

# Redescription of *Isohypsibius sculptus* Ramazzotti, 1962 (Tardigrada)

HIERONYMUS DASTYCH

(With 10 figures)

## Abstract

*Isohypsibius sculptus* Ramazzotti, 1962 (Tardigrada) is redescribed from type material and a new specimen collected in the Chilean Andes. Cuticular pillar-like structures, hitherto unknown in the family Hypsibiidae, has been found in this species.

## Introduction

While examining tardigrades collected by Dr. Brian Stuckenberg in Chile, a specimen of rarely recorded water bear, *Isohypsibius sculptus* Ramazzotti, 1962, was found. The species was originally described from the Chilean Andes and reported later also from Argentina (Rossi & Claps 1989), Mexico (Beasley 1972) and Denmark (Hallas 1977). As none of the above reports deals adequately with the morphology of species, a redescription of the taxon is given here. *Fulard*

## Material

Two specimens on two slides from Ramazzotti Collection deposited in the Museum of Natural History in Verona. One specimen (holotype) is mounted together with *Mopsechiniscus imberbis* (Richters 1907), *Hypsibius convergens* (Urbanowicz, 1925), *Macrobiotus* sp. and a ?syntype of *M. subintermedius* Ramazzotti, 1962. This slide is marked "Tipo 136" and labelled "Nahuelbuta (Chile) a m. 1100 / 22.4.62 / Licheni su albero / Polivinil / Biotopo L-7 / Ramazzotti". The other slide from the same collection is similarly described. However, it bears no inscription indicating the type status of its only specimen. The additional marking "IX-84" may indicate that it represents a toptype.

New material: one specimen, sex undet., Chile, Temuco District, Villarrica National Park near Pucon, Villarrica Volcano. Mosses and lichens from *Nothofagus* trunk, in the forest near its upper zone, 2 Dec 1987, coll. B. Stuckenberg. No altitudinal data. The slide (No. 18) is housed at the Natal Museum, Pietermaritzburg, South Africa. The specimen is mounted in Faure's medium, together with tardigrades from the genus *Oreella*, *Minibiotus*, *Hypsibius* and *Diphascon*.

All measurements are in micrometers ( $\mu\text{m}$ ).

## Description of species

*Isohypsibius sculptus* (Ramazzotti, 1962) (Figs 1-10)

*Hypsibius (Isohypsibius) sculptus*: Ramazzotti 1962;  
Beasley 1972; Hallas 1977

*Isohypsibius sculptus*: Rossi & Claps 1989

**D i a g n o s i s.** A small dumpy *Isohypsibius* with very small, regular cuticular sculpture, two macroplacoids in the spherical pharynx and small claws.

**D e s c r i p t i o n.** The body is small, dump (Figs 5, 6) and whitish and between 109-191  $\mu\text{m}$  long. Eye-spots are lacking. The cuticle is made of very small, regularly distributed pillars, up to 1  $\mu\text{m}$  in length. These pillars, when seen in dorsal or ventral aspect, give the impression of the presence on the cuticular surface of numerous small, even sized, closely and regularly distributed granules (dots) (Figs 5-8). These granules have the diameter of up to 0.6  $\mu\text{m}$  (0.5-0.8) and bear a resemblance to those occurring in *Pseudechiniscus suillus* Ehrenberg, 1844. The cuticular pillars are, with the exception of distal parts of legs, present over the whole body, and are relatively easily seen in lateral aspect (Figs 2, 9, 10).

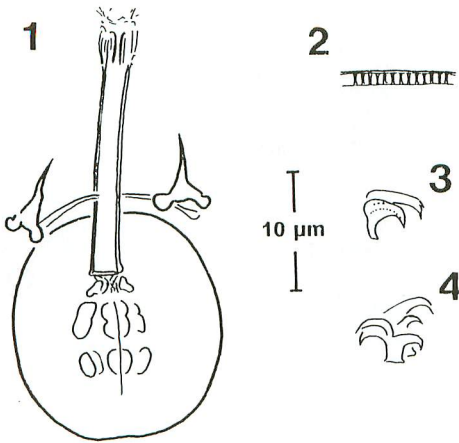
Mouth opening is antero-ventral and is surrounded by barely recognizable lobes. The mouth cavity itself is small and without internal sculpturing. The buccal tube (Fig. 6: arrowhead) is median wide, its outer diameter being 1.8  $\mu\text{m}$ . In the type specimens it is much wider (4  $\mu\text{m}$  in diameter). Its length varies between 19.4-31  $\mu\text{m}$ . The distance between the stylet sheaths and stylet supports is 13.5-21  $\mu\text{m}$ , hence the "pt index" (Pilato 1981) is equal 69.6, 69.0 and 70.0% for a particular specimen.

Pharynx is spherical, 18  $\mu\text{m}$  in diameter, or roundish (26 x 25  $\mu\text{m}$ ), with distinct pharyngeal apophyses and two macroplacoids (Figs 1, 6, 7). Microplacoids are absent. The placoid row is 8.6  $\mu\text{m}$  long. In the smallest specimen the macroplacoids are small, grain-like, the first being longer than the second (3.4 and 2.3  $\mu\text{m}$ ). In the holotype they are larger, the first having a length of 7  $\mu\text{m}$ , while the second one, in the specimens from Ramazzotti's collection, is 4 and 4.8  $\mu\text{m}$ . The first macroplacoid has a tiny incision in its middle, the second placoid is provided with a small external incision in its posterior part, about one-third from its end.

The claws (Figs 3, 4) are small, stumpy and of *Isohypsibius*-type. The main branches are thin but wide and provided with small accessory spines. The bases of the claws have small lunules. The lunules were however visible in only one specimen where two legs and their claws are not strongly curled up. The length of the posterior (external) claw IV is 6.3  $\mu\text{m}$ . Cuticular bars do not occur between the claws. Transversal bars are not present at the bases of claws I-III.

## Comments

The presence of pillar-like structures of the cuticle in *I. sculptus* was not reported in the original description as such, Ramazzotti (1962) indicating in the protologue only: "granulazione estremamente fine". These microstructures are of special interest. This type of cuticle, called also "heterotardigrade-type" and described for the first in detail by Greven (1972), is characteristic for the majority of Arthrotardigrada and as such



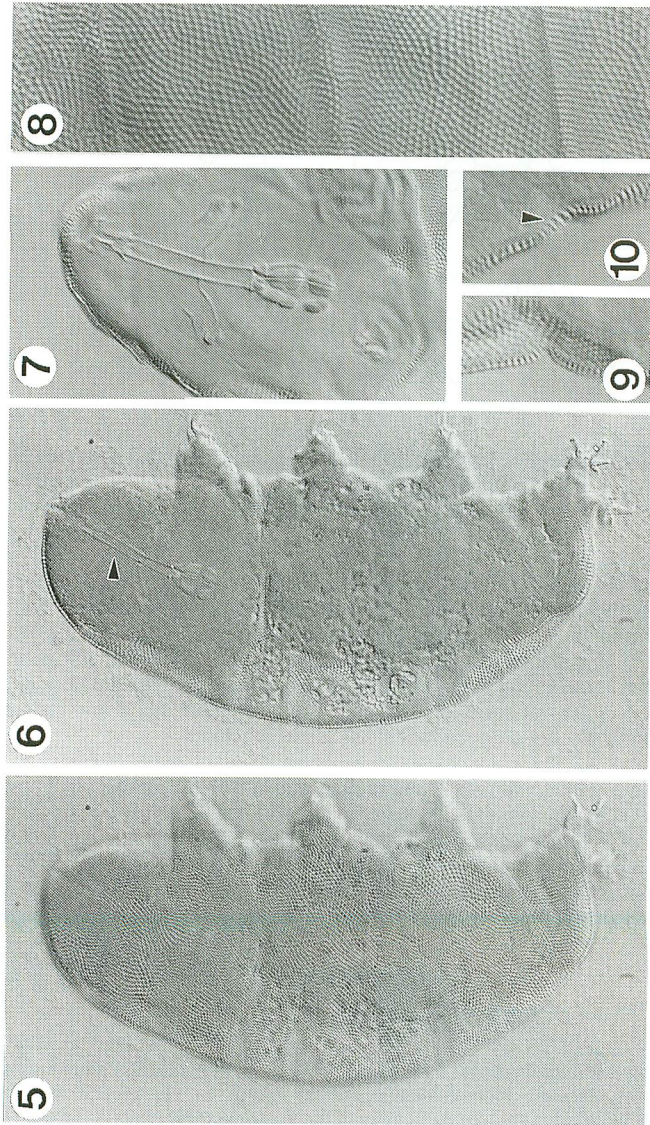
Figs 1-4. *Isohypsibius sculptus* Ramazzotti, 1962: 1- buccal apparatus, dorso-lateral view; 2- cuticular pillars, lateral view; 3- external claw of leg I, lateral view; 4- claws of leg II (specimen from Villarica Volcano).

represents here plesiomorphy. Recently this type of cuticle has been also discovered in more advanced water bears, the Eutardigrada, then only in their ancestral line represented by the family Macrobiotidae [in *Dactylobiotus dispar* (Murray, 1907): see Greven 1982 and in *Macrobiotus dianae* Kristensen, 1982: see Kristensen 1982]. In the more derived eutardigrade family, the Hypsibiidae, to which *I. sculptus* belongs, that type of cuticle so far has not been reported. It should be emphasised that the genus *Isohypsibius* also represents an ancestral stock within this family.

The scanty data on *I. sculptus* suggest a montane character for the species, with its distribution confined at least to the Neotropics. The report about its presence in Denmark (Hallas 1977) is based most probably on misidentification, thus the presence of the species in Europe is very uncertain. Unfortunately the slides with the specimens from Denmark have been destroyed (Prof. Kristensen, pers. comm.). The Mexican material of *I. sculptus* (see Beasley 1972) is regrettably no longer available for examination (Dr. Beasley, pers. comm.).

#### Acknowledgements

I thank Mrs. Chiara Maucci (Verona) for the loan of the types of *I. sculptus* and Mrs. Bianca Lawrence (the Natal Museum, Pietermaritzburg, South Africa) for the loan of the Chilean specimen. I am very grateful to Dr. Clark W. Beasley (McMurry University, Abilene, Texas) for his information on the whereabouts of Mexican material, Prof. Dr. Reinhardt M. Kristensen (Zoological Museum, Copenhagen) for his notice on the fate of Danish specimens, and to Dr. D. L. Bürkel (Universität Hamburg) for linguistic correction in the English manuscript.



Figs 5-10. *Isohypsibius sculptus* Ramazzotti, 1962: 5- whole animal, dorso-lateral view, 6- as above, vertical longitudinal view (arrowhead: mouth tube), 7- buccal apparatus, 8- cuticular structure (pillars), dorsal view, 9 and 10- cuticular pillars (arrowhead), lateral view (Figs 7-10: holotype) (all DIC contrast).

## Zusammenfassung

Eine südamerikanische Tardigradenart, *Isohypsibius sculptus* Ramazzotti, 1962, wird aus Chile wiederbeschrieben. Ihre charakteristischen und für diese Art bisher unbekanntes Mikrosäulen in der Kutikula repräsentieren ein neues Merkmal für die Familie Hypsibiidae, in die dieses Bärtierchen gehört.

## Literature

- Beasley, C. W., 1972: Some tardigrades from Mexico. - *The Southwestern Naturalist*, **17** (1): 21-29. Austin.
- Greven, H., 1972: Vergleichende Untersuchungen am Integument von Hetero- und Eutardigraden. - *Z. Zellforsch.*, **135**: 517-538. Berlin.
- Greven, H., 1982: Homologues or analogues? A survey of some structural patterns in Tardigrada. - *Proc. IIIrd Int. Symp. Tardigrada*, Johnson City, Tennessee, USA, 55-76. Johnson City.
- Hallas, T. E., 1977: Survey of the Tardigrada of Finland. - *Ann. Zool. Fennici*, **14**: 173-183. Helsinki.
- Kristensen, R. M., 1982: New aberrant eutardigrades from homothermic springs on Disco Island, West Greenland. - *Proc. IIIrd Int. Symp. Tardigrada*, Johnson City, Tennessee, USA, 203-220. Johnson City.
- Pilato, G., 1981: Analisi di nuovi caratteri nello studio degli Eutardigradi. - *Animalia*, **8** (1/3): 51-57. Catania.
- Ramazzotti, G., 1962: Tardigradi del Cile, con descrizione di quattro nuove specie e di una nuova varietà. - *Att. Soc. ital. Sci. nat. Museo civ. Stor. nat. Milano*, **101**: 275-287. Milano.
- Rossi, G. C. and M. C. Claps., 1989: Tardigrados de la Argentina V. - *Rev. Soc. ent. argent.*, **47** (1-4): 133-142. Buenos Aires.

Author's address:

Dr. H. Dastych, Zoologisches Institut und Zoologisches Museum der Universität Hamburg, Martin-Luther-King-Platz 3, 20146 Hamburg, Bundesrepublik Deutschland.