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Acutuncus, a new genus of Hypsibiidae (Eutardigrada)

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(With 2 figures)

Abstract

Several populations of the species *Hypsibius antarcticus* (Richters, 1904) have been studied, and the characteristics of this species have been found to be different from all other members of the genus *Hypsibius*. The inner claws of the first three legs, and anterior claws of the fourth pair of legs conform to the genus *Hypsibius*, while the outer claws are more similar to those in the genus *Isohypsibius*. The apophyses for the insertion of the stylet muscles are symmetrical with respect to the front plane, and composed of sharp hooks, unlike the semi-lunar hooks of *Hypsibius*. It has therefore become necessary to erect a new genus *Acutuncus*, for which *Macrobiotus antarcticus* Richters, 1904 becomes the type species.

Introduction

The species *Hypsibius antarcticus* (Richters, 1904) has been collected from several localities in continental Antarctica, the maritime Antarctic and sub-Antarctic archipelagoes. A recent re-description of *Hypsibius antarcticus*, with the addition of *Hypsibius mertoni simoizummi* Sudzuki, 1964 as a new synonym (Dastych 1991), reported: "It should be noted, that some characters of *H. antarcticus*, i.e. the shape and armature of the buccal cavity and mouth tube and particularly, free laid eggs and the structure of chorion processes, distinguish the species from all reliably described taxa in the genus *Hypsibius*. This indicates that its present status needs further studies."

To clarify these points, numerous specimens from various localities in Victoria Land, Continental Antarctica, and a few specimens from King George Island, South Shetland Islands, and Princess Elizabeth Land, Continental Antarctica, were studied.

Results and Discussion

The study of the various specimens from Antarctic populations has indicated other characters (in addition to those discussed in Dastych 1991), which suggests that *H. antarcticus* cannot be ascribed to either *Hypsibius*, nor any other known genus of Hypsibiidae. In particular, the shape of the claws, which Dastych (1991: see Figs. 25-28)

reported as variable, were found to conform to the *Isohypsibius* type for the outer claws of the first three legs, and posterior claw of the fourth, while the inner claws of the first three legs and anterior claw of the hind leg correspond to those of the *Hypsibius* type (Fig. 1a, c-e, g-i). The claws often have a septum dividing the basal portion from the secondary branch, and between the secondary and primary branches. However, this character does not have generic validity due to its variability. Indeed, it was noted that septa may vary in shape, size and position in the different claws on a single specimen, and may also be underdeveloped or absent.

The bucco-pharyngeal apparatus of *H. antarcticus* shows some unusual characteristics, which do not belong to the genus *Hypsibius*. When *Hypsibius* is viewed laterally, the margin of the hook-like apophyses for the insertion of the muscle of the stylets is convex, forming a continuous curve, and the caudal apex is very close to the wall of the buccal tube. It is this characteristic shape which defines the description of the apophyses as "semilunar hooks" (Pilato 1987). In *H. antarcticus* the apophyses have very different shape, with a central concavity along the margin, rather than the smooth curve, whilst the caudal apex is sited further from the buccal tube (Fig. 2b). Consequently, these apophyses are to be described as "sharp hooks". In ventral view these apophyses, as in *Hypsibius* and other genera of eutardigrades, show two diverging, sharp caudal processes pointing diagonally backwards (Fig. 2c). The shape of the apophyses for the insertion of the stylet muscles is considered a conservative character (and can be identical in different genera), thus a difference in the shape must be considered a significant indicator of phylogenetic divergence.

Both dorsal and ventral walls of the buccal tube have a median cuticular thickening, caudal to the apophyses for the insertion of the stylet muscles (Figs 2b, 2c). The thickenings are clearly visible for a third of the length of the buccal tube (this is more apparent in the lateral view), but extend, decreasing in thickness, almost to the stylet supports. The thickening of the dorsal wall, mentioned by Dastych (1991), is more obvious than that of the ventral wall. Similar structures thickening the buccal tube can be observed in other eutardigrade genera, i.e. *Halobiotus* Kristensen, 1982, *Ramazzotius* Binda and Pilato, 1986, and *Mixibius* Pilato, 1992. In concordance with several genera of the Hypsibiidae the furcae of the stylet branches have thickened, rounded apices.

Peribuccal lamellae are lacking in *H. antarcticus*, but the mouth is surrounded by a ring of twelve elliptical structures described here as peribuccal papulae. Though not reported in the text, Dastych (1991) indicated these structures in the figures. The peribuccal papulae are arranged symmetrically with respect to the sagittal plane, in accordance with the arrangement of other peribuccal structures found in the Hypsibiidae.

The eggs of *H. antarcticus* have a thick cuticle with small thin projections immersed in the external hyaline sheath, which gives the appearance of regular small dots covering the whole surface. Unlike any other member of the genus *Hypsibius*, these eggs are laid free.

It has been shown that *H. antarcticus* differs from all other members of the genus *Hypsibius*, and that these differences are based to some very conservative characteristics. Due to these facts it is suggested that this species belongs to an evolutionary

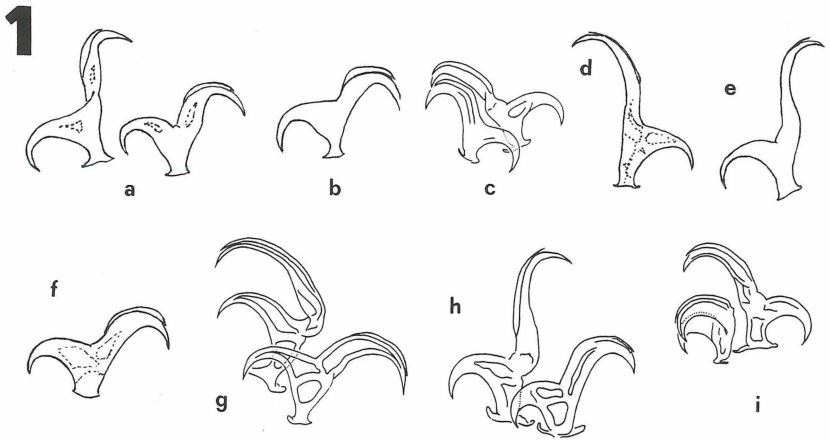

Fig. 1a-i. *Acutuncus antarcticus* (Richters, 1904): a-c, claws of the second pair of legs; d-i, claws of the fourth pair of legs (c, g, h, i - from Dastych 1991).

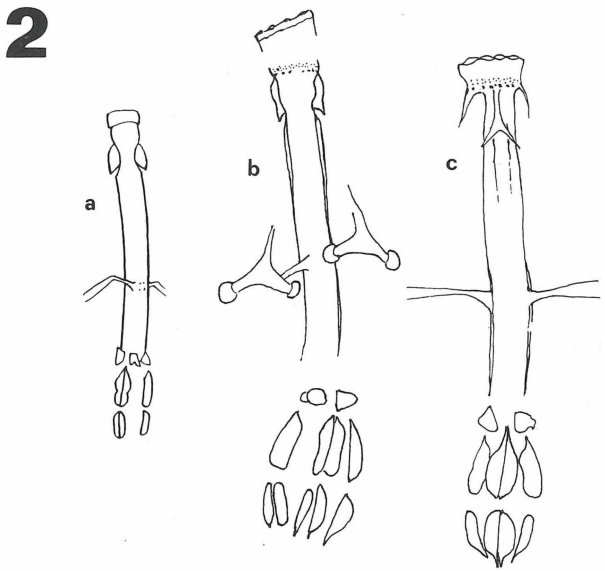

Fig. 2a-c. a - *Hypsibius*, bucco-pharyngeal apparatus (lateral view); b, c - *Acutuncus antarcticus* (Richters, 1904), bucco-pharyngeal apparatus (b - lateral view, c - ventral view).

line akin to the genus *Hypsibius* but distinct. In order to express this phylogenetic situation it is necessary to institute a new genus; *Acutuncus*. The etymon refers to the shape of the apophyses for the insertion of the stylet muscles. The new genus can be defined as follows:

Acutuncus n. gen.

D i a g n o s i s : Hypsibiidae, Hypsibiinae. Dorso-lateral elliptical organs on the head absent. Outer claws of the first three pairs of legs and posterior claws of the hind legs similar to those found in *Isohypsibius*. Inner claws of the first three pairs of legs and anterior claws of the hind legs conform to the *Hypsibius* type. In the bucco-pharyngeal apparatus the tube is rigid, without a ventral strengthening bar. The apophyses for the insertion of the stylet muscles are in the form of a "sharp look", and symmetrical with respect to the frontal plane. The caudal processes of these apophyses pint diagonally backwards. Peribuccal lamellae absent; twelve peribuccal papulae present. Pharyngeal apophyses and placoids present. The two branches of the furcae of the stylets have thickened, rounded apices. The eggs are laid free; the egg shell has projections.

T y p e s p e c i e s : *Macrobiotus antarcticus* Richters, 1904.

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

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