A NEW SPECIES OF TRICHONISCUS (CRUSTACEA, ISOPODA, ONISCIDEA) WITH GLANDULAR-PILIFEROUS ORGAN FROM ROMANIA

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Abstract. A new species of *Trichoniscus* Brandt, 1833 is described from Lazului Cave in South-Western Romania.
Keywords: Isopoda, Oniscidea, Trichoniscidae, *Trichoniscus*, Lazului Cave.

1. INTRODUCTION

Among the Oniscidea of Romania (15 families, 31 genera, 96 species and 12 subspecies), the family Trichoniscidae Sars, 1899 has the highest number of species: the subfamily Trichoniscinae Sars 1899 has 25 species while the subfamily Haplophthalminae Verhoeff, 1908 contains 13 species (GIURGINCA, 2022).

Also, the Trichoniscidae represent the majority of the 35 cavernicolous Oniscidea from Romania, especially regarding the true troglobionts: from the 14 species of troglobitic Oniscidea, 12 belong to the Trichoniscidae (*Caucasonethes vandeli vandeli* Tabacaru, 1993, *Caucasonethes vandeli pygmaeus* Giurginca, 2021, *Biharoniscus fericeus* Tabacaru, 1973, *Biharoniscus racovitzai* Tabacaru, 1963, *Trichoniscus dancaui* Tabacaru, 1996, *Trichoniscus racovitzai* Tabacaru, 1994, *Trichoniscus tuberculatus* Tabacaru, 1996, *Trichoniscus vandeli* Tabacaru, 1996, *Haplophthlamus caecus* Radu, 1955, *Haplophthalmus movilae* Gruia & Giurginca, 1998, *Haplophthalmus tismanicus* Tabacaru, 1970, *Banatoniscus karbani* Tabacaru, 1991), one to the Trachelipodidae Strouhal, 1953 (*Trachelipus troglobius* Tabacaru & Boghean, 1989) and Armadillididae (*Armadillidium tabacarui* Gruia, Iavorschi & Sârbu, 1994) (TABACARU, 1994; GIURGINCA, 2022).

Among the most particular species of the Trichoniscidae of Romania, are those found in the Southern Carpathians in caves situated between the Oltului Valley and the Timiş-Cerna Corridor, species corresponding with *Trichoniscus inferus* Verhoeff, 1898 regarding the characters of pereiopode VII and male pleopode 1 but distinguished by the presence of various glandular-piliferous organs (TABACARU, 1996; TABACARU & GIURGINCA, 2013).

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Up to the present, four species of *Trichoniscus* with glandular-piliferous organs are known from Romania: *Tr. racovitzai*, *Tr. tuberculatus*, *Tr. vandeli* and *Tr. dancaui*. We can now add a fifth species, collected from the same area as the previous four.

2. MATERIAL AND METHODS

All the specimens collected by hand and preserved in 75% alcohol were examined with an Optika SZM-4, ver.4.0.0 binocular stereomicroscope.

All taxonomically important structures were dissected and mounted in glycerine as temporary microscope preparations and observed with an Olympus CH2 microscope. For the drawings, we used the Olympus CH2 microscope with an Olympus *camera lucida*.

Material studied:

1 male, Peştera Lazului (peştera = cave), Vâlcan Mountains, Southern Carpathians, Romania, 17-21July 2023, leg. Robert Opran & Rodica Plăiaşu.

The specimen is preserved in the collection of the "Emile Racovitza" Institute of Speleology.

3. RESULTS

Taxonomy
Order Isopoda Latreille, 1817
Suborder Oniscidea Latreille, 1802
Family Trichoniscidae Sars, 1899
Genus Trichoniscus 1833

Smooth or scaly tegument, but without granules. Three ommatidia arranged in a triangle; there are also blind species. Antenna flagellum formed by 3-4 articles, the limit between articles barely visible. Left mandible with two ciliated rods, right mandible with one ciliated rod. Genital apophysis ending in a pointed tip with long hairs. Pleopode 1 male: triangular exopodite without rods; endopodite with two articles, the distal article presenting a basal part as wide as the basal article and a narrowed distal part.

Trichoniscus selenae Giurginca n. sp.

Type locality. Lazului Cave, Vâlcan Mountains, Motru Sec Basin, Southern Carpathians, $45^0$4'16.84" N, $22^0$45'51.97" E, 475 m a.s.l.

Type specimens. Holotype: 1 male, Peştera Lazului, Vâlcan Mountains, Southern Carpathians, Romania, 17-21.VII.2023, leg. Robert Opran & Rodica Plăiaşu.

Etymology: "selenae" after Selene: in ancient Greek mythology and religion, Selene (meaning "Moon") is the goddess and the personification of the Moon. In the Homeric Hymns, she is addressed as "Hail, white-armed goddess, bright Selene, mild, bright-tressed queen" and we have dedicated the new species to her as it has the same white color as the goddess.

Diagnosis: *Trichoniscus selenae* differs from all the other four species of *Trichoniscus* with glandular-piliferous organ from Romania by the presence of a big tubercle near the anterior edge of the first pereionite on the median line.

Description:

Size: 2-2.2 mm in males.

Color: depigmented, completely white.

Eyes: absent.

Tegument: smooth, no granulations.

Pleotelson: trapezoidal.

Appendages:

Antennule: three short articles; the third presents 5-6 aesthetascs (Fig. 1).

Antenna: flagellum with four articles, the limit between the individual articles is barely visible.

Male sexual characters:

Pereiopode VII: articles longer than wider; basipodite with a brush of recurved scales on the sternal-distal edge of the caudal margin (Fig. 2).

Genital apophysis: slightly narrowed in the basal part, with a wider, rounder upper part.

Pleopode 1: triangular exopodite, without an indentation, external side strongly concave defining a basal part extended by a rectangular lobe and a rather narrow terminal part with a rounded tip and lacking hairs. Distal article of endopodite narrowed and with fine transversal striae near the tip (Fig. 3).

Pleopode 2: endopodite bi-articulated, distal article ending in a long, fine tip.

Glandular-piliferous organ: the first pereionite presents a big tubercle on the median line near the anterior edge (Fig. 1, 4).

4. DISCUSSION

Affinities and differences. The characters of *Trichoniscus selenae* are found in several species of *Trichoniscus* distributed in the Southern Carpathians in caves situated between the Oltului Valley and the Timiş-Cerna Corridor. This group of species (named *Trichoniscus inferus* by TABACARU, 1974 after the first species described) is defined by the following characters: pereiopode VII male with a brush of curved scales on the sternal-distal edge of the caudal margin; pleopode 1 male with a triangular exopodite with the external side strongly concave delimitating a basal part laterally prolonged by a rectangular or trapezoidal lobe and a narrow terminal part and without hairs; the distal article of pleopode 1 endopodite without hairs and with more or less obvious transversal striae in the terminal part (TABACARU & GIURGINCA, 2013) (for the distribution of the *Tr. inferus* group see Fig. 5).

However, *Tr. selenae* is clearly different from *Tr. inferus* by the presence of the characteristic glandular-piliferous organ.

Although the male characters correspond between *Trichoniscus selenae* and *Tr. tuberculatus*, *Tr. vandeli*, *Tr. dancaui* and *Tr. racovitzai*, namely a brush of curved scales on the sternal-distal edge of the caudal margin of pereiopode VII male basipodite and a rectangular lobe on the basal part of the pleopode

1 exopodite, the glandular-piliferous organs are differentiating clearly each species. *Tr. vandeli* presents on the third pereionite a big brush of hairs, *Tr. racovitzai* presents the fourth pereionite a slight depression with piliferous scales while *Tr. dancaui* is defined by the presence of the glandular-piliferous organ both on the posterior edge of the cephalon (a slight pit with scales) and, on the anterior edge of the first pereionite, there is a brush of curved scales, moreover, unlike all the other species of *Trichoniscus* with glandular-piliferous organs, *Tr. dancaui* has three pigmented ommatidia (TABACARU, 1996).

Unlike the three previous species, at *Tr. tuberculatus* and *Tr. selenae* the glandular-piliferous organ is represented by a big tubercle. At *Tr. tuberculatus*, it is situated in the middle of the fourth pereionite (TABACARU, 1996) while at *Tr. selenae* the tubercle is on the median line near the anterior edge of the first pereionite.

Only one other species of *Trichoniscus* presents a glandular-piliferous organ on the first pereionite, namely *Trichoniscus foveolatus* described by VANDEL in 1951. However, at *Tr. foveolatus* the first pereionite has a triangular, median pit, the base of the triangle corresponding with the posterior edge of the pereionite; its anterior area is covered by several rows of scales, the center having a semi-circular foveola with rods arranged in a radiating pattern (VANDEL, 1951). This complex structure is in clear contrast with the simple tubercle present at *Tr. selenae*. Moreover, *Tr. foveolatus* has three pigmented but reduced ommatidia, while at *Tr. selenae* the eyes are completely absent.

35 species of Oniscidea are known to inhabit the caves of Romania and their most remarkable aspect is the high number of endemic species: 22 species and subspecies forming two groups: Carpathian endemites and Dobrogea endemites (TABACARU & GIURGINCA, 2013; GIURGINCA & ALL., 2015).

Five endemic species and two endemic subspecies have been described from Dobrogea: *Caucasonethes vandeli* Tabacaru, 1993, *Haplophthalmus movilae* Gruia & Giurginca, 1998, *Trachelipus troglobius* Tabacaru & Boghean, 1989, *Armadillidium tabacarui* Gruia, Iavorschi & Sârbu, 1994, *Kithironiscus dobrogicus* Tabacaru & Giurginca, 2003 and the subspecies: *Leptotrichus pilosus dobrogicus* Radu, 1973 and *Caucasonethes vandeli pygmaeus* Giurginca, 2021 (GIURGINCA & ALL., 2015; GIURGINCA & SARBU, 2021).

From the Romanian Carpathians, 16 endemic species and one endemic subspecies have been recorded; no endemic cavernicolous Oniscidea have been identified yet in the Eastern Carpathians (TABACARU & GIURGINCA, 2013).

From the Apuseni Mountains, four endemic species and one endemic subspecies are known: *Trichoniscus carpaticus* Tabacaru, 1974, *Biharoniscus racovitzai* Tabacaru, 1963, *Biharoniscus fericeus* Tabacaru, 1973, *Haplophthalmus caecus* Radu, Radu & Cadariu, 1956 and the subspecies *Mesoniscus graniger dragani* Giurginca, 2003 (GIURGINCA & ALL., 2014).

From the Banat Mountains, including the area of the Iron Gates, with a remarkable fauna, two endemic species have been recorded: *Hyloniscus dacicus* Tabacaru, 1972 and *Banatoniscus karbani* Tabacaru, 1991.

But the highest number of endemic species (11) has been described from the Southern Carpathians, between the River Olt and the Timiş-Cerna Corridor: *Hyloniscus flammuloides* Tabacaru, 1972, *Trichoniscus inferus* Verhoeff, 1908,

T. racovitzai Tabacaru, 1996, *T. vandeli* Tabacaru, 1996, *T. tuberculatus* Tabacaru, 1996, *T. dancaui* Tabacaru, 1996, *Thaumatoniscellus orghidani* Tabacaru, 1973, *Haplophthalmus tismanicus* Tabacaru, 1970, *Buddelundiella serbani* Tabacaru, 1971, *Trachelipus trilobatus* (Stein, 1859) and now, *Trichoniscus selenae* (GIURGINCA & ALL., 2014, 2015).

The main reasons for the high richness of the cavernicolous fauna (exemplified here by Oniscidea, but also including species of Diplopoda, Chilopoda and Coleoptera) are the great age of the emerged land, the paleogeographic and ecologic continuity with Dinaric and Balkanic regions during different geological periods, the high number of karstic areas and their high degree of karstification, the succession of climatic conditions enhancing the colonization of the subterranean habitats by the cavernicoles ancestors and, as a consequence, their separate evolution in karstic centers (DANCĂU &TABACARU, 1964, 1969).

For the moment, it is difficult to specify when the migration from the South of the lineages leading to the present day cavernicoles of this region took place, but it is possible the migration happened as early as the beginning of the Paleogene (DANCĂU &TABACARU, 1964, 1969).

The characters and the distribution of the various cavernicolous lineages also suggests this migration was not simultaneous but happened in successive waves – and as a consequence, probably, the migration of some lineages took place before the fragmentation of the emerged land during the Tortonian (11.61-7.25 Ma, see HILGEN & ALL., 2005, POUND & ALL., 2011) and it is this fragmentation which contributed to the diversification of the lineages which evolved independently in different massifs isolated by the sea (DANCĂU &TABACARU, 1964, 1969).

Another possibility is that other lineages might have migrated during the Tortonian due to the continued existence of a band of emerged land to the East of the Cerna Valley up to the Mehedinţi Plateau. Finally, as DANCĂU &TABACARU (1969) suggest it is possible that some lineages migrated after the regression of the Tortonian sea, but before the climate cooling during Pliocene and Pleistocene (DANCĂU &TABACARU, 1964, 1969; TABACARU, 1968).

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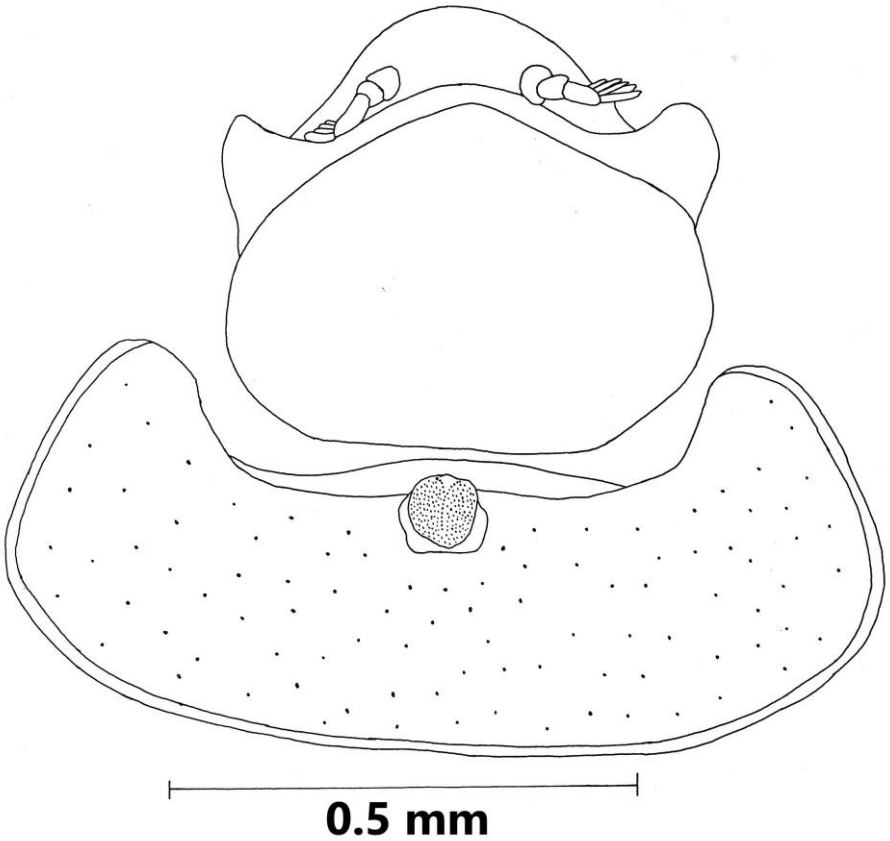

Fig. 1. Trichoniscus selenae: Cephalon, with antennula, and first pereionite.

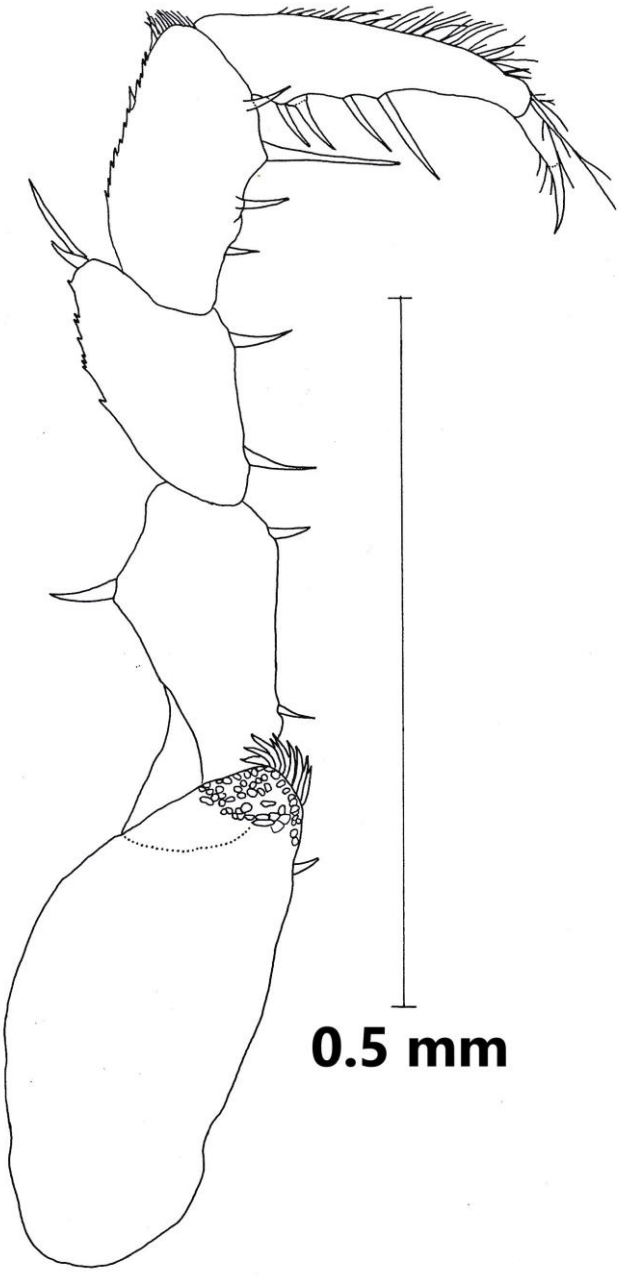

Fig.2. Trichoniscus selenae: Pereiopode VII male.

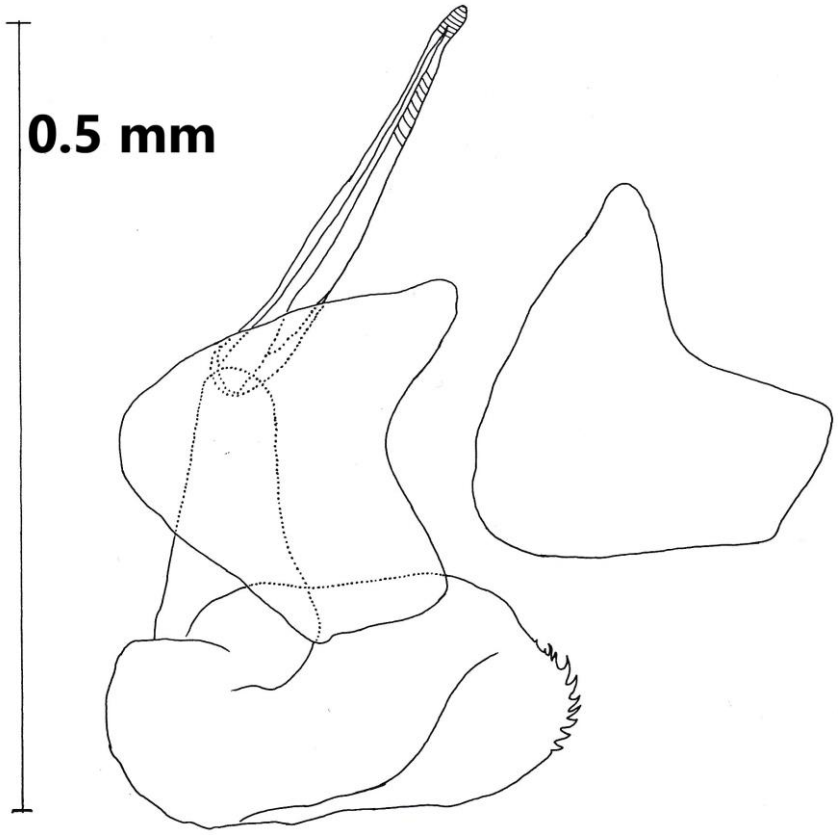

Fig. 3. Trichoniscus selenae: A: Pleopode 1 male, endopodite and exopodite; B: pleopode 1 male exopodite separated for a better view.

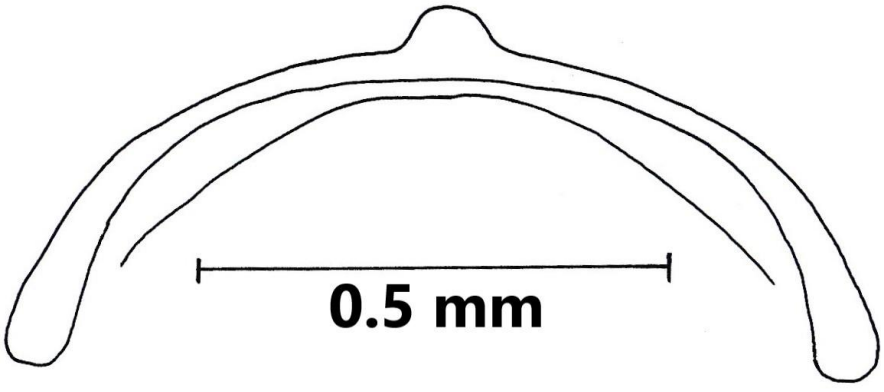

Fig. 4. Trichoniscus selenae: Pereionite 1 anterior (oral view).

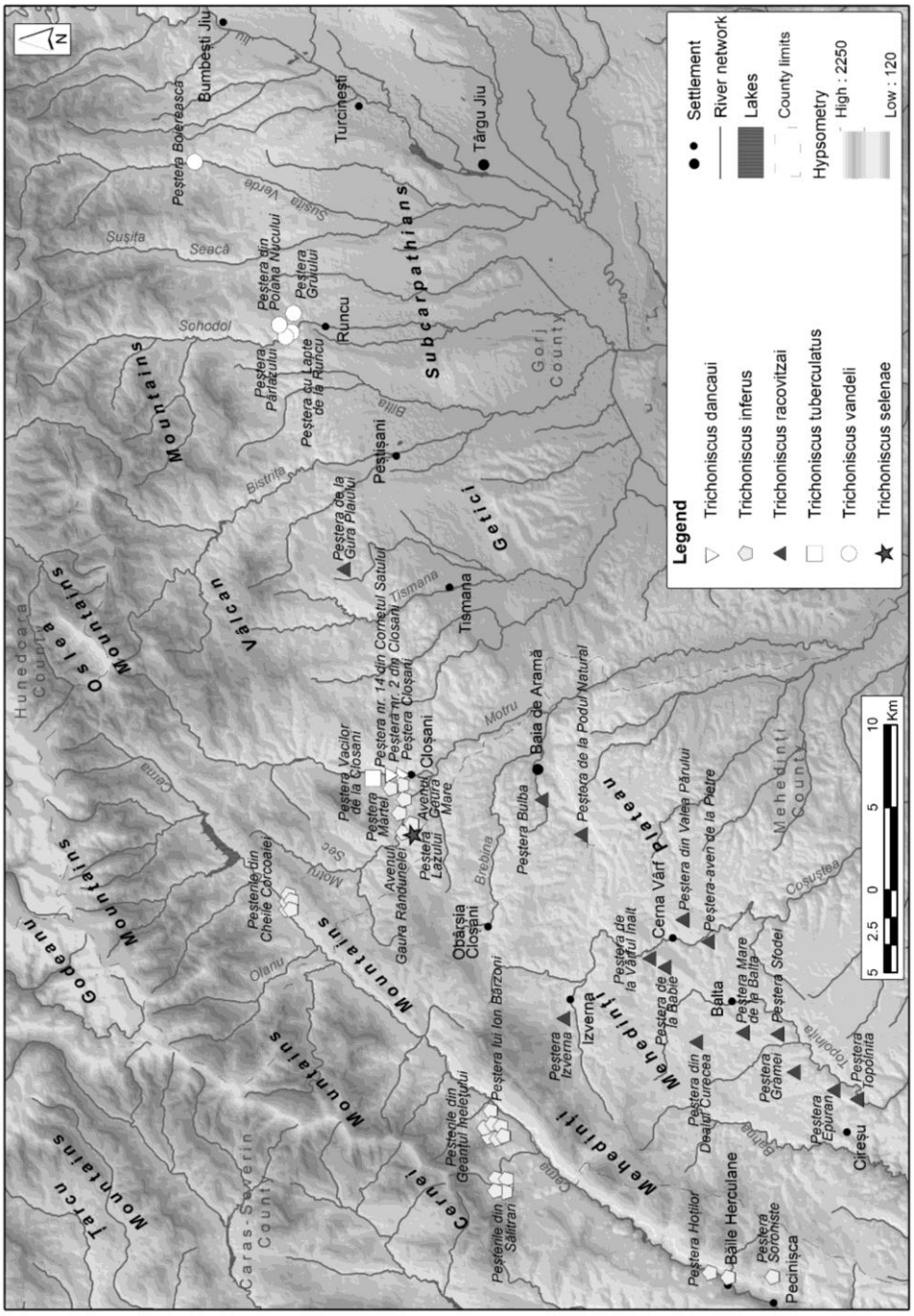

Fig. 5. Distribution of the *Tr. inferus* group, including *Tr. selenae*.