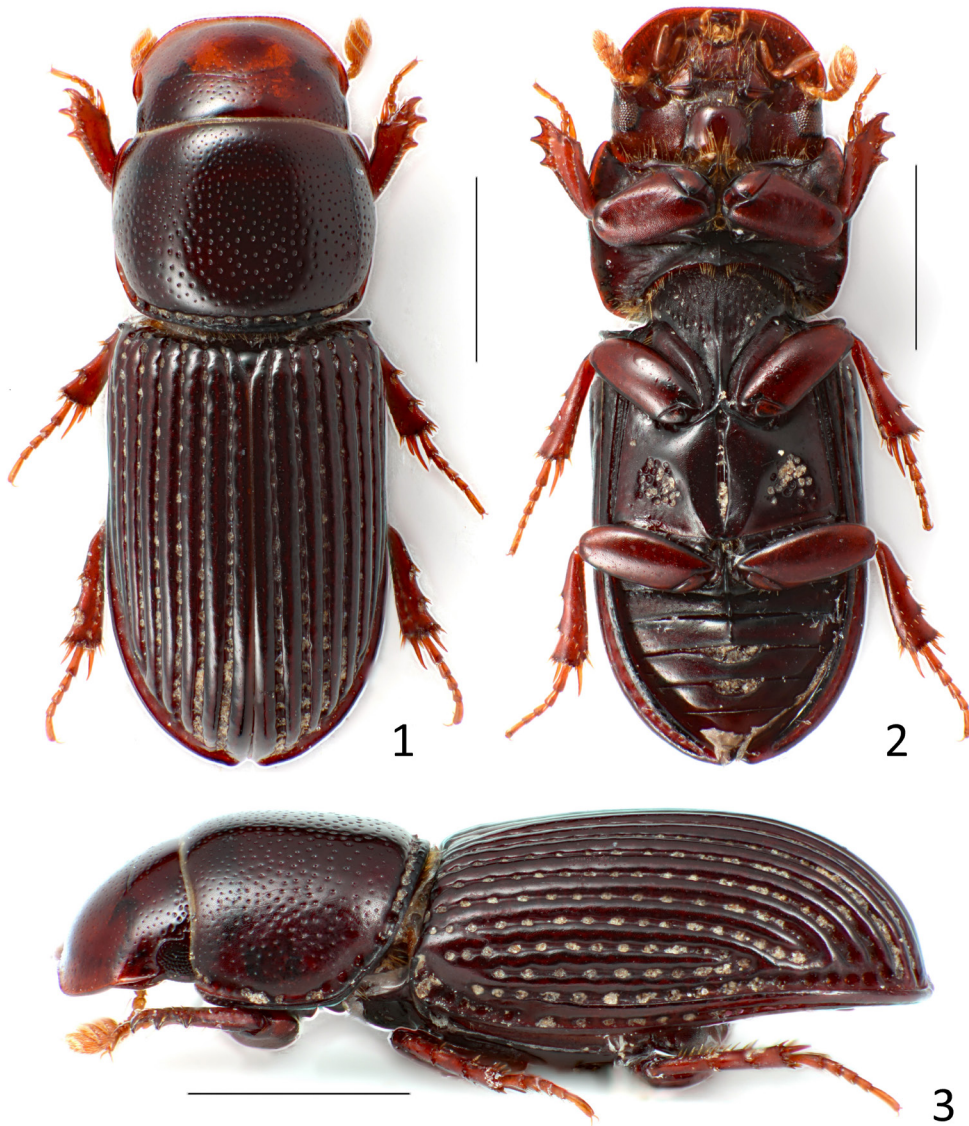
Epipharynx (Fig. 6) transverse, with sides broadly rounded. Anterior margin of pedia convex, but near corypha concavely arcuate; corypha weakly produced, with two distinctly raised celtes. Acropariae in the region where the anterior margin becomes concavely arcuate much wider than rest of them. Between epitorma and row of quite dense chaetopediae there are two very short rows of "celtes". Between row of chaetopediae and dense row of chaetopariae there are next two very short rows of "celtes". Additional very short row of "celtes" is located between chaetopariae and lateral margin of epipharynx. Epitorma rectangular. Tormae long, regularly rounded.

Mandibles (Fig. 7) asymmetrical, "penguin"-shaped, dark yellowish-brown. Each mandible on external side with a few (3-5) relatively long, thin setae. Left mandible slightly shorter, and very slightly shallower. Both mandibles in cutting part with two sharp teeth. Left mandible in cutting part with basal tooth much shallower. Both mandibles in basal part with very deep concavity, from which come out muscles connected to membranous internal border of mandible. Membranous internal border of each mandible with series of very thin setae which appear from about half of length and reach basal tooth; setae here becoming longer towards the tooth.

Pronotum transverse, approximately as wide as base of elytra, widest in the middle, quite distinctly convex, shiny, with simple punctation, sides and base very deeply and very widely bordered, in border with belt of irregularly spaced, large punctures; anteriorly not bordered. Anterior and hind angles widely rounded.

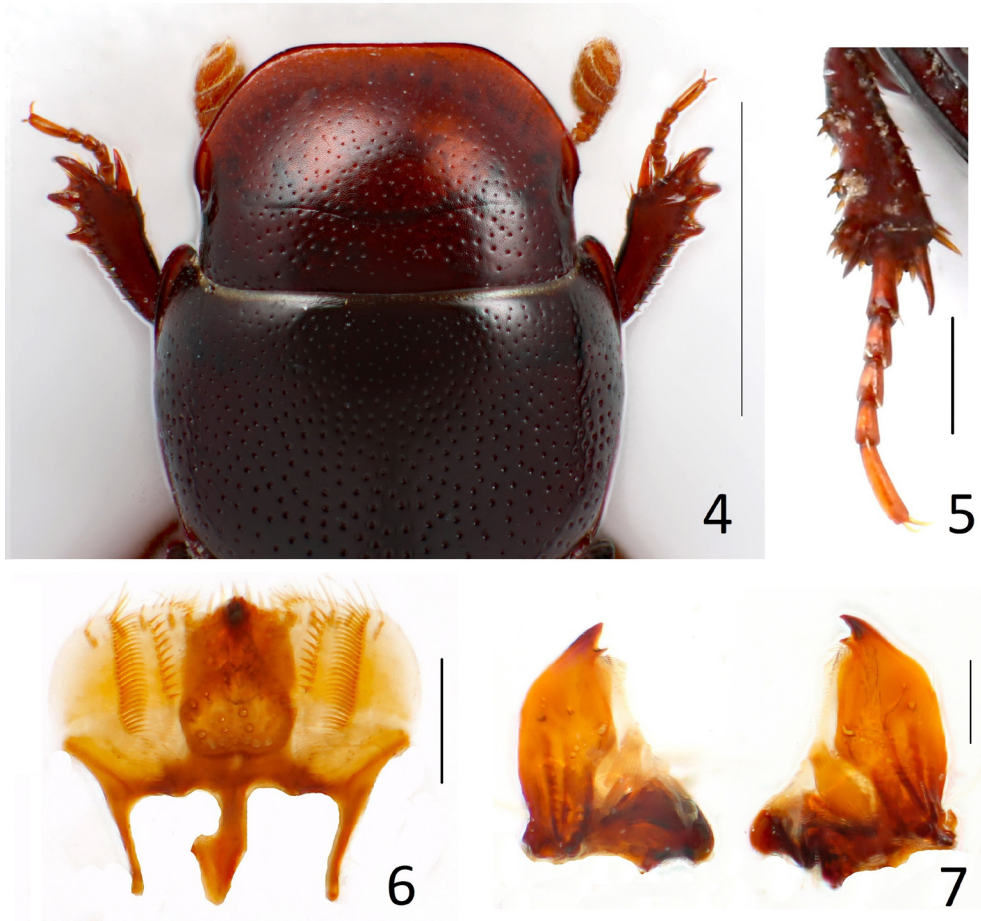
Scutellum small, triangular, without punctures, shiny, bordered on sides.

Elytra elongate, distinctly convex, parallel sided, shiny, with small but distinct humeral denticles; with ten striae and ten intervals. Striae distinctly, densely punctate; punctures large, up to middle of length gently indenting margins of intervals, striae becoming wider towards the apex, and punctures not indenting margins of intervals here. Intervals shiny, very distinctly convex, with small punctures. Tenth interval basally distinctly convex, becoming extremely convex towards the apex, but abruptly much less convex just before the apex, so that the elytral sutures do not appear contiguous at the apex.



Figs. 1-3. *Hornietus ventralis* (Horn, 1887), ♀: 1- dorsal view; 2- ventral view; 3- lateral view. Figs. 1-3: scale lines: 1.0 mm.

Legs. Femora shiny, finely and sparsely punctate. Protibiae distinctly tridentate laterally, not serrulate; apical spur long, moderately broad, with acute apex in females, inwardly hooked apex in males. Meso- and metatibiae with two strong transverse carinae, fimbriate apically with row of short spinules of unequal length. Superior and inferior apical spur of



Figs 4-7. *Hornietus ventralis* (Horn, 1887), ♀: 4- head; 5- metatibia, view on apical spurs; 6- epipharynx; 7- mandibles. Fig. 4: scale line: 1.0 mm. Figs. 5-7: scale lines: 0.2 mm.

metatibiae very widely placed, nearly on two opposite sides (Fig. 5). Claws rather small, thick, distinctly arcuate.

**Macropterous.**

Venter (Fig. 2). Metaventral plate shiny, concave, with very deep, match-shaped longitudinal furrow visible at middle, “head of match” deeper than rest part of furrow. Sides of metaventral plate with some very deep, large punctures concentrated nearby middle part of side. Abdominal ventrites not punctate, with quite high ridge in the middle; pre-penultimate, and penultimate ventrite basally with transverse, semicircular, deep concavity, last ventrite without any modification. Pygidium without modifications, covered by very short, very thin, very dense macrosetae.



Aedeagus with parameres much shorter than phallobase, sinuate in the middle of apex, when visible in lateral view; additionally with setae erected from each paramere.

**Differential diagnosis.** *Hornietus ventralis* (Horn, 1887) because of its many of unique features can be easily distinguished from all other known Aphodiinae. In my opinion, tribe Hornietiini trib. nov. represents one of the evolutionary lines closest to Eupariini Schmidt, 1910 and somewhat less close to Aphodiini Leach, 1815, Rhyparini Schmidt, 1910 and part of Psammodiini Mulsant, 1842. The shape of the mandibles suggests some similarity to Aegialiinae Laporte, 1840 and Eremazinae Iablakoff-Khnzorian, 1977. It is not so clear to me which of the features should be cited as diagnostic for the tribe. Certainly: shape of epipharynx, especially anterior margin, and corypha with celtes, mandibles with two teeth on internal margin, tridentate, not modified protibiae, meso- and metatibiae with two strong transverse carinae, superior and inferior apical spur of metatibiae very widely placed, nearly on opposite sides, modified ventrites, unmodified pygidium and shape of aedeagus are most important from an evolutionary point of view and most probably sufficient to cite in diagnosis, but I think other features like: head rather large, moderately convex, sides and base of pronotum very widely and deeply bordered, pronotum and elytra distinctly convex, shape of metaventral plate, and shape of tenth interval are also important, but all of them need additional discussion.

**Name derivation.** The name come from name of type genus - *Hornietus* Stebnicka, 2000.

## DISCUSSION

In my opinion, *Hornietus ventralis* (Horn, 1887) clearly deserves a new tribe. To begin I will try to focus on Stebnicka's matrix features and will try to analyse them to greater depth. Stebnicka compared the genus *Hornietus* with *Ataenius platensis* (Blanchard, 1846), genus *Saprosites* Redtenbacher, 1846, genus *Dialytes* Harold, 1869 and *Aphodius* s.str. complex (now: Aphodiini). As result of that study genus *Hornietus* proved to be most closely related to Aphodiini than to the rest of the compared species. The analysis used only simple „0-1” code which in my opinion makes it wrong and defective. Additionally only 12 features are for me decidedly insufficient in amount. I will try to re-analyze part of them and show weak points of previous analysis. Most important features, which exclude affiliation of genus *Hornietus* to tribe Aphodiini are: superior and inferior apical spur of metatibiae very widely placed, nearly on opposite sides (in Aphodiini apical spurs of metatibiae are clearly separate, but the distance between them is never so large; in other tribes apical spurs frequently are close together, which can suggest “as simple feature” close correlation to Aphodiini, but in my opinion it is still “good distinguishing feature” because that feature is very conservative); mandibles with two teeth on internal margin (that feature is for me unique, not observed in Aphodiini, somewhat similar to Aegialiinae and Eremazinae, but I think it is rather connected with type of food, probably similar in both subfamilies); shape of epipharynx: anterior margin near the middle gently concave (this inconspicuous feature is not observed in Aphodiini, rather more common in Eupariini, or Rhyparini), different acropariae (much

wider) in region where anterior margin becomes concavely arcuate (this feature is not observed in Aphodiini (but frequently visible in Rhypariini)), but it is to notice here that the genus *Hornietus* has the epipharynx with quite distinctly produced corypha, what suggests some correlation to Aphodiini (part of Eupariini have similar shape of epipharynx too); shape of aedeagus (in general shape parameres are similar to some Psammodiini, or Eupariini, but not Aphodiini), but shape of phallobase is similar to Aphodiini; abdominal ventrites are with various kind of modifications (which was never observed in Aphodiini, usually observed in Rhypariini, but ridges observed in basal ventrites are unique, not observed in any other tribe; additionally ventrites are not foveate in contrast to Eupariini and other tribes like Rhypariini too). Some additional features suggesting that *Hornietus* should be excluded from Aphodiini are: width of head (with connection with some other small features like: shape of genae, shape of punctation is more characteristic of Eupariini and was never observed in Aphodiini; frontal suture is not tuberculate - in some Aphodiini we can observe tuberculate suture), similar convexity of head is rather rarely observed in Aphodiini (but rather rarely observed in Eupariini too); very widely and deeply bordered pronotum can be observed in some Eupariini, never in Aphodiini; pronotum and elytra so distinctly convex more commonly we can observe in Eupariini than in Aphodiini; parallel elytra, with so distinctly convex intervals, deep elytra, with large punctures can be observed only in Eupariini, but similar size and distribution of punctures we can see in Rhypariini too; metaventral plate with so wide and deep median longitudinal groove is not observed in Aphodiini (is rather not typical to Eupariini to, but can be observed here and can be associated rather with Rhypariini); the shape of the tenth interval is very unique - this feature is not observed in any other known Aphodiinae, or even Scarabaeidae, but its shape is somewhat similar to last costae in part of Rhyparini and Euparini - but here, in apical part, costae are modified in caudal bulbs. However, meso- and metatibiae have two strong transverse carinae - which usually is observed in Aphodiini, rarely in other tribes; pygidium is not modified, covered by dense, fine macrosetae what can be connected with similar shape of pygidium in Aphodiini, but in *Hornietus* pygidium have shape different from abdominal ventrites which are without any macrosetae (in Aphodiini pygidium usually have setae similar to that observed on abdominal ventrites).

As a final conclusion, because of a lot of unique features I think we should treat Hornietiini trib. nov. as the tribe most similar and most closely related to Eupariini. Some features show its correlation to Aphodiini and somewhat to Rhypariini too. Because of presence of features which can be more or less commonly observed in various tribes I suspect that shape of *Hornietus* gives it a relict character, which gives a chance to make some evolutionary observations in the future.

At the end, it is to mention that the species is recorded from Indiana for first time. Little is known about biology of this species and collection of the species on fungi is also a new observation.

ACKNOWLEDGEMENTS. I am grateful to Robert Angus (Great Britain) for checking the English. Special thanks go to Gareth S. Powell who gave me studied specimen as gift.

## REFERENCES

- CHAPIN E. A. 1940: A revision of the West Indian beetles of the Scarabaeid subfam Aphodiinae. *Proceedings of the United States national Museum* 89(3092): 1-41.
- DELLACASA M. 1987: Contribution to a world-wide catalogue of Aegialiidae Aphodiidae Aulonocnemidae Termitotrogidae. *Memorie della Società Entomologica Italiana* 66: 1-455.
- DELLACASA G., BORDAT P. & DELLACASA M. 2001: A revisional essay of world genus-group taxa of Aphodiinae. *Memorie della Società Entomologica Italiana* 79: 1-482.
- GORDON R. D. & SKELLEY P.E. 2007: A monograph of the Aphodiini inhabiting the United States and Canada. *Memoirs of the American Entomological Institute* 79: 1-580.
- KERNS K. 2014: Notes on two rarely collected “Scarabs” from Ohio. *Ohio Beetles Bulletin* 13: 1-5.
- STEBNICKA Z. 2000: A new genus for Nearctic *Pleurophorus ventralis* with phylogenetic inferences. *Acta Zoologica Cracoviensia* 43(3-4): 287-291.

*Received: 15.2.2020*

*Accepted: 20.3.2020*

*Printed: 5.10.2020*

