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# *Heterocerus keimoesensis* sp.n. from the Republic of South Africa (Coleoptera: Heteroceridae)

S. SKALICKÝ

**Abstract**

*Heterocerus keimoesensis* sp.n. (Coleoptera: Heteroceridae) from the Republic of South Africa is described and illustrated. The presence of *H. elongatus* GROUVELLE, 1896, *H. incertus* GROUVELLE, 1896, *H. ornatus* GROUVELLE, 1906, *H. peringueyi* GROUVELLE, 1919 and *H. thebaicus australis* CHARPENTIER, 1965 in the Republic of South Africa is confirmed.

**Key words**: Coleoptera, Heteroceridae, *Heterocerus*, new species, Republic of South Africa, taxonomy.

## Introduction

The family Heteroceridae contains at present about 390 described, morphologically uniform species, divided into five genera. All members are found at sandy and muddy banks of streams and rivers, where they live in tunnels, a few millimeters below the surface.

Between 1999 and 2009, six species of Heteroceridae were collected from three localites in the Republic of South Africa by Miroslav Snížek (České Budějovice, Czechia). One of these species is new to science and described herein; it is the 14th species of *Heterocerus* known from the Republic of South Africa and belongs to the *H. bredoi* group sensu CHARPENTIER (1965), resembling *H. peringueyi* GROUVELLE, 1919 and *H. hardei* MASCAGNI, 1988. In addition, distributional records of the other five species collected by M. Snížek are presented.

## Material and methods

All specimens are deposited in CSU (Coll. S. Skalický, Ústí nad Orlicí, Czechia).

Separate labels are indicated by double slashes; locality data are cited verbatim between "quotation marks". Author's explanatory remarks are given in square brackets.

## *Heterocerus keimoesensis* sp.n.

TYPE MATERIAL: **Holotype** ♂ : "RSA [Republic of South Africa], N. Cape NC Upington, Keimoes 22.x.2009 Snížek lgt." // "HOLOTYPE *Heterocerus keimoesensis* Skal. Det. S. Skalický 2021" [red label]. **Paratypes**: 1 ♀ (allotype): same data as holotype, the second red label is: "ALLOTYPE *Heterocerus keimoesensis* Skal. Det. S. Skalický 2021"; 1 ♀: same data as holotype, the second red label is: "PARATYPE *Heterocerus keimoesensis* Skal. Det. S. Skalický 2021".

DESCRIPTION: Holotype ♂: Total length 4.20 mm (incl. labrum); elytra 2.45 mm long, 1.45 mm wide across shoulders. Labrum and head dark brown, eyes and pronotum black, elytra dark brown with pale brown spots as in Fig. 1; legs pale brown to rusty brown, ventral surface dark brown, pale brown laterally. Labrum (Fig. 2), visible part 0.85 times as wide as long, apex emarginate, softly serrate in median portion, surface finely granular, without larger intermixed punctures; setae fine, with intermixed dense longer erect setae. Mandibles (Fig. 3) strong with acute apex, dorsal subapical tooth small, round, with pointed tooth on the lateroventral edge.

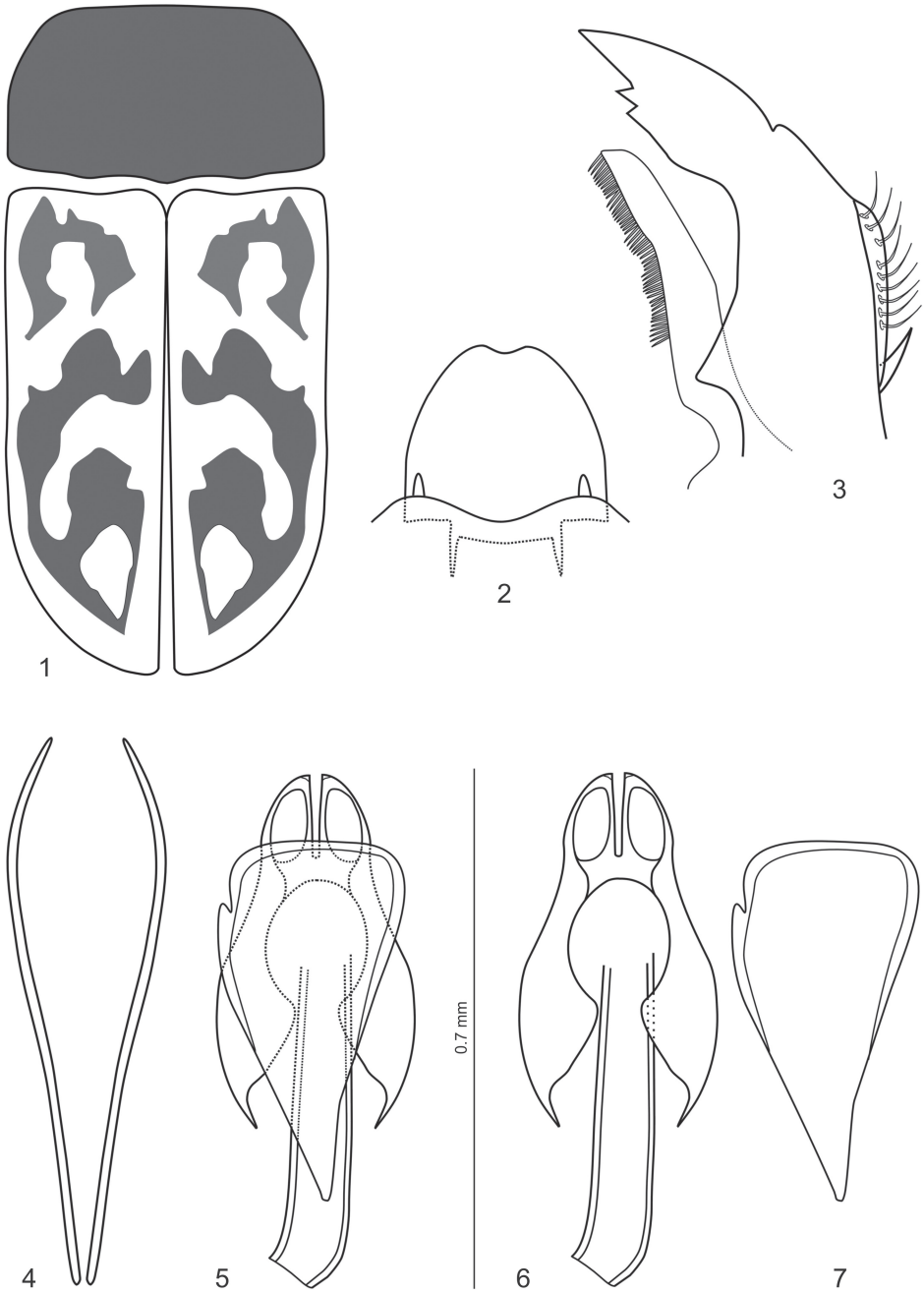
Prostheca densely and finely bristled, without prosthecal notch. Clypeus with anterior horns; anterior margin deeply emarginate; surface finely granular, setae short, dense, semierect. Head finely granular, with long erect setae above eyes. Antennae 11-segmented, with 7-segmented club, scape triangular, with sparse and long setae. Pronotum 1.65 times as wide as long, as wide as base of elytra; lateral margins almost parallel, anterolateral angle of pronotum broadly rounded, pronotal base finely rimmed. Dorsal surface of pronotum with irregular, shallow and diffusely punctate punctures about as half diameter to eye facets Setae of pronotum yellow, sparse, short, with intermixed longer setae laterally. Scutellum triangular, pointed, surface roughly granular. Elytra without longitudinal furrows, scutellar depressions shallow, humeral depressions well developed, extending obliquely almost to the basal fourth of the elytra. Surface of elytra shiny, micropunctate with coarse dense granules approximately 1.5 times as large as eye facets; setae short, semierect, yellowish and sparse, without longer setae. Epipleural ridge absent. Metaventrite with post-mesocoxal ridge. Transverse ridge on the mesoventrite U shaped. Mesoventrite neither spinose only tuberculate in front of each mesocoxa. Post-metacoxal line uncomplete. Stridulatory arch marked with visible striae. Protibia with ten stout spines, mesotibiae with ten long and thin spines, metatibia with uncertain number of thin spines. Spiculum gastrale 0.80 mm long; V-shaped as in Fig. 4, arms connected by membrane apically. Aedeagus (Figs. 5–7) 0.70 mm long, well sclerotized, Parameres firmly fused; with phallobase. Supporting sheath without border posteriorly. Penis simple, without internal sac.

Paratype (allotype) ♀: Externally similar to male. Total length 4.25 mm (to apex of labrum); elytra 2.50 mm long, 1.55 mm wide across shoulders. Mandibles without tooth on the lateroventral ridge. Shape of elytral pattern partially different.

DIFFERENTIAL DIAGNOSIS: Due to the shape of the aedeagus (flaps of parameres firmly connected with the rest of phallobase, penis without long processus accessorius), 11-segmented antennae and the presence of a post-mesocoxal ridge on the metaventrite, the new species belongs to the *Heterocerus bredoi* group sensu CHARPENTIER (1965). This group contains eleven previously described taxa from the Ethiopian Region (CHARPENTIER 1965, MASCAGNI & MONTE 2001, SKALICKÝ 1996, 1999, 2019). Among them, only two species, *H. meridionalis* PÉRINGUEY, 1892 and *H. peringueyi*, are known from the Republic of South Africa. *Heterocerus keimoesensis* is similar to *H. peringueyi* and *H. hardei* (CHARPENTIER 1965, MASCAGNI 1988, MASCAGNI & MONTE 2003a, b).

*Heterocerus keimoesensis* differs from these species in the following characters: 1) body length (5.2–5.8 mm in males of *H. peringueyi*, 4.2 mm in *H. keimoesensis*); 2) tooth absent from lateroventral mandibular ridge in *H. peringueyi* and *H. hardei* (present in *H. keimoesensis*); 3) colour of elytra and elytral spots (black to brown with orange spots in *H. hardei*, black with pale brown spots in *H. peringueyi* and dark brown with pale brown spots in *H. keimoesensis*); 4) shape of elytral pattern (Fig. 1) [*H. peringueyi*: see CHARPENTIER (1965: fig. 70), however, the elytral pattern in *H. peringueyi* is quite variable and does not provide reliable distinguishing characters; *H. hardei*: see MASCAGNI (1988: fig. 4B)]; 5) distribution of *H. hardei* (Chad, Ethiopia); 6) male genitalia: in *H. peringueyi* (see CHARPENTIER 1965: fig. 113), phallobase S-shaped laterally, penis with internal sac; in *H. hardei* (MASCAGNI 1988: fig. 7B), phallobase "triangular", penis with internal sac; in *H. keimoesensis* (Figs. 5–7), phallobase similar to *H. peringueyi*, but more curved laterally, penis simple, without internal sac.

ETYMOLOGY: The new species is named after the town where it was collected.




Figs. 1–7: *Heterocerus keimoesensis*, holotype: 1) pronotum and elytra, dorsal view; 2) labrum and front part of clypeus, dorsal view; 3) right mandible, and prostheca, dorsal view; 4) spiculum gastrale, dorsal view; 5) aedeagus, dorsal view; 6) phallobase, dorsal view; 7) penis, dorsal view. Figs. 1–3 not to scale.

## Distributional notes

### *Heterocerus elongatus* GROUVELLE, 1896

Material examined: 46 ♂♂, 118 ♀♀: "RSA [Republic of South Africa], N. Cape NC Upington, Keimoes 22.x.2009 Snížek lgt."; 16 ♂♂, 6 ♀♀, 38 exs. (sex not studied): "RSA [Republic of South Africa], W Cape S of Lamberts Bay 28.x.1999 M. Snížek leg."; 11 ♂♂, 58 ♀♀: "RSA [Republic of South Africa], NW [North West Province] W of Bothaville Vaal river 26.10. 2008 M. Snížek".

DISTRIBUTION: Widely distributed in Africa (including Madagascar), with the exception of North Africa.

### *Heterocerus incertus* GROUVELLE, 1896

Material examined: 3 ♂♂: "RSA [Republic of South Africa], W Cape S of Lamberts Bay 28.x.1999 M. Snížek leg."; 1 ♂, 2 ♀♀: "RSA [Republic of South Africa], NW [North West Province] W of Bothaville Vaal river 26.10. 2008 M. Snížek".

DISTRIBUTION: Angola, Congo, Côte d'Ivoire, Democratic Republic of the Congo [formerly: Zaire], Ethiopia, Kenya, Madagascar, Nigeria, Republic of South Africa, Senegal, Seychelles, Tanzania, Uganda, Zambia, Zanzibar, Zimbabwe.

### *Heterocerus ornatus* GROUVELLE, 1906

Material examined: 6 ♂♂, 6 ♀♀,163 exs. (sex not studied): "RSA [Republic of South Africa], N. Cape NC Upington, Keimoes 22.x.2009 Snížek lgt."; 22 ♂♂, 34 ♀♀: "RSA [Republic of South Africa], W Cape S of Lamberts Bay 28.x.1999 M. Snížek leg.".

DISTRIBUTION: Botswana, Guinea, Kenya, Madagascar, Mozambique, Namibia, Republic of South Africa, Somalia, Tanzania, Zambia, Zimbabwe.

### *Heterocerus peringueyi* GROUVELLE, 1919

Material examined: 6 ♂♂, 2 ♀♀: "RSA [Republic of South Africa], W Cape S of Lamberts Bay 28.x.1999 M. Snížek leg." (CHARPENTIER 1965, MASCAGNI & MONTE 2005).

DISTRIBUTION: Republic of South Africa.

### *Heterocerus thebaicus australis* CHARPENTIER, 1965

Material examined: 41 ♂♂, 38 ♀♀: "RSA [Republic of South Africa], N. Cape NC Upington, Keimoes 22.x.2009 Snížek lgt."; 3 ♂♂: "RSA [Republic of South Africa], W Cape S of Lamberts Bay 28.x.1999 M. Snížek leg."; 132 exs. (sex not studied): "RSA [Republic of South Africa], NW [North West Province] W of Bothaville Vaal river 26.10. 2008 M. Snížek"; 335 ♂♂, 385 ♀♀, 52 exs.: "RSA [Republic of South Africa], North West [Province] Vaal riv., 1250m [a.s.l.] W of Bothaville 2007 22.12. lgt. M. Snízek"; 132 exs.: "RSA [Republic of South Africa], NW [North West Province] W of Bothaville Vaal river 26.10. 2008 M. Snížek".

At present, three subspecies of *Heterocerus thebaicus* GROUVELLE, 1896 are recognized: the nominotypical subspecies (Benin, Egypt, Sudan, South Africa and Zambia), *H. thebaicus evanescens* MAMITZA, 1930 (Chad, Congo, Mauritania, Niger, Senegal and Togo) and *H. thebaicus australis* CHARPENTIER, 1965 (Angola, Botswana, Malawi, Mozambique, Republic of South Africa, Zambia, Zimbabwe). The geographical distribution of these three subspecies is shown in Fig. 8. The external characters of *H. thebaicus* (such as total length, dominant colour, shape of spots on elytra and punctation of body) are very variable in all subspecies and are also similar to *H. vulpes* GROUVELLE, 1906 and *H. tibesticola* CHARPENTIER, 1964. These two species can be distinguished from *H. thebaicus* by male genitalia, and by the meso- and metatibiae being darker on the outer edge than the femora. The male genitalia of all three subspecies of *H. thebaicus* are shown in Figs. 9–11.

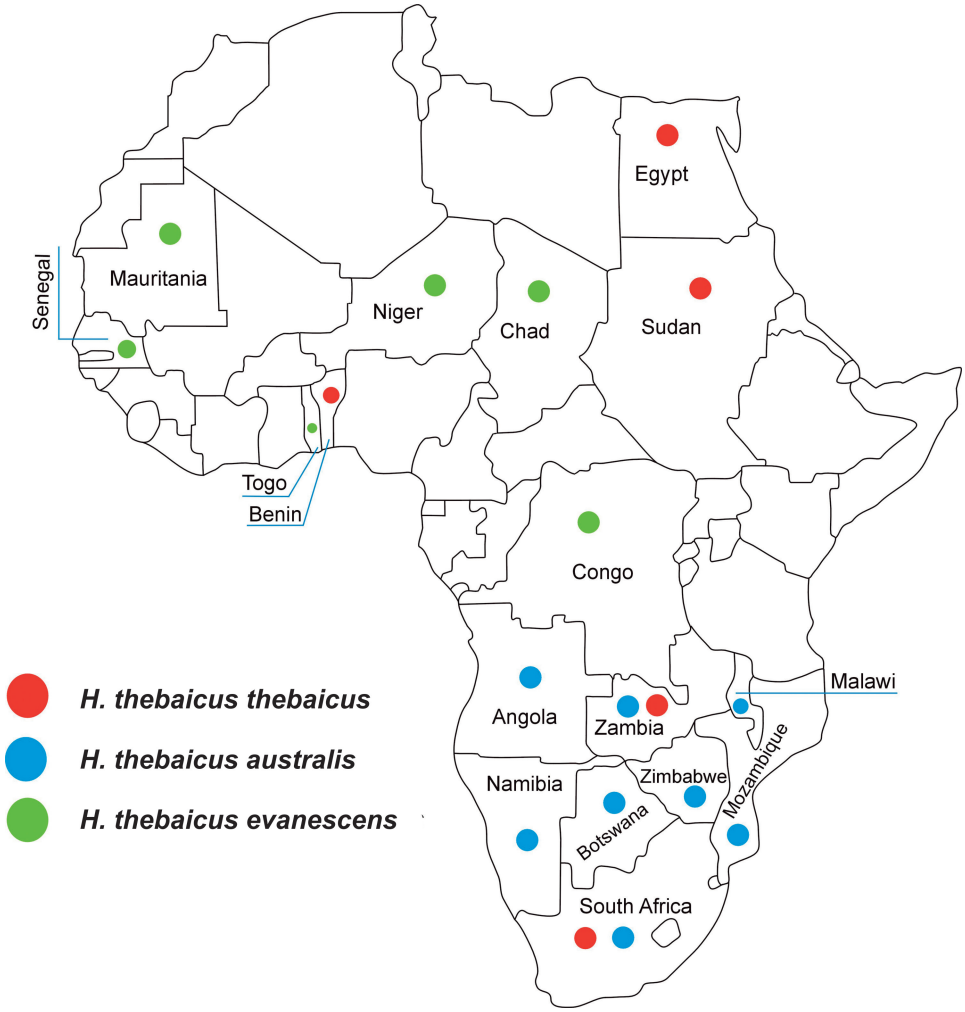
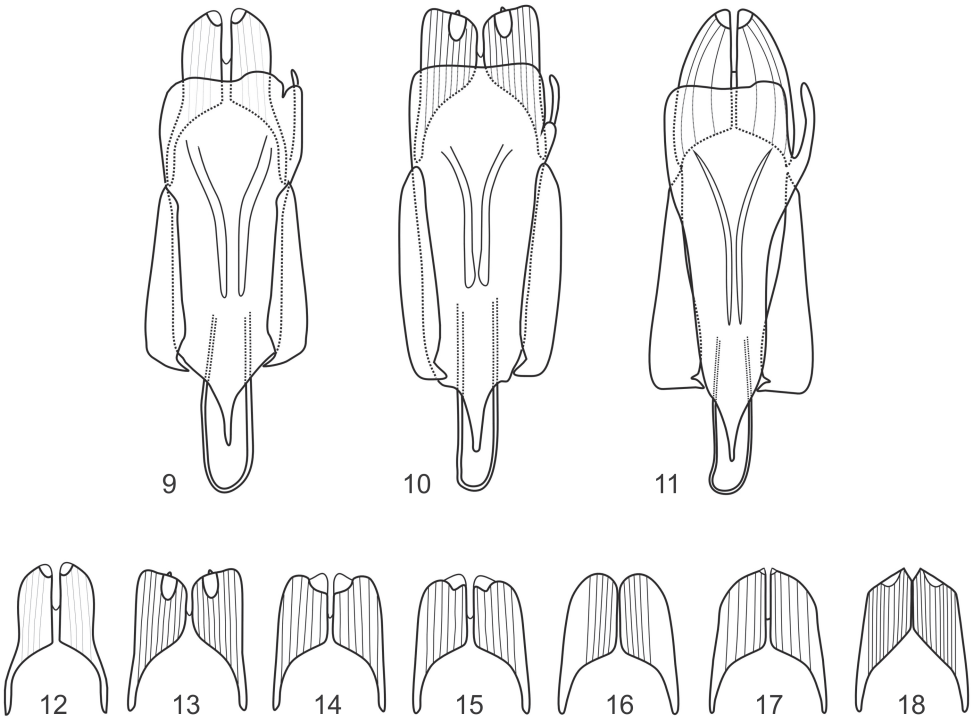



Fig. 8: Geographical distribution of *H. thebaicus*.

The basic colour of the nominotypical subspecies is dark brown with pronounced light brown spots on the elytra. Male genitalia as in Fig. 9. *Heterocerus t. australis* is significantly lighter in colour, all elytral spots are diffuse. The male genitalia are very variable. *Heterocerus t. evanescens* is externally recognizable by its convex pronotum with lighter posterior and lateral margins, and also by the shape of the male genitalia (Fig. 11).

A series of 772 specimens of *H. t. australis* collected at a single South African locality in 2007 near the Vaal River contains a total of 335 ♂♂, 385 ♀♀ and 52 specimens not sexed. During the study of the male specimens of this series, I observed some notable variability in the parameres. Compare Fig. 13, the original drawing of the parameres for typical examples of *Heterocerus t. australis* from South Africa with Figs. 14–18 for the modified shape of the parameres observed. None of the samples have parameres as in Fig. 12. The phallobase of these samples is independent of the paramere shape, variable in shape and gradually transitions to the shape in

Figs. 9–10. The processus accessorius is as in Fig. 10 in all observed samples. All specimens are pale brown to brown with a diffuse pale brown pattern.




Figs. 9–11: Aedeagi, dorsal view: 9) *Heterocerus thebaicus thebaicus*; 10) *H. t. australis*; 11) *H. t. evanescens*. Figs. 9–11 are modified after CHARPENTIER (1965). All Figs. not to scale.

Figs. 12–18: Parameres, dorsal view: 12) *H. t. thebaicus*; 13–18) *H. t. australis*. Figs. 12–13 are modified after CHARPENTIER (1965). All Figs. not to scale.

It should, however, be mentioned that the phylogenetic relationships of the three subspecies are still a matter of debate. According to the known distribution (Fig. 8), it seems most unlikely that *Heterocerus t. australis* and *H. t. thebaicus* represent two subspecies of the same species. More probably, *H. t. australis* is either a separate species or a synonym of *H. t. thebaicus*. Extensive molecular studies will be necessary to clarify the taxonomy of *H. thebaicus* s.l.

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Stanislav SKALICKÝ
*Dukla 322, CZ – 56201 Ústí nad Orlicí, Czechia* (s.skalicky@wo.cz)

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