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Systematics and Phylogenetics
Research Article

Expanding the Knowledge on Genus *Thrakosphaera* Schmalfuss, 1998 (Crustacea: Oniscidea) with the Definition of a New Family

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Abstract: *Thrakosphaera schawalleri* was recorded for the first time in Romania: in the southern part of the Romanian Plain and the north-eastern part of the Burnazului Plain. Both qualitative and quantitative sampling methods were used. Most specimens were captured by means of Winkler sieve in leaf litter in deciduous forests. An extended re-description of the species is provided. A new family, Thrakosphaeridae **fam. nov.**, is suggested for this species based on the following set of characters concerning the stomach inferolateralia, pereiopod I, pleopod 1 of male endopodite, pleopod 2 of male exopodite and the extension of the uropodal protopodite.

Key words: systematics, *Thrakosphaera*, Thrakosphaeridae fam. nov.

Introduction

Schmalfuss (1998) described the new genus *Thrakosphaera* and the new species of Oniscidea, *Thrakosphaera schawalleri*, from several localities in North-East Greece (Thrace) tentatively assigning it to the family Tendosphaeridae Verhoeff, 1930.

During the studies for their bachelor degree, Andreea Mîrleneanu (Faculty of Biology, University of Bucharest) collected several species of Oniscidea, including several specimens identified here as *Thrakosphaera schawalleri* Schmalfuss, 1998. This is a surprising find as the species was known until now only from Greece. Even though *T. schawalleri* is currently unknown from Bulgaria, Beron (2020) pointed out, its occurrence might be expected there, as the species has been originally collected not far from the Bulgarian border.

As this represents the first record of *T. schawalleri* in Romania, here we provide a more detailed re-description of the species. Moreover, we assign this species to a new family.

Materials and Methods

Sampling locality

The material was collected within the Comana Natural Park, situated in the southern part of the

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Romanian Plain and the north-eastern part of the Burnazului Plain, in the south-eastern part of the Giurgiu County. The sampling took place in 2024, covering the vernal (March and April), aestival (June, July and August) and autumnal periods (September, October and November) in three perimeters around the Spring of Vlad the Impaler (44°9′31.35″ N; 26°6′9.69″ E; 84–91 m a.s.l.), the Comana Lake (44°9′43.52″ N; 26°6′43.42″ E; 48–50 m a.s.l.) and in close proximity to a marked touristic trail (44°9′47.26″ N; 26°7′29.63″ E; 77–81 m a.s.l.) through the deciduous woods covering the area.

The vegetation around the Comana Lake had a relatively large tree cover formed by *Acer tataricum* Linnaeus, 1753, *Quercus robur* Linnaeus, 1753, *Q. cerris* Linnaeus, 1753, *Fraxinus angustifolia* Vahl, 1804, *Carpinus betulus* (Linnaeus, 1753), *Robinia pseudoacacia* Linnaeus, 1753 but also *Tilia* sp. and *Ulmus* sp., bushes (*Rosa* sp.) and the herbaceous carpet was made up by *Cichorium intybus* Linnaeus, 1753, *Capsella bursa-pastoris* (Linnaeus, 1792), *Dentaria bulbifera* (Linnaeus, 1769), *Chelidonium majus* Linnaeus, 1753, *Taraxacum* sp., *Plantago* sp., *Rumex* sp., *Silene* sp. and *Viola* sp. At the Spring of Vlad the Impaler, the trees were represented by *Acer campestre* Linnaeus, 1753 and *Tilia* sp., the bushes - by *Ruscus aculeatus* Linnaeus, 1753 and the herbaceous species - by *Arum maculatum* Linnaeus, 1753, *Geranium phaeum* Linnaeus, 1753, *Lamium maculatum* (Linnaeus, 1763), *Galium aparine* Linnaeus, 1753, *Anthriscus* sp., *Allium* sp., *Plantago* sp. and *Viola* sp. Along the surrounding touristic trail a somewhat higher number of tree species were recorded: *A. campestre*, *Q. cerris*, *Q. robur*, *C. betulus*, *Cornus mas* Linnaeus, 1753 and *Tilia* sp. The bushes were represented also by *R. aculeatus* and the herbaceous carpet - by *C. bursa-pastoris*, *Scilla bifolia* Linnaeus, 1753, *G. aparine*, *Parietaria officinalis* Linnaeus, 1753, *Anthriscus* sp., *Stelaria* sp., *Ornithogalum* sp. and *Viola* sp.

Sampling methods

The sampling methods followed a protocol first applied by us at the Buzău Mountains (see Baba et al. 2023) and included:

Direct sampling using tweezers: natural shelters were checked for approximately 30 minutes for each station at each visit.

Sifting leaf-litter with a Winkler sieve wire mesh (0.25 mm^2 apertures): at each station, three samples were taken; samples were sorted for approximately 20 minutes after sieving.

Pitfall traps (Barber traps with ethylene glycol 70% as preserving liquid): for each site a 25 m^2 perimeter was established and three Barber traps were randomly placed; the Barber trap, exposed approximately for 30 days, functioned seasonally.

A total of 63 individuals of *T. schawalleri* (22 males and 41 females) were collected between March and July 2024. All the specimens were preserved in 75% ethanol. The studied material is preserved in the „Emile Racoviță" Institute of Speleology (ERIS), Romanian Academy, Bucharest, Romania.

Techniques of microscopic investigation and photography

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. Images of the habitus were captured with an Optika SZM-2 stereomicroscope paired with a Canon EOS 2000D camera.

Examined material

ROMANIA – Giurgiu County, Comana National Park • 1 ♀; Comana Lake; 44°9′43.52″ N, 26°6′43.42″ E; 48–50 m a.s.l.; 31 Mar. 2024; A. Mîrleneanu leg.; A. Giurginca det.; Winkler sieve; ERIS. • 1 ♂; Comana Lake; 44°9′43.52″ N, 26°6′43.42″ E; 48–50 m a.s.l.; 28 Apr. 2024; A. Mîrleneanu leg.; A. Giurginca det.; Winkler sieve; ERIS. • 6 ♂♂, 7 ♀♀; Spring of Vlad the Impaler; 44°9′31.35″ N, 26°6′9.69″ E; 84–91 m a.s.l.; 28 Apr. 2024; A. Mîrleneanu leg.; A. Giurginca det.; Winkler sieve; ERIS. • 1 ♂, 2 ♀♀; Spring of Vlad the Impaler; 44°9′31.35″ N, 26°6′9.69″ E; 84–91 m a.s.l.; 28 Apr. 2024; A. Mîrleneanu leg.; A. Giurginca det.; Barber traps; ERIS. • 5 ♂♂, 8 ♀♀; Touristic trail; 44°9′47.26″ N, 26°7′29.63″ E; 77–81 m a.s.l.; 28 Apr. 2024; A. Mîrleneanu leg.; A. Giurginca det.; Winkler sieve; ERIS. • 1 ♂, 2 ♀♀; Touristic trail; 44°9′47.26″ N, 26°7′29.63″ E; 77–81 m a.s.l.; 28 Apr. 2024; A. Mîrleneanu leg.; A. Giurginca det.; Barber traps; ERIS. • 1 ♀; Comana Lake; 44°9′43.52″ N, 26°6′43.42″ E; 48–50 m a.s.l.; 26 May 2024; A. Mîrleneanu leg.; A. Giurginca det.; Barber traps; ERIS. • 1 ♂; Comana Lake; 44°9′43.52″ N, 26°6′43.42″ E; 48–50 m a.s.l.; 24 Jul. 2024; A. Mîrleneanu leg.; A. Giurginca det.; Winkler sieve; ERIS. • 1 ♂, 3 ♀♀; Spring of Vlad the Impaler; 44°9′31.35″ N, 26°6′9.69″ E; 84–91 m a.s.l.; 24 Jul. 2024; A. Mîrleneanu leg.; A. Giurginca det.; Winkler sieve; ERIS. • 6 ♂♂, 17 ♀♀; Touristic trail; 44°9′47.26″ N, 26°7′29.63″ E; 77–81 m a.s.l.; 24 Jul. 2024; A. Mîrleneanu leg.; A. Giurginca det.; Winkler sieve; ERIS.

Most specimens were collected using a Winkler sieve: 56 individuals in comparison with only seven sampled using Barber traps.

Material examined for comparisons with the genus *Tendosphaera* Verhoeff, 1930:

Tendosphaera verrucosa Verhoeff, 1930

ITALY • 1 ♂, 6 ♀♀; Piedmont, Invorio (NO); 45°46′13″ N, 8°29′34″ E; 360 m a.s.l.; G. Gardini, P. Gardini leg.; P. Gardini det.

FRANCE • 5 ♂♂, 4 ♀♀; Provence-Alpes-Côte d'Azur, La Chapelle-en-Valgaudémar, Écrins National Park; 47°47′53″ N, 6°12′53″ E; 1283 m a.s.l.; F. Noël leg.; F. Noël det.

Abbreviations

Amv = median ventral apodeme, Ca = clatri setarum anteriores, Cp = clatri setarum posteriors, Il = inferolateralia, L = lateralia, Ld = lamella dorsalis, Lv = lamella ventralis, Vlo = valvulae lateralis oesophagi.

Results

Family Thrakosphaeridae Giurginca fam. nov.

Type genus. *Thrakosphaera* Schmalfuss, 1998

Diagnosis. Antennal brush limited only to pereiopod I propodus; pleopod 1 of male endopodite with simple apex; pleopod 2 of male exopodite longer than broad. Uropodal protopodite extended, covering almost completely the space between telson and epimera of 5th pleonal tergites. Inferolateralia longer than lamella ventralis.

Thrakosphaera Schmalfuss, 1998

Type species

Thrakosphaera schawalleri Schmalfuss, 1998

Figures 1-12

Description.

Body size. Male 2.2-2.4 mm. Female 2.7-3 mm.

Habitus. Strongly convex, weakly pigmented (pale yellowish with brownish areas) body with euspheric exo-antennal conglobation ability. Two short, shallow antennal furrows on frons (but not on vertex) protecting second antennae during conglobation. Furrows defined by relatively triangular scutellum; in profile scutellum crest shaped (Fig. 1). First coxal plate with schism. Second and third coxal plates with lobes formed by fold on ventral side (Fig. 2).

Pleon. Internal margins of pleon epimera 5 slightly parallel.

Ocular apparatus. Five well-pigmented ommatidia.

First antenna. Three-jointed; apical article with aesthetascs (Fig. 3A).

Second antenna. Shorter than caudal edge of pereionite 1; two-jointed flagellum, basal article four times shorter than distal article (Fig. 3B).

Mandibles. Right lacinia mobilis smaller than left. Molar process stout and simple; right mandible with 2+1 penicilli, left with 1+1 penicilli (Fig. 4A & B).

Fig. 1. *Thrakosphaera schawalleri*, habitus. **A**. female. **B**. male (1 ♂, 1 ♀; Spring of Vlad the Impaler; 28 Apr. 2024, ERIS).

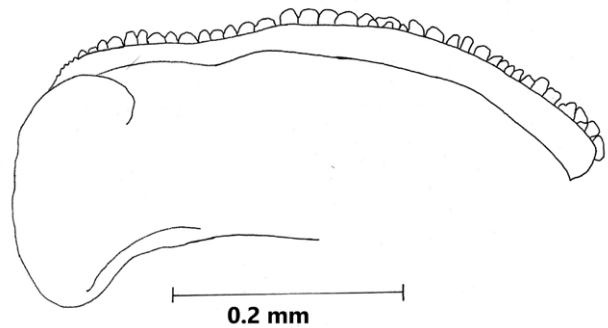

Fig. 2. *Thrakosphaera schawalleri*. First pereionite with schisma (1 ♂, Spring of Vlad the Impaler, 24 Jul. 2024, ERIS).

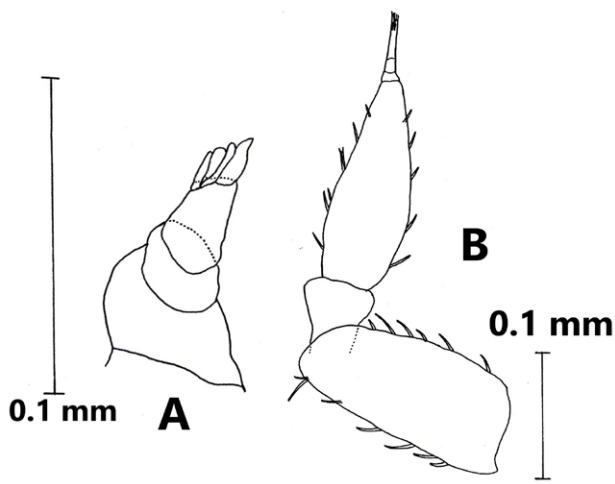

Fig. 3. *Thrakosphaera schawalleri*. **A**. first antenna. **B**. second antenna, flagellum (1 ♂, Spring of Vlad the Impaler, 24 Jul. 2024, ERIS).

First maxilla. Outer endite with four simple outer teeth and inner group of five more slender simple teeth; distal third of lateral margin fringed by thin setae; inner endite with rather acute lateral distal corner and two penicilli (Fig. 5A).

Second maxilla. Consisting of two endites fused to a single, distally bilobate appendage with sensilla on mediodistal corner; thin lines on apical edge give the impression of four lobes (Fig. 5B).

Maxilliped. Endite rectangular, with subapical medial process. Acute lateral distal corner with two setae. Palp with three articles, basal article with two rather large setae; second article on medial margin with proximal group of one small and one large seta, distal group of one large and several small setae and small seta on lateral margin; distal article with one seta on outer margin and apical tuft of several small setae (Fig. 6A).

Hypopharynx. Strong hook or teeth lacking on both lobes (Fig. 6B).

Stomach. Presents characteristics defining the stomach Crinocheta (Tabacaru & Giurginca 2003): small size relative to body size; medial apodema long and well-developed; lateralia elongated with a caudal, ventrally triturating apparatus; superomedianum absent; superolateralia missing; short and trapezoidal lamella dorsalis.

In species of *Thrakosphaera*, lamella dorsalis has a rather narrow trapezoidal shape, with a slightly curved caudal edge. The inferolateralia represent the most significant character: they are longer than the lamella ventralis with a rather sharp tip (Fig. 7).

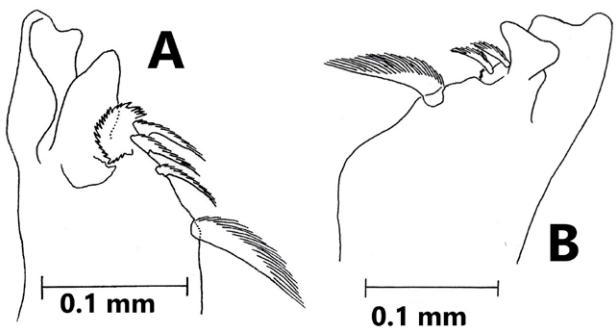

Fig. 4. *Thrakosphaera schawalleri.* **A**. left mandible. **B**. right mandible (1 ♂, Spring of Vlad the Impaler, 24 Jul. 2024, ERIS).

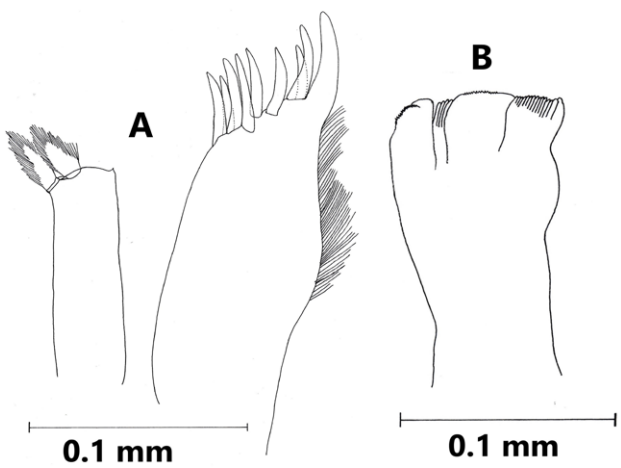

Fig. 5. *Thrakosphaera schawalleri*. **A**. maxilla 1, inner and outer endite. **B**. maxilla 2 (1 ♂, Spring of Vlad the Impaler, 24 Jul. 2024, ERIS).

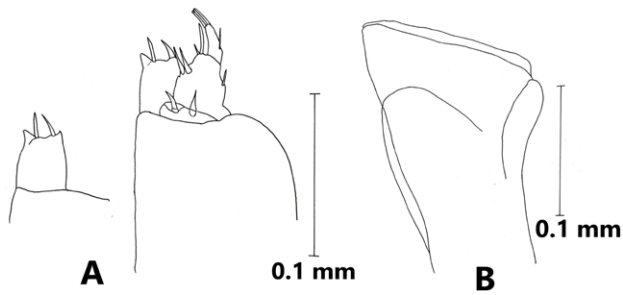

Fig. 6. *Thrakosphaera schawalleri*. **A**. maxilliped. **B**. hypopharynx (1 ♂, Spring of Vlad the Impaler, 24 Jul. 2024, ERIS).

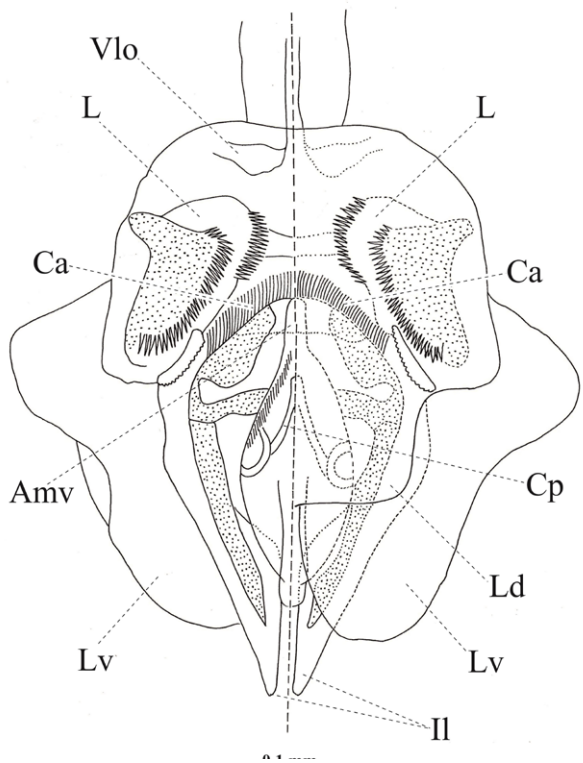

Fig. 7. *Thrakosphaera schawalleri*. Stomach, ventral (left side) and dorsal (right side) view: **Amv**: median ventral apodema; **Ca**: clatri setarum anteriores; **Cp**: clatri setarum posteriors; **Il**: inferolateralia; **L**: lateralia; **Ld**: lamella dorsalis; **Lv**: lamella ventralis; **Vlo**: valvulae lateralis oesophagi (1 ♂, Spring of Vlad the Impaler, 24 Jul. 2024, ERIS).

Pereiopod I. Antennal brush on propodus. Ungual seta as long or almost as long as claw; dactylus with straight ungual seta almost as long as outer claw. Dactylar setae simple, rather short. Merus longer than ischium and carpus; carpus as wide as long (Fig. 8A).

Pereiopod VII. Meros and carpus of equal length; ischium without hairy fields or other sexual modifications (Fig. 8B).

Genital apophysis. Ending with rounded hyaline blade with two weakly defined lobes (Fig. 8C).

Pleopod 1. Straight endopodite, tapering evenly towards tip; internal margin of endopodite slightly folded, tip simple, obliquely cut; reduced exopodite, strongly curved toward endopodite; exopodite 1 longer than broad (Fig. 9A, B).

Pleopod 2. Endopodite thin, longer than exopodite; exopodite triangular with medium-sized spine on lateral-external margin (Fig. 10A, B).

Uropodal protopodite. Protopodite with dorsal extension covering almost completely space between telson and epimera of fifth pleonal tergite; endopodite inserted on lower internal corner; uropod endopodite larger than exopodite, slightly longer than tip of pleotelson; exopodite short and pushed forward (Fig. 11C, D).

Pleotelson. Rounded, triangular tip with roughly parallel sides. Telson tip at same level with uropodal protopodite and tips of fifth pleonal tergite epimera (Fig. 11A, B).

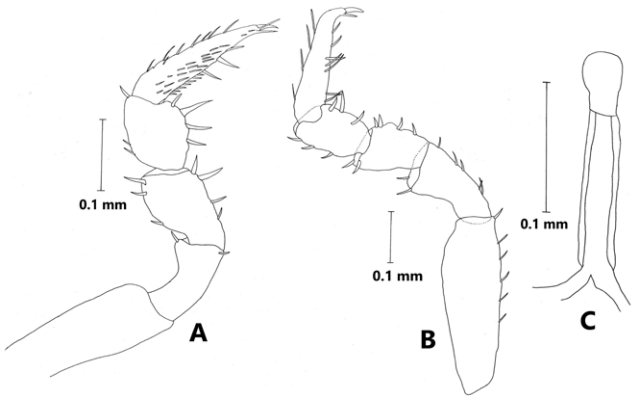

Fig. 8. *Thrakosphaera schawalleri*. **A**. pereiopod I male. **B**. pereiopod VII male. **C**. genital apophysis (1 ♂, Spring of Vlad the Impaler, 24 Jul. 2024, ERIS).

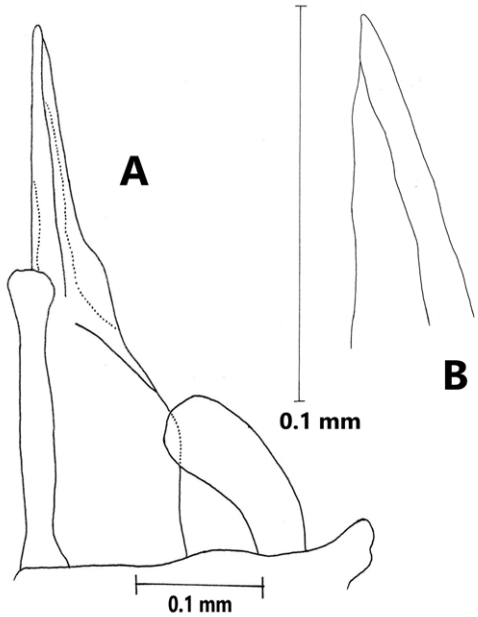

Fig. 9. *Thrakosphaera schawalleri*. **A**. pleopod 1 male, endopodite and exopodite. **B**. pleopod 1 male, tip of the endopodite (1 ♂, Spring of Vlad the Impaler, 24 Jul. 2024, ERIS).

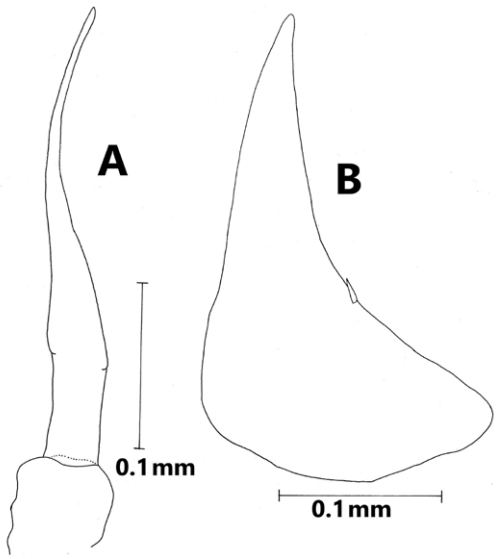

Fig. 10. *Thrakosphaera schawalleri*. **A**. pleopod 2 male endopodite. **B**. pleopod 2 male exopodite (1 ♂, Spring of Vlad the Impaler, 24 Jul. 2024, ERIS).

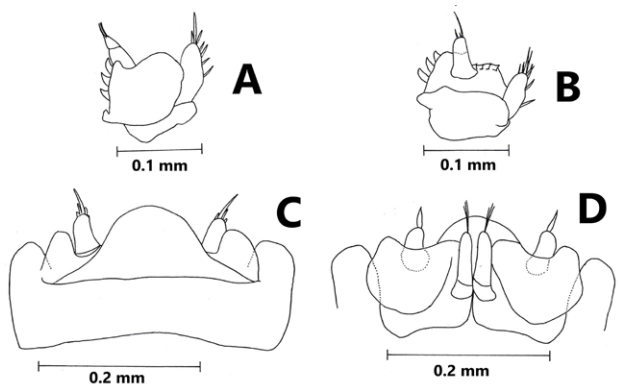

Fig. 11. *Thrakosphaera schawalleri*. **A**. pleotelson, dorsal; **B**. pleotelson, ventral. **C**. uropod, dorsal. **D**. uropod, ventral (1 ♂, Spring of Vlad the Impaler, 24 Jul. 2024, ERIS).

Discussion

In conglobating families of terrestrial isopods, four main strategies evolved to arrive at a closed outline of the caudal part of the pleon (Vandel 1943, 1960a, Taiti et al. 1986, Tabacaru & Giurginca 2003): **1.** telson covering the whole area between the epimera of pleonite 5, while the ventrally placed uropods cover the anal region like opercula (Tylidae); **2.** the telson is extended to cover near completely the uropodal exopodites and endopodites in some exo-antennal conglobating oniscids (Spelaeoniscidae Vandel, 1948, Tendosphaeridae Verhoeff, 1930, *Buchnerillo* Verhoeff, 1942); **3.** uropodal exopodite flattened and elongated to cover the space between the epimera of pleonite 5 and the telson (Armadillididae Brandt, 1833, Atlantiidae = Porcellionidae Brandt, 1831 following Schmalfuss 1989a) and **4.** uropodal protopodite flattened and elongated to cover the space between the epimera of pleonite 5 and the telson, but when the telson is short, the uropodal protopodites cover the space between the epimera of pleonite 5 together with the exopodites and the endopodites (Buddelundiellidae Verhoeff, 1930, Eubelidae Budde-Lund, 1899, Armadillidae Brandt & Ratzeburg, 1831, Scleropactidae Verhoeff, 1938, Irmaosidae Ferrara & Taiti, 1983, Delatorreidae Verhoeff, 1938 and the genus *Thrakosphaera* Schmalfuss, 1998).

The phylogenetic and systematic position of genus *Thrakosphaera* which, as Schmalfuss (1998) pointed out, is unclear. In his paper, Schmalfuss used eight characters to define his new genus: euspheric exo-antennal conglobation; head without antennal grooves; tergites arched and with broad scales; pereion tergite 1 with schism; telson triangular; antennal flagellum two-jointed; uropod protopodite broadened, filling the space between telson and pleon tergite 5 (Schmalfuss 1998). We can add several more characters: first pereiopod with antennal brush limited to propodus; dactylar seta on all pereiopods simple and rather short; pleopod 1 male endopodite with simple, obliquely cut apex; pleopod 1 male exopodite longer than broad; inferolateralia longer than lamella ventralis.

In our opinion, the most defining autapomorphy are the uropods (see Fig. 11): extension of uropodal protopodite covering almost completely the space between pleotelson and epimera of fifth pleonal tergite and uropodal exopodite pushed forward (as described by Schmalfuss 1998). Spelaeoniscidae has similar antennal furrows but the pleonal morphology is completely different, especially the uropods characterised by large, flattened and backward-projecting endopodites. In the strongly convergent uropods of Armadillididae and the genus *Atlantidium* Arcangeli, 1936 (Vandel 1957, Vandel 1960b) the exopodite is much larger than the styliform endopodite.

There are other differences between *Thrakosphaera* and the other families in group 4. In Buddelundiellidae, the uropodal protopodite is quadrangular, exopodites inserted near medial margin, endopodite distinctly longer than exopodite (see Gardini & Taiti 2023). In contrast, in *Thrakosphaera*, the protopodite is not quadrangular, the exopodite is inserted near the middle of the posterior margin and it is not much shorter than the endopodite. In the Eubelidae (Schmidt 2003, Taiti 2014), the exopodite is reduced in size and in most species inserted in the middle of the posterior margin; in *Thrakosphaera*, the exopodite is inserted in a similar way but is not reduced as much. In Armadillidae and Irmaosidae (Ferrara & Taiti 1983, Schmidt 2003), the exopodite is small to minute and is inserted dorsally near the medial margin of sympodite, as opposed to *Thrakosphaera*, where the exopodite is not so minute and is not inserted on the dorsal side of the uropod. In the Scleropactidae (Schmidt 2003, Tabacaru & Giurginca 2003), the usually smaller exopodite is inserted on the inner corner of the sympodite, while the endopodite is widened, longer than the exopodite; in *Thrakosphaera*, the exopodite is inserted in the middle of the medial margin and the endopodite, not much larger than the exopodite, is styliform. In Delatorreidae (Schmalfuss 1984, Schmidt 2003), the uropodal exopodite is small and inserted on the inner corner of the sympodite, the endopodite is large, laterally flattened but a ventral portion is also laterally extended; in *Thrakosphaera*, the exopodite has a completely different position, the size difference is smaller and both the exo- and the endopodite are styliform, neither being flattened.

According to our observations, the autapomorphies presented above (antennal brush limited to the propodus of the first pereiopod, the simple apex of pleopod 1 male endopodite, pleopod 1 male exopodite longer than broad and the extension of the uropodal protopodite) define a new family, the Thrakosphaeridae fam. nov. The new family shares a series of similarities and differences with Spelaeoniscidae Vandel, 1948 and Tendosphaeridae Verhoeff, 1930. Spelaeoniscidae contains nine genera: *Spelaeoniscus* Racovitza, 1907 with nine species (*S. debrugei* Racovitza, 1907, *S. sahariensis* Paulian De Felice, 1942, *S. orientalis* Vandel, 1959, *S. kabylicola* Vandel, 1948, *S. coiffaiti* Vandel, 1961, *S. lagrecai* Caruso, 1973, *S. vandeli* Caruso, 1976, *S. ragonesei*

Caruso & Lombardo, 1977 *S. akfadouensis* Caruso, Pezzino, Messina, Lombardo, 2017 and *S. costai* Caruso & Lombardo, 1976), *Uncuniscus* Caruso, Pezzino, Messina, Lombardo, 2017 with three species (*U. hamatus* (Caruso & Lombardo, 1978), *U. singularis* Caruso, Pezzino, Messina, Lombardo, 2017 and *U. elegans* Caruso, Pezzino, Messina, Lombardo, 2017), *Albertosphaera* Caruso & Lombardo, 1983 with a single species (*A. algerina* Caruso & Lombardo, 1983), *Atlantoniscus* Vandel, 1959 with a single species (*A. primitivus* Vandel, 1959), *Barbarosphaera* Vandel, 1948 with a single species (*B. lucasi* Vandel, 1948), *Desertosphaera* Vandel, 1948 with a single species (*D. remyi* Vandel, 1948), *Maghreboniscus* Vandel, 1959 with four species (*M. minimus* Caruso & Lombardo, 1983, *M. palmetensis* (Vandel, 1959), *M. rojasi* Garcia, 2022 and *M. trapezoidalis* (Vandel, 1959)) and *Triceratosphaera* Caruso and Lombardo, 1978 with a single species (*T. sabulicola* Caruso & Lombardo, 1978) (Caruso & Lombardo 1987, Caruso et al. 2017). Thrakosphaeridae fam. nov. shares the following similarities with Spelaeoniscidae Vandel, 1948: exo-antennal conglobation, second antenna with two-jointed flagellum, first maxilla inner endite with two unequal penicilli and uropodal exopodite smaller than endopodite. The differences are more numerous: first antenna two-jointed in Spelaeoniscidae, three-jointed only in *Triceratosphaera* Caruso & Lombardo, 1987 (Caruso et al. 2017) (three-jointed in Thrakosphaeridae fam. nov.); Spelaeoniscidae have antennal furrows beyond frons and even on pereionite I (only on frons in Thrakosphaeridae **fam. nov.**); hypopharynx with three strong teeth (Racovitza 1907, 1908) or one strong hook, as in *Triceratosphaera* (Schmidt 2003) (both absent in Thrakosphaeridae fam. nov.); maxillipedal palp with two articles in Spelaeoniscidae (Racovitza 1907, 1908, Schmidt 2003) versus three articles in Thrakosphaeridae fam. nov.; Spelaeoniscidae vary between no eyes (as in *Spelaeoniscus debruggei* see Racovitza 1907, 1908) and up to three in *Triceratosphaera* (Schmidt 2003) or four ommatidia in *Spelaeoniscus sahariensis* Paulian De Felice, 1942 (Caruso et al. 2017), while species of Thrakosphaeridae fam. nov. have five well-pigmented ommatidia. Unlike Spelaeoniscidae, Tendosphaeridae Verhoeff, 1930 contains only a single genus *Tendosphaera* with two species: *T. verrucosa* Verhoeff, 1930 and *T. graeca* Schmalfuss, 1989 (Schmalfuss, 2003, Schmidt, 2003).

Schmalfuss (1998) and Schmidt (2003) consider unlikely a close relationship between *Thrakosphaera* and *Tendosphaera*, but there are synapomorphies: first coxal plate with schism, second and third coxal plates with lobes formed by a fold on internal side (see also figure 215 in Vandel 1962); uropodal endo- and exopodite styliform, uropodal exopodite inserted laterally and not medially; outer endite of first maxilla with simple teeth only and a reduced pleopod 1 male exopodite. There are also clear differences: in *Thrakosphaera* the first pereiopod with antennal brush limited to propodus, while in *Tendosphaera* antennal brush extend to carpus; dactylar seta on all pereiopods in *Thrakosphaera* simple and rather short, in *Tendosphaera* - dactylar seta long, curved and with spatulate end (see figures 113-115 in Schmidt 2003); pleopod 1 male endopodite with a simple, obliquely cut apex in *Thrakosphaera* and with complicate and twisted apex in *Tendosphaera* (see figure 116 in Schmidt 2003); pleopod 1 male exopodite longer than broad in *Thrakosphaera* and broader than long in *Tendosphaera* (see Schmalfuss 1989b). Concerning the stomach, the differences are clear: caudal edge of lamella dorsalis slightly curved in *Thrakosphaera* but deeply curved forming two clear lobes in *Tendosphaera* (Fig. 12). In Oniscidea, the aspect of lamella dorsalis is also particularly characteristic of different sections but also genera (see the differences between *Halophiloscia* Verhoeff, 1908*, Chaetophiloscia* Verhoeff, 1908, *Leptotrichus* Budde-lund, 1885, *Protracheoniscus* Verhoeff, 1917, *Trachelipus* Budde-Lund, 1908 and *Armadillidium* Brandt, 1833) (Radu V. V 1959, Radu V. Gh. 1973, Tomescu 1974, Gruia et al. 1994) and even the species, as V. V. Radu (1961) showed for five species of *Platyarthrus* Brandt, 1833. As a result, it might not represent a good separating character between *Thrakosphaera* and *Tendosphaera*. The inferolateralia are clearly differentiating for the two genera: shorter than lamella ventralis in *Tendosphaera* (in fact, the aspect of the stomach in *Tendosphaera* is very similar with that of *Platyarthrus*) but longer than lamella ventralis in *Thrakosphaera* (Fig. 7), an aspect also

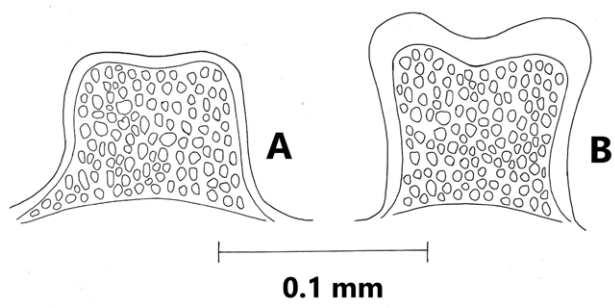

Fig. 12. Lamella dorsalis. **A**. *Thrakosphaera schawalleri*. **B**. *Tendosphaera verrucosa* (1 ♂, 1 ♀, Spring of Vlad the Impaler, 24 Jul. 2024, ERIS; 1 ♂, 1 ♀; Piedmont, Invorio (NO).

found in *Philoscia* Latreille, 1804, *Halophiloscia*, *Chaetophiloscia* and *Trachelipus nodulosus* (C. L. Koch, 1838) (Hassal 1977, Tomescu 1974, figure 7).

Family Thrakosphaeridae **f**am. nov. likely represents the basal adelphotaxon of family Tendosphaeridae. However, defining a new family for a monospecific genus seems, in our view, somewhat premature. Therefore, the final assignment of Thrakosphaera to a family and a clarification of its systematic position might be greatly enhanced by finding more species of this genus. Until then, we suggest that the adoption of family Thrakosphaeridae fam. nov. represents a solution to this phylogenetic and systematic problem. The next stage of our study of *Thrakosphaera* will include a molecular study to clearly define its systematic and phylogenetic position.

Coexisting species

Thrakosphaera schawalleri was collected along with *Hyloniscus riparius* (C. L. Koch, 1838), *Protracheoniscus politus* (C. L. Koch, 1841), *Porcellium collicola* (Verhoeff, 1907) and *Trachelipus arcuatus* (Budde-Lund, 1885) from the Spring of Vlad the Impaler; with *P. politus* and *Armadillidium vulgare* Latreille, 1804 from the Comana Lake and *P. politus*, *P. collicola*, *T. arcuatus* and *A. vulgare* along the touristic trail. All are widely distributed species within Romania (Giurginca 2022).

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