

Phylogeny and biogeography of South American Crinocheta, traditionally placed in the family "Philosciidae" (Crustacea: Isopoda: Oniscidea)

Andreas Leistikow*

Universität Bielefeld, Fakultät für Biologie, Abteilung Morphologie der Tiere, Bielefeld, Germany

Received 15 February 2000 · Accepted 9 August 2000

Abstract

South America is diverse in climatic and thus vegetational zonation, and even the uniform-looking tropical rain forests are a mosaic of different habitats depending on the soils, the regional climate and also the geological history. The terrestrial Isopoda (Oniscidea) constitute an important link in the nutrient webs of the rain forests. They participate in soil formation by shredding leaf litter when foraging on the associated fungi and bacteria.

After a century of research on this interesting taxon, a revision of the terrestrial isopod taxa from South America and some of the Antillean Islands, which are traditionally placed in the family Philosciidae, was performed to establish monophyletic genera. In addition, the phylogenetic relationships of these genera are elucidated in the light of phylogenetic systematics. Several new taxa are recognized, among them the two genera *Plataoniscus* gen. n. and *Pulmoniscus* gen. n.; the former name replaces *Plataoniscus* Vandel (1963) which is not an available name according to § 13a ICZN because a type species was never designated.

Diagnosis of *Plataoniscus* gen. n.: Cephalothorax with linea frontalis and faint linea supra-antennalis, lateral lobes present, compound eyes composed of more than 20 ommatidia. Antenna with three-articulate flagellum bearing short apical organ. Maxillula with 4 + 5 slender teeth on lateral endite, maxillula with lateral lobe two times broader than medial one, maxilliped without knob-like penicil on endite. Pereopods with simple dactylar setae. Pleopods with exopodites bearing more than 20 sensory spines laterally, in apical region a second row more centrally, covered lungs in all pleopods, lungs 1 to 2 monospiracular, lungs 3 to 5 multispiracular, spiracular area covered with pectinate scales and a derivative of those scales, forming a triangular lobe.

The autapomorphies of *Plataoniscus* gen. n. are:

- 1) Pleopod 1 to 5 exopodites with covered lungs, monospiracular in pleopods 1 and 2, multispiracular in pleopods 3 to 5.
- 2) Perispiracular area with triangular or three-tipped cuticular scales as derivatives of pectinate scales.
- 3) Pleopod exopodites with second, more centrally located row of sensory spines in apical region.
- 4) Male pleopod 5 exopodite with furrow on medial margin of caudal surface.

Type species of the genus is *Plataoniscus borelli* (Dollfus, 1897).

Diagnosis of *Pulmoniscus* gen. n.: Cephalothorax without lateral lobes and linea frontalis, linea supra-antennalis present, compound eyes consisting of 14 ommatidia in three rows. Antennula three-articulate with coniform distal joint, antennae with three-articulate flagellum bearing short apical organ. Maxillula with 4+5 teeth on lateral endite, inner set cleft, maxillipedal endite without knob-like penicil. Pereopods with simple dactylar setae, coxal plates with nodulus lateralis and sulcus marginalis. Pleopods with rhomboidal exopodites bearing covered lungs, perispiracular area concentrically wrinkled, endopodites subrectangular.

*Corresponding author: Dr. Andreas Leistikow, Welsingheide 160, D - 48163 Münster, Germany, e-mail: leiste@biologie.uni-bielefeld.de

The autapomorphies of *Pulmoniscus* gen. n. are:

- 1) Cephalothorax without lateral lobes.
- 2) Lateral endite of maxillula with particular teeth, bearing a crown-shaped, 3-tipped apex.
- 3) Covered lungs in all five pairs of pleopod exopodites.
- 4) Spiraculum opening distally at more than one third of lateral length.

The type species of this hitherto monotypic genus is *Balloniscus insularuminfracventum* Vandel, 1952.

Two further new taxa are established on a higher taxonomic level: within the family "Philosciidae" two supergeneric taxa are recognised. Both are endemic in the Neotropics:

The new tribe Ischiosciini trib. n. is defined by the following apomorphies:

- 1) Antennula with proximal article bearing a shield-like protrusion distally.
- 2) Pleotelson with ventral semicircular pit apically. The following genera are members of this tribe: *Ecuadoroniscus* Vandel, 1968, *Oreades* Vandel, 1968, *Tropiscia* Vandel, 1968, *Mirtana* Leistikow, 1997, and *Ischioscia* Verhoeff, 1928, the latter is the typical genus.

The new tribe Prosekiini trib. n. is established for the genera *Prosekia* Leistikow, 2000 (the type genus), *Metaprosekia* Leistikow, 2000, *Xiphoniscus* Vandel, 1968, *Andenoniscus* Verhoeff, 1941, *Androdeloscia* Leistikow, 1999, and *Erophiloscia* Vandel, 1972. It is characterised by the following autapomorphies:

- 1) Antennula with the medial aesthetascs gathered in a tuft, directed more or less medio-distally, not attached to article 3.
- 2) Transverse fold between aesthetasc tuft and distal pair of aesthetascs.
- 3) Male pleopod 1 with hyaline lamellae near apex.

There are several more undescribed taxonomic units which are partially neotropical, partially also found on other continents, particularly on the old Gondwanan fragments. These monophyla are not formally named because of the lack of sufficient data. They were checked for their distribution patterns which are compared with patterns of other taxa from South America. Some correspondence was found: typical patterns are northwestern Neotropics, southwestern new world Australis, and southeastern new world Australis. Particularly the southern taxa have relationships to paleotropical taxa. The distribution patterns are analysed with respect to the evolution of the Oniscidea and to the geological history of their habitats.

Key words: Crustacea, Isopoda, Oniscidea, Crinocheta, phylogenetic systematics, phylogeny, biogeography, Neotropics, South America

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