SPIXIANA	21	3	215–225	München, 01. November 1998	ISSN 0341-8391

Redescriptions of terrestrial Isopoda from Chile and Peru

(Crustacea, Isopoda, Oniscidea)

Andreas Leistikow

Leistikow, A. (1998): Redescriptions of terrestrial Isopoda from Chile and Peru (Crustacea, Isopoda, Oniscidea). – Spixiana **21/3:** 215-225

A redescription of the type material of *Andenoniscus silvaticus* Verhoeff, 1941 and *Araucoscia chilenica* Verhoeff, 1939 from western South America is given and all mentioned characters are depicted. The examined material from the Zoologische Staatssammlung München represents the remainder of the samplings Verhoeff originally worked on. The generic diagnoses are completed to allow phylogenetic comparison with other "philosciid" Oniscidea.

A. Leistikow, Universität Bielefeld, Abteilung für Morphologie und Systematik der Tiere, Morgenbreede 45, D-33615 Bielefeld, Germany. E-mail: Leiste@Biologie.Uni-Bielefeld.de

Introduction

Our knowledge on the isopod fauna of South America is full of gaps and vast regions of this continent are still white patches especially concerning research on Oniscidea. It is very difficult to make an elaborate analysis of the phylogeny of the interesting diversity of terrestrial isopods since most descriptions are rather superficial. Especially the contributions of K. W. Verhoeff and A. Vandel are often seemingly intuitive and it is almost impossible to imagine the species examined by the authors (e.g. Vandel 1968 or 1973, Verhoeff 1939 or 1941). To provide a character set as voluminous as possible, two species of "philosciid" Oniscidea from western South America are redescribed: *Andenoniscus silvaticus* Verhoeff, 1941 and *Araucoscia chilenica* Verhoeff, 1929. As far as possible, characters are chosen which reveal most information for generic diagnosis as indicated by Taiti & Ferrara (1980).

Species account

Genus *Andenoniscus* Verhoeff, 1941

Diagnosis. Cephalothorax with linea frontalis, antenna with three-articulate flagellum. Molar penicil of mandible semi-dichotomized, lateral endite of maxillula bearing 4+4 teeth, the inner set cleft, maxilla with lateral lobe setose, medial lobe cuspidate, endite of maxilliped lacking knob-like penicil and setation.

Pereopods rather weakly sclerotized, dactylus with flagelliform dactylar seta and short inner claw. Coxal plates with sulcus marginalis, lacking in at least coxal plate 1, no gland pores, noduli laterales present with d/c maximum on coxal plate IV. Pleopod exopodites with straight lateral margins, uropod endopodite inserting slightly proximally of exopodite.

Type species. *Andenoniscus silvaticus* Verhoeff, 1941 (by monotypy and original designation).

Andenoniscus silvaticus Verhoeff, 1941

Figs 1-2

Material. Microscopic slides of a male specimen, the only material remaining: Peru, Sivia, 520 m, native forest, Zoologische Staatssammlung München (ZSM), designated **Lectotype**.

Description

Colour. Verhoeff (1941) stated that the dorsal colouration was brown and gray.

Cephalothorax. Linea frontalis present, presence of linea supra-antennalis not described (Verhoeff 1941). Compound eyes of less than 10 ommatidia (Verhoeff 1941).

Pereon. Smooth, sparsely covered with setae (Verhoeff 1941). Coxal plates without gland pores, mounted material: coxal plate 1 without, coxal plate 7 with sulcus marginalis, both bearing noduli laterales (Fig. 1, Cx1/7).

Pleon. Retracted from pereon, pleotelson with almost straight lateral margins (Fig. 1, Tel).

Antennula. Three-articulate, distal article bulbous with set of aesthetascs medially and few aesthetascs apically (Fig. 1, An1).

Antenna. Three flagellar articles, subequal in length, apical organ broken, peduncular articles 4 to 5 subequal in length to flagellum (Fig. 2, An2).

Mandible. Only left mandible mounted, setation of pars intermedia partially removed, one short penicil present, molar penicil semi-dichotomized, about 5 branches of different length (Fig. 1, Mdl).

Maxillula. No medial endite available, lateral endite with 4+4 teeth, inner set cleft (Fig. 1, Mx1).

Maxilla. Lateral lobe surpassing medial one, setose, medial lobe with a row of cusps apically (Fig. 1, Mx2).

Maxilliped. Basipodite with laterodistal edge rather rectangular, scattered tricorn-like setae, lateral to proximal border accompanied by slight sulcus lateralis. Endite lacking dense setation, setal tuft rostrally, caudally bearing two teeth. Palp significantly three-articulate, unless denied by Verhoeff (1941), medial margin of article 2 with setal tuft distally and set of long and short seta proximally (Fig. 1; Mxp).

Pereopods. Male pereopods 1 and 7 the only remaining, dactylus with flagelliform dactylar seta, long interungual seta and short inner claw. Carpus with setal tuft laterodistally, antenna-grooming brush on carpus 1, as its counterpart longitudinal row of hyaline setae medially on propus 1, ornamental sensory spine of carpus 1 with double fringed apex (Fig. 2, PE1/PE7).

Sexual differentiation. Unless new material or the lost samplings are found, remaining unknown. Male pereopod 7 merus with serrate lobe mediodistally, may be sexually dimorphic.

Pleopods. Exopodites with straight lateral margin, bearing some sensory spines, endopodites somewhat smaller, lobate. No respiratory areas discernible in light microscope at 400× magnification (Fig. 2, PL1-3).

Sexual differentiation. Male pleopod 1 with rounded exopodite (Verhoeff 1941), endopodite stout, apex bulbous with a small lateral hook, pointing laterodistally, row of spiniform setae rather short, proximally beginning at ⅘ of the endopodite's length, crossing transversely to tip of hook, distally of setal row scattered spines, on caudal surface of apex inserting a presumably motile, falciform appendix with laterally serrate margin ("Endhörnchen" of Verhoeff 1941). Pleopod 2 exopodite pyriform, without sensory spines on lateral margin, endopodite rather slender, distal part broken in examined material.

Uropod. Endopodite inserting slightly proximal of exopodite, protopodite laterally grooved (Fig. 1, Tel).

Genital papilla. No significant features discernible.

Discussion. *Andenoniscus* Verhoeff, 1941 is a genus of rather small species inhabiting mainly the cordilleras of South America. Beside the type species, two species are described from Ecuador, i.e. *Andenoniscus narcissi* Vandel, 1968 and *Andenoniscus tropicalis* Vandel, 1968, both based on only some female specimens. These species have been transferred by Vandel (1972) to the genus *Erophiloscia* Vandel, 1972 accompanied by the statement that the author never had seen a specimen of *Andenoniscus* Verhoeff, 1941, only of *Erophiloscia* Vandel, 1972. Therefore, from his point of view it is not justified to ascribe the above mentioned species to *Andenoniscus* Verhoeff, 1941. The disposition of *tropicalis* Vandel, 1968 and *narcissi* Vandel, 1968 to *Erophiloscia* Vandel, 1972 appears random since the most

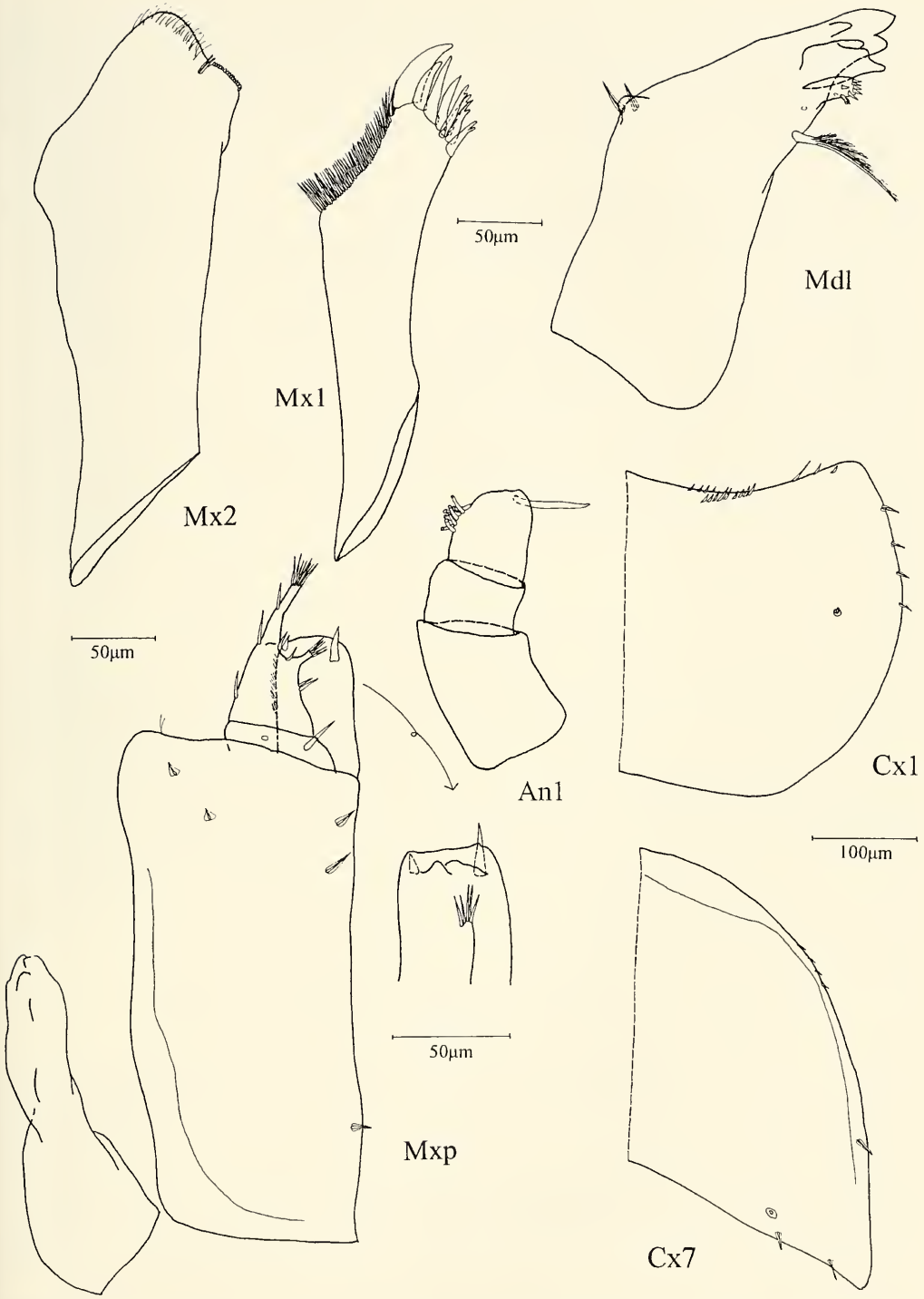

Fig. 1. *Andenoniscus silvaticus* Verhoeff, 1941. **An1:** antennula; **Cx1:** coxal plate 1; **Cx7:** coxal plate 7; **Mdl:** left mandible; **Mxp:** maxilliped with detail of endite, rostral view; **Mx1** maxilla, lateral endite; **Mx2:** maxilla.

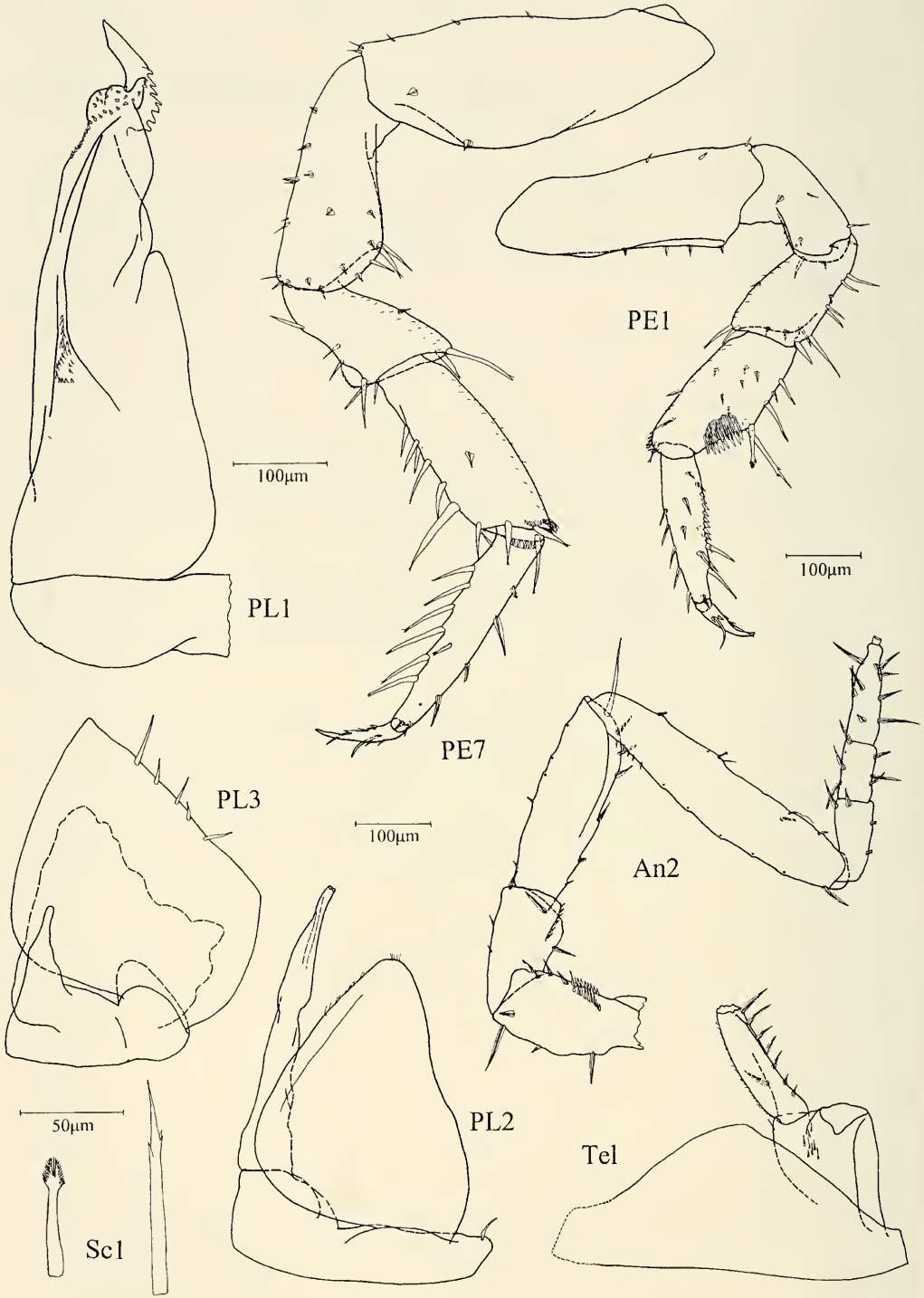

Fig. 2. *Andenoniscus silvaticus* Verhoeff, 1941. **An2:** antenna; **PE1:** pereopod 1, rostral view, ♂; **PE7:** pereopod 7, caudal view, ♂; **PL1:** pleopod 1 endopodtite, ♂; **PL2/3:** pleopods 2 and 3, ♂; **Sc1:** sensory spines of carpus 1; **Tel:** pleotelson with left uropod in situ.

characteristic difference between both genera is the shape of the male pleopod 1 and 2 endopodites which are rather sout in *Andenoniscus* Verhoeff, 1941 but rather slender in *Erophiloscia* Vandel, 1972. Both *tropicalis* Vandel, 1968 and *narcissi* Vandel, 1972 are only known by females, as stated above, so the real affinities will remain obscure. The two *Andenoniscus narcissi* Vandel, 1968 and *Andenoniscus tropicalis* Vandel, 1968 should be treated as nomina dubia since it is difficult even to establish their generic relationships. And it is quite impossible to discriminate the males of these species, if they were ever found.

In the original description of *Andenonsicus silvaticus* Verhoeff, 1941 several individuals are mentioned from two collection sites at Peru, a female from Aina and several specimens from Sivia (Verhoeff 1941). The whereabouts of all the material but the examined male is enigmatic, since it is not deposited in the Naturhistorisches Museum, Hamburg as stated by Verhoeff, nor in the Naturkundemuseum der Humboldtuniversität Berlin, nor in ZSM.

The re-examination of the remaining material should accomplish the generic diagnosis of *Andenoniscus* Verhoeff, 1941. It is quite similar to other small South American crinochete Oniscidea, particularly to *Ecuadoroniscus* Vandel, 1968 and *Erophiloscia* Vandel, 1972 in general appearence, and the shape of the mouthparts, but are at once discriminated by their male pleopod 1 endopodites from *Erophiloscia* Vandel, 1972; *Ecuadoroniscus* Vandel, 1968 is known only from a single female, but differs notably in the shape of the mouthparts. The male pleopod 1 endopodites of *Andenoniscus* Verhoeff, 1968 are of unique complexity within the neotropic philosciid *Oniscidea* save in some members of *Prosekia* Vandel, 1968, where they are structurally quite different to Verhoeff's diagnosis, the lateral endite of the maxillula is composed of 4+4 teeth with the inner set cleft, he may have taken the 8th tooth for a small additional tip of one of the other teeth, since he wrote that only one of the 7 teeth is equipped with a small additional tip.

Genus *Araucoscia* Verhoeff, 1939

Diagnosis. Cephalothorax with linea supra-antennalis, linea frontalis lacking. Antenna with three-articulate flagellum. Mandibles bearing dichotomized molar seta, maxillula with 7 teeth on lateral endite, maxilla with median lobe half as wide as lateral, maxilliped with endite lacking knob-like penicil and setation, strong seta and 2 cusps.

Pereopods slender, dactylus with short inner claw and flagelliform dactylar seta, long medial sensory spines of carpus on prominent humps. Coxal plates rather narrow, without sulcus marginalis and gland pores, two noduli laterales present. Pereopod 7 might be sexually dimorphic with male ischium bearing setal comb rostrally. No respiratory areas discernible on exopodites of pleopods at 400× magnification. Exopodites rounded, with long sensory spines laterally.

Type species. *Araucoscia chilenica* Verhoeff, 1939 (by monotypy and original designation).

Araucoscia chilenica Verhoeff, 1939
Figs 3-6

Material. 3 slides of ♂ (6 mm), ♀ (7mm), the only material available representing this species: Chile, Calbuco, leg. Dr. G. H. Schwabe (10.10.1937) (ZSM), ♂ designated herein **Lectotype**.

Description

Colour. Verhoeff (1939) described the colouration of the living animals as brown with grayish yellow spotting.

Cephalothorax. Linea supra-antennalis present, bent between the antennal sockets, linea frontalis very faint, vertex rather rounded, without setation, compound eyes composed of several ommatidia seemingly randomly arranged.

Pereon. Tegument rather smooth, coxal plates narrow, without sulcus marginalis and gland pores, some tricorn-like setae arranged near lateral margin, two noduli laterales present, insertion on coxal plate 4 as in Fig. 3, Cx4, on coxal plate 7 one near the lateral magin, one near the caudal margin, all broken in the mounted specimens.

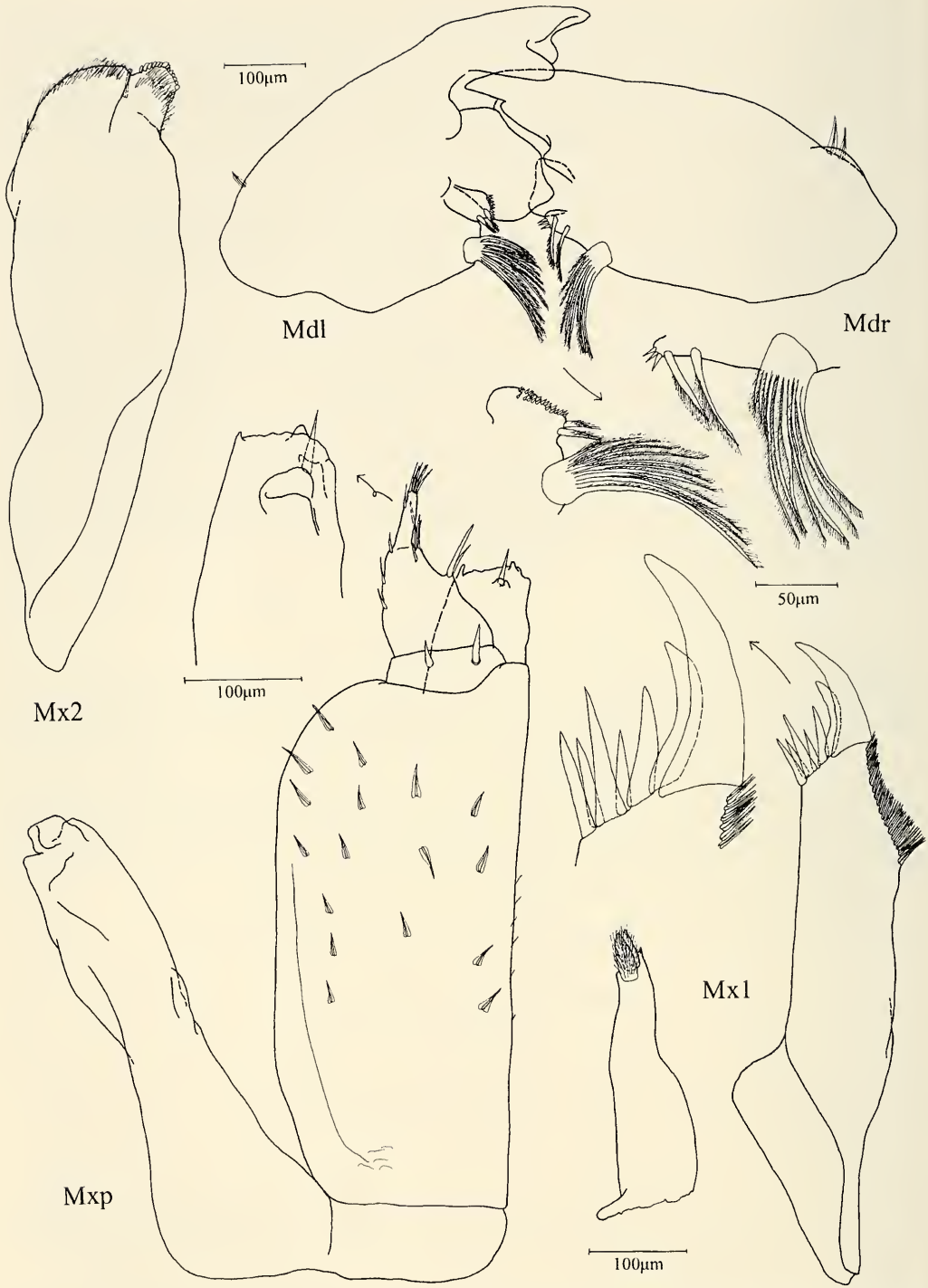

Fig. 3. *Araucoscia chilenica* Verhoeff, 1939. **Mdl:** left mandible in situ with detail of molar penicil, **Mdr:** right mandible in situ with detail of molar penicil; **Mxp:** maxilliped with detail of endite, rostral view; **Mx1:** maxillula with detail of apical region of lateral endite; **Mx2:** maxilla.

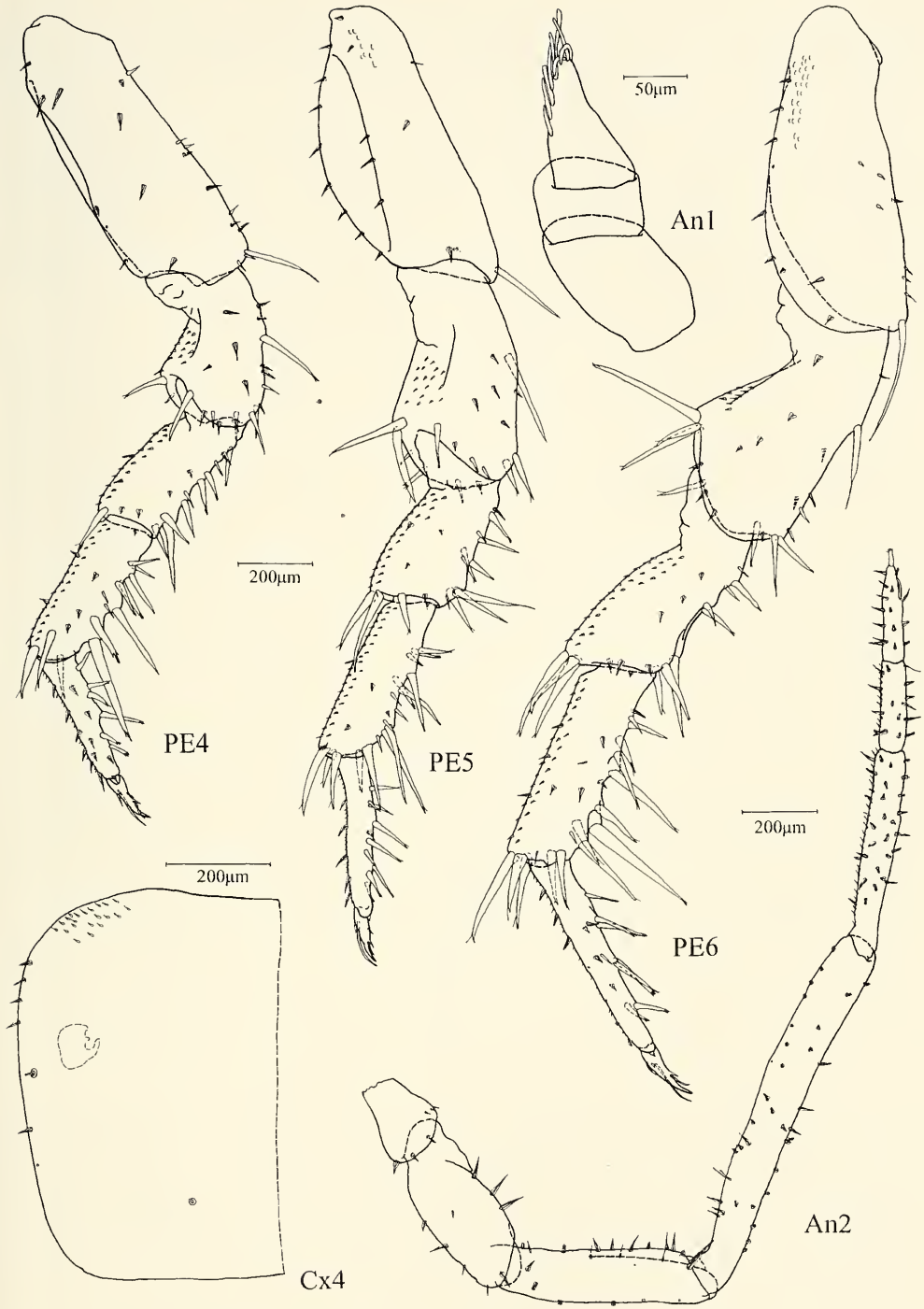

Fig. 4. *Araucoscia chilenica* Verhoeff, 1939. **An:** 1 antennula; **An2:** antenna; **Cx4:** coxal plate 4; **PE4-6:** pereopods 4-6, caudal view, ♀.

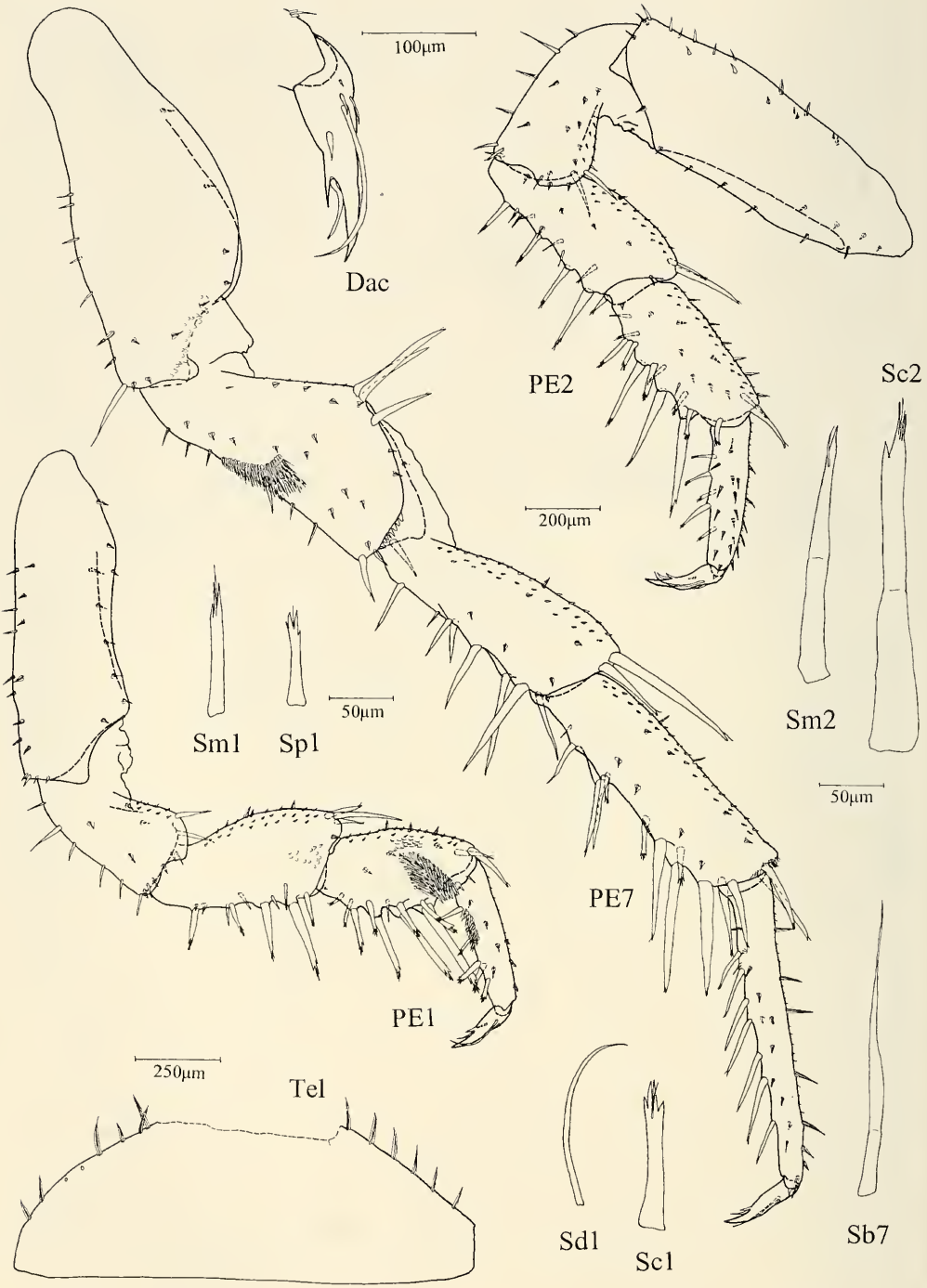

Fig. 5. *Araucoscia chilenica* Verhoeff, 1939. **Dac:** dactylus, rostral view; **PE1:** pereopod 1, rostral view, ♂; **PE2/7:** pereopods 2 and 7, caudal view, ♂; **Sb7:** sensory spine of basis 7; **Sc1:** sensory spine of carpus 1; **Sc2:** sensory spine of carpus 2; **Sd1:** dactylar seta of dactylus 1; **Sm1:** sensory spine of merus 1; **Sm2:** sensory spine of merus 2; **Tel:** proximal half of pleotelson, apex broken.

Pleon. Retracted from pereon, but small neopleurae on pleonites 3 to 5 present. Pleotelson pointed with straight lateral margins, bearing a row of tricorn-like setae, apex in examined type material broken.

Antennula. Three-articulate with article 1 and 3 subequal in length, article 2 of half the length, distal article pointed, bearing a set of aesthetascs (Fig. 4, An1).

Antenna. Flagellum three-jointed, proximal twice as long as article 2 and 3, apical organ broken in examined material. Peduncle with article 5 as long as flagellum, article 4 of half the length, all articles bearing tricorn-like setae (Fig. 4, An2).

Mandible. Since mandibles mounted in situ, examination difficult. Molar penicil prominent, dichotomized, composed of about 10 branches, pars intermedia with coniform setae, only few on right mandible, two penicils present. Additional penicil on left mandible not discernible (Fig. 3, Mdl/Mdr).

Maxillula. Medial endite with two penicils and lateral tip apically, lateral endite with extraordinarily arranged acute teeth, tooth formula described by Verhoeff (1939) as 1+6 (2+1+1+1+1), lateral one huge, endite laterally with fringe of setae, about 3 originating at same level, thus lateral margin appearing serrate (Fig. 3, Mx1).

Maxilla. Medial lobe half as broad as lateral, apically cuspidate, both lobes apically setose (Fig. 3, Mx2).

Maxilliped. Palp three-articulate, article 2 with 4 to 5 setae distally and a long and short seta medially of medial margin, proximal article with tuft of few setae apically, proximal joint with 2 subequal setae. Endite lacking setation and knob-like penicil, apically with 2 cusps and a stong seta, rostral surface with wrinkled protrusion (Fig. 3, Mxp).

Pereopods. Long and slender, pereopods 6 and especially 7 conspicuously longer than pereopod 1. Carpus and propus of pereopod 1 with antenna grooming-brush, sensory spines with fourlobed apices, the longest originating on conspicuous humps on pereopods 1 to 4. Dactylus with short inner claw, flagelliform dactylar seta, interungual seta almost as long as main claw. Pereopod 7 with setal comb on medial margin of ischium conspicuously shaped: proximally small and parallel to margin, more distally bent inwards while broadening. Basis of all pereopods of comparable size (Fig. 4, PE4-6; Fig. 5.Dac, PE1-2, 7).

Sexual differentiation. Micropsopic slides showing male pereopods 1, 2 and 7 while pereopods 4 to 6 are of a female specimen, therefore no statements can be given.

Pleopods. Pleopod exopodites very rounded, lateral margin concave, bearing 3 to 5 sensory spines, endopodites comparably short, lobate. No respiratory areas on exopodites discernible (Fig. 6, PL1-4).

Sexual differentiation. Male pleopod 1 with exopodite triangular, obliquely pointed, laterally with obtuse additional apex, endopodite slender, slightly s-shaped, with longitudinal row of inconspicuous spiniform setae medially, subapically terminated by 7 more prominent setae, apex acute. Pleopod 2 with pointed exopodite, lateral margin sinuous, bearing 3 sensory spines, endopodite basally broader than distal part, tapering at half of length, apex slightly bent medially. Female pleopods 1 and 2 remaining unknown.

Uropod. Verhoeff (1939) mentioned that the exopodites were broken, endopodites inserting proximally of exopodites.

Genital papilla. Ductus ejaculatorii proximally very close, mouths slightly surpassing apex of ventral shield (Fig. 6, Gen).

Discussion. The monotypic genus *Araucoscia* Verhoeff, 1939 from Chile is one of the enigmatic genera from southern South America. It was found on Calbuco Island at 41°6'30"S and 73°8'W which is mainly used for agriculture even in 1937 when *Araucoscia* Verhoeff, 1939 was collected. The genus is characterized by the peculiar dentation of the lateral endite of the maxillula, which is superficially similar to the Melanesian genus *Oroscia* Verhoeff, 1926, which shows a 4+4 pattern instead of a 1+6 pattern of *Araucoscia* Verhoeff, 1939. Interestingly, *Oroscia squamuligera* Verhoeff, 1926 bears a similar ornamental sensory spine on carpus 1 and the longer sensory spines of the medial margin of carpus and merus are raising from a prominent hump. Other genera from the Australian zoogeographic region also have a most lateral tooth of the maxillula of huge dimensions, i.e. *Adeloscia dawsoni* Vandel, 1977 (North Island of New Zealand), *Leucophiloscia endogaea* Vandel, 1973 (Papua-New Guinea) and certain species of *Papuaphiloscia* Vandel, 1970 like *Papuaphiloscia rennelli* Vandel, 1973 (Solomon Islands). They all differ from *Araucoscia chilenica* Verhoeff, 1939 in having the molar penicil simple and – save *Leucophiloscia endogaea* Vandel, 1973 – bearing a knob-like penicil on the endite of the maxilliped. Particularly

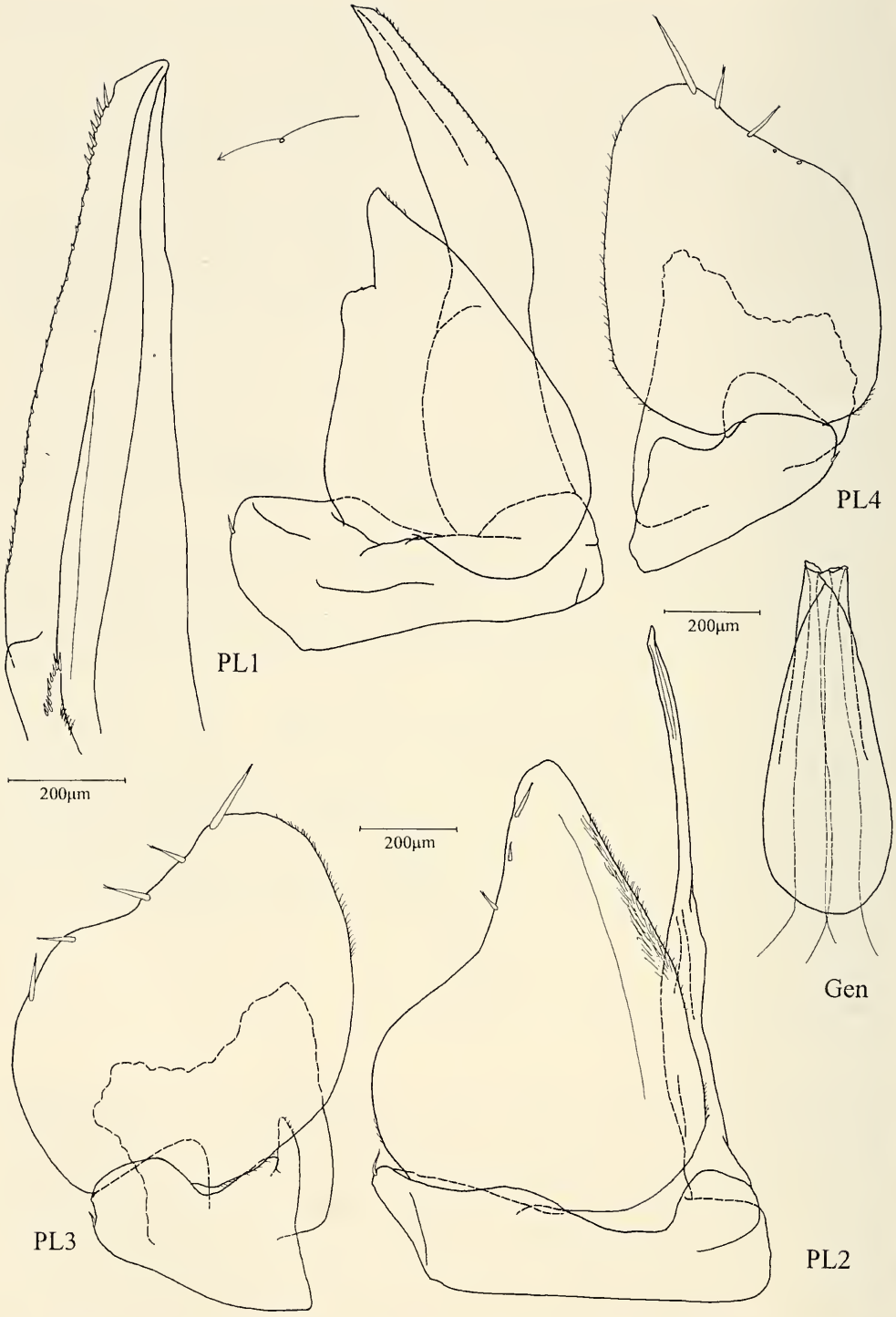

Fig. 6. *Araucoscia chilenica* Verhoeff, 1939. **Gen:** genital papilla; **PL1-4:** pleopods 1-4 with detail of enopodite 1, caudal view.

Adeloscia dawsoni Vandel, 1977 is similar to *Araucoscia chilenica* Verhoeff, 1939 in the shape of the male pleopod 1 with the exopodite simpler, bearing a weak sinuosity instead of an incision laterally.

The shape of the endite of the maxilliped is comparable with the respective appendage of *Andenoniscus* Verhoeff, 1941 and *Oniscophiloscia* Wahrberg, 1922. There is a further similarity between *Araucoscia* Verhoeff, 1939 and *Oniscophiloscia* Wahrberg, 1922: the molar penicil of both genera is rather strong and dichotomized, certainly representing a symplesiomorphy. Therefore, this character is useless for reconstruction of phylogeny.

The pleonites bear only small neopleurae (Verhoeff 1939), while the pereopods 7 are surprisingly long compared with other "philosciid" Oniscidea, so it may be presumed, that *chilenica* Verhoeff, 1939 is capable of quick movements within its habitat. This might be a preadaptation to rather open habitat, which was originally covered with temperate rain forest.

Acknowledgements

The author like to express his thanks to Dr. L. Tiefenbacher, Zoologische Staatssammlung München, for the loan of the material. He is indepted to Dr. Gisela Wegener, Naturkundemuseum Hamburg, and Dr. C. O. Coleman, Museum für Naturkunde Berlin, for their support in tracing the whereabouts of the material.

References

Taiti, S. & F. Ferrara 1980. The family Philosciidae in Africa, south of the Sahara. – Mon. zool. ital. **13**: 53-98

Vandel, A. 1968. Isopodes terrestres. – In: Leleup, **???** (ed.). Mission zoologique belge aux Îles Galapagos et Ecuador **84**: 35-168

– – 1973. Les isopodes terrestres et cavernicoles de l'Île de Cuba. – Resultats de l'expédition biospéléologique cubano-roumaine à l'Île de Cuba **1**:153-188

Verhoeff, K. W. 1939. Von Dr. G. H. Schwabe in Chile gesammelte Isopoda terrestria, Diplopoda und Chilopoda. – Zeitschr. wiss. Zool. **8**: 301-324

– – 1941. Landisopoden. – In: Titschack, **???** (ed.): Beiträge zur Fauna Perus **2**: 74-80