



A new synonymy of *Heterocerus fenestratus* (Thunberg, 1784) (Coleoptera: Heteroceridae) and its first records for South Hemisphere

ALEXEY S. SAZHNEV

Papanin Institute for Biology of Inland Waters, Yaroslavl' Oblast, Borok, 152742 Russia. E-mail: sazh@list.ru

Abstract

Based on the examination of the type specimens of *Heterocerus subantarcticus* Trémouilles, 1999, described from Patagonia, the following synonymy is proposed: *Heterocerus fenestratus* (Thunberg, 1784) = *H. subantarcticus* Trémouilles, 1999, **syn. nov.** The ways of the species penetration into the Southern Hemisphere are discussed.

Key words: Byrrhoidea, Heteroceridae, taxonomy, synonymy, Neotropical Region, Chile

Introduction

Heterocerus subantarcticus Trémouilles, 1999 was described based on two specimens from Patagonia (Magallanes Region, Punta Arenas). No additional specimens of the species were collected ever since. In 2015, one heterocerid specimen was collected in the vicinity of Santiago, which has been identified as *Heterocerus fenestratus* (Thunberg, 1784) (see additional material). This was the reason for checking Chilean Heteroceridae for validity and the results of this revision are given here.

Materials and methods

The type series of *H. subantarcticus* (holotype and one paratype) is deposited in the collection of the Museo Argentino de Ciencias Naturales (Argentina, Buenos Aires, MACN). Material was studied using LOMO MBS-9 stereomicroscope at 8–56× magnifications. The structure of the aedeagus and morphology details were investigated for comparison with *H. fenestratus*. Images of the beetle's genitalia and habitus were made on different digital cameras by Luis A. Compagnucci (Argentina, Buenos Aires, MACN), Kirill V. Makarov (Russia, Moscow, MSPU) and Stanislav V. Litovkin (Russia, Samara).

Studied material is stored in the following collections:

MACN Museo Argentino de Ciencias Naturales (Buenos Aires, Argentina);
IBIW Papanin Institute for Biology of Inland Waters (Borok, Russia).

Taxonomy

Heterocerus fenestratus (Thunberg, 1784) (*Dermestes*)

= *asiaticus* Nomura, 1958: 58 (*Heterocerus*)

= *beckeri* Kuwert, 1892: 311 (*Heterocerus*)

= *completus* Hatch, 1965: 13 (*Heterocerus*)

= *confinis* Rey, 1890: 163 (*Heterocerus*)

= *corsicus* Kuwert, 1890: 538 (*Heterocerus*)

- = *croaticus* Kuwert, 1890: 538 (*Heterocerus*)
- = *kamtschaticus* A. Egorov, 1989 (*Heterocerus*)
- = *laevigatus* Panzer, 1794: 12 (*Heterocerus*)
- = *lanatus* Rey, 1890: 163 (*Heterocerus*)
- = *latus* Grouvelle, 1915: 134 (*Heterocerus*)
- = *marshami* Stephens, 1829: 101 (*Heterocerus*)
- = *molleri* Varenius, 1891: 22 (*Heterocerus*)
- = *multimaculatus* Motschulsky, 1854: 18 (*Heterocerus*)
- = *obscurus* Rey, 1890: 163 (*Heterocerus*)
- = *pusillus* Walth, 1839: 221 (*Heterocerus*)
- = *siculus* Kuwert, 1890: 547 (*Taenheterocerus*)
- = *tonkinensis* Grouvelle, 1896: 5 (*Heterocerus*)
- = *tristis* Mannerheim, 1853: 218 (*Heterocerus*)

***Heterocerus subantarcticus* E. Trémouilles, 1999: 108, syn. nov.**

(Figs 1A, 2A–B)

One specimen of the type series was examined: holotype, male with a geographical label “Chile, Pta. Arenas, leg. T. Cekalovic 10-IV-1961” (MACN) (Fig. 1A).

As an additional material, one specimen of *H. fenestratus* was studied from West Coast of South America: CHILE, *Santiago Metropolitan Region*, 36 km NE Santiago, Farellones, 975 m a.s.l., 26 Jan. 2015, leg. A.R. Cuadros, 1 female (IBIW).

The review of the original description and original figures of *H. subantarcticus* (Trémouilles 1999), as well the holotype study showed that the form and structure of the aedeagus (Figs 1, 2), the colour of the legs, and especially a characteristic elytral pattern with pronounced scutellar mark confirm that the type specimens belong to *H. fenestratus*. Thus *H. subantarcticus* should be treated as a synonym of *H. fenestratus*.

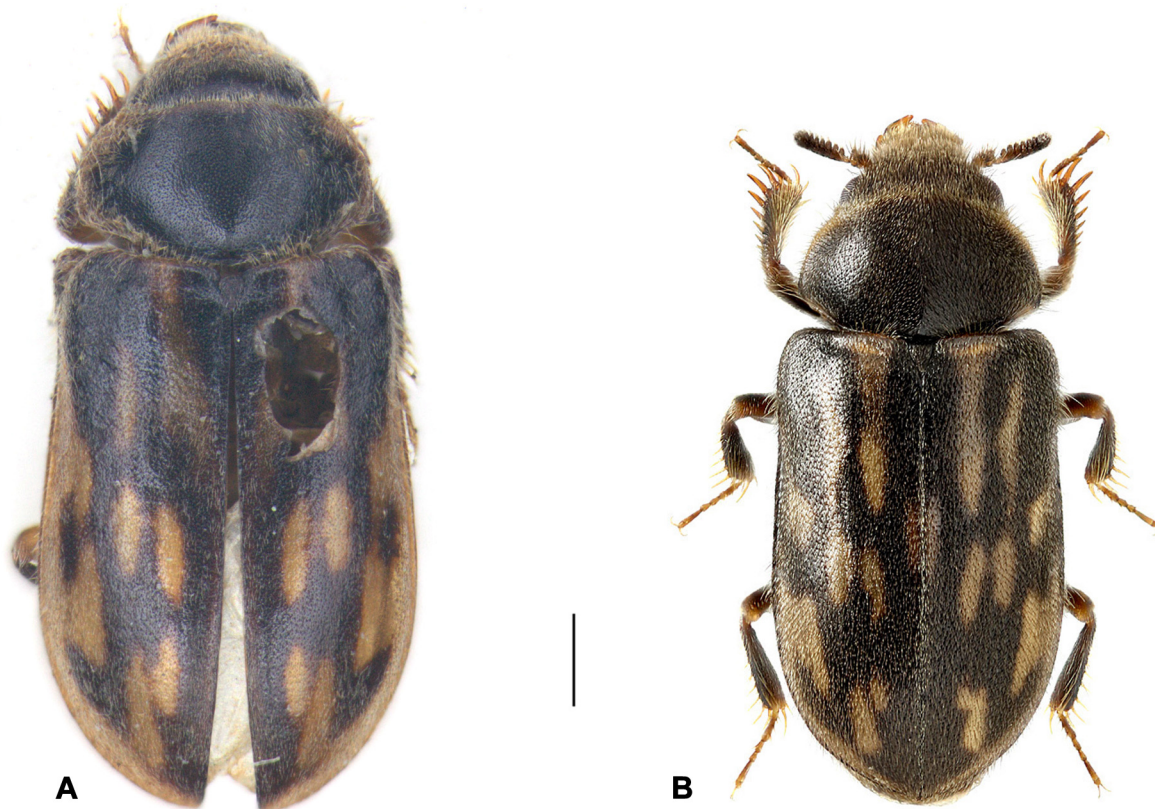


FIGURE 1. *Heterocerus fenestratus*, A—male, Chile, Punta Arenas, holotype of *H. subantarcticus*; B—female, Russia, Moscow Oblast. Scale bar 0.5 mm. Photos by: L.A. Compagnucci and K.V. Makarov.

Discussion

Heterocerus fenestratus is a species with great ecological plasticity and with high adaptive potential among all Heteroceridae. It has the widest circumpolyzonal distribution, and is distributed also in the north of Oriental Region (Skalický 1999; King & Lago 2012; Mascagni 2016). In the Western Hemisphere, this species was known only from the northern and central regions of North America (LeSage 1991; Mascagni 1993). Given the new synonymy, the first records of *H. fenestratus* in the Southern Hemisphere dates back to the 1960s (type series of *H. subantarcticus*). These records come from the port city Punta Arenas (Patagonia). New records (2015) occur from the vicinity of Santiago, which lies in the Santiago Basin (Central Chile) far from the sea.

Theoretically, there are two possible explanations for this. The first is that *H. fenestratus* has an amphitropic range and ancient origin. But there are no records from other regions of the Southern Hemisphere (for example South Africa, Australian Region). Also, the general distribution of the species most likely proves that the expansion of the range was recent (in postglacial), using the Bering distribution corridor. Fossil records (Quaternary, Pleistocene) of *H. fenestratus* are known only for modern Holarctic Realm: Great Britain, Worcestershire (~42.000 years ago); USA, Washington (as *Lapsus tristis* (Mannerheim, 1853), median 19.786 years ago) et al. (<http://fossilworks.org>). The second variant is that *H. fenestratus* was brought to Neotropical Region and Chile in particular as a result of unintentional invasion (by sea way). The individual cases of the range's extension are happening as part of the anthropogenic and natural processes of cosmopolitan invasion and the homogenization of the biosphere. Human activities account for the following causes of changing the species distribution: anthropogenic changes in abiotic environmental factors; intentional introduction and reintroduction of organisms and random drifts (with ballast water, on imported agricultural products, etc.). For example, well-established occurrences of invasions in South Hemisphere for semi-aquatic and terrestrial Hydrophilidae of the Palearctic genus *Cercyon*: *Cercyon laminatus* Sharp, 1873 recorded from Chile, and *Cercyon haemorrhoidalis* Fabricius, 1775 recorded from Argentina (Fikáček 2009). For Heteroceridae established occurrence of incidental transportation of *Augyles nepalensis* Mascagni, 1993 to Moscow with a batch of sesame seeds (author data).

Thus, it is likely that *H. fenestratus* is alien species to Chile and South America, and its naturalization cannot be ruled out in some regions of the country in the future.

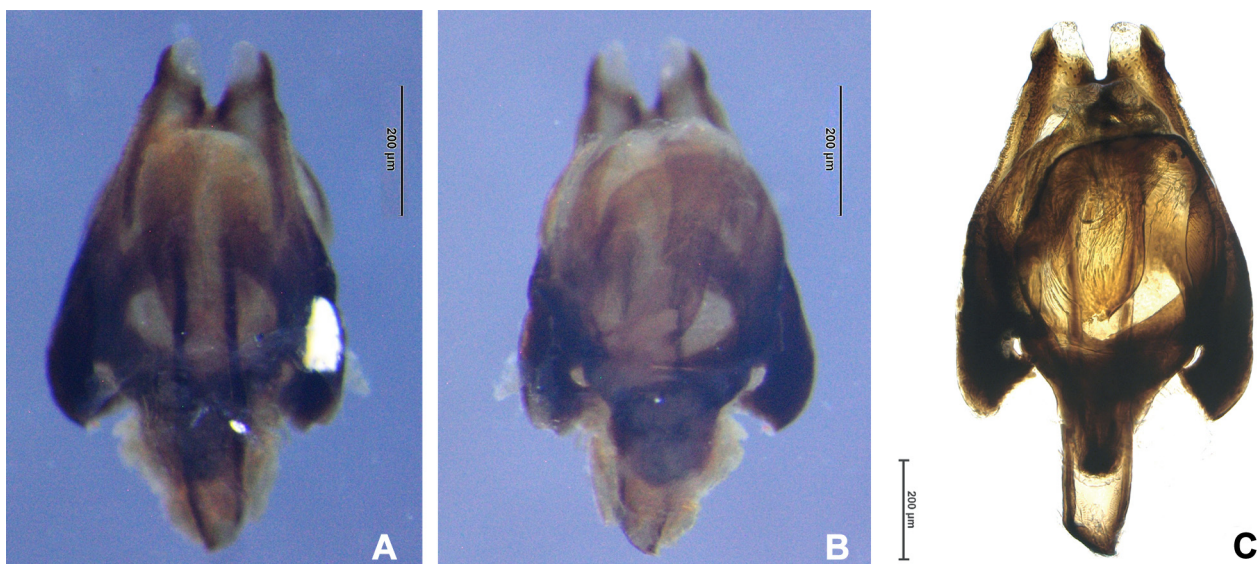


FIGURE 2. *Heterocerus fenestratus*, aedeagus: A, B—Chile, Punta Arenas, holotype of *H. subantarcticus*; ventral (A), dorsal (B) view; C—Russia, Samara Oblast, dorsal view (Sazhnev 2016). Scale bar 0.2 mm. Photos by: L.A. Compagnucci and S.V. Litovkin.

Acknowledgements

I'm thankful to Luis A. Compagnucci (Buenos Aires) for the opportunity to examine the type specimen of *H. subantarcticus*, and for making the photograph of the aedeagus and habitus of holotype; to Andreas R. Cuadros (San-

tiago), and Vyacheslav V. Shaporinsky (Simferopol') for material presented for the study; to Stanislav V. Litovkin (Samara) for making the photograph of the aedeagus of *H. fenestratus* from Samara Oblast and to Kirill V. Makarov (Moscow) for making the photograph of *H. fenestratus* from Moscow Oblast.

This research was funded by the Russian Science Foundation, Project No 16-14-10031, and in the framework of the Russia state assignment (theme No AAAA-A18-118012690105-0).

References

- Fikáček, M. (2009) Occurrence of introduced species of the genus *Cercyon* (Coleoptera: Hydrophilidae) in the Neotropical Region. *Revista de la Sociedad Entomológica Argentina*, 68, 351–357.
- King, J.G. & Lago, P.K. (2012) The variegated mud-loving beetles (Coleoptera: Heteroceridae) of Mississippi and Alabama, with discussion and keys to the species occurring in the south eastern United States. *Insecta Mundi*, 275, 1–53.
- LeSage, L. (1991) Familia Heteroceridae (Variegated mud-loving beetles). *In*: Bousquet, Y. (Ed.), *Checklist of beetles of Canada and Alaska*. Agriculture Canada, Ottawa, pp. i–vi + 1–430.
- Mascagni, A. (1993) La collezione eteroceridologica del Carnegie Museum of Natural History di Pittsburgh (U.S.A.), con descrizione di quattro nuove specie (Coleoptera: Heteroceridae). *Opuscula Zoologica Fluminensia*, 103, 1–12.
- Mascagni, A. (2016) Family Heteroceridae W.S. Macleay, 1825. *In*: Löbl, I. & Löbl, D. (Eds.), *Catalogue of Palaearctic Coleoptera. Vol. 3. Revised and Updated Edition. Scarabaeoidea, Scirtoidea, Dascilloidea, Buprestoidea, Byrrhoidea*. Brill, Leiden/Boston, pp. 610–616.
- Sazhnev, A.S. (2016) *Heterocerus kamtschaticus* A. Egorov, 1989 is a new synonym of the Holarctic *H. fenestratus* (Thunberg, 1784) (Coleoptera: Heteroceridae). *Zoosystematica Rossica*, 25 (1), 163–164.
- Skalický, S. (1999) New species of Heteroceridae from Thailand and Namibia (Coleoptera: Heteroceridae). *Koleopterologische Rundschau*, 69, 119–123.
- Trémouilles, E. (1999) Descripción de tres nuevas especies de *Heterocerus* Fabricius, de América del Sur (Coleoptera, Heteroceridae). *Revista del Museo Argentino de Ciencias Naturales, Nueva Serie*, 1 (1), 103–108.
<https://doi.org/10.22179/REVMACN.1.144>