

A new species of the genus *Hebesuncus*  
from the Antarctic nunataks,  
Dronning Maud Land  
(Tardigrada)

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(With 9 figures)

A b s t r a c t

A new tardigrade, *Hebesuncus ryani* sp. n. from lithosol samples collected at nunataks in the western Dronning Maud Land (the Antarctic) is described.

I n t r o d u c t i o n

Ice-free areas of continental Antarctica situated far from sea-shores are characterized by particularly harsh climatic and edaphic conditions. Consequently, these remote ice-surrounded outcrops of rock, known as nunataks are inhabited by a limited number of plants and animals. To such animal groups belong tardigrades or water-bears, able to survive in extreme habitats. For the first time tardigrades have been reported from the western Dronning Maud Land during the biological survey of the Robertskollen nunataks in the austral summer of 1987-88. The survey was conducted from the South African station (SANAE) located on the Jelbard Ice Shelf. The preliminary results of those studies, including geological and ecological characteristics, are summarized in Ryan et al. (1989) and Ryan and Watkins (1989). At that time two new tardigrades were discovered in lichen samples and described by Dastych et al (1990).

The continuation of the survey in recent years accumulated additional tardigrade material which originated mainly from the Vesletskarvet nunatak, where another research base (SANAE III) had been established. Numerous tardigrades were extracted from samples of seemingly lifeless gravel and poorly developed mineral soil (lithosol) which were without bryophytes, lichens and macroalgae. Here was found another new tardigrade which is described below.

The measurements given are those of the holotype, unless otherwise indicated. All were taken from specimens mounted in Faure's medium.

### Description of the species

*Hebesuncus ryani* sp. n.

*Hypsibius oberhaeuseri* (Doyère): Ryan et al., 1989  
(Figs 1-6)

**HOLOTYPE** (Figs 1, 2): sex undet., 160  $\mu\text{m}$  long, December 1992, coll. J. M. Harris; deposited in the Zoologisches Museum Hamburg (ZMH, Reg. No. A39/94).

**TYPE LOCALITY:** The Antarctic, western Dronning Maud Land, northern Ahlmannryggen. The nunatak Vesletskarvet in the Robertsollen group of nunataks ( $71^{\circ} 28' \text{ S} + 30^{\circ} 15' \text{ W}$ ), about 850 m a.s.l. Soil and gravel sample from diorite bed-rock, December 1992, coll. J. Harris.

**PARATYPES:** 40 individuals and 6 eggs, data as for holotype; 16 individuals and 2 eggs, data as above, but collected between 5-20 January 1992 by D. Balfour and W. Steele. Other locality: the nunatak Snokjerringa (Robertsollen nunataks): soil and gravel samples, December 1992, coll. J. M. Harris: 19 individuals.

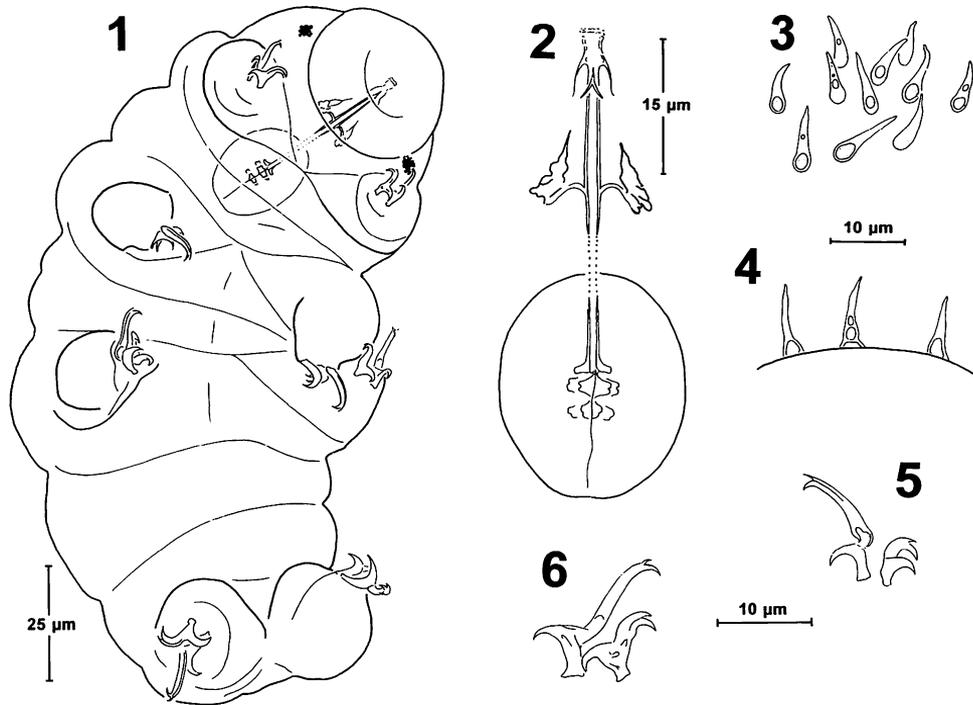
In total 75 paratypic animals and 8 eggs (Reg. No. A40/94). Three paratypes mounted on two slides (two individuals, egg) are deposited in the Dipartimento di Biologia Animale, Universita di Catania, Italy: the Pilato's collection). The remaining paratypes in ZMH.

**DIAGNOSIS:** A small *Hebesuncus* with two short macroplacoids and moderately long primary branches of the external claws. Eggs laid freely, the egg processes spine-like and mostly with bubble-like structures at their bases.

**DESCRIPTION:** The holotype is 160  $\mu\text{m}$  long (measurement taken off a slightly shrunk specimen); paratypes 134-266  $\mu\text{m}$ . Body of most specimens light pink or light violet, other specimens whitish. The body cavity sometimes with small clumps of brown pigment. Cuticle smooth. Eye-dots composed of several dark brown pigment granules (Fig. 1).

Mouth opening antero-ventral. Mouth cavity small, without internal sculpturing (crests, teeth). Buccal tube thin, long and solid in its anterior and posterior part, but flexible and striated in its middle (Fig. 2). The striated is slightly thinner than solid parts, but poorly marked and seen only in a few specimens. The striated section divides the buccal tube into a mouth- and pharyngeal tube. The mouth tube is without dorso-posterior apophyse (= drop-shaped structure). Stylet supports are short. The posterior solid unit of the pharyngeal tube ends with distinct pharyngeal apophyses.

Pharynx spherical or slightly ovoid (24 x 20  $\mu\text{m}$ ); in most paratypes its diameter 18-21  $\mu\text{m}$ . The pharyngeal apophyses 1.4  $\mu\text{m}$  long. Macroplacoids are small and grain-like, the first slightly longer (2.2  $\mu\text{m}$ ) than the second (1.8  $\mu\text{m}$ ). First macroplacoid with a tiny incision in its



Figs 1-5: *Hebesuncus ryani* sp. n. : 1- habitus, ventral view; 2- buccal apparatus, ventral view; 3 and 4- processes of egg; 5- claws of the IVth pair of legs; 6- claws of the IIIrd pair of legs (Figs 1 and 2: holotype, 3-6: paratypes).

middle, the second with a hardly visible incision in its latero-posterior part. Microplacoids are absent. The whole buccal apparatus 51  $\mu\text{m}$  long, the buccal tube itself 32  $\mu\text{m}$ . The mouth tube 19  $\mu\text{m}$  long; its length from the dorso-anterior apophyse to the stylet supports is 15  $\mu\text{m}$  [18-22  $\mu\text{m}$  in the paratypes; the "pt index" (see Pilato, 1981) in the holotype = 79 %; in the paratypes between 67 and 82 %]. External diameter of the mouth tube 1.2  $\mu\text{m}$  (measured at the stylet supports). Length of pharyngeal tube 13  $\mu\text{m}$ , in its striated unit 0.9  $\mu\text{m}$  wide (external diameter). The "pt index" for the whole buccal tube in the holotype is 47 %.

Claws (Figs 5, 6) are median sized and with distinct accessory spines on primary branches, particularly on internal claws. Cuticular bars between the claws, transverse bars at the bases of claws I-III and lunules are absent. All claws with indistinct internal sculpturing. Internal claws stumpy, with wide primary branches, the width due to the presence of thick cuticular section on each primary branch. The sections terminate apically with large accessory spines, especially distinct on the two last pairs of legs. The primary branches of the external claws are relatively wide and moderately long and carry distinct accessory spines. The bases of the branches are poorly sclerotized and flexible and have a different light-refracting index. The external claws on leg IV 18 are  $\mu\text{m}$  long, their bases and primary branches are 6 and 12  $\mu\text{m}$  in length, respectively. Thus, the length ratio between the primary branches and the whole claw is 66 %, in paratypes they are between 14-23  $\mu\text{m}$  long, giving a ratio between 61 to 72 %. "Pt index" for the IVth external claw in the holotype is 95 %, in the paratypes it ranges between 76-109 % (see Table 1).

Table 1. The lengths of some structures and their ratios (min-max,  $\bar{x}$ ) within the genus *Hebesuncus*.

Lengths and indices	<i>H. conjungens</i> n=5*	<i>H. schusteri</i> n=10	<i>H. ryani</i> n=9
the mouth tube length ( $\mu\text{m}$ )	19-23, $\bar{x}$ = 22.2	21-25, $\bar{x}$ = 23.2	18-22, $\bar{x}$ = 18.9
the claw IVth length ( $\mu\text{m}$ )**	9-10, $\bar{x}$ = 9.5	15-23, $\bar{x}$ = 17.1	14-20, $\bar{x}$ = 17.0
pt index for the mouth tube (%)	69-79, $\bar{x}$ = 71.8	67-76, $\bar{x}$ = 72.2	67-82, $\bar{x}$ = 75.6
pt index for the IVth claw** (%)	38-52, $\bar{x}$ = 42.2	65-91, $\bar{x}$ = 73.2	76-109, $\bar{x}$ = 91.5

\* specimens from the Carpathians (the Tatra and the Rodnei Mts)  
\*\* external claw

The eggs are small, whitish and freely layed. The egg shells are covered with elongated cone-like processes, shaped as more or less blunt spines. The processes are rather irregularly and sparsely spaced over the shell and variable in shape (Figs 3, 4). Most of the processes have a large internal bubble-like structure at their base, due to a poorly sclerotized cuticle. Some of the processes have additionally 1-2 such structures, but smaller in size. Surface of the processes and area between them smooth, however all eggs were more or less covered with detritus or mineral particles. On the egg circumference occur 14-23 processes. The processes are 6-11  $\mu\text{m}$  long (usually 8-9  $\mu\text{m}$ ), their bases 1.6-3.0  $\mu\text{m}$  in diameter (average about 2  $\mu\text{m}$ ). Diameter of eggs 51-60  $\mu\text{m}$ , excluding the processes.

No embrionate eggs were found. The affiliation of the eggs with extracted tardigrades has been confirmed by the method described by Bertolani & Rebecchi (1988). Two eggs removed from the ovary of a mature female of the new species had exactly the same type of processes as these eight eggs without embryos, proving that they belong to the same taxon.

ETYMOLOGY: We dedicate this species to Dr. Peter G. Ryan (the University of Cape Town), who co-organized the first biological survey on nunataks in the Dronning Maud Land, Antarctica.

#### C o m m e n t s

In the genus *Hebesuncus*, a taxon with unclear suprageneric status within the family Hypsibiidae (see Dastych 1992), two species were known to date, i.e. *H. conjugens* (Thulin, 1911) and *H. schusteri* (Dastych, 1984). The former has been reported from the Arctic and some mountains in the northern and southern hemisphere, *H. schusteri* has been recorded only from the Antarctic (op. cit.).

Individuals of *H. ryani* sp. n. closely resemble those of *H. schusteri* and both taxa are difficult to distinguish if their eggs are not available. The new species differs from *H. schusteri* in its relatively shorter mouth tube and a lower "pt index" for the IVth external claws (Table 1). However, the taxa can be readily separated because of the different shape of their egg processes, i.e. hemispherical in *H. schusteri* and spine-like in *H. ryani* sp. n.

The eggs of the new species and those of *H. conjugens* are so far alike, in that they have similarly shaped and sized processes. Nevertheless, the spine-like processes in *H. ryani* sp. n. are usually provided with internal bubble-like structure at their bases, such structures generally being absent in *H. conjugens*. Individuals of *H. ryani* sp. n. are separable from those of *H. conjugens* by the decidedly longer claws (in their absolute lengths), distinctly higher "pt index" for the IVth internal claws and the relatively shorter mouth tube (comp. Table 1). The above differences separate also individuals of *H. schusteri* from *H. conjugens*.

The new species has already been reported from the Robertskollen nunataks, but under other name. It was extracted from mosses collected at the nunatak Grunehoga, but misidentified as *Hypsibius oberhaeuseri* (Doyère) (see Ryan et al. 1989).

#### A c k n o w l e d g e m e n t

We wish to thank W. R. Miller (Mahomet, USA) for the loan of two slides with the new species from the Grunehogna (identified as *H. oberhaeuseri*) from his collection which represent a part of the material on which the preliminary survey of water-bears of the Robertskollen (Ryan et al. 1989) was based.

#### Z u s a m m e n f a s s u n g

Eine neue Bärtierchen-Art, *Hebesuncus ryani* sp. n., wird aus den Proben mit Kies und vom primären Boden (Antarktis, Maud Dronning Land, die Nunataken aus der Robertskollen - Gruppe) beschrieben. Charakteristisch für die neue Art sind (1) die relativ langen Hauptäste der äußeren Krallen und (2) die dornförmigen Fortsätze auf der Eihülle.

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