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Zoltanzonitis a new genus of Afrotropical Nemognathinae (Coleoptera: Meloidae)

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The new Afrotropical nemognathine genus *Zoltanzonitis* is described. Species herein assigned have until now been placed in the Palaeotropical genus *Zonitoschema* based on their elongate, filiform antennae and greatly enlarged eyes, but are distinguished by the distinctly shorter antennomere II (0.5 or less the length of III), the absence of sclerotised rings in the male ejaculatory ductus and the emarginate ventrite V in males. The new genus includes five sub-Saharan species belonging to two distinct phenetic groups. New combinations for all species are proposed as well as the following new synonymies: *alluaudi*, *burgeoni elongaticeps* var. *surcoufi* and *posticalis* = *natala*; *elongaticeps* and *jansei* = *testaceiventris*.

Key words: blister beetles, taxonomy, key to species, genital structure.

INTRODUCTION

The meloid subfamily Nemognathinae remains inadequately studied (Pinto & Bologna 1999; Bologna & Pinto 2001, 2002). In a recent study of Australasian Meloidae (Bologna *et al.* 2013), the tribal classification of Nemognathinae was redefined with the description of the new tribe Palaestrini and two new genera. That paper also defined a Palaeotropical-Australasian lineage, which includes *Zonitoschema* Péringuey, 1909 and *Australozonitis* Bologna, Turco & Pinto, 2013, characterised by the following male genitalic features: ventral lobes of the aedeagus present but poorly sclerotised and the apical portion of the sperm duct reinforced with a series of sclerotised parallel rings or ridges (probably composed of micro-spicules). In the same work it was pointed out that some African species referred to *Zonitoschema* required reassignment to a new genus. In these species, unlike *Zonitoschema*, antennomere II is considerably shorter, 0.5 or less the length of III, ventrite V in males is emarginate, and the male ejaculatory ductus lacks sclerotised rings. Other differences are detailed in the Diagnosis below. The enlarged, bulging eyes and elongate, filiform antennae, features which originally placed these species in *Zonitoschema*, as well as the shortened antennomere II, serve to separate *Zoltanzonitis* from all other nemognathine genera. The distinctiveness of *Zoltanzonitis* is supported by more recent studies of nominal *Zonitoschema* from the Palaearctic (Batelka & Bologna 2014) and other

regions (Bologna *et al.* in prep.). The aim of this paper is to describe the new genus, assign to it the recognised species and propose several synonymies.

MATERIAL AND METHODS

The following collections were studied for this project: Albany Museum, Rhodes University, Grahamstown, South Africa (AMG); Natural History Museum, London, U.K. (BMNH); Marco A. Bologna Coll., Dipartimento di Scienze, Università Roma Tre, Roma, Italy (CB); California Academy of Sciences, San Francisco, CA, U.S.A. (CAS); Mickaël François Coll., Bar sur Aube, France (CF); Stanislav Krejčík Coll., Unico, Czech Republic (CK); University of California, Riverside, CA, U.S.A. (UCRC); the late Jan Probst Coll., Vienna (to be deposited at the Natural History Museum, Vienna) (CPV); Hungarian Natural History Museum, Budapest, Hungary (HNHM); Museo civico di Zoologia, Roma, Italy (MCZR); Museum für Naturkunde der Humboldt-Universität zu Berlin, Germany (MNB); Muséum national d'Histoire naturelle, Paris, France (MNHN); Museo regionale di Storia naturale, Torino, Italy (MRSNT); Museo civico di Storia naturale, Carmagnola, Torino, Italy (MSNC); Museo di Storia naturale, Università degli Studi di Firenze, Italy (MSNF); Museo civico di Storia naturale "G.Doria", Genova, Italy (MSNG); Ditsong



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National Museum of Natural History, Pretoria (formerly Transvaal Museum), South Africa (NHP); National Collection of Insects, ARC-Plant Protection Research Institute, Pretoria, South Africa (PPRI); Royal Museum for Central Africa, Tervuren, Belgium (RMCA); Royal Belgian Institute of Natural Sciences (RBINS); Iziko South African Museum, Cape Town, South Africa (SAMC); National Museum of Namibia, Windhoek, Namibia (SMWN); University of Guelph (Insect Collection), ON, Canada (UGO).

For this study we examined hundreds of specimens historically assigned to *Zonitoschema* from throughout the range of the genus. This included all described and several undescribed taxa. Nominal species of *Zonitoschema* herein assigned to *Zoltanzonitis*, all African, are as follows (number of specimens examined in brackets): *alluaudi* Pic, 1913 (65 and the photograph of holotype); *posticalis* Péringuey, 1892 (55); *burgeoni* Pic, 1931 (2 and holotype and its photograph); *natala* Beaugard, 1890 (38 and the photograph of holotype); *bivittipennis* Kaszab, 1981 (2 and holotype); *griseohirta* Pic, 1914 (4 and holotype); *testaceiventris* Pic, 1931 (36); *elongaticeps* Pic, 1935 (3); *jansei* Kaszab, 1951 (4 and holotype); *deserticola* Bologna, 2018 (holotype and 13 paratypes). Some of these are herein considered synonyms (see below).

Terms for Meloidae genitalia follow Selander (1964) which derive from Michener (1944). The orientation of male structures follows Gerber *et al.* (1972).

RESULTS

Zoltanzonitis Bologna & Pinto **gen. n.**

Type species: *Zonitis natala* Beaugard, 1890, by present designation.

Etymology. The new genus is named after Zoltán Kaszab, the late Director of the Hungarian Natural History Museum, Budapest. Z. Kaszab was one of the most relevant specialists of Meloidae and Tenebrionidae of the last century. He was for both of us an important supporter at the beginning of our careers.

Diagnosis. Elongate, slender Nemognathini, 9–17 mm in length; eyes large, protuberant, extending beyond inner margin of maxillae on under surface of head; antennae elongate, filiform, segment VIII *c.* 6 times as long as wide; antennomere II 0.5 or less length of III; maxillary galeae not joined to form a sucking tube; ventrite V in males deeply emarginate; aedeagus with

ejaculatory ductus uniform, not reinforced with sclerotised rings and with ventral lobes largely or entirely membranous and not bilobed; gonocoxal plate only slightly curved in lateral view, not gibbous.

In most Nemognathini genera antennomere II is *c.* two-thirds the length of III or longer. A distinctly shorter second antennomere (< half the length of III) does occur in other groups (*e.g.* *Zonitomorpha*, *Palaestrída* and some species of *Nemognatha*), but *Zoltanzonitis* is the only genus we are aware of in which this trait is coupled with elongate filiform antennae and enlarged eyes.

Description. Various coloured, never metallic; surface slightly shiny or more commonly subopaque; sparsely to moderately setose; setae short on entire body, slightly longer on venter. Head distinctly elongate below eyes, widest at eyes, temples short and more or less parallel, frons slightly depressed; eyes very large, almost in contact on underside of head, and rather narrowly separated above as well (interocular space *c.* 0.2 maximum head width); labrum suboval, slightly emarginate or rounded apically; mandibles extending slightly beyond labrum; maxillary galeae short, separated, not joined to form a sucking tube, extending slightly beyond mandibles; antennae filiform, elongate, extending beyond midlength of elytra; antennomere II *c.* 0.5 the length of III, VIII *c.* 6 times as long as wide. Pronotum distinctly longer than wide, subcampaniform, more (*e.g.* *natala*, *testaceiventris*) or less (*bivittipennis*, *deserticola*) widened in the middle; legs simple, not sexually dimorphic; elytra densely punctate, subcostate at basal third only in *natala* and *testaceiventris*; metatibial spurs narrow, similar, obliquely excavate and acute at apex; mesopleuron very wide. Male ventrite VI completely divided; ventrite V deeply emarginate, U- or V-shaped emargination extending half the length of ventrite. Female last ventrite slightly emarginate. Male genitalia with aedeagus and gonoforceps length subequal; aedeagus cylindrical, with or without hooks (see below), with a pair of spinose dorsoapical structures in two species (*natala*, *testaceiventris*); ventral aedeagal lobes narrow, elongate, not bilobed, not highly sclerotised; endophallic hook absent or present with a small ventrally curved or very large and elongate (*natala*) dorsally curved hook; sperm duct uniformly sclerotised much of its length without a series of sclerotised, parallel ridges or rings near apex; gonostyli divided only at apical fifth,

elongate, almost straight and very slender in lateral view (*natala*, *testaceiventris*), or more robust and slightly recurved at apex in other species; gonocoxal plate longer than wide, not gibbose ventrally, elongate and with a large basal membranous area in two species (*natala*, *testaceiventris*).

Remarks. The species of *Zoltanzonitis*, all Afrotropical, are phenetically similar to those of *Zonitoschema*, in which they were previously included. The similarities, primarily enlarged eyes and extremely elongate filiform antennae, are likely convergences due, at least in part, to nocturnal habits. Similar adaptive features are present in a group of Australian *Australozonitis* species (Bologna *et al.* 2013), in the New World genus *Pseudozonitis* (Pinto & Bologna 1999) and in at least one species of *Zonitis* (Enns 1956; Pinto 2017). Three features in addition to the ejaculatory duct and antennal structure separate *Zoltanzonitis* from *Zonitoschema*. The male ventrite V is deeply emarginate, almost triangularly in the *Z. natala* group, and U-shaped in the *Z. griseohirta* group (see below for the definition of groups of species). The ventral surface of the gonocoxal plate is only slightly convex in males of *Zoltanzonitis* (Figs 15b, 16c, 17b, 18b) but strongly convex or gibbose in *Zonitoschema* (Bologna *et al.* 2013). Additionally, with the exception of *deserticola*, the elytral surface in *Zoltanzonitis* is relatively opaque and densely punctate; in *Zonitoschema* the surface is more lustrous and densely micropunctate.

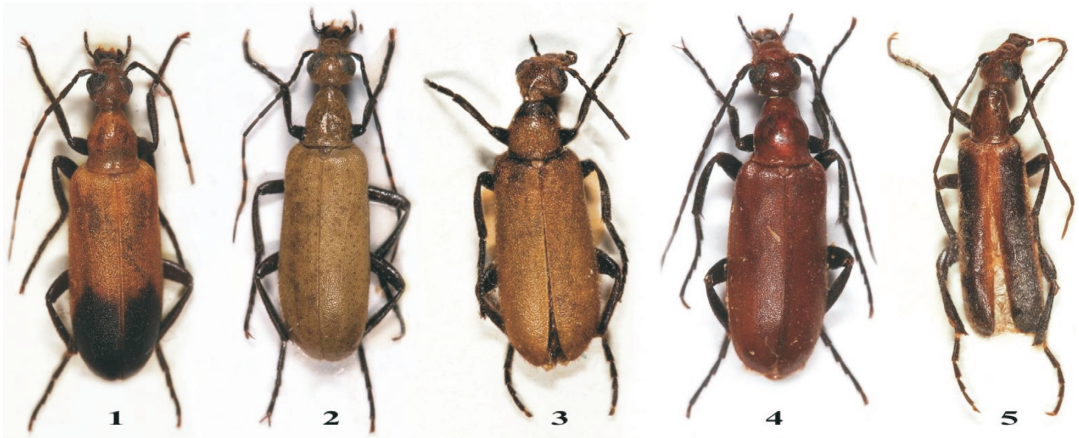
Zoltanzonitis can be divided into two phenetic groups mainly based on the structure of male genitalia and ventrite V: the first group (*Z. natala* group), includes *Z. natala* and *Z. testaceiventris*; the second group (*Z. griseohirta* group) includes *Z. griseohirta*, *Z. bivittipennis*, and *Z. deserticola* (see below for synonymies). The first group is characterised by the: (i) endophallus of the aedeagus distinctly hooked, while in the second it is unmodified; (ii) gonoforceps very slender, particularly the gonostyli, and gonocoxal plate with a large basal membranous area, while in the second group the gonoforceps are more robust and the gonocoxal plate is only partially or scarcely submembranous basally (both traits not observed in *Z. bivittipennis*, because the gonoforceps was lost); (iii) male ventrite V deeply triangularly emarginate, while in the second group the emargination is deeply U-shaped; (iv) elytra subcostate at basal third, but not in the second group.

Zoltanzonitis clearly belongs to the Nemognathini tribe, as defined by Bologna *et al.* (2013). This group is worldwide in distribution with *c.* 30 genera. Relationships have never been studied and it is premature to speculate on the placement of the new genus within the tribe.

The occurrence of hooks associated with the aedeagus in two species of *Zoltanzonitis* may be unique in the Nemognathini although we suspect that the aedeagal process of the Mediterranean *Zonitis ruficollis* Frivaldszky, 1877 (see Pardo Alcaide 1954), could also represent an endophallic hook. Although uncommon in this tribe, aedeagal hooks of a different nature and not associated with the endophallus characterise several species of *Palaestra* in the nemognathine tribe Palaestrini (Bologna *et al.* 2013).

Taxonomy. The diagnostic features of *Zoltanzonitis* were recognised in 10 Afrotropical nominal species previously included in different nemognathine genera: *Zonitoschema alluaudi* Pic, 1913, *Zonitoschema bivittipennis* Kaszab, 1981, *Zonitoschema burgeoni* Pic, 1931, *Zonitoschema deserticola* Bologna, 2018, *Zonitoschema elongaticeps* Pic, 1935, *Zonitoschema griseohirta* Pic, 1914, *Zonitopsis jansei* Kaszab, 1951, *Zonitis natala* Beaugard, 1890, *Zonitis posticalis* Péringuey, 1892 (described as *Zonitis apicalis* Péringuey, 1886, a preoccupied name), and *Zonitoschema testaceiventris* Pic, 1931. The study of available material including types revealed considerable synonymy, reducing the number of species to five.

(i) Five nominal taxa [(*alluaudi*, *burgeoni*, *natala*, *posticalis*, and one variety of *elongaticeps* (var. *surcoufi* Pic, 1935)] have similar elytral colour. In all, the elytra are yellow except for black colouration at the apical fourth. Variation in pronotal shape, as well as pronotal and head punctuation (Figs 6–9) are the only differences separating these forms. The distinctive male genitalia (Fig. 15) are identical in all. Consequently we consider *alluaudi*, *burgeoni* *posticalis* and *elongaticeps* var. *surcoufi*, as synonyms (**syn. n.**) of *Zoltanzonitis natala* (Beaugard, 1890) (**comb. n.**) (see also Figs 23–25). This species is widely distributed throughout most of sub-Saharan Africa (Appendix 1) (Fig. 20). The populations from western, central and eastern Africa (corresponding to *alluaudi* and *burgeoni*) have the pronotum with punctures that are deeper and coarser (Figs 7–9) than those from southern Africa (*natala*, *posticalis*) (Fig. 6). These southern populations also have the pronotum slightly wider



Figs 1–5. Habitus of *Zoltanzonitis natala*, South Africa, KwaZulu-Natal, Mkuze River (1); *Z. testaceiventris*, Kenya, Voi (2); *Z. griseohirta*, Kenya, Meru, Hateri (3); *Z. deserticola*, Namibia, nr. Usakos (4); *Z. bivittipennis*, Namibia, Kaokoland (5).



Figs 6–9. *Zoltanzonitis natala*, variation of pronotum and head punctation: South Africa, KwaZulu-Natal, Mkuze River (6); Tanzania, Same (7); Zaire, Ishango, Virunga N.P. (8); Kenya, Voi (9).



Figs 10–14. *Zoltanzonitis testaceiventris*, variation of colour: Kenya, Voi (10, 11); South Africa, Mpumalanga, Kruger N.P., Skukuza (12); South Africa, Southpansberg, Sard (13); South Africa, Limpopo, Merensky (14).

medially (this feature also occurs in some central African populations) (Fig. 8) and the genae are black or deeply infuscate rather than yellow or only slightly infuscate as in other populations. No additional information on *natala*, *posticalis*, *burgeoni* and *elongaticeps* var. *surcoufi*, was published after their descriptions.

We examined specimens referable to the *alluaudi-burgeoni* phenotype from Somalia, Kenya, Tanzania, Uganda, D.R. Congo, Central African Republic,

Togo, Benin, the Ivory Coast and Guinea. These forms were described respectively from Tanzania and Kenya (Pic 1913) and from D.R. Congo (Pic 1931b), and *alluaudi* was later recorded from Eritrea (Bologna 1978), Somalia (Kaszab 1973, Bologna 1978, 1990), D.R. Congo (Kaszab 1960), the Ivory Coast (Kaszab 1968), and Ghana (Kaszab 1973, 1981). Specimens of *natala* were examined from Mozambique, South Africa, Angola, and N. Namibia. Its synonym *posticalis* was described



Fig. 15. *Zoltanzonitis natala*, male genitalia: gonoforceps, ventral (a); gonoforceps, lateral (b); aedeagus lateral (c); aedeagus with everted endophallic hook, lateral (d). Bar: 1 mm.



Fig. 16. *Zoltanzonitis testaceiventris*, male genitalia: gonoforceps, ventral (a); gonoforceps, dorsal (b); gonoforceps, lateral (c); aedeagus, lateral (d); aedeagus, dorsal (e); detail of aedeagal apex, lateral (f). Bar: 1 mm.



Fig. 17. *Zoltanzonitis griseohirta*, male genitalia: gonoforceps, ventral (a); gonoforceps lateral (b); aedeagus dorsal (c); aedeagus, lateral (d). Bar: 1 mm.



Fig. 18. *Zoltanzonitis deserticola*, male genitalia: gonoforceps, ventral (a); gonoforceps lateral (b); aedeagus dorsal (c); aedeagus, lateral (d). Bar: 1 mm.

from a doubtful southern African locality (Péringuey 1886; see also 1892, 1909) and never again recorded as such, except recently from Namibia (Bologna *et al.* 2018). The var. *surcoufi* (sub *elongaticeps*) was described from Mozambique (Pic 1935). We examined the photo of the holotype of *Zonitis natala* from 'Natal' (= KwaZulu-Natal,

South Africa) as well as holotypes of the synonyms *alluaudi* and *burgeoni* (Figs 23–25). The examined material (localities and month) is listed in Appendix 1.

(ii) Three other nominal taxa [*elongaticeps*, *jansei*, *testaceiventris* and one variety of *testaceiventris* (var. *brunneicollis*)] are characterised by colour. The antennae and legs are completely black, the last six antennomeres reddish, and the venter black except for the last three abdominal ventrites which are red. The structure of the male genitalia is similar and distinctive in that the aedeagus has paired spinose areas dorsoapically and a sclerotised ventrally directed endophallic hook. In addition the gonocoxal plate is elongate and partially membranous at the basal third, dividing the structure into distinct portions. We are unable to find any constant differences between *elongaticeps* and *testaceiventris*, in which the shape and punctuation of the pronotum are only slightly variable (Figs 10–13), while only minor differences occur in *jansei*. In the latter the elytra are distinctly light yellow (Fig. 14) rather than deep yellow or yellow brown as in the other forms (Figs 10–13) and the elytral punctures are slightly more distanced. It represents a southern geographic colour variant which occurs intermixed with typical populations in Kenya and Mozambique. Pic (1939) described *testaceiventris* var. *brunneicollis*, a minor colour variant with a darker head and pronotum; material from Mozambique and Zimbabwe of this form was examined. Considering this minor variation we treat *elongaticeps*, *jansei* and *testaceiventris*



Fig. 19. *Zoltanzonitis bivittipennis*, male genitalia: aedeagus dorsal (a); aedeagus, lateral (b). Bar: 1 mm.



Fig. 20. Distribution of *Zoltanzonitis natala*.

var. *brunneicollis* as synonyms (**syn. n.**) of *Zoltanzonitis testaceiventris* (Pic, 1931a) (**comb. n.**). No additional data for *jansei* and *elongaticeps* were published after their descriptions. For *testaceiventris* there is a single somewhat uncertain record from northeastern Namibia (Bologna *et al.* 2018) and another of the var. *brunneicollis* from Tanzania (Pic 1939).

We examined specimens of the typical phenotype from Rwanda, Kenya, Tanzania, Zimbabwe, Mozambique and northeastern South Africa; *testaceiventris* was described from Zimbabwe (Bulawayo: Pic 1931a) and *elongaticeps* from Mozambique (Zambesi area: Pic 1935). We examined specimens of the *jansei* phenotype from Rwanda, Mozambique and South Africa mixed with typical phenotype; this form was described from Mozambique and northeastern South Africa (Kaszab 1951) (Fig. 21).

(iii) The remaining three species are easily distinguished by characters listed in the key (see below). *Zoltanzonitis bivittipennis* (Kaszab, 1981) (**comb. n.**) (Fig. 5) is characterised by the vittate elytral pattern, unique in the genus and relatively uncommon in Nemognathinae. This species was described from southwestern Angola and later recorded from northwestern Namibia (Bologna *et al.* 2018) (Fig. 22).

Zoltanzonitis griseohirta (Pic, 1914) (**comb. n.**) (Fig. 3) and *Zoltanzonitis deserticola* (**comb. n.**)

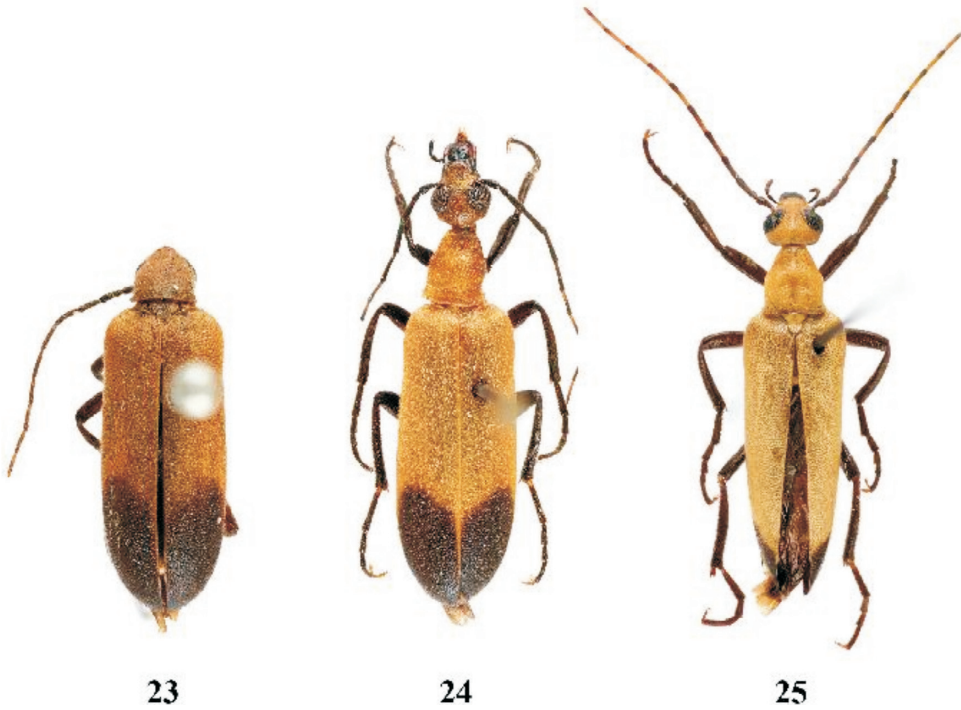


Fig. 21. Distribution of *Zoltanzonitis testaceiventris*.



Fig. 22. Distribution of *Zoltanzonitis bivittipennis* (★), *Z. deserticola* (▲), *Z. griseohirta*. (●).

(Fig. 4) are quite similar to *testaceiventris*, with the former easily recognised by its partially red legs and the second by the carmine colouration and the considerably less dense punctation on the pronotum. *Zoltanzonitis griseohirta* was described from Somalia and later erroneously recorded from the Arabian Peninsula and several Afrotropical coun-



Figs 23–25. Holotypes of *Zonitis natala* (23), *Zonitoschema alluaudi* (24), *Zonitoschema burgeoni* (25).

tries (Ethiopia, Eritrea, Kenya, Tanzania, Rwanda, Sudan, D.R. Congo, Nigeria, Ghana, Gambia). As demonstrated by Batelka & Bologna (2014), all these citations refer to *Zonitoschema* cfr. *genicularis*, and forms belonging to the *Zonitoschema genicularis* (Wellman, 1910) and *Z. coccinea* (Olivier, 1801) complexes which remain taxonomically unresolved (Bologna *et al.*, in prep.). Consequently *griseohirta* seems distributed with certainty only in Somalia and Kenya (see Appendix) (Fig. 22). *Zoltanzonitis deserticola* is endemic to the Namib Desert in Namibia (Bologna *et al.* 2018) (Fig. 22).

Key to species

- 1. Elytra reddish with a wide longitudinal dark vitta (south Angola, north Namibia) (Fig. 5) *bivittipennis*
- 1' Elytra not vittate, entirely yellow-brown or carmine, or black at apex 2
- 2. Elytra yellow-brown, with black at apical ¼ (Eritrea, Somalia, Kenya, Tanzania, Mozambique, South Africa, northeastern Namibia, southwestern Angola, Uganda, D.R. Congo, Central African Rep., Togo, Ghana, Ivory Coast, Guinea, Gambia) (Fig. 1) *natala*
- 2' Elytra entirely yellow-brown or carmine ... 3
- 3. Femora red in basal half or more; antennomeres robust, totally black; body yellow-brown; elytra shallowly subrugose; temples short and converging (Somalia, Kenya) (Fig. 3) *griseohirta*
- 3' Legs entirely black; antennomeres slender, totally black or VII–XI reddish at base; elytra distinctly punctate; temples longer and less convergent 4
- 4. Body carmine with venter somewhat darker; dorsal surface of body shiny, particularly on head and pronotum; head and pronotum sparsely, finely punctate; antennomeres totally black (western Namibia) (Fig. 4) *deserticola*
- 4' Body brown or yellow-brown, except thoracic sterna black and abdominal venter black with last three ventrites reddish; dorsal surface of body subopaque; head and pronotum more densely and deeply punctate; antennomeres black but usually VI–XI reddish at base (Rwanda, Kenya, Tanzania, Mozambique, Zimbabwe, northeastern South Africa, northeastern Namibia) (Fig. 2) *testaceiventris*

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APPENDIX 1. List of localities from literature and examined specimens (acronyms are listed in Material and Methods), with information on the month of collection.

Zoltanzonitis bivittipennis (Kaszab, 1981)

SW Angola: Namibe, Pastoril do Sul (holotype and paratype: SMWN; HMNH; Kaszab 1981).

NW Namibia: Kaokoveld, Ombuku, 16.9833°S 13.3667°E (MNB; Bologna *et al.* 2018); Kaokoveld, Ombuku, 17.1500°S 13.5333°E (CB; MNB; Bologna *et al.* 2018).

Zoltanzonitis deserticola (Bologna, 2018)

W Namibia: Torrabai turnoff, 25 km W, V (CB; SMWN; Bologna *et al.* 2018; holotype and paratypes); Henties Bay/Usakos via Spitzkoppen, 21°54'S 14°58'E, IV (CB; AMG; Bologna *et al.* 2018; paratypes); Blutkuppe, Namib-Naukluft Park, SE 2215 Cd, IV (SMWN; Bologna *et al.* 2018; paratypes); Damaraland, Bethanis 514, SE 2014 Ad, V (SMWN; Bologna *et al.* 2018; paratypes).

Zoltanzonitis griseohirta (Pic, 1914)

Somalia: Somalia (Bologna 1990 for a synthesis); Territorio dei Rahanuin, X–XI (MSNG, holotype; Pic 1914; Bologna 1990); Bardera (MSNG; Pic 1914; Bologna 1990).

Kenya: Meru Distr., Materi, Mitunguu, II (CB). As discussed in the text and well explained by Batelka & Bologna (2014), other late records from Africa and Arabian Peninsula, cited as *griseohirta*, actually refer to a distinct species of the genus *Zonitoschema* close to *genicularis* (Wellman 1910).

Zoltanzonitis natala (Beauregard, 1890)

Ethiopia: Gamo Goffa, 2km SE Key Afer, 05°30'19"N 36°42'06"E, IV (CF).

Eritrea: Ducambia, VII (MRSNT; Bologna 1978).

Somalia: Somalia (Bologna 1990 for synthesis); Afgoye, V (CB; Bologna 1990); Lower Shebelle, Abarey lake, Joware, V (CB; Bologna 1990); Labadaad (=Alessandra) (CB; Bologna 1978, 1990); Jillib (Kaszab 1973).

Kenya: Coast SW Garsen, W of Witu, XII (CB); Voi, XII (CB); Voi, Siagala, XII (CPV); Sagala Hills, I (CPV).

Tanzania: Tanzania (Kaszab 1973); Kilimanjaro E prov., Same I (MSNF) and XI–XII (CPV); Moshi (MNHN; Pic 1913); rd. Mto Wa Mbu-Karatu, IV (MSNF); Lake Manyara, view point, rd. to Karatu, IV (MSNF) (this locality is not far from the type locality of *alluaudi*); Manyara, 25 km S Babati, XII (CF); Iringa, 50 km NW

Iringa, I (CF); Pwani, 15 km W Kibiti, I (CF).

Uganda: Mubende env., XI (CK); Queen Elizabeth N.P., Ishasha Camp, V (CB).

D.R. Congo: Virunga N.P., Ishango, btw. Amin Lake (= Edward Lake) and Semliki River, II (CB); Virunga N.P. as Parc Albert, III (RMCA) (these localities are not far from the type locality of *burgeoni*: Pic 1931b); Nord-Kivu, Munene, Asingi river, Parc Albert, III (RMCA); Province Orientale, Source Duru, Garamba National Park, IV (RMCA; Kaszab 1960); Mitwaba (Manono), X (UCRC).

Central African Rep.: Kemo Prov., 35–45 km N Sibut, IV (CB; CF); Ombella-Mpoko P.R., 85 km NW Bangui, nr. Boali, III (CB).

Nigeria: Osun, Ile-Ife, IV (RMCA).

Benin: Fôret de Nicouli, 06°44'N 02°08'E, IV (MSNC).

Togo: Fazao, IV (CB).

Ghana: Ashanti reg. Abofour, IV (Kaszab 1981); Kadaso, III (Kaszab 1981)

Ivory Coast: Comoe, Zamou, 08°32'50.1"N 003°46'07.5"W, VI, at light (CB, alcohol 95 %); Comoe, Kolomabira, 08°29'19.3"N 003°45'24.3"W, VI–VII (CB); Lagunes, Lamto, VII (MNHN); Marahoué, Danangoro, VI (RMCA); Sud-Bandama, Divo, IV–V (RMCA; Kaszab 1968).

Guinea: Plateau de Zouguepò, Mifergui, V (CB; MNHN).

S Mozambique: Nova Chupanga (MNHN, holotype of *elongaticeps* var. *surcouffi*); Porto Henrique, XII (CB); Matutuine Distr., Tinti Gala Lodge, II (CB).

Zambia: Western Province, 14 km W Kataba, 15°26'53"S 23°15'37"E, XI (CF); Western Province, 7 km S Mukokwa, 15°37'57"S 23°18'57"E, XII (CF); Western Province, 5 km W Masese, 17°17'50"S 24°36'09"E, XI (CF); Western Province, 6 km W Masese, 17°18'05"S 24°36'07"E, XII (CF); Western Province, 7 km W Masese, 17°18'01"S 24°35'40"E, XII (CF); Western Province, 13 km SW Lusu, 17°16'04" S 24°00'07" E, XI (CF); Western Province, 14 km W Sesheke, 17°26'25" 24°10'14"E, XII (CF); Western Province, 6 km NE Chiulu, 17°18'38" S 24°12'29"E, XII (CF); Western Province, 25 km W Lusu, 17°17'09" S 23°53'14"E, XII (CF).

Zimbabwe: Matabeleland, Northern Victoria Falls, Zambezi Nat. Park., 17°53'S 25°49'E, XII (MNB).

NE South Africa: (holotype of *posticalis* from uncertain locality, SAMC). Limpopo, Louis Trichardt, I (CPV); Limpopo, Klaserie Private Game Reserve, I (MSNG); Limpopo, 35 km W Hoedspruit, XII (CF); Limpopo, Lekgalameetse Nat. Res., 24°05'S 30°15'E, XII (MNB); Mpumalanga, Schoemanskloof Valley, XI (CB; MCZR); Mpumalanga, Kruger N.P., Skukuza, I (CB, alcohol 95%); KwaZulu-Natal (as '5Natal'5) (holotype; RBINS; Beauregard 1890; Kaszab 1954); KwaZulu-Natal, Ndumo Game Res., XI (CB, UGO; photograph R. Perissinotto, Port Elizabeth Univ.); KwaZulu-Natal, Tembe Elephant Park, 27°02'S 32°25'E, XI (MNB); KwaZulu-Natal, Mkuze Riv. env., 25 km SW Mbazuama, XII (CB); KwaZulu-Natal, Mukze GR, I (CB); KwaZulu-Natal, Sodwana Bay N. P., 27°33'S 32°40'E and 27°37'S 32°41'E, XI and XII (CB; CF; MNB); KwaZulu-Natal, False Bay, XI (CB); KwaZulu-Natal, iSimangaliso Wetland Park, Cape Vidal, XI (photograph R. Perissinotto, Port Elizabeth Univ.).

SW Angola: Sá da Bandeira, XII (CAS); 5 mi. E Vila Arriaga, XII (CAS); Huila Cacula, XI (CF).

NE Namibia: Caprivi, Kongola, Kwando R., W Caprivi, 17.7833°S 23.3333°E (SMWN; Bologna *et al.* 2018); Caprivi, Rundu, 17.93°S 19.76°E, I (MSNF; Bologna *et al.* 2018). 12 km S Katima Mulio, I (CB).

Zoltanzonitis testaceiventris (Pic, 1931)

Rwanda: Lake Ihema, XI (RMCA).

Kenya: Tsavo E N.P., Buchuma, XII (CB); SW Voi, XII (CB; CPV).

Tanzania: Tanzania (Pic 1939); 30 km SW Songea, XII (CPV).

Mozambique: Région de Zambèze (MNHN, holotype *elongaticeps*; Pic 1935); 15 km SSE Manie, 15°29'S 33°16'E, XII (CB); Magade, X (Kaszab 1951 as *jansei*).

Zimbabwe: 30 km S Harare, XI (CPV); Mwuma, rd. Gutu-Chatsworth, II (CB); Bulawayo (MNHN, holotype; Pic 1931a); 20 km W Gwanda, 120 km S Bulawayo, XII (CB; CPV).

NE South Africa: Limpopo, nr. Hans Merensky, XII (CB) (this locality is not far from the type locality of *jansei*); Limpopo, Zebediela (Kaszab 1951 as *jansei*); Limpopo, Soutpansberg Mts., Sand River gorge, Medike Res., XII (CB); Limpopo, Blouberg, XII (CB); Limpopo, Thabazimbi, XI–XII (CB); KwaZulu-Natal, Ndumo Game Res., XI (CB; UGO); KwaZulu-Natal, Newcastle, Volkraus, XII (CPV).

NE Namibia: Otjozondjupa, Tsumkwe, Aha Hills, Bushmanland, 19.6167°S 20.9500°E (SMWN); Caprivi strip, 12 km S Katima Mulio (CB).