Discovery of Hemilepistus (Hemilepistus) klugii (Brandt, 1833) (Isopoda, Oniscidea) in the Republic of Georgia with an overview of the ecology and biology of the subgenus

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Abstract

The terrestrial woodlice Hemilepistus (Hemilepistus) klugii (Brandt, 1833) is reported from Georgia for the first time, with a commentary on the species composition of the genus Hemilepistus Budde-Lund, 1879 in the Caucasus. A short review of the ecology of the subgenus H. (Hemilepistus) is also provided.

Key words

Agnaridae, CaBOL, Chachuna Managed Reserve, South-Caucasus, woodlice

Introduction

Hemilepistus was established as a subgenus of the genus Porcellio Latreille, 1804 (Budde-Lund 1879) until Verhoeff (1930) raised it to the generic level, splitting it into two subgenera: Hemilepistus and Desertellio, based on the absence or presence of a frontal line between the frons and the epistome. Originating in Central Asia (Schmalfuss 1998), the genus has expanded its distributional range to North Africa (Lincoln 1970) and the Caucasus (Schmalfuss 2003, Kuznetsova et al. 2012).

Until the end of the first decade of the 21th century, all finds of representatives of the genus Hemilepistus in the South-Caucasus were known only from the territory of Azerbaijan (Schmalfuss 2003, Kuznetsova et al. 2012), represented by three species: H. (Hemilepistus) klugii (Brandt, 1833), H. (Desertellio) elongatus Budde-Lund, 1885 and H. (Desertellio) ruderalis Pallas, 1771 (syn. Hemilepistus ruvonovae Borutzky, 1951 (Kashani 2019). To date, only a single Hemilepistus species has been reported from Georgia. The very first mention of this undoubtedly remarkable desert agnarid presence in Georgia was given by Kashani et al. (2012) in an article devoted to finding H. elongatus in Iran. During the study of additional material stored in the Staatliches Museum für Naturkunde, Stuttgart (SMNS), a male and a female (SMNS 13082) of the above-mentioned species, collected in Vashlovani National Park (Georgia) in 1983, were found in the museum’s collection. Here we report the first record of the second species – H. (Hemilepistus) klugii (Brandt, 1833) from Georgia.
The new record

The material for the present study was collected at the foot of Qila Kupra (Chachuna Managed Reserve) mud volcanoes and Dalis Mta (Dali mountain) Reservoir by the “Caucasus Barcode of Life” (CaBOL- https://ggbc.eu/) team of the Ilia State University (ISU) in 2021-2022 season. Additional material was collected from the same location on November 6, 2021. The specimens were collected during the day by hand from burrows in the ground, then preserved in 96% ethanol and deposited in the collection of ISU (Table 1). Species identification was done using the key provided by Kashani et al. (2010).

Photos of preserved Hemilepistus (Hemilepistus) klugii (Fig. 1A,B) (CaBOL-ID 1020602) and H. (Desertellio) elongatus (Fig. 1C) (CaBOL-ID 1023332) were taken using a Canon EOS 550D camera and Canon EF 100 mm f/2.8 Macro USM lens. Digital images were prepared using Zerene Stacker image stacking software and Adobe Photoshop CS6. In addition, photos of the natural habitat and burrows of H. klugii are given at Fig. 2.

The newly recorded Hemilepistus klugii differs from the other potential congeners that might occur in the area in the arrangement of tubercles on the head, forming a large circle of eight tubercles in the middle of the head which may encircle no or a few large ones, and a row of 3–5 large tubercles that run to the postero-lateral margins (Fig. 1B).

Study of the life cycle of Hemilepistus klugii (Kashani et al. 2011), together with studies on the biology of other Hemilepistus species has shown that desert woodlice feed on dead or living tissues of plants, playing a significant role as primary decomposers of plant remains, having symbiotic relations with microorganisms decomposing nitrogen-free compounds and in this way regulating the microbial activity in the soil (Borutzky 1958, Kozlovskaja 1974, Kozlovskaja and Striganova 1977). In spring, they feed on the soil surface while carrying dry plant remains to the bottom of the self-dug burrows, where the humidity is close to saturation, so the plant remains become soft and are used for food during the summer (Lazshak 1952).

Unlike most terrestrial isopods, the members of the subgenus Hemilepistus (Hemilepistus) display strictly monogamous behavior. In spring adults form monogamous cooperative pairs in which partners recognize each other individually and later form, with their progeny, strictly closed family communities (Linsenmair 1984). Life cycle and population structure of H. klugii in Georgia remain unknown and require further studies.

Figure 1. Hemilepistus (Hemilepistus) klugii (Brandt, 1833), Qila Kupra (Chachuna Managed Reserve); A: dorsal view (the scale bar: 4 mm). B: dorsal view of the head, showing tubercles form a large circle on middle of head (scale bar: 1 mm). C: H. (Desertellio) elongatus Budde-Lund, 1885, Dalis Mta Reservoir (Chachuna Managed Reserve) (scale bar: 4 mm).
Table 1. *Hemilepis (Hemilepis) klugii* (Brandt, 1833) and *H. (Desertellio) elongatus* Budde-Lund, 1885 collected by the CaBOL team in Georgia.

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<th>Date</th>
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Figure 2. Natural habitat and burrows of *H. klugii* (Chachuna Managed Reserve). A: Qila Kupra, 18.04.2021; B: Qila Kupra, 18.04.2022; C and D: *H. klugii* in its burrow covering the entrance with body.

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References


