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First cave records for Palearctic burrower bugs (Hemiptera: Heteroptera: Cydnidae) from Tajikistan, with a checklist of the World Cydnidae associated with caves

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Species of the family Cydnidae (known as the "burrower bugs") live usually on or in the ground; sometimes they even burrow deep into the soil (e.g., Froeschner 1960; Schaefer 2003; Linnavuori 1993; Lis 1994, Lis *et al.* 2000). However, data on burrower bugs associated with caves and their environment are very rare; only ten species of three Cydnidae subfamilies were hitherto recorded from this type of habitat (see the checklist at the end of this paper).

Caves, forming a specific environment with peculiar microclimate and speleotherms (i.e., stalactites and stalagmites), are ecologically important due to several distinct features, e.g., the absence of light, a lower temperature than that of the outside environment, the lack of food, etc. (Culver and Pipan 2009; Kłys and Wołoszyn 2012).

A majority of burrower bug species cave records comes from the Neotropic (see the checklist at the end of this paper). No burrower bug species were found to be associated with caves in the mountains of the Palearctic Region.

Material. During the expeditions by the first author (2005–2012), to the mountains of Central Asia (Tajikistan), some chosen mountain ranges were provisionally explored for the occurrence of caves. Nearly every mountain range has its own caves with undiscovered vertebrate and invertebrate fauna, and most of them are waiting to be described (Kłys and Wołoszyn 2012).

Pending studies in the Zeravshan Mountain Range (north of Dushanbe), a very peculiar cave, previously known only by bats records (Khabilov 2003), was investigated twice (in 2007 and 2012). This cave, called the "**Stinking cave" [Вонючийа пещера]** by the local dwellers (Figs 1–3), is located north of the Majkata settlement (N 39˚31'283", E 67˚46'050", 1104 m. a.s.l., north of Panjakent), and, is made of gypsum, mostly in the form of white alabaster (Fig. 2).

The entrance to the cave is located on a hill above a settlement (Fig. 3; the entrance is indicated by the arrow). Its floor, at the first entrance steps towards the main chamber, is made of loose loess soil, crushed up rocks, and mixed organic detritus. The deepest parts of the cave are covered with bat guano and excrements of Indian crested porcupines *Hystrix indica* Kerr.

During cave investigations in 2007 and 2012, five specimens of two Cydnidae species were collected in debris at the entrance part of this cave: *Stibaropus henkei* (Jakovlev, 1874) (2 specimens, July 28th, 2007; 2 specimens, July 19th, 2012); and *Microporus nigrita* (Fabricius, 1794) (a single specimen, July 28th, 2007; no individual was collected on July 19th, 2012).

Discussion. Both species have been previously recorded from Tajikistan (see: Kłys and Lis 2013), but never in the cave environment. *S. henkei* has usually been collected in different types of sandy habitats (Putshkov 1965); it was also found deep in the rodent burrows (Kiritshenko 1959). *M. nigrita* is usually also found in sandy areas (Lis *et al.* 2000).

Oriental species of the genus *Stibaropus* Dallas have frequently been recorded to fly at dusk, or even at night (Lis 1994), when the air temperature was lower than during the day. It seems possible, therefore, that the cave entrance with the debris mixed with the soil and rocks particles, is a suitable habitat for hiding during the day. Because *S. henkei* was collected twice (first in 2007; then after five years, in 2012), we assume that it probably established a small (only two specimens were collected each time), perhaps temporary, population in the cave entrance. Therefore, the species can be regarded as troglophile; such facultative cave residents are often recorded in different cave types (Culver and Pipan 2009).

Cave entrances are very specific habitats (the ecotone of the cave dark zone and an open area outside the cave), and their arthropod species diversity is always higher than that of other cave regions (Peck 1976); this phenomenon, known as "the effect of cave entrances" (Peck 1976), may play a role also in the case of *S. henkei*, because its specimens were not collected in any other cave parts, nor outside cave.

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