

NEW PROTOJANIRIDAE (ISOPODA, ASELLOTA) FROM SRI LANKA
AND SOME CORRECTIONS OF THE TAXONOMY OF THE FAMILY

NOVE OBLIKE DRUŽINE PROTOJANIRIDAE (Isopoda, Asellota) IZ
SRI LANKE IN NEKAJ POPRAVKOV K TAKSONOMIJI DRUŽINE

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SYNOPSIS - Description of Aneckella srilankae n.sp., A. srilankae rectecopulans n. ssp., Enckella lucei major n. ssp. Genus Enckella (= Protojanira lucei) removed to Protojaniridae again. Partly changed and completed diagnoses of the gnathostenetroid families and genera.

DESKRIPTORJI: Isopoda, klasifikacija, Sri Lanka

IZVLEČEK - Opis taksonov Aneckella srilankae sp.n., A. srilankae rectecopulans ssp.n., Enckella lucei major ssp.n. Rod Enckella (= Protojanira lucei) vrnjen v družino Protojaniridae. Deloma spremenjene in dopolnjene diagnoze družin in rodov skupine Gnathostenetroidoidea.

In November 1981 a group of biologists from Ljubljana made a short visit to Sri Lanka. Although only a couple of days could be spent on the study of hypogean habitats there, we succeeded in finding some "troglobitic" animals. As a special paper shall be devoted to hypogean fauna of Sri Lanka, only taxonomy of Isopoda Asellota shall be treated here.

NEW TAXA

ANECKELLA SRILANKAE sp.n.

L o c u s t y p i c u s : large pool in the cave Istripura near Pannala, Hanguranketa (Nuwara Eliya District), Sri Lanka.

M a t e r i a l : 3 ♂♂ and 5 ♀♀. Holotypus: ♂ of 1,37 mm.

Body very small, colourless, moderately slender (width-length ratio 1 : 5,5). Pereionites broader than long, bearing up to 10 slender spines on their lateral margins. The free pleonite I much narrower and shorter than pereionite VII, partly hidden under its tergite. Pleotelson very broadly elliptic or pear-shaped, broader in its proximal part, irregularly setose resp. spinulated on its margins; with a moderately protruding caudal lobe.

Article 1 of antenna I almost as broad as long, article 2 of the same length but narrower. All other articles about a half shorter. Flagellum 6-jointed, aesthetascs in number of 6, almost twice as long as flagellar articles, in groups of 1-2, mainly on distal articles. Antenna II with a small, rod like squama with 2 setae distally; (distal peduncular articles as well as flagellum broken).

All parts of mandibula slender. Incisor process and lacinia

mobilis with 5 rounded denticles each; setal row consisting of 4-6 setae. Molar process cylindrical, with 1 seta on the margin of its distal plate. The palp overreaching the incisor process when extended; the distal article curved, with 2 setae apically and a row of very fine setae on its interior margin.

The maxilla I with subequally long lobes. Its outer lobe with 12 slightly C or S curved pectinate spines. Inner lobe with 4 plumose spines distally and some setae along its outer margin. The maxilla II with subequally long lobes. They bear apically very slender, slightly curved, and finely pectinate spines in number of 3, 4, and 6 (beginning from outside), there are about 6 setae along the inner margin of the inner lobe.

The maxilliped with a long and narrow inner lobe, terminating in a thin lamella with 3 thick spines; two coupling hooks; palpus articles 2-3 broad, 4-5 finger-like.

All pereopods reachly armoured with setae resp. slender spines. The length ratio of pereopods I : IV : VII = 100 : 114 : 160; the pereopod VII reaching 55 % of the body length. Articles 1 narrowly elliptical; the dactyli II - VII triunguiculate. The pereopod I with a narrowly ovate propodus, its palmar margin beginning at the article's half length, equipped with about 6 spines in a double row. Dactylus I biunguiculate and without other spines or denticles.

The pleopods I totally melted together, without any remains of articulation. Each lobe of the plate slightly broadened toward its distal part and with an \pm straight, oblique distal margin, bearing 2-3 setae.

The protopod of the pleopod II reaching about 80% of the pleopod's I length; it is more than half as broad as long, its apical end doesn't reach far beyond the insertion of the exopodit. The small exopodit with some broad cuticular denticles on its apical margin. The outlet kennel on the endopodit distinctly differentiated and strongly curved innwards.

The pleopods III-V similarly shaped as in *Enckella lucei lucei*. The uropods reaching about 50% of the pleotelson length. Protopodit only as long as broad, the exopodit about half shorter than the endopodit, all parts with some groups of long spines and setae.

Females are up to 1,44 mm long and slightly broader, of the *Asellus habitus* (width : length = 1 : 4,5). The pleopodes' II plate is semicircular and with a slight cutting-out distally, accompanied by two pairs of setae. No other sexual differences have been noticed.

R e l a t i o n s h i p s . In general, the new taxon has the appearance of a strongly diminished and thus correspondingly simplified representative of the group. *A. srilankae* is more than half shorter than *A. perbrincki* or *A. ficki*; the lobes of the maxillae are more equal, widening of the propodus I is less accentuated, chaetotaxy of all appendages is reduced. There are very strong specific differences also in the shape of male and female pleopods I-II. In spite of the thicker mollar process of the mandible, the new species seems to be related to *A. ficki* and *A. perbrincki* rather than to *Protojanira leleupi* and *P. prenticei*, concluding on the shape of the pereopod I and the short apical part of the male pleopod II protopodite.

ANECKELLA SRILANKAE RECTECOPULANS ssp.n.

L o c u s t y p i c u s : dug out wells in Pokonwita near Horana (Kalutara District), SW Sri Lanka.

M a t e r i a l : 5 ♂♂ and 27 ♀♀. Holotypus: ♂ of 1,25 mm.

Very similar to *A. s. srilankae*, reaching also the same body length, but most specimens somewhat smaller. The distal articule of the antenna I peduncle much longer than the preceding one. Flagellar articles longer than broad, 14 in number.

Male pleopods I with nearly parallel longitudinal margins, not widened in their distal part. The outlet kennel of the male pleopod II almost rectilinear.

R e l a t i o n s h i p s . The only difference from the nominate subspecies appears to be the shape of male pleopods I-II. As this difference on the copulatory organs could even mean a reproductive barrier, it is not excluded that *A.s.rectecopulans* is an independent species.

ENCKELLA LUCEI MAJOR ssp.n.

L o c u s t y p i c u s : large pool in the cave Istripura near Pannala, Hanguranketa (Nuwara Eliya District), Sri Lanka.

M a t e r i a l : 8 ♂♂ and 60 ♀♀ (1 ♀ with embryos). Holotypus: ♂, 7,1 mm.

As the taxon is very similar to *Enckella lucei lucei* (Enckell), only differences shall be mentioned here.

M a l e up to 7,4 mm long, the length : width ratio of body is 5,9 : 1. Head comparatively smaller than in *E.l.lucei*.

Antenna I with 11 - 14 joints in its flagellum. Its aesthetascs are single on proximal joints and paired on distal ones; they are somewhat longer than the flagellar joints. The distal article of antenna II peduncle is remarkably longer than the preceding one. Flagellum about 55-jointed. The length of antenna II equals about 73% of the body length.

Pereiopod I with a double row of about 15 + 25 spines along its palmar margin. All pereiopods with almost doubled numbers of spines along their edges (in comparison to *E.l.lucei*).

Pleopods I similarly shaped as in *E.l.lucei* but only a little shorter than pleopods II. Pleopods II with a narrower and

shorter distal lobe of the protopodit than in *E.l. lucei*. Pleopod III has a shorter endopodit, failing by far to reach the exopodit's tip.

F e m a l e up to 8,9 mm long. Flagellum of its antenna II up to 72-jointed. Surface of the pleopod II less setose than in *E.l. lucei*, Endopodit of pleopod III shorter and broader than in nominate subspecies but a little longer than in male.

R e l a t i o n s h i p s . The remarkably smaller nominate subspecies (*Protojanira lucei* Enckell 1970) was found in flowing water. As a diminishing effects of lotic waters on the body size has been noticed in Monolistrini and Asellidae (SKET 1968), it is very probable that differences in size and with it connected numbers of joints and spines on appendages are just phenotypic and thus without taxonomic value. That is obviously not the case with the mentioned differences in pleopods.

TAXONOMIC RELATIONSHIPS WITHIN Protojaniridae AND Gnathostenetroidoidea

The first species of Gnathostenetroidoidea described BARNARD 1927, as *Protojanira prenticei* and attributed it to the family Jaeridae. Some other related species have been described since (BARNARD 1957, GRINDLEY 1963, ENCKELL 1970). BIRŠTEJN and LJOVUŠKIN (1965) attributed also the genus *Aneckella* of CHAPPUIS and DELAMARE (1957) to *Protojanira*. The whole group is dulciaquicole and Gondwanian (South Africa - Ceylon).

AMAR (1957) described the first related marine species as *Gnathostenetroides laodicense* and created for it a separate family Parastenitriidae as well as the superfamily Parastenitrioidea. Some other related species and genera have been described since (FRESI and SCHIECKE 1968, NUNOMURA 1975, FRE-

SI 1973, CARPENTER pers. comm.). MAGNIEZ (1974) found also the right place for the *Protojanirina* spp. in the same family Parastenetriidae.

A good survey of this "growing" group was made by FRESI, IDATO, and SCIPIONE (1980). They brought a good deal of order into the taxonomy of the group, but unfortunately also some elements of confusion. They rebaptized the superfamily from Parastenetroides to more correct Gnathostenetroides; but WILSON (1980) introduced the correct name Gnathostenetroididea. They ignored the existing (but incorrect) family name Parastenetriidae and erected new families Gnathostenetroidae (here mended to Gnathostenetroididae) for marine members of the group and Protojaniridae for freshwater ones. They subdivided the genus *Protojanina*, erecting a new genus *Protojaninoides* for some of the species but unluckily overlooking the availability of the generic name *Aneckella* Chapp. et Delam.

The same authors also completely separated *Protojanina lucei* Enckell creating a new genus *Enckella*, for which they made a very inappropriate definition; "... it is best placed in the Janiridea and, because of the abnormal condition of its male pleopods 1, a new genus should be created to contain it, which we propose *Enckella* n.gen.".

I think that the somewhat smaller pleopods I do not justify the separation of *Enckella* from the Gnathostenetroididea as in all other respects it is very similar to other Protojaniridae; its pleopods I are also very unlike any Janiridea. Also some other definitions shall be corrected in the following survey based on data not yet known to the above authors (which followed partly incorrect descriptions of known taxa).

Superfamily GNATHOSTENETROIDIDEA Wilson 1980

(= Parastenetriidea Amar 1957, Gnathostenetroides Fressi, Idato et Scipione 1980)

A subgroup of Asellota. Female operculum made of completely fused pleopods II. Male operculum made of extremely enlarged pleopods I sometimes supplemented by marginal parts of the sympodites of the pleopods II. Sympodites of the pleopods I fused.

Family GNATHOSTENETROIDIDAE Fresi, Idato et Scipione 1980
(emend. Sket) (= Parastenetriidae Amar 1975)

A subgroup of Gnathostenetroidoidea. With two free pleonal somites (sometimes very small). Pereiopods II-VII with biunguiculate (always ?) dactyli. ♂ pleopods I with articulation between ramus and sympodit (if latter developed). ♂ pleopod II with branches inserted apically or subapically on the sympodit; exopodite's terminal article short, not participating with the endopodite in forming the copulatory "pipette".

Gnathostenetroides laodicense Amar 1957

Caecostenetroides ischitanum Fresi et Schiecke 1968

Caecostenetroides nipponicum Nunomura 1975

Maresiella barringtoniana (Fresi 1973) (syn. *Maresia* b.)

All the above species exhibit fused sympodites of the pleopods I on which the free rami are articulated. The new cavernicolous species from Bahamas (Carpenter, pers.comm.) shall most likely also be attributed to this group. It's very deeply bifurcated pleopodal plate (♂ pleopods I) without any articulation could disturb this clear picture to some extent, but it could have been formed by reduction of the sympodial part rather than by its fusion with rami; in *Caecostenetroides nipponicum* the fused sympodites are extremely short ! This marine family is otherwise extremely diverse in the shape of the body as well as of some appendages.

Family PROTOJANIRIDAE Fresi, Idato et Scipione 1980

A subgroup of Gnathostenetroidoidea. With one free pleonite. Pereiopods II-VII with triunguiculate dactyli. No articulation

between the rami and the sympodial part of the ♂ pleopods I. In ♂ pleopods II rami inserted ± laterally on the sympodite; exopodit elongated, its terminal article participating with the endopodite's tip in forming the copulatory "pipette".

All known species are eyeless, they inhabit subterranean freshwaters.

Genus *PROTOJANIRA* Barnard 1927

Pereiopods I differentiated but not forming an *Asellus*-type subchela. Distal part of ♂ pleopode's II sympodite small.

Protojanira prenticei Barnard 1927

Protojanira teleupi Grindley 1963

Genus *ANECKELLA* Chappuis et Delamare 1957

(syn. *Protojaniroides* Fresi, Idato et Scipione 1980)

Pereiopods I forming an *Asellus*-type subchela. Distal part of the ♂ pleopode's II sympodites small.

Aneckella ficki Chappuis et Delamare 1957 (syn. *Protojanira* f.,
Protojaniroides f.)

Aneckella perbrincki (Barnard 1957) (syn. *Protojanira* p.,
Protojaniroides p.)

Aneckella srilankae srilankae sp. n.

Aneckella srilankae rectecopulans ssp.n.

Genus *ENCKELLA* Fresi, Idato et Scipione 1980 (new position, new definition)

Pereiopods I forming an *Asellus*-type subchela. Distal part of the ♂ pleopode's II sympodites very enlarged, participating with pleopodes I in opercular function.

Enckella lucei lucei (Enckell 1970) (syn. *Protojanira* l.)

Enckella lucei major ssp.n.

As the mandible's processus molaris in *A. srilankae* is thinner than in *Protojanira* spp. but thicker than in other *Aneckella* spp., I omitted this character from the genus diagnoses.

In all protojanirids seen by me the dactyli II-VII are (in disagreement with original descriptions) triunguiculate. The same must be true for *P. perbrincki* (BARNARD 1957: " ... 2 strong claws and between them an equally strong curved spine" ...). As one of three claws is usually protruding vertically in the preparation it is often easily overlooked! The second and the third claws seem to be homologous with spines in uniunguiculate dactyli. In Gnathostenetroididae the dactyli seem to be always biunguiculate.

In all protojanirids seen by me, the pleon exhibit (in disagreement with original figures) one free pleonite. The same is probably true for *P. perbrincki* and *A. ficki*.

Distal parts (distally from the insertion of rami) of the ♂ pleopode's II sympodite are not (at least not in all specimens) as large in *Protojanira* spp. as shown in the figures of Barnard (1927) and Grindley (1963). Thus in this character *Aneckella* and *Protojanira* are similar.

If new discoveries confirm the uniqueness of the gonopod structure in Protojaniridae (exopodite holding the tip of the endopodite) it'll probably be necessary either to divide the superfamily, erecting a new superfamily Protojaniroidea, or to cancel the taxonomic group of superfamily within the Asellota completely.

SUMMARY

Three new taxa of Asellota from hypogean waters of Sri Lanka are described: *Aneckella srilankae* sp.n. with *A.s. rectecopulans* ssp. n. and *Enckella lucei major* ssp.n.

An survey of the known taxa of Gnathostenetroidoidea is given

and some nomenclature is amended or corrected. The diagnoses of the superfamily and of both families, Gnathostenetroididae, and Protojaniridae as well as of the genera *Protojanira* and *Aneckella* (syn. *Protojaniroides*) are partly changed and completed. For the genus *Enackella*, an appropriate definition is given and its position beside other protojanirids is restored. Further research shall show whether the Protojaniridae deserve a higher rank (as a superfamily) owing to a peculiar composition of the gonopods.

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POVZETEK

Skupina ljubljanskih biologov, ki je jeseni 1981 obiskala Sri Lanko, je nekaj že tako skopo odmerjenega časa posvetila raziskovanju podzemeljskih habitatov. Med drugim smo našli tri taksonne vodnih izopodov, ki jih tukaj opisujem kot *Enckella lucei major* ssp.n., *Aneckella srilankae* sp.n. (obe iz jezerca v jami Istripura pri Hanguranketi, osrednja Sri Lanka) in *Aneckella srilankae rectecopulans* ssp.n. (iz vodnjakov v vasi Pokonwita pri Horani, JZ Sri Lanka).

Podan je pregled znanih oblik naddružine Gnathostenetroidoidea, poimenovanje je deloma popravljeno (slovnično ali taksonomsko-formalno). Podane, deloma spremenjene in dopolnjene so diagnoze naddružine, obeh družin (Gnathostenetroididae in Protojaniridae) ter rodov *Protojanira* in *Aneckella* (sinonim *Protojaniroides*). Za rod *Enckella* je postavljena korektna diagnoza, obnovljen je pa položaj tega taksona ob drugih protojaniridih. Če bodo nadaljnje raziskave potrdile svojevrstnost zgradbe kopulacijskega kompleksa pri družini Protojaniridae, jo bo treba bodisi dvigniti na rang naddružine, ali pa ta taksonomski rang v sklopu podreda Asellota sploh ukiniti.

Zahvaljujem se raziskovalnim in nekaterim gospodarskim organizacijam, ki so denarno podprle študijsko potovanje. Posebej gre zahvala B. Bojku (Intertrade, Ljubljana - Colombo), H. H. Costi (Univerza, Kelaniya) in V.K. Ganeshalingamu, ki so močno poenostavili in pocenili naše bivanje, Y. Amararatni, ki nas je na poti spremljal in bi njegovo vsestransko pomoč težko poprešali, ter F. Velkovrhu (Univerza, Ljubljana), ki mi je pomagal pri nabiranju materiala in pri nadaljnji obdelavi vzorcev. G. Magniez (Univerza, Dijon) mi je priskrbel nekaj manjkajoče literature, South African Museum (Cape Town) pa mi je posodil primerjalni material.

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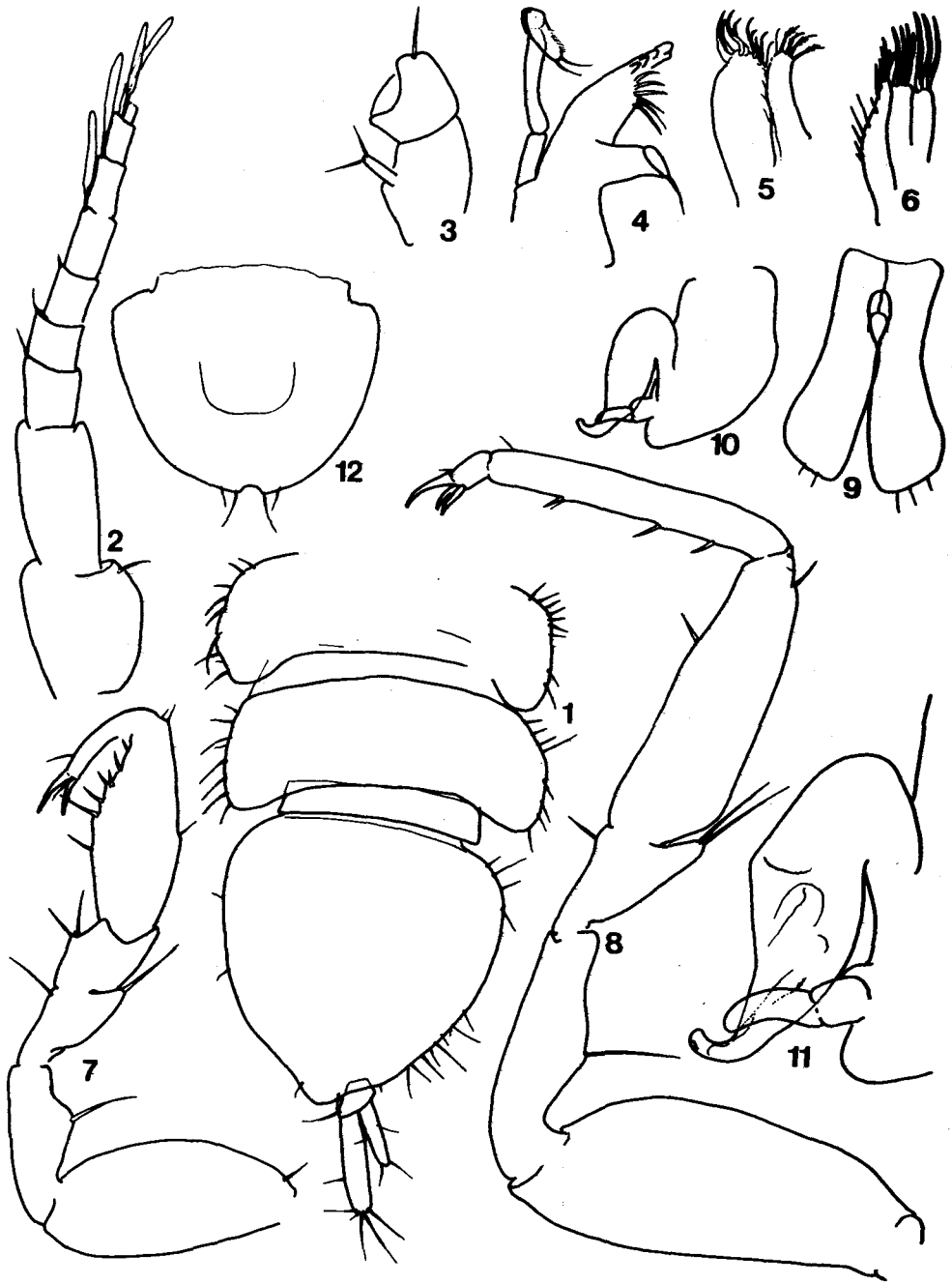


FIG. 1-12. *Aneckella srilankae srilankae* sp.n., cave Istripura, Harguranketa, holotypus ♂ 1,37 mm (2-11), ♀ 1,44 mm (1,12)
 1 - posterior part of body, 2-3 - antenna I-II, 4-6 - mandibula, maxilla I-II, 7-8 - pereopod I and VII, 9-11 - pleopod I-II, 12 - pleopod II

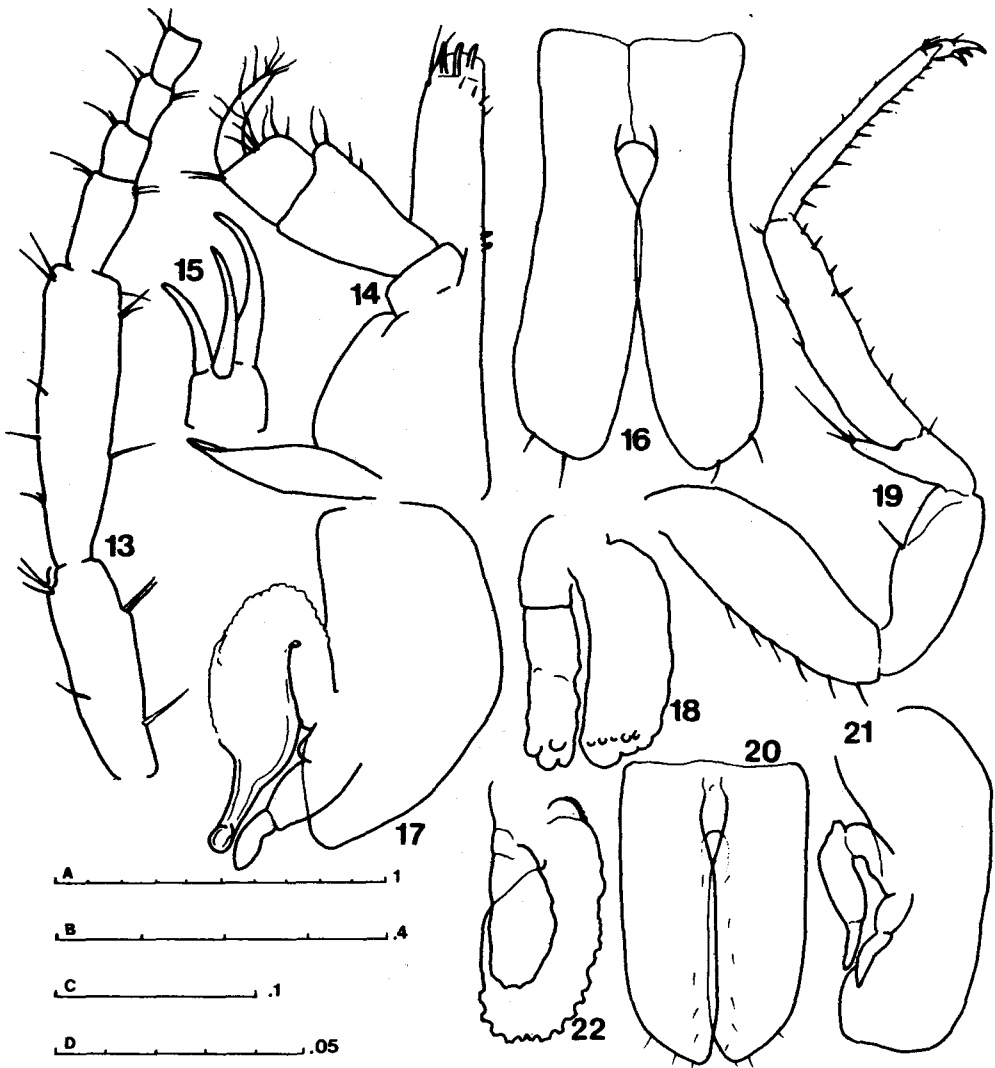


FIG. 13-18. *Aneckella srilankae rectecopulans* ssp.n., Pokonwita near Horana, σ 1,3 mm (16-17), σ 1,25 mm (18), f 1,25 mm (13-15)
13 - antenna II, 14 - maxilliped, 15 - dactylus, 16-18 - pleopod I-III

FIG. 19-22. *Enckella lucei major* ssp.n., cave Istripura, Hanguranketa, holotypus σ 7,1 mm (19, 21-22), σ 6,6 mm (20)
19 - pereopod VII, 20-22 - pleopod I-III

Scale (in mm): A - 19-22; B - 1, 9-10, 12, C - 2-8, 11, 13, 16-18, D - 15