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Terrestrial Isopoda (Crustacea) from Southern China, Macao and Hong Kong

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With 325 figures

Summary

Forty-nine species of terrestrial isopods are recorded from southern China, Macao and Hong Kong. **One new genus** (*Sinodillo*) and **16 new species** are described, viz. *Papuaphiloscia granulata*, *P. arcangelii*, *Burmoniscus purpura*, *B. yunnanensis*, *B. flavivertex*, *B. lobatus*, *Exalloniscus silvestrii*, *Lucasiodes pedimaculatus*, (?) *L. cavernicolus*, *Mongoloniscus nigrogranulatus*, *Trogldillo rotundatus*, *Sinodillo troglophilus*, *S. ferrarai*, *S. schmalfussi*, *Spherillo orientalis*, and *Parakermania maculata*. The following poorly known species are discussed and illustrated: *Tylos minor*, *Ligidium denticulatum*, *Nagurus sundaicus*, *N. pallidipennis*, (?) *N. verhoeffi*, *Lucasiodes isseli*, *L. zavattarii*, *Dryadillo maculatus*, and *Spherillo raffaelei*. *Nagurus travancorius* (Verhoeff) is considered to be a **junior synonym** of *N. pallidipennis* (Dollfus) and *Porcellio breviramus* Shen of *Porcellionides pruinosus* (Brandt). The composition of the oniscidean fauna from southern China is briefly discussed.

Zusammenfassung

Von Südchina, Macau und Hongkong sind 49 Arten von Landisopoden aufgelistet. Eine **neue Gattung** (*Sinodillo*) und **16 neue Arten** werden beschrieben: *Papuaphiloscia granulata*, *P. arcangelii*, *Burmoniscus purpura*, *B. yunnanensis*, *B. flavivertex*, *B. lobatus*, *Exalloniscus silvestrii*, *Lucasiodes pedimaculatus*, (?) *L. cavernicolus*, *Mongoloniscus nigrogranulatus*, *Trogldillo rotundatus*, *Sinodillo troglophilus*, *S. ferrarai*, *S. schmalfussi*, *Spherillo orientalis* und *Parakermania maculata*. Nachfolgende, wenig bekannte, Arten sind kommentiert und illustriert: *Tylos minor*, *Ligidium denticulatum*, *Nagurus sundaicus*, *N. pallidipennis*, (?) *N. verhoeffi*, *Lucasiodes isseli*, *L. zavattarii*, *Dryadillo maculatus* und *Spherillo raffaelei*. Die folgenden **neuen Synonyme** werden festgelegt: *Nagurus travancorius* (Verhoeff) = *N. pallidipennis* (Dollfus); *Porcellio breviramus* Shen = *Porcellionides pruinosus* (Brandt). Die Zusammensetzung der Oniscideen-Fauna von Südchina wird diskutiert.

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1. Introduction

This contribution deals with the terrestrial isopods from southern China including Macao and Hong Kong. The area under consideration is limited to the north by the river Chiangjiang (= Yangtze), to the west by Myanmar (= Burma), to the south by Laos, Vietnam and the South China Sea, and to the east by the East China Sea. Some records from Sichuan, north of the river Chiangjiang, are also included.

The terrestrial isopods from this part of China, as well as from the rest of the country and from many other parts of Far East Asia, have received very little attention. Most of the information available is due to ARCANGELI (1927, 1952) who recorded 26 species from the whole of China, of which 23 occurred in southern China, Macao and Hong Kong. Other contributions are given by BUDDE-LUND (1885) who reported *Ligia exotica* Roux, 1828 from Chusan and Macao, by SHEN (1949) who described six new species from Yunnan, and by CHEN (1987) who recorded *Ligia exotica* from all the coastal provinces of China, together with *L. occidentalis* Dana, 1853 from Yantai (Shandong). Recently TAITI & FERRARA (1986b, 1986c, 1989), MA (1990), DUDGEON, MA & LAM (1990), MA, DUDGEON & LAM (1991) and MA, LAM & DUDGEON (1991) recorded nine species from Hong Kong, i. e. *Tylos* sp., *Ligia exotica*, *Olibrinus* sp., *Armadilloniscus litoralis* Budde-Lund, 1885, *Littorophiloscia aldabrana* Ferrara & Taiti, 1985, *Burmoniscus ocellatus* (Verhoeff, 1928), *Exalloniscus rotundatus* Taiti & Ferrara, 1986, *Orodillo maculatus* Arcangeli, 1952, and *Formosillo raffaelei* (Arcangeli, 1927).

The study material was collected by Dr. P. BERON (Sofia) in southern China, and by Dr. H. H. T. MA (Hong Kong), Prof. P. BRIGNOLI (L'Aquila), Prof. G. OSELLA (L'Aquila), and Prof. V. COTTARELLI (Rome) in Hong Kong. Most of the specimens collected by Prof. F. SILVESTRI (Portici) and recorded by ARCANGELI (1927, 1952) were also re-examined.

Abbreviations:

DEAP	=	Dipartimento di Entomologia Agraria dell'Università, Portici;
IRSNB	=	Institut Royal des Sciences Naturelles de Belgique, Bruxelles;
MHNG	=	Muséum d'Histoire Naturelle, Genève;
MZUF	=	Museo di Storia Naturale, Sezione di Zoologia „La Specola“ dell'Università, Firenze;
NHMB	=	Naturhistorisches Museum, Basel;
NNHMS	=	National Natural History Museum, Sofia;
SMNS	=	Staatliches Museum für Naturkunde, Stuttgart;
ZMA	=	Zoologisch Museum, Amsterdam;
ZMB	=	Zoologisches Museum, Berlin.

2. Tylidae

Genus *Tylos* Audouin, 1826

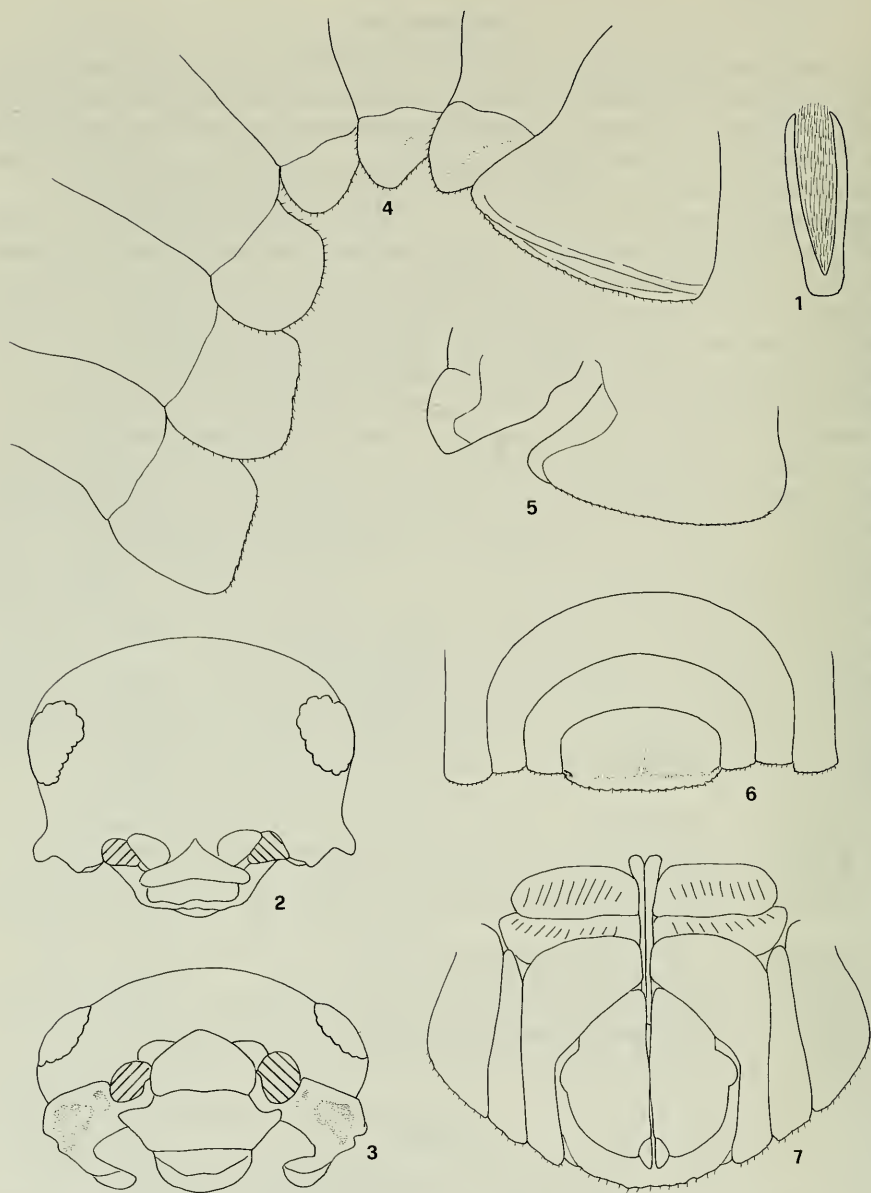
2.1. *Tylos minor* Dollfus, 1893 (Figs. 1–12)

Tylos sp.: MA 1990: 1024.

Specimens examined: **Hong Kong**: 1 ♂ Boulder Shore, Tai Tam Bay, leg. MA III. 1985 (SMNS). – 1 ♂, 1 ♀, same data (MZUF).

Distribution: Previously known from Seychelles, Aldabra and Comoro islands, in the western Indian Ocean.

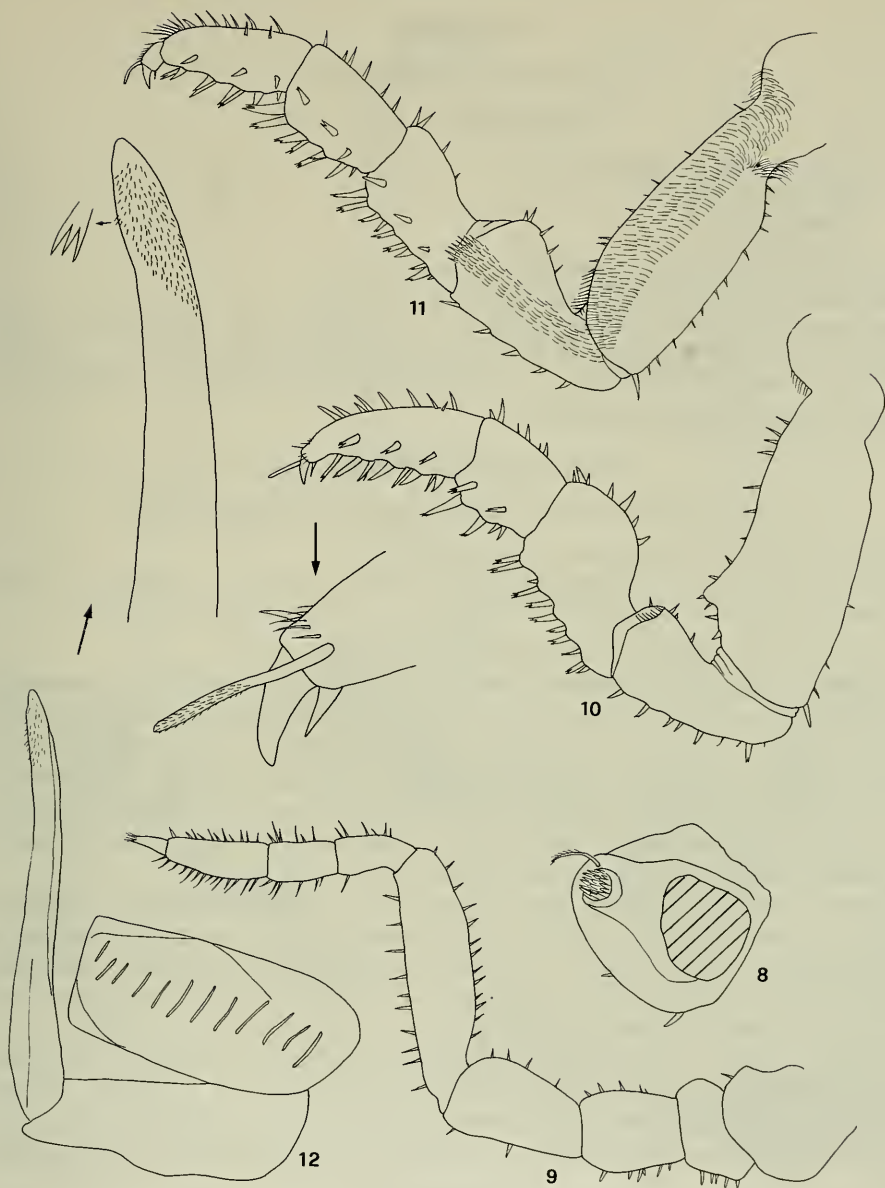
Remarks: These specimens are identified as *T. minor* after comparison with specimens from Aldabra, Seychelles and Comoro in the collections of MZUF. Since recognition of this species is difficult due to the poor descriptions by previous



Figs. 1–7. *Tylos minor*; ♂. — 1. Dorsal scale-spine; — 2. Cephalon, dorsal view; — 3. Cephalon, frontal view; — 4. Epimera of pereon, lateral view; — 5. Epimera of pereonites 1 and 2, ventral view; — 6. Pleonites 3–5 and telson; — 7. Pleon and telson, ventral view.

authors (DOLLFUS 1893: 189, Fig. 4a–d; BUDDE-LUND 1906: 76, pl. 3, Figs. 25–26), a full illustration is given of the specimens from Aldabra Island. —

Tylos minor is morphologically similar to *T. opercularis* Budde-Lund, 1885 from the Philippines, Indonesia, Papua New Guinea and Australia (for illustrations of this



Figs. 8–12. *Tylos minor*; ♂. – 8. Antennule; – 9. Antenna; – 10. Pereopod 1; – 11. Pereopod 7; – 12. Pleopod 2.

species see TAITI, FERRARA & KWON 1992), from which it is essentially distinguished in having the ventral plates of pleonite 5 with shorter medial margin, and anterior pereopods with smaller distal process of the basis.

3. Ligiidae

Genus *Ligia* Fabricius, 1798

3.1. *Ligia exotica* Roux, 1828

Ligia exotica: BUDDE-LUND 1885: 266;

ARCANGELI 1927: 268;

CHEN 1987: 9, Fig. 1;

MA 1990: 1025.

Ligyda exotica: RICHARDSON 1905: 676, Figs. 716–718.

Ligia (Megaligia) exotica: ARCANGELI 1952: 312.

Specimens examined: **Hong Kong**: 1 ♂, 1 ♀, Tai Po, leg. BRIGNOLI 26. I. 1981 (MZUF). – 1 ♀, Tai Po, 20 km from Tai Lou, leg. OSELLA 26. I. 1981 (MZUF). – 1 ♀, Starfish Bay, leg. MA IV. 1986 (MZUF). – 1 ♀, Three Fathom Cove, leg. MA IV. 1986 (MZUF).

Distribution: Circumtropical.

Genus *Ligidium* Brandt, 1833

3.2. *Ligidium denticulatum* Shen, 1949 (Figs. 13–26)

Ligidium denticulatum: SHEN 1949: 50, Fig. A, 1–14.

Specimens examined: **China**: 1 ♂, 1 ♀, Yunnan, Kunming, near Bamboo Temple, 2200 m, leg. BERON 29. XII. 1988 (NNHMS).

Distribution: Known only from Yunnan, China.

Remarks: *Ligidium denticulatum* was described by SHEN (1949) from specimens collected in Kunming. The specimens examined, also collected in Kunming, well fit the description of the species especially in the morphology of the male pleopod 2 endopod. There is a difference in the number of apical setae of the male pleopod 1 exopod (3 vs. 4–5 in SHEN's specimens), but too little material has been examined to say whether this character is variable or not. The main characters of this species are illustrated from the present material in Figs. 13–26. –

VERHOEFF (1946) describes the new species *Ligidium burmanicum* from Kumbaiti, Burma, a locality near the border with Yunnan, which is apparently similar to *L. denticulatum*. Unfortunately VERHOEFF's description is very short and lacks details on the morphology of the male pleopod 2 endopod, so a real comparison between the two species is not possible. –

ARCANGELI (1927, 1952) records *L. japonicum* Verhoeff, 1918 from Yunnanfu, Yunnan. Re-examination of this material (2 ♂♂, 4 ♀♀ all mutilated, DEAP) showed that these specimens are neither *L. japonicum* nor *L. denticulatum*, but a specific identification is not possible due to the poor condition of the male pleopods.

4. Olibrinidae

Genus *Olibrinus* Budde-Lund, 1913

4.1. *Olibrinus truncatus* Taiti & Ferrara, 1991

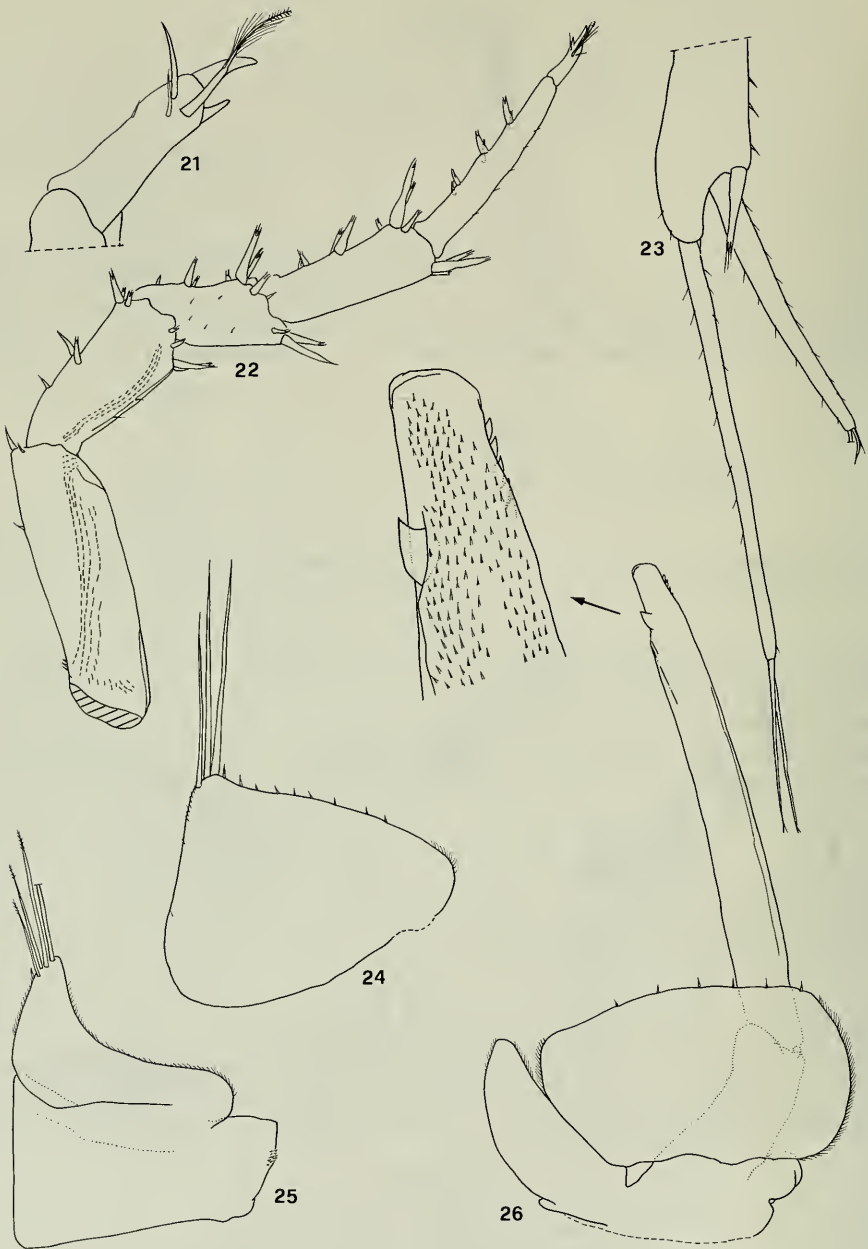
Olibrinus sp.: MA 1990: 1024.

Specimens examined: **Hong Kong**: 1 ♂, 1 ♀, Three Fathom Cove, leg. OLIVER IV. 1986 (MZUF). – 2 ♀♀, same data (SMNS).

Distribution: This species, previously known from the Hawaiian Islands and Sulawesi (TAITI & FERRARA 1991a; TAITI, FERRARA & KWON 1992), seems to have a wide distribution along the coasts of the Pacific Ocean.



Figs. 13–20. *Ligidium denticulatum*; ♀. – 13. Left epimeron of pereonite 1; – 14. Pereonite 7, pleon, telson and right uropod; – 15. Antennule; – 16. Antenna; – 17. Right mandible; – 18. Left mandible; – 19. Maxillule; – 20. Maxilliped.



Figs. 21–26. *Ligidium denticulatum*; ♂. — 21. Pereopod 1 dactylus; — 22. Pereopod 7; — 23. Uropod; — 24. Pleopod 1 exopod; — 25. Pleopod 1 protopod and endopod; — 26. Pleopod 2.

5. Scyphacidae

Genus *Alloniscus* Dana, 1854

5.1. *Alloniscus pigmentatus* Budde-Lund, 1885

Specimens examined: **China**: 2 ♂♂, 2 ♀♀, Hainan Dao, Haikou, sea shore, leg. BERON 15. X. 1988 (SMNS). — 2 ♂♂, 2 ♀♀, same data (MZUF). — 1 ♂, 5 ♀♀, 1 juv., same data (NNHMS).

Distribution: Madagascar, Aldabra, Chagos, Comoro, Mozambique and southern China (Hainan Dao). BUDDE-LUND (1908) also records this species from Sulawesi, several islands in the Gulf of Siam, and Oshima (Ryukyu). ARCANGELI (1960) states that these records probably refer to other species and that *A. pigmentatus* only inhabits the coasts of the western Indian Ocean. Without a re-examination of BUDDE-LUND's material we are unable to comment on the validity of his identifications; certainly *A. pigmentatus* also occurs on the coasts of the western Pacific Ocean, as confirmed by the record of Hainan Dao.

Remarks: For illustrations and comments on this species see FERRARA & TAITI (1985).

Genus *Armadilloniscus* Uljanin, 1875

5.2. *Armadilloniscus ellipticus* (Harger, 1878)

Armadilloniscus litoralis: TAITI & FERRARA 1989: 82;

MA 1990: 1024.

Specimens examined: **Hong Kong**: 2 ♂♂, 7 ♀♀, Boulder Shore, Tai Tam Bay, leg. MA III. 1985 (MUZF) (specimens identified as *Armadilloniscus litoralis* by TAITI & FERRARA 1989).

Distribution. Atlantic coasts of USA, Bermuda, Mediterranean coasts, Azores, Madeira, Madagascar, Malaysia, Korea, Hong Kong, Hawaiian Islands.

Remarks: GARTHWAITE, LAWSON & TAITI (1992) proved *Armadilloniscus litoralis* Budde-Lund, 1885 to be a junior synonym of *A. ellipticus* on both morphological and genetic evidence. As pointed out by TAITI & FERRARA (1989), other species of *Armadilloniscus* (*A. minutus* Budde-Lund, 1885 from the coasts of the Black Sea, *A. letourneuxi* Simon, 1885 from Tunisia, *A. nasatus* Budde-Lund, 1908 from Madagascar, and *A. bulgaricus* Frankenberger, 1941 from Bulgaria) are probably junior synonyms of *A. ellipticus*.

6. Philosciidae

Genus *Littorophiloscia* Hatch, 1947

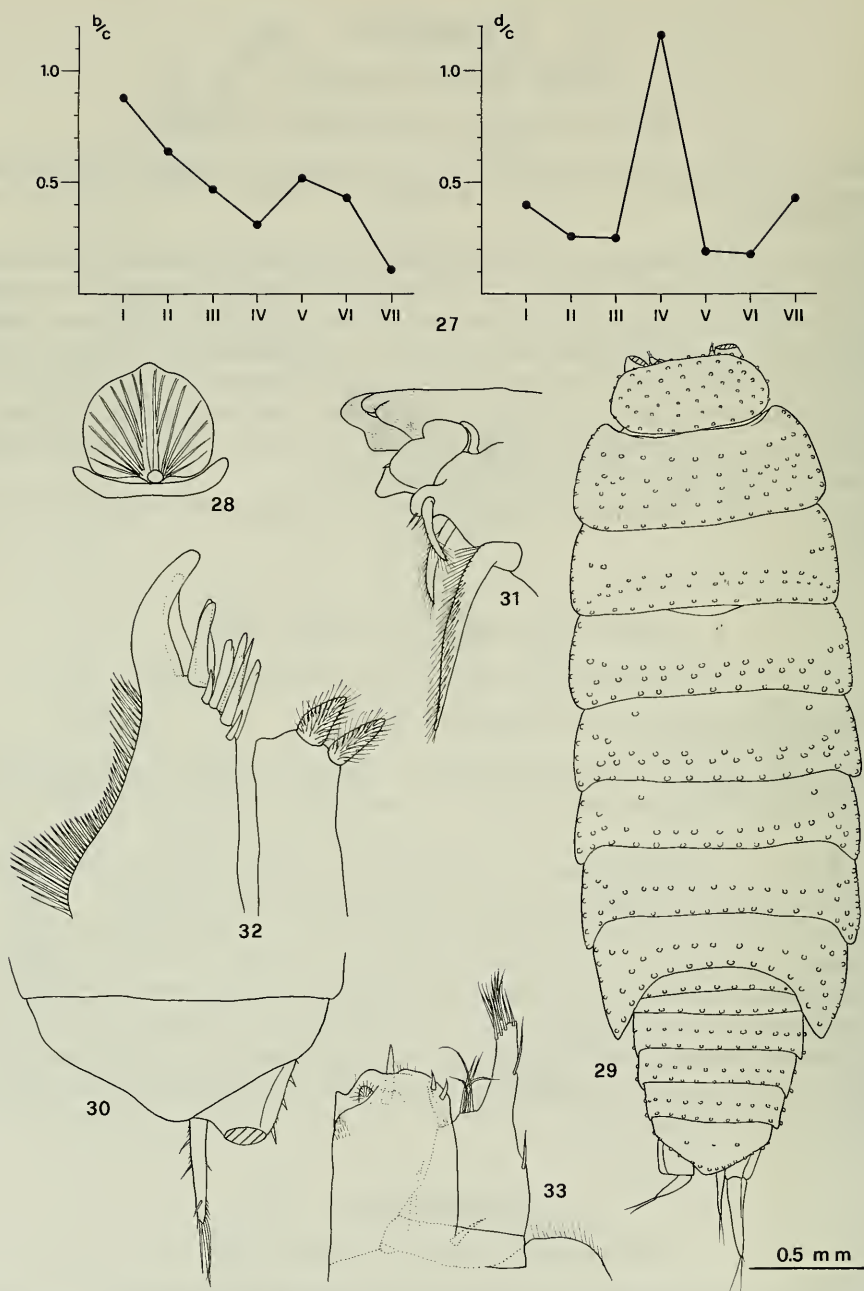
6.1. *Littorophiloscia aldabrana* Ferrara & Taiti, 1985

Littorophiloscia aldabrana: MA 1990: 1024.

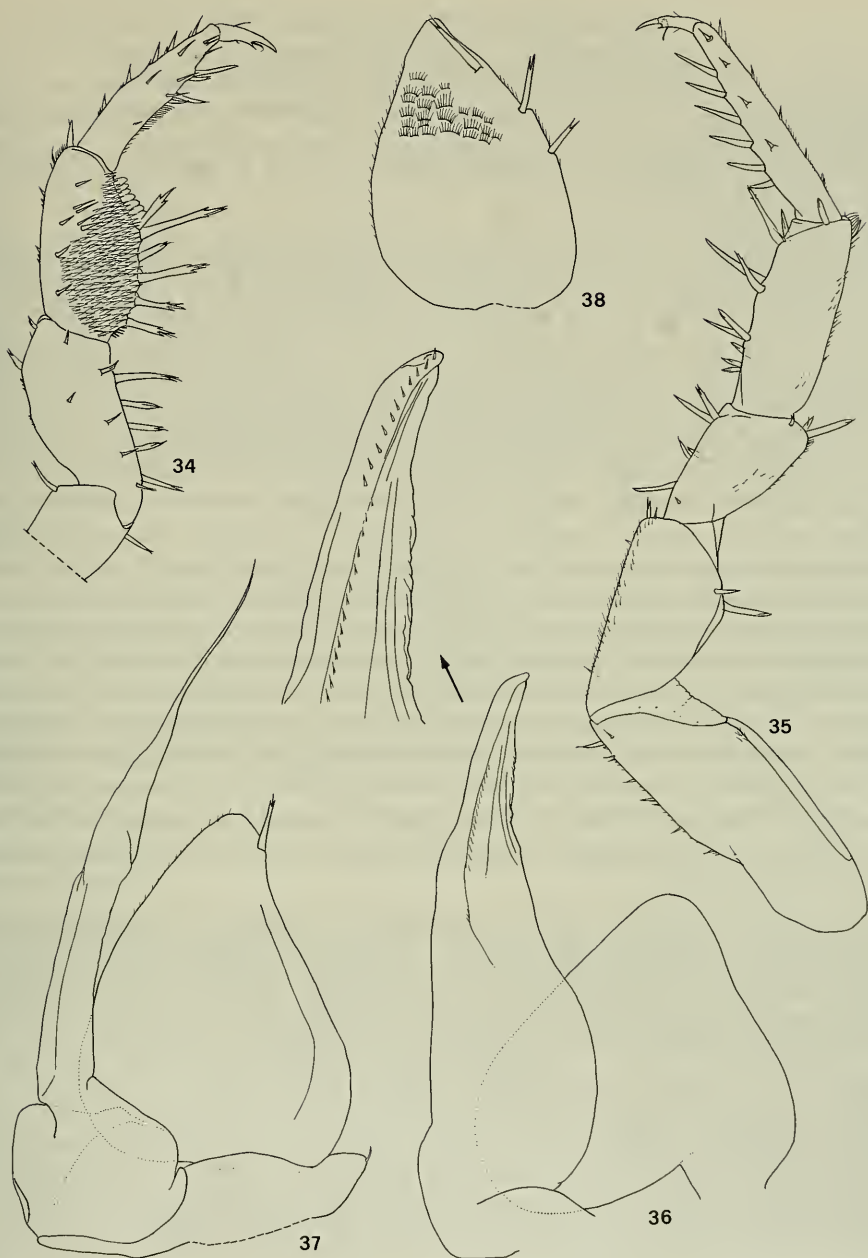
Specimens examined: **Hong Kong**: 1 ♂, Three Fathom Cove, leg. MA IV. 1986 (SMNS). — 1 ♂, 1 ♀, same data (MZUF).

Distribution: At present known only from Aldabra Island and Hong Kong.

Remarks: For description and illustrations of this species see FERRARA & TAITI (1985) and TAITI & FERRARA (1986a).



Figs. 27–33. *Papuaphiloscia granulata* n. sp.; ♂. – 27. Co-ordinates of noduli laterales; – 28. Dorsal scale-spine; – 29. Holotype in dorsal view; – 30. Pleonite 5, telson and right uropod; – 31. Mandible; – 32. Maxillule; – 33. Maxilliped.



Figs. 34–38. *Papuaphiloscia granulata* n. sp.; ♂. – 34. Pereopod 1; – 35. Pereopod 7; – 36. Pleopod 1; – 37. Pleopod 2; – 38. Pleopod 5 exopod.

Genus *Papuaphiloscia* Vandel, 19706.2. *Papuaphiloscia granulata* n. sp. (Figs. 27–38)

Holotype: ♂ 3.5 mm long, **China**, Hainan Dao, Qingdao, 200–300 m, leg. BERON 14. X. 1988 (SMNS).

Paratypes: 1 ♂, same data as holotype (SMNS). – 1 ♂, 1 ♀, same data (NNHMS). – 2 ♂♂, same data (MZUF).

Description:

Maximum length of ♂ 3.5 mm, of ♀ 4.0 mm. Colourless body. Dorsum granulated, each granule bearing rounded scale-spine. Gland pores absent. Co-ordinates of noduli laterales typical of the genus, i. e. curve d/c with a peak on pereonite 4 (Fig. 27). Eyes absent. Body outline as in Fig. 29. Cephalon with almost straight supra-antennal line; no frontal line. Pereonites 1–3 with postero-lateral corners rounded; pereonites 4–7 with corners progressively more and more directed backwards. Pleonal epimera reduced, adpressed, without posterior points. Telson with almost straight sides, largely rounded apex. Antenna with fifth article of peduncle as long as flagellum; flagellar articles subequal in length; second and third flagellar articles with six and two aesthetascs respectively. Mandible with molar penicil consisting of a single plumose seta. Maxillular outer branch with 9 long + 2 small teeth, all simple except two which are slightly cleft near apex; inner branch with two unequal penicils. Maxillipedal endite with penicil. Uropodal protopod grooved on outer margin; insertion of endopod slightly proximal to that of exopod. –

Male. Carpus of pereopod 1 and, to a lesser extent, 2 enlarged and covered with tiny scales on rostral surface. Pereopod 7 without particular modifications. Pleopod 1 exopod cordiform, with almost straight outer margin and rounded apex; endopod with stout distal part, apex slightly bent outwards. Pleopod 2 exopod much shorter than styliform endopod, with a subapical spine. Pleopod 5 exopod as in Fig. 38.

Etymology: Latin *granulatus* = granulated. The name refers to the dorsum with distinct, even if shallow, granules.

Remarks: Until now the genus *Papuaphiloscia* included eight species distributed in the Ryukyus, Melanesia and Hawaii (VANDEL 1970, 1973; TAITI & FERRARA 1991a). On account of the granulated dorsum, the new species is close to *Papuaphiloscia rennelli* Vandel, 1973 from Rennell Island (Solomon Archipelago) from which it is readily distinguished by the shape of the male pleopod 1 (compare Fig. 36 and in VANDEL 1973: Fig. 56A). For this last character *P. granulata* n. sp. is similar to *P. insulana* Vandel, 1970 from the Ryukyu Archipelago, and *P. laevis* (Schultz, 1973) from Hawaii Island. It differs from both these species in the granulated instead of smooth dorsum; from the latter also in its smaller size (4 mm vs. 7 mm long), and male pereopod 7 without modifications while it has a rounded lobe on the ischium rostral surface in *P. laevis* (see Fig. 4A in TAITI & FERRARA 1991a).

6.3. *Papuaphiloscia arcangelii* n. sp. (Figs. 39–49)

Philoscia (*Setaphora*) *coeca* (non Budde-Lund): ARCANGELI 1927: 262 (in part: Wuchang, Hunan).

Setaphora coeca (non Budde-Lund): ARCANGELI 1952: 300 (in part: Wuchang, Hunan).

Holotype: ♂ 3.5 mm long, **China**, Hubei, Wuchang, leg. SILVESTRI 2. XI. 1925 (SMNS).

Paratypes: 1 ♂, 1 ♀, same data as holotype (SMNS). – 2 ♂♂, 1 ♀, same data (DEAP). – 2 ♂♂, 1 ♀, same data (MZUF).

Description:

Maximum length of ♂ 3.5 mm, of ♀ 4.0 mm. Colourless body. Dorsum smooth with numerous tiny cordiform scale-spines. Gland pores absent. Co-ordinates of noduli laterales as in Fig. 39. Eyes absent. Cephalon with supra-antennal line slightly bent down in the middle; no frontal line. Pereonites 1–4 with postero-lateral corners rounded; pereonites 5–7 with corners progressively more and more directed backwards. Pleonal epimera reduced, adpressed, without posterior points. Telson triangular with straight sides, rounded apex. Antenna with fifth article of peduncle slightly longer than flagellum; ratio of flagellar articles 4:3:3; second and third flagellar articles with 3 and 2 aesthetascs respectively. Buccal pieces and uropods as in the preceding species. —

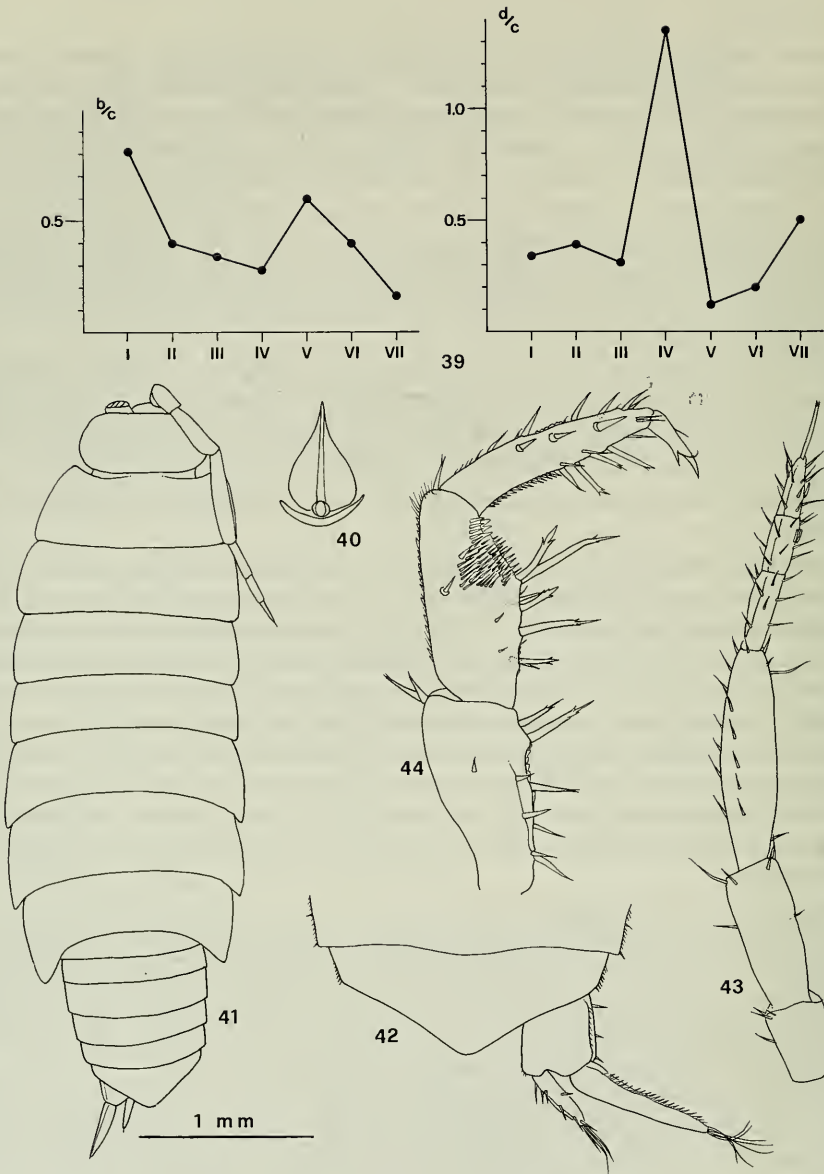
Male. Pereopods without particular modifications. Pleopod 1 exopod cordiform, with outer margin almost straight and rounded apex; endopod with stout distal half swollen at base, apex slightly bent outwards. Pleopod 2 exopod much shorter than styliform endopod, with a subapical spine. Pleopod 5 exopod as in Fig. 49.

Etymology: The new species is named after Prof. A. ARCANGELI, who first studied these specimens.

Remarks: ARCANGELI (1927) identified these specimens together with others from Japan (Atami and Mikino-o) as *Philoscia* (*Setaphora*) *coeca* Budde-Lund, 1895. As already pointed out by VANDEL (1968: 352), none of these specimens belong to *Burmoniscus coecus* (for a redescription and discussion on its taxonomic position see TAITI & FERRARA 1986b). VANDEL (1968) recorded a female specimen of Philosciidae from Aioi, Hyogo Prefecture, Japan and stated that it seemed conspecific with the specimens from China and Japan recorded by ARCANGELI (1927), but he did not effectively compare them. The French author adopted the new name *Setaphora japonica* for the Japanese specimens (his, ARCANGELI's or both?), without describing the species and without choosing a holotype. Thus *S. japonica* must be considered as a *nomen nudum*. —

Re-examination of the material studied by ARCANGELI deposited in DEAP showed that the Chinese and Japanese specimens belong to the same genus (*Papuaphiloscia*) but different species. The specimens from China are here described as *Papuaphiloscia arcangelii* n. sp. while the specimens from Japan (2 ♀♀, Atami, leg. SILVESTRI 14. VIII. 1925 and 1 mutilated ♂ juv., Mikono-o, near Nagasaki, leg. SILVESTRI 3. VI. 1925) cannot be identified at specific level. —

Papuaphiloscia arcangelii n. sp. appears morphologically similar to *P. insulana* Vandel, 1970 from a cave on Okino-érabu Island, Ryukyu Archipelago, Japan. Unfortunately the original description of this species provided by VANDEL (1970) includes only figures of male pleopods 1 and 2 and the co-ordinates of the noduli laterales. NUNOMURA (1986) redescribed *P. insulana* from a male syntype and added figures of the whole body, antennule, antenna, maxilliped and pereopod 7. We had no possibility of re-examining the type specimens of *P. insulana*, but, if the figures of this species are correct, *P. arcangelii* differs in having wider body shape, male pleopod 1 exopod with more broadly rounded apex, endopod with distal half swollen at the base, and longer male pleopod 2 endopod compared to the exopod.



Figs. 39–44. *Papuaphiloscia arcangelii* n. sp. — 39. Co-ordinates of noduli laterales; — 40. Dorsal scale-spine; — 41. Paratype ♀ in dorsal view; — 42. Pleonite 5, telson and right uropod; — 43. Antenna, ♂; — 44. Pereopod 1, ♂.

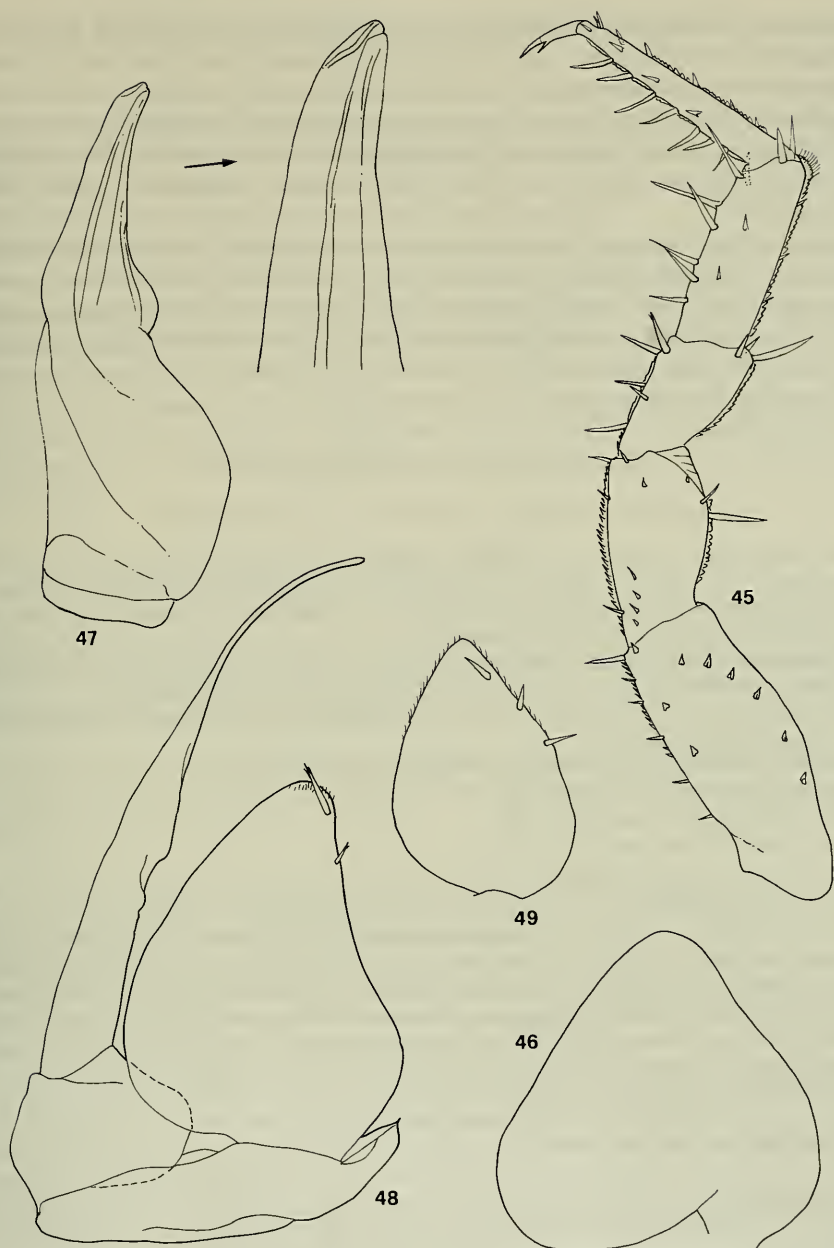
Genus *Pseudotyphloscia* Verhoeff, 1928

6.4. *Pseudotyphloscia alba* (Dollfus, 1898)

Philoscia (*Setaphora*) *pallida* (non Dollfus): ARCANGELI 1927: 261.

Setaphora pallida (non Dollfus): ARCANGELI 1952: 308.

Specimens examined: **China**: 1 ♂, 1 ♀, 1 juv., Hainan Dao, Qingdao, 200–300 m, leg. BERON 14. X. 1988 (SMNS). — 1 ♂, 2 ♀♀, same data (NNHMS). — **Hong Kong**: 3 ♀♀,



Figs. 45–49. *Papuaphiloscia arcangelii* n. sp.; ♂. — 45. Pereopod 7; — 46. Pleopod 1 exopod; — 47. Pleopod 1 endopod; — 48. Pleopod 2; — 49. Pleopod 5 exopod.

Hong Kong, leg. SILVESTRI, XII. 1924 (DEAP) [specimens identified as *Philoscia* (*Setaphora*) *pallida* Dollfus by ARCANGELI 1927].

Distribution: Indonesia (Sulawesi, Java, Krakatau Islands and Bali), Philippines, southern China (Hainan Dao), Hong Kong and Taiwan.

Remarks: This species has recently been redescribed and illustrated by GREEN, FERRARA & TAITI (1990). —

Re-examination of the specimens from Hong Kong and Los Baños, Luzon Island, Philippines, identified as *Philoscia (Setaphora) pallida* Dollfus, 1898 by ARCANGELI (1927) showed that they belong to *Pseudotyphloscia alba* and not to „*Philoscia*“ *pallida*, according to re-examination of the type specimens of the latter species deposited in ZMA. —

NUNOMURA (1986) described two new species of Philosciidae, *Pseudophiloscia donanensis* from Yonakuni Island, Okinawa Pref., Japan, and *Pseudophiloscia okinawaensis* from Okinawa Island, Okinawa Pref., Japan, which both appear very similar, if not identical, to *Pseudotyphloscia alba*, as far as can be judged from original descriptions and figures. A re-examination of NUNOMURA's material is necessary to confirm the synonymy.

Genus *Burmoniscus* Collinge, 1914

6.5. *Burmoniscus ocellatus* (Verhoeff, 1928)

Philoscia (Setaphora) truncata (non Dollfus): ARCANGELI 1927: 260 (in part: Kusang and mountain near Ausu, Foochow, Fukien, China; Taipò, Hong Kong; Hong Kong).

Philoscia (Setaphora) angusticauda (non Budde-Lund): ARCANGELI, 1927: 259 (in part: 1 ♂ Taipò, Hong Kong; Wuchang, China).

Setaphora truncata (non Dollfus): ARCANGELI 1952: 307 (in part: Kusang and mountain near Ausu, Foochow, Fukien, China; Taipò, Hong Kong; Hong Kong).

Setaphora angusticauda (non Budde-Lund): ARCANGELI, 1952: 306 (in part: 1 ♂ Taipò, Hong Kong; Wuchang, China).

Burmoniscus ocellatus: TAITI & FERRARA 1986b: 191, Figs. 18–23;

DUDGEON, MA & LAM 1990: 398;

MA, DUDGEON & LAM 1991: 348;

MA, LAM & DUDGEON 1991: 678.

Specimens examined: China: 2 ♂♂, 3 ♀♀, Hainan Dao, Qingdao, 200–300 m, leg. BERON 14. X. 1988 (SMNS). — 2 ♂♂, 2 ♀♀, same data (MZUF). — 2 ♂♂, 5 ♀♀, 2 juvs., same data (NNHMS). — 1 ♂, 1 ♀, Hubei, Wuchang, leg. SILVESTRI, 2. XI. 1925 (DEAP) [specimens identified as *Philoscia (Setaphora) angusticauda* by ARCANGELI 1927]. — 1 ♂, 1 ♀, Kusang, mountain near Foochow, Fukien, on the coast, leg. SILVESTRI, 27. IX. 1924 (DEAP) [specimens identified as *Philoscia (Setaphora) truncata* by ARCANGELI 1927]. — 2 ♂♂, 2 ♀♀, mountain near Ausu, Foochow, Fukien, leg. SILVESTRI, 27. IX. 1925 (DEAP) [specimens identified as *Philoscia (Setaphora) truncata* by ARCANGELI, 1927]. — **Hong Kong**: 3 ♂♂, 18 ♀♀, Hill above Belcher's, leg. MA V. 1986 (MZUF). — 3 ♂♂, 5 ♀♀, Tai Po, 20 km from Tai Lou, leg. OSELLA 26. I. 1981 (SMNS). — 1 ♀, Hong Kong, leg. SILVESTRI, 6. IV. 1924 (DEAP) [specimen identified as *Philoscia (Setaphora) truncata* by ARCANGELI 1927]. — 3 ♂♂, 2 ♀♀, Taipò (= Tai Po), not far from Hong Kong, leg. SILVESTRI, 24. XII. 1924 (DEAP) [specimens identified as *Philoscia (Setaphora) truncata* by ARCANGELI 1927]. — 1 ♂, Taipò, leg. SILVESTRI, 1. 1925 (DEAP) [specimen identified as *Philoscia (Setaphora) angusticauda* by ARCANGELI 1927].

Distribution: Southern China, Hong Kong and Taiwan.

Remarks: This species was described by VERHOEFF (1928) as *Formososcia ocellata* n. gen., n. sp. from Taiwan. TAITI & FERRARA (1986b: 191, Figs. 18–23) re-described it from specimens collected in Hong Kong and transferred it to the genus *Burmoniscus*. —

Re-examination of the material identified as *Philoscia (Setaphora) truncata* by ARCANGELI (1927) showed that none of the specimens belong to this species (according to a comparison with the type specimens of *Philoscia truncata* Dollfus, 1898

deposited in NHMB and ZMA). The specimens from Kusang, mountain near Ausu (China), Taipò and Hong Kong (Hong Kong) belong to *B. ocellatus*; the specimen (1 ♂, not 1 ♂, 1 ♀) from Kyoto (Japan) belongs to *Burmoniscus okinawaensis*; the specimen from Funkikò (Taiwan) belongs to a distinct species of *Burmoniscus* (its description will be given in a separate paper); all the other specimens from Shanghai (China), Macao, and Khuoi Tao and Than-hoa (Vietnam) are either females or males in poor condition and their identification is not possible. —

Re-examination of the material identified as *Philoscia* (*Setaphora*) *angusticauda* by ARCANGELI (1927) showed that none of the specimens belong to *Burmoniscus angusticauda* (Budde-Lund, 1885), a species presently known only from Borneo (for illustrations and comments on this species see TAITI, FERRARA & KWON, 1992). The specimens from Taipò (Hong Kong) belong to *Burmoniscus mauritiensis* (5 ♂♂, 4 ♀♀) and *B. ocellatus* (1 ♂); the specimens from Wuchang (China) to *B. ocellatus*; the specimens from Yolushan (China) and Hong Kong to *B. mauritiensis*; all the other specimens from Indochina and Kiu-shiu Island (Japan) are females and cannot be identified.

6.6. *Burmoniscus okinawaensis* (Nunomura, 1986)

Specimens examined: **China:** 1 ♂, 2 ♀♀, Guanxi Zhuangxi Zizhiqu, Guilin, leg. BERON 6. X. 1988 (SMNS). — 1 ♂, 1 ♀, same data (MZUF). — 2 ♂♂, 2 ♀♀, same data (NNHMS). — **Hong Kong:** 4 ♂♂, 3 ♀♀, Tai Po, leg. OSELLA 26. I. 1981 (MZUF). — 2 ♂♂, 1 ♀, University City, leg. OSELLA & COTTARELLI 26. I. 1981 (SMNS). — 1 ♀, Castle Park, leg. COTTARELLI 25. I. 1981 (MZUF).

Distribution: Southern China, Hong Kong, Japan and Hawaiian Islands.

Remarks: *Setaphora okinawaensis* has been transferred to *Burmoniscus* and re-illustrated by TAITI & FERRARA (1991a).

6.7. *Burmoniscus javanensis* (Richardson Searle, 1922)

Philoscia (*Setaphora*) *sundaica* (non Dollfus): ARCANGELI 1927: 261.

Setaphora sundaica (non Dollfus): ARCANGELI 1952: 308.

Specimens examined: **China:** 1 ♂, Yamon, garden in Canton, leg. SILVESTRI 3. V. 1925 (DEAP) [specimen identified as *Philoscia* (*Setaphora*) *sundaica* by ARCANGELI 1927]. — **Hong Kong:** 1 ♂, Castle Park, leg. COTTARELLI 25. I. 1981 (MZUF).

Distribution: Réunion, India, Indonesia (Java, Bali and Sulawesi), Malaysia, New Guinea, southern China, Hong Kong and Taiwan.

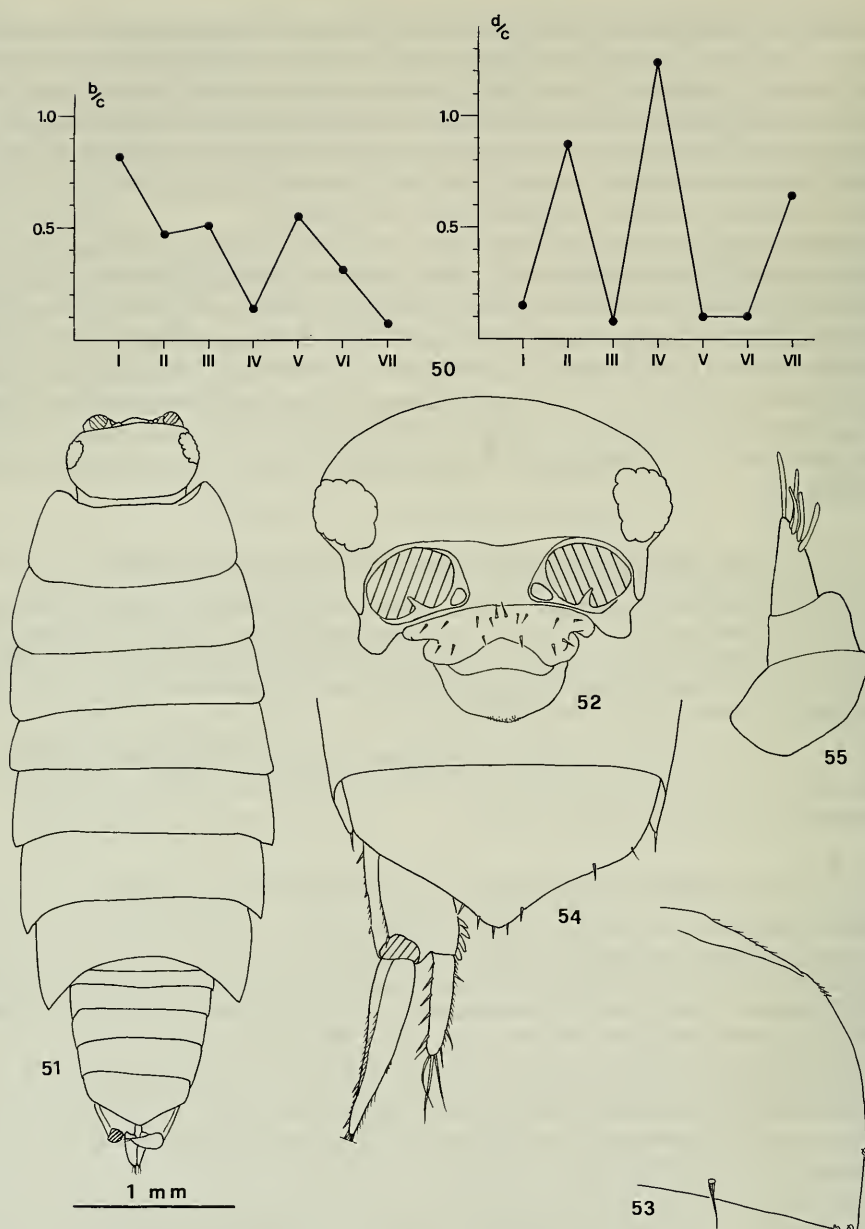
Remarks: For synonyms and illustrations of this widespread species see TAITI, FERRARA & KWON (1992). —

Re-examination of the specimen from Yamon (Canton, China), identified as *Philoscia* (*Setaphora*) *sundaica* by ARCANGELI (1927), showed that it belongs to *B. javanensis* and not to „*Philoscia*“ *sundaica* Dollfus, 1898, according to a re-examination of the type specimens of the latter species deposited in ZMA.

6.8. *Burmoniscus mauritiensis* (Taiti & Ferrara, 1983)

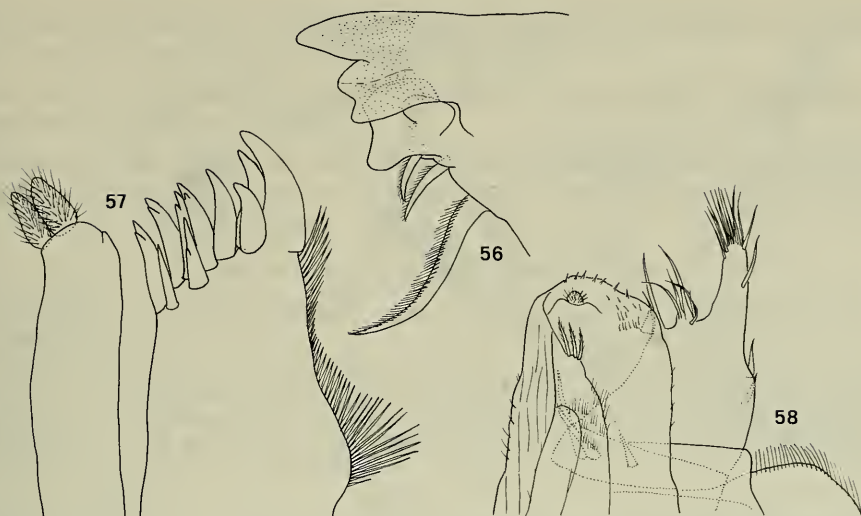
Philoscia (*Setaphora*) *angusticauda* (non Budde-Lund): ARCANGELI 1927: 259, Fig. 19 (in part: Yolushan, China; 5 ♂♂, 4 ♀♀ Taipò, Hong Kong; Hong Kong).

Setaphora angusticauda (non Budde-Lund): ARCANGELI 1952: 306 (in part: Yolushan, China; 5 ♂♂, 4 ♀♀ Taipò, Hong Kong; Hong Kong).



Figs. 50–55. *Burmoniscus purpura* n. sp. – 50. Co-ordinates of noduli laterales; – 51. Paratype ♂ in dorsal view; – 52. Cephalon, frontal view; – 53. Right epimeron of pereonite 7; – 54. Pleonite 5, telson and left uropod; – 55. Antennule.

Specimens examined: **China:** 2 ♂♂, 2 ♀♀, Nanjing, Zijin (Purple) Mt., 350–450 m, leg. BERON 9. X. 1988 (NNHMS). – 2 ♂♂, 2 ♀♀, same data (SMNS). – 1 ♂, 1 ♀, same data (MZUF). – 2 ♂♂, 9 ♀♀, Sichuan, Chengdu, Baoguang Monastery, leg. BERON 21. I. 1989 (NNHMS). – 1 ♂, 5 ♀♀, same data (SMNS). – 1 ♂, 5 ♀♀, same data (MZUF). – 1 ♂, 2 ♀♀, Guanxi Zhunagxi Zizhiq, Guilin, leg. BERON 6. X. 1988 (NNHMS). – 1 ♂,



Figs. 56–58. *Burmoniscus purpura* n. sp. — 56. Mandible; — 57. Maxillule; — 58. Maxilliped.

3 ♀♀, Yolushan, near Changsha, leg. SILVESTRI, 24. X. 1925 (DEAP) [specimens identified as *Philoscia* (*Setaphora*) *angusticauda* by ARCANGELI 1927]. — Hong Kong: 5 ♂♂, 4 ♀♀, Taipò (= Tai Po), not far from Hong Kong, leg. SILVESTRI I. 1925 (DEAP) [specimens identified as *Philoscia* (*Setaphora*) *angusticauda* by ARCANGELI 1927]. — 1 ♀, Hong Kong, leg. SILVESTRI 6. IV. 1925 [specimens identified as *Philoscia* (*Setaphora*) *angusticauda* by ARCANGELI 1927].

Distribution: Mauritius, China, Hong Kong, Korea and Hawaii.

Remarks: For description and illustrations of this species see TAITI & FERRARA (1983), for its generic position see TAITI & FERRARA (1986b).

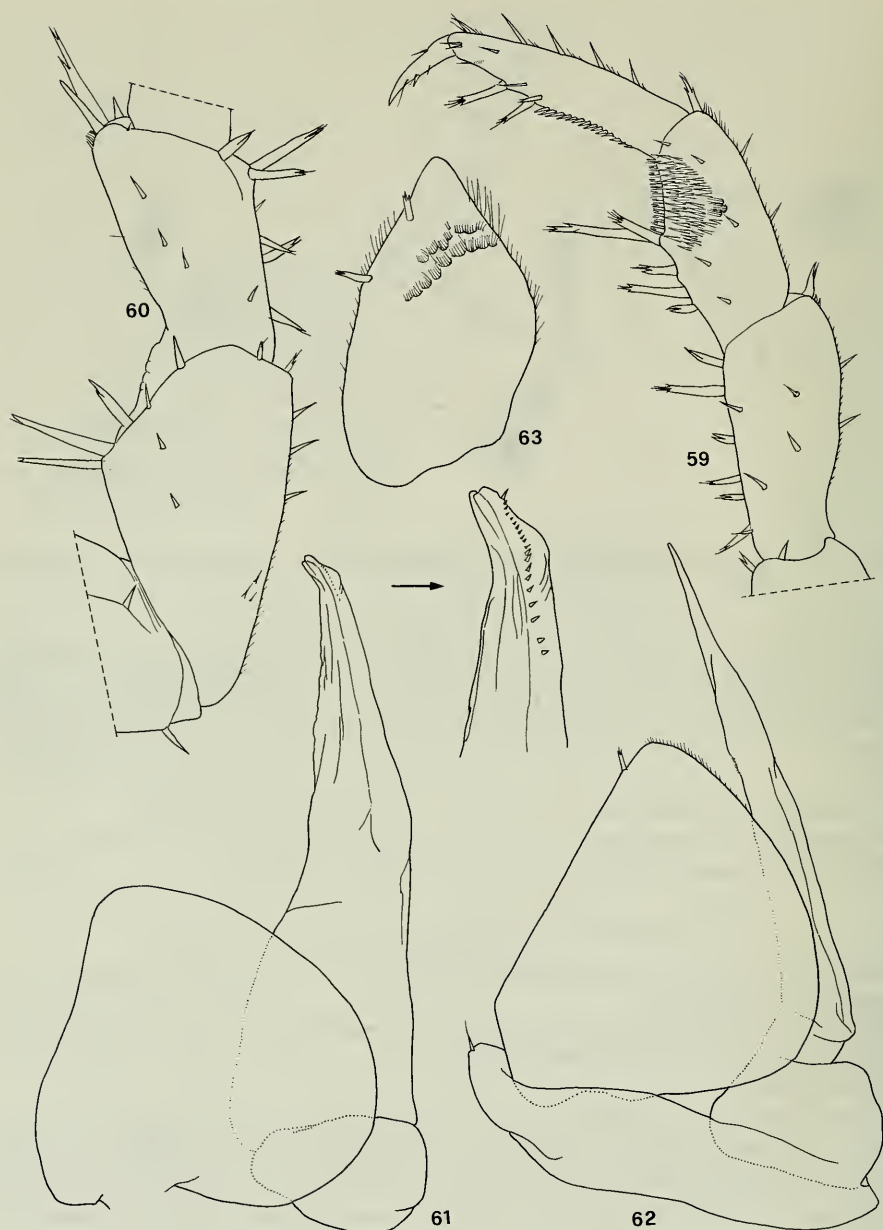
6.9. *Burmoniscus purpura* n. sp. (Figs. 50–63)

Holotype: ♂ 4.2 mm long, China, Nanjing, Zijin (= Purple) Mt., 350–450 m, leg. BERON 9. X. 1988 (SMNS).

Paratypes: 3 ♂♂, 11 ♀♀, same data as holotype (NNHMS). — 4 ♂♂, 6 ♀♀, same data (SMNS). — 4 ♂♂, 6 ♀♀, same data (MZUF).

Description:

Maximum length of ♂ 4.2 mm, of ♀ 4.5 mm. Pale brown colour with usual yellowish muscle spots; in some specimens a small pale irregular spot at base of pereonal epimera is present. Dorsum smooth. Gland pores not visible. Noduli laterales with co-ordinates typical of the genus, i. e. curve d/c with a distinct peak on pereonites 2 and 4 (Fig. 50). Eye with about 14 ommatidia. Body outline as in Fig. 51. Cephalon with supra-antennal line slightly bent downwards in the middle; no frontal line. Pereonite 7 with postero-lateral corners almost at right angle. Pleonal epimera reduced, adpressed, with short posterior points on pleonites 3–5 in a ventral position, not visible in dorsal view. Telson with sides almost straight, rounded apex. Antennule with a line of superimposed aesthetascs. Antenna with fifth article of peduncle as long as flagellum; ratio of flagellar articles 3:3:4; second and third flagellar article each with 2 aesthetascs. Mandible with molar penicil consisting of a single plumose seta. Maxillular outer branch with 10 (5 cleft) teeth; inner branch



Figs. 59–63. *Burmoniscus purpura* n. sp.; ♂. — 59. Pereopod 1; — 60. Pereopod 7; — 61. Pleopod 1; — 62. Pleopod 2; — 63. Pleopod 5 exopod.

with two unequal penicils. Maxillipedal endite with a penicil. Uropodal protopod grooved on outer margin; insertion of endopod and exopod at the same level; exopod almost twice as long as endopod. —

Male. Pereopods without particular modifications. Pleopod 1 exopod cordiform, with outer margin slightly sinuous and broadly rounded apex; endopod with a stout

apical part bent outwards. Pleopod 2 exopod triangular with straight outer margin and a subapical spine. Pleopod 5 exopod as in Fig. 63.

Etymology: Latin *purpura* = purple. The name of the species refers to the collecting site of the specimens: Zijin (= Purple) Mt.

Remarks: The shape of the male pleopod 1 is the character that distinguishes the new species from all the other species presently included in the genus *Burmoniscus*.

6.10. *Burmoniscus yunnanensis* n. sp. (Figs. 64–74)

Holotype: ♂ 7 mm long, **China**, Yunnan, Menzi County, near Wulichong, leg. BERON 6. I. 1989 (SMNS).

Paratypes: 1 ♂, same data as holotype (MZUF). – 1 ♀, **China**, Yunnan, Menzi County, Cave Chi Be Yi Dong, leg. BERON 12. I. 1989 (NNHMS). – 2 ♀♀, **China**, Yunnan, Menzi County, Cave Wulichong, Sink hole (No. 3), leg. BERON 4. I. 1989 (SMNS). – 2 ♀♀, same data (MZUF). – 2 ♀♀, **China**, Yunnan, Menzi County, Cave Ma Fa Tiao Dong (Pot hole No. 2), leg. BERON 6. I. 1989 (NNHMS).

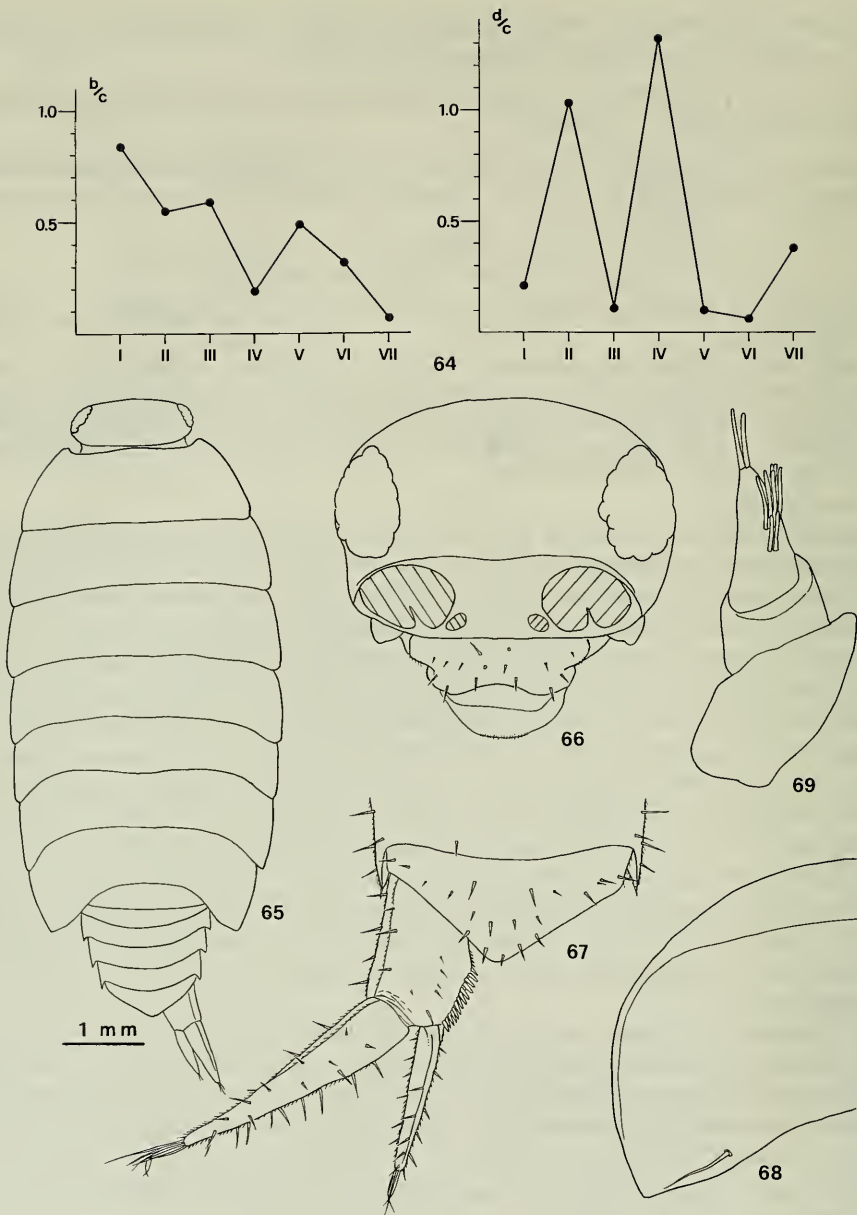
Description:

Maximum length of ♂ 7 mm, of ♀ 9 mm. Brown ground colour with the usual yellowish muscle spots; pereonite 1 darker in the anterior $\frac{3}{4}$ and light in the posterior part; lateral parts of pereonites 2–7 darker with an elongated yellow spot at the base of epimera; postero-lateral corners of pereonites pale; pleonites usually with a narrow light stripe in the middle. Dorsum smooth with sparse short upright setae. More than 10 gland pores along antero-lateral margins of pereonal epimera 3–6. Noduli laterales with b/c and d/c co-ordinates as in Fig. 64. Eye with about 24 ommatidia arranged in four rows. Body outline as in Fig. 65. Cephalon and buccal pieces as in *B. purpura*. Pereonite 7 with postero-lateral corners right-angled. Pleonal epimera reduced, with small posterior points on pleonites 3–5 clearly visible in dorsal view. Telson with straight sides, rounded apex. Antennule with two rows of aesthetascs in the middle plus two single ones at apex of third article. Antenna long and thin, reaching middle of pereonite 4 when pushed back; ratio of flagellar articles 6:3:2; second and third flagellar articles with 4 and 2 aesthetascs respectively. Uropodal protopod grooved on outer margin; insertions of exopod and endopod at the same level. –

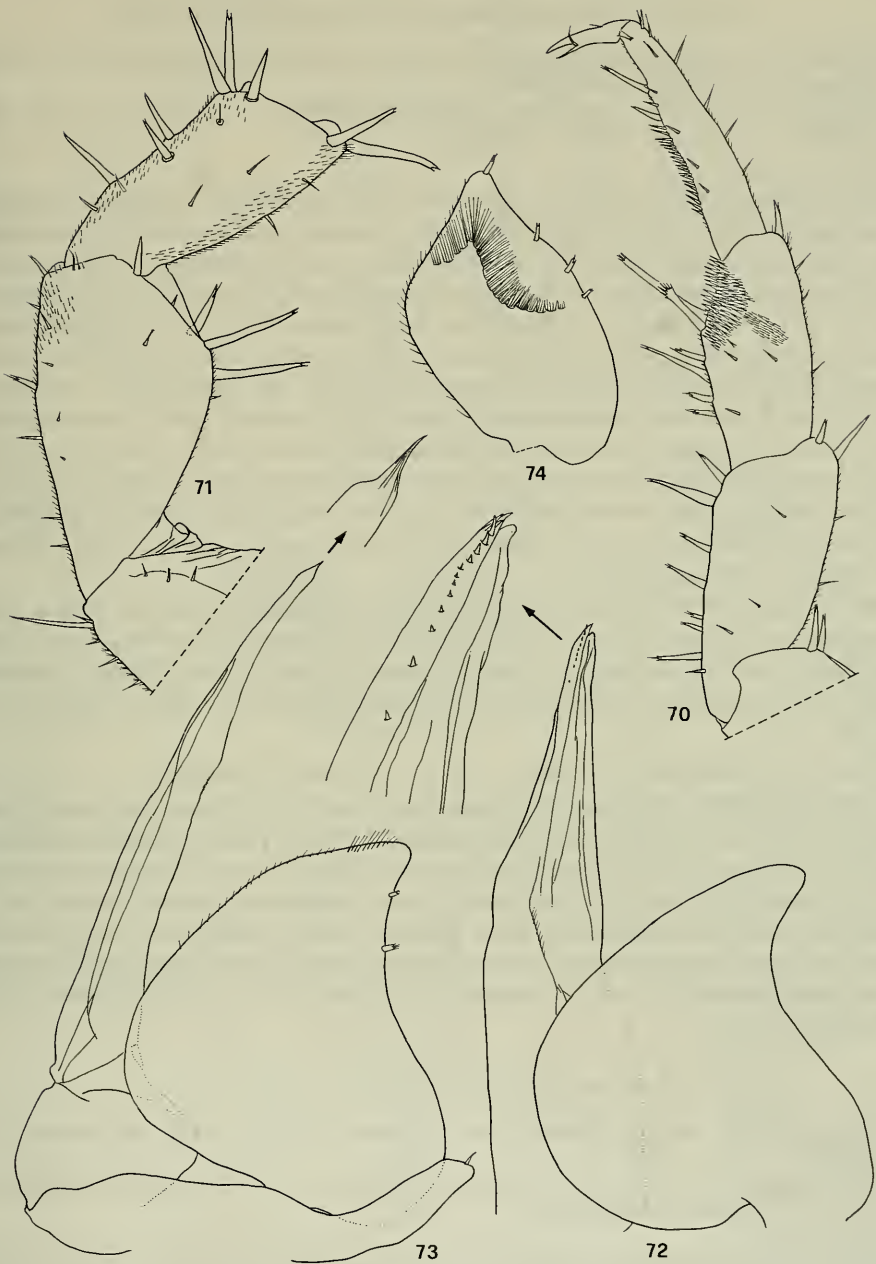
Male. Pereopod 7 ischium with sternal margin slightly convex. Pleopod 1 exopod with a triangular posterior point bent outwards, outer margin clearly sinuous; endopod with distal part straight and stout, apex acute and incised on outer margin. Pleopod 2 exopod slightly longer than wide; endopod with a sharply pointed apex. Pleopod 5 exopod as in Fig. 74.

Etymology: The name refers to Yunnan, province of the People's Republic of China, where the specimens were collected.

Remarks: *Burmoniscus yunnanensis* n. sp. appears morphologically similar to *B. novabritannicus* (Vandel, 1973) from the Bismarck and Solomon archipelagoes. It is distinguished by the characteristic colour pattern, the male pleopod 1 exopod with regularly sinuous instead of incised outer margin (compare Fig. 72 and in VANDEL 1973: Fig. 15C, D), endopod without stripes on outer margin, and male pleopod 2 endopod ending with an acute point.



Figs. 64–69. *Burmoniscus yunnanensis* n. sp. – 64. Co-ordinates of noduli laterales; – 65. Paratype ♀ in dorsal view; – 66. Cephalon, frontal view; – 67. Pleonite 5, telson and left uropod; – 68. Left epimeron of pereonite 7; – 69. Antennule.



Figs. 70–74. *Burmoniscus yunnanensis* n. sp.; ♂. – 70. Pereopod 1; – 71. Pereopod 7; – 72. Pleopod 1; – 73. Pleopod 2; – 74. Pleopod 5 exopod.

6.11. *Burmoniscus flavivertex* n. sp. (Figs. 75–86)

Holotype: ♂ 6 mm long, China, Yunnan, Menzi County, litter near the Cave Long Bao Pao Dong, leg. BERON 7. I. 1989 (SMNS).

Paratypes: 1 ♂, 1 ♀, same data as holotype (SMNS). – 2 ♂♂, 1 ♀, same data (NNHMS). – 2 ♂♂, 1 ♀, same data (MZUF).

Description:

Maximum length of ♂ 6.0 mm, of ♀ 6.2 mm. Brown colour with the usual yellowish muscle spots; cephalon with pigmentless vertex; postero-lateral corners of pereonites pale. Dorsum smooth with some short upright setae. Numerous gland pores near lateral margins of pereonites 3–5. Noduli laterales with b/c and d/c co-ordinates as in Fig. 75. Eye with about 20 ommatidia. Body shape as in Fig. 76. Cephalon and buccal pieces as in *B. purpurea*. Pereonite 7 with postero-lateral corners subacute. Pleonal epimera reduced, with short posterior points on pleonites 3–5 visible in dorsal view. Telson with almost straight sides, widely rounded apex. Antennule with two aesthetascs at apex and some superimposed ones on medial margin of third article. Antenna with fifth article of peduncle slightly shorter than flagellum; ratio of flagellar articles 5:5:4; second and third flagellar article with 3 and 2 aesthetascs respectively. Uropodal protopod grooved on outer margin; insertions of endopod and exopod at the same level. –

Male. Pereopods without particular modifications. Pleopod 1 exopod with a short triangular posterior point, outer margin distinctly sinuous; endopod with distal part bent slightly outwards, bearing a short styliiform process at apex. Pleopod 2 exopod wider than long; endopod with slightly swollen distal part. Pleopod 5 exopod as in Fig. 86.

Etymology: Latin *flavus* = yellow + *vertex* = summit (of cephalon).

Remarks: The new species is distinguished from all the others in the genus by the typical structure of the male pleopod 1 endopod with a short but distinct styliiform process at the apex. For the typical coloration with pale vertex which contrasts the brown colour of the body, *B. flavivertex* n. sp. resembles *B. xantocephalus* Taiti & Manicasteri, 1988 from Sri Lanka, from which it differs in the more acute postero-lateral corners of the pereonite 7, more rounded tip of the telson and different shape of the male pleopods 1 and 2 (compare Figs. 83–85 and in TAITI & MANICASTRI 1988: Fig. 15 F, G).

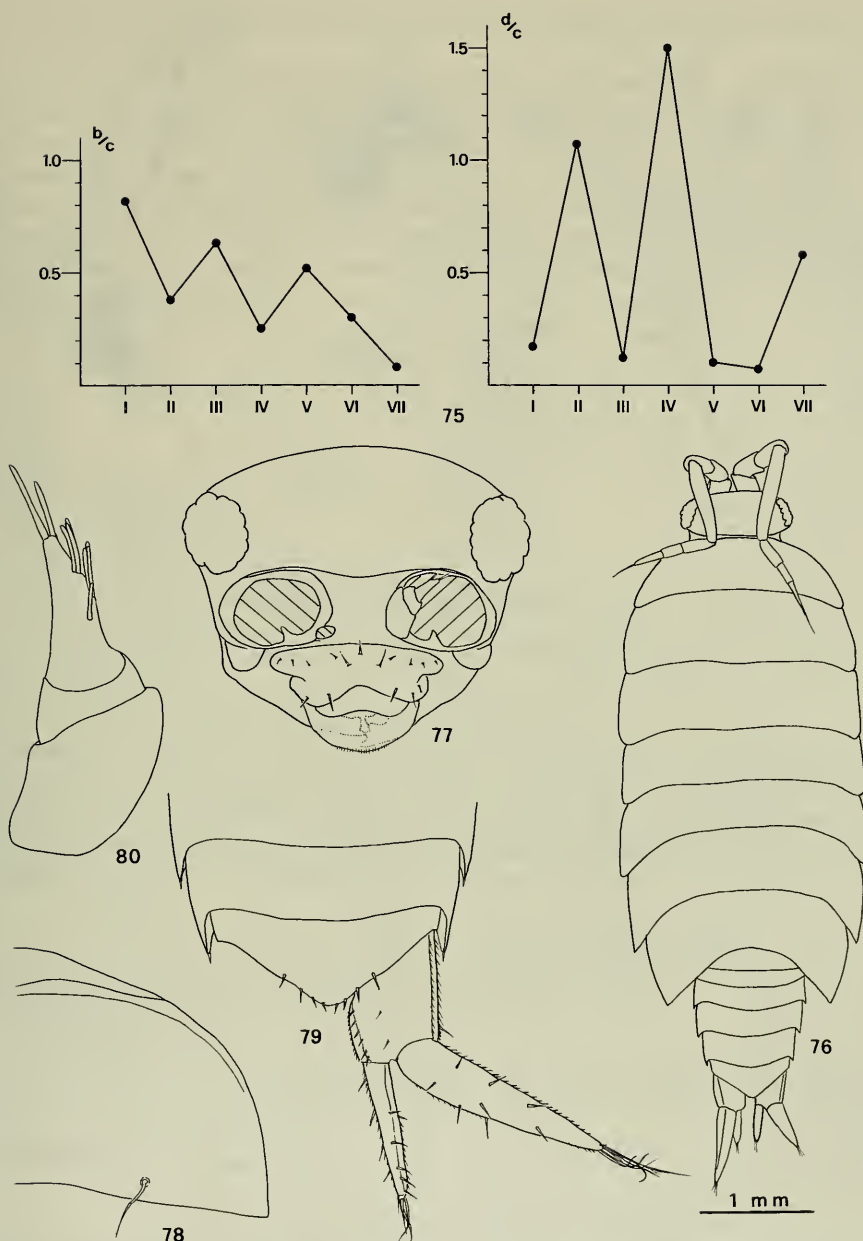
6.12. *Burmoniscus lobatus* n. sp. (Figs. 87–97)

Holotype: ♂ 4 mm long, China, Guanxi Zhuangxi Zizhiqu, Guilin, leg. BERON 6. X. 1988 (SMNS).

Paratypes: 2 ♂♂, 7 ♀♀, data as holotype (NNHMS). – 1 ♂, 2 ♀♀, same data (SMNS). – 2 ♂♂, 2 ♀♀, same data (MZUF).

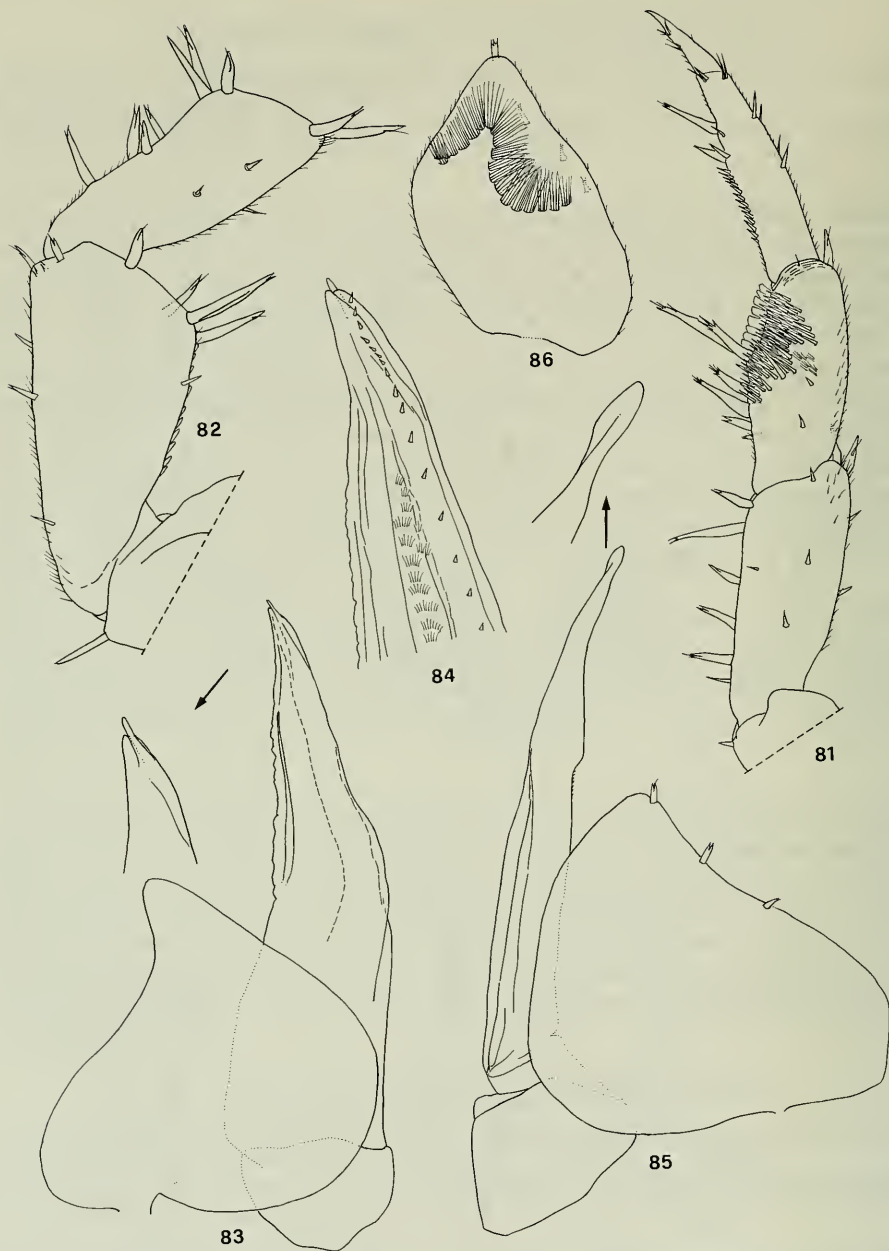
Description:

Maximum length of ♂ 5.5 mm, of ♀ 6.5 mm. Brown colour with the usual yellowish muscle spots and an oval pale spot at the base of epimera of pereonites 2–7. Dorsum smooth. Gland pores not visible. Noduli laterales with b/c and d/c co-ordinates as in Fig. 87. Eye with about 18 ommatidia. Body outline as in Fig. 88. Cephalon with supra-antennal line straight. Buccal pieces as in *B. purpurea*. Pereonite 7 with postero-lateral corners almost at right angle. Pleonal epimera reduced, with short posterior points visible in dorsal view. Telson with nearly straight sides and rounded apex. Antennule with two apical aesthetascs and some superimposed ones on medial



Figs. 75–80. *Burmoniscus flavivertex* n. sp. – 75. Co-ordinates of noduli laterales; – 76. Holotype in dorsal view; – 77. Cephalon, frontal view; – 78. Right epimeron of pereonite 7; – 79. Pleonites 4–5, telson and right uropod; – 80. Antennule.

margin of third article. Antenna with fifth article of peduncle as long as flagellum; ratio of flagellar articles 3:2:2; second and third flagellar articles with 4 and 2 aesthetascs respectively. Uropodal protopod grooved on outer margin; insertions of exopod and endopod at the same level; exopod slightly longer than endopod. –



Figs. 81–86. *Burmoniscus flavivertex* n. sp.; ♂, paratype. — 81. Pereopod 1; — 82. Pereopod 7; — 83. Pleopod 1; — 84. Distal part of pleopod 1 endopod, rostral surface; — 85. Pleopod 2; — 86. Pleopod 5 exopod.

Male. Pereopods without particular modifications. Pleopod 1 exopod with long narrow triangular posterior point bent outwards, outer margin sinuous; endopod with a beak-shaped hyaline lobe at apex. Pleopod 2 exopod as long as wide, much shorter than endopod. Pleopod 5 exopod as in Fig. 97.

Etymology: Latin *lobatus* = lobate. The name refers to the hyaline lobe at the apex of the male pleopod 1 endopod.

Remarks: For the presence of a hyaline lobe at the apex of the male pleopod 1 endopod, *B. lobatus* n. sp. appears similar to *B. veliger* Green, Ferrara & Taiti, 1990 from Sumatra, and to *B. microlobatus* (Vandel, 1973) from the Bismarck and Solomon archipelagoes. It is distinguished from both by the shape of the male pleopod 1 exopod which has a long triangular posterior point bent outwards; from the former also in the absence of a recurved spine on the male pereopod 7 merus; and from the latter by the pointed, instead of rounded, apical hyaline lobe of the male pleopod 1 endopod.

7. Oniscidae (?)¹⁾

Genus *Exalloniscus* Stebbing, 1911

7.1. *Exalloniscus cortii* Arcangeli, 1927

Exalloniscus cortii: ARCANGELI 1927: 263, Fig. XXI;

ARCANGELI 1952: 310;

DALENS 1987: 47;

MANICASTRI & ARGANO 1986: 39;

TAITI & FERRARA 1988: 348 (in part: ? nec Honmoku, Japan, Fig. 6);

KWON 1993: 139, Figs. 5–6.

Type specimen re-examined: **China**: 1 ♀ paralectotype, Shanghai, leg. SILVESTRI 19. V. 1925 (DEAP).

Distribution: Eastern China, Korea and Japan.

Remarks: *Exalloniscus cortii* has recently been discussed and illustrated by KWON (1993). From southern China ARCANGELI (1927) recorded two localities for this species: Wuchang (Hubei) and Shanghai. In the DEAP collections the specimens from Wuchang are missing and the one from Shanghai is a female, thus we are unable to confirm ARCANGELI's identifications from these localities.

7.2. *Exalloniscus rotundatus* Taiti & Ferrara, 1986

Exalloniscus rotundatus: TAITI & FERRARA 1986c: 239, Figs. 1–3;

MANICASTRI & ARGANO 1986: 40;

DALENS 1987: 47;

TAITI & FERRARA 1988: 352, Figs. 10, 11.

Type specimen re-examined: **Hong Kong**: 1 ♂ paratype, Tai Po, 20 km from Tai Lou, leg. OSELLA 26. I. 1981 (MZUF).

Distribution: At present only known from Hong Kong.

7.3. *Exalloniscus silvestrii* n. sp. (Figs. 98–113)

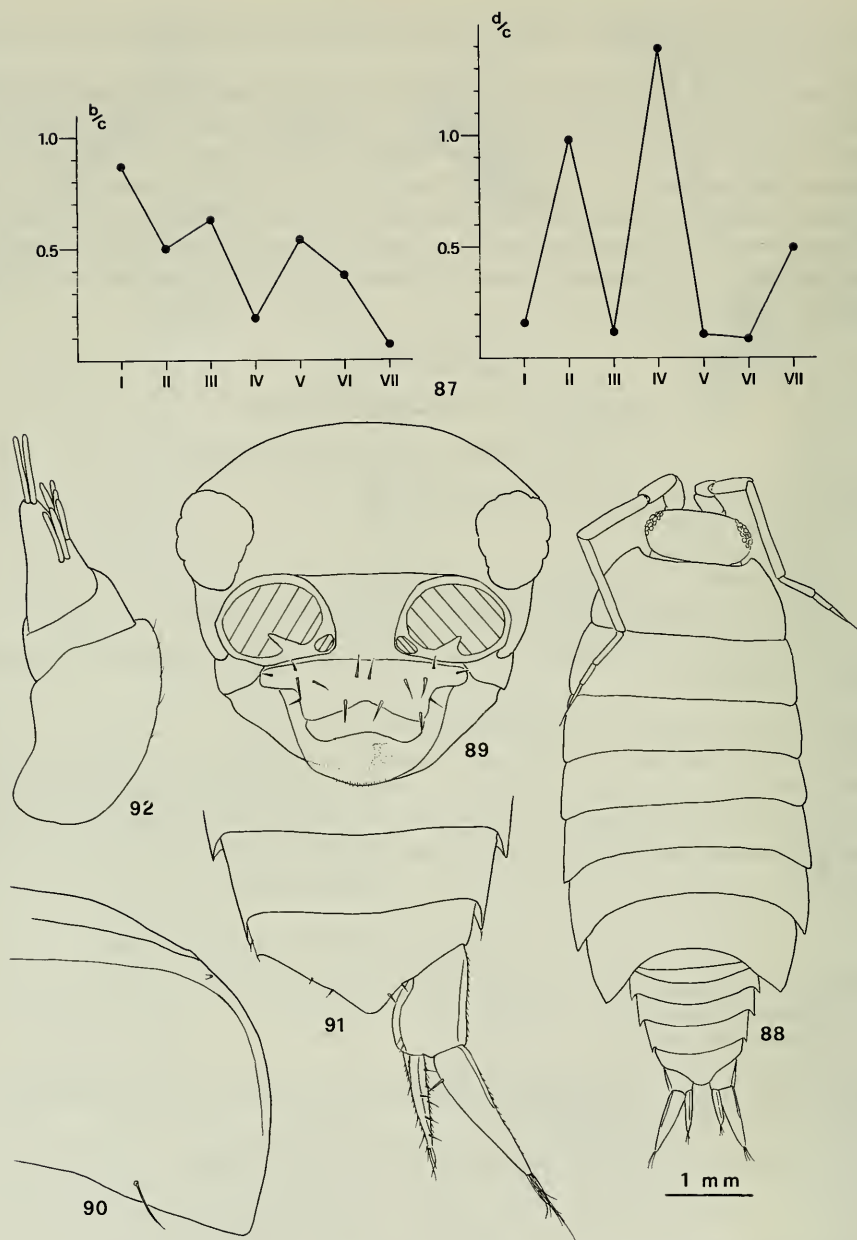
Holotype: ♂ 3.5 mm long, **China**, Sichuan, Loochou (= Luzhou), leg. SILVESTRI 17. V. 1924 (SMNS).

Paratypes: 1 ♀, same data as holotype (DEAP). – 1 ♀, same data (MZUF).

Description:

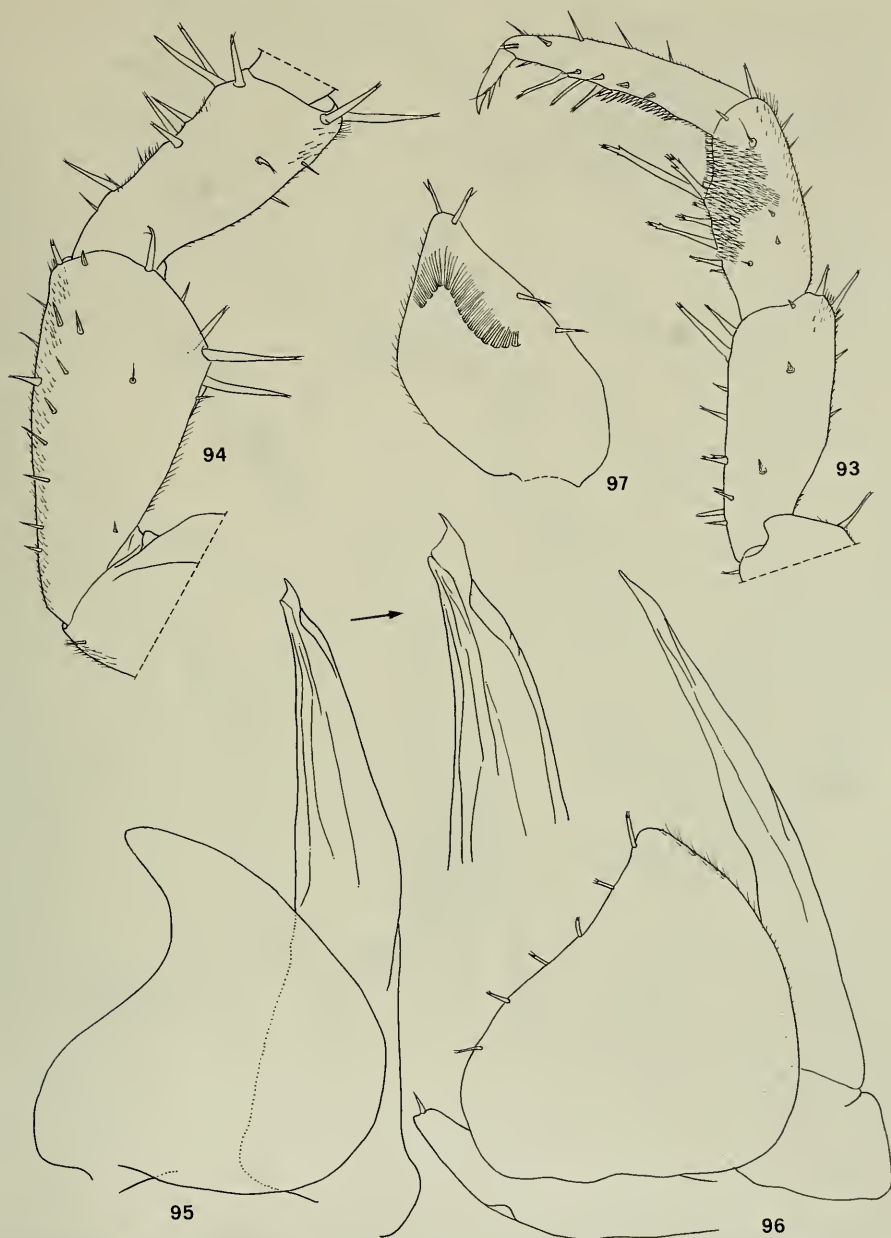
Maximum length of ♂ 3.5 mm, of ♀ 3.2 mm. Colour faded by long conservation. Dorsum granulated with numerous large scale-spines as in Fig. 98. Eye with three large ommatidia. Body outline as in Fig. 99. Cephalon with lateral lobes almost

¹⁾ The ascription of the genus *Exalloniscus* to the family Oniscidae is doubtful (SCHMALFUSS 1983).



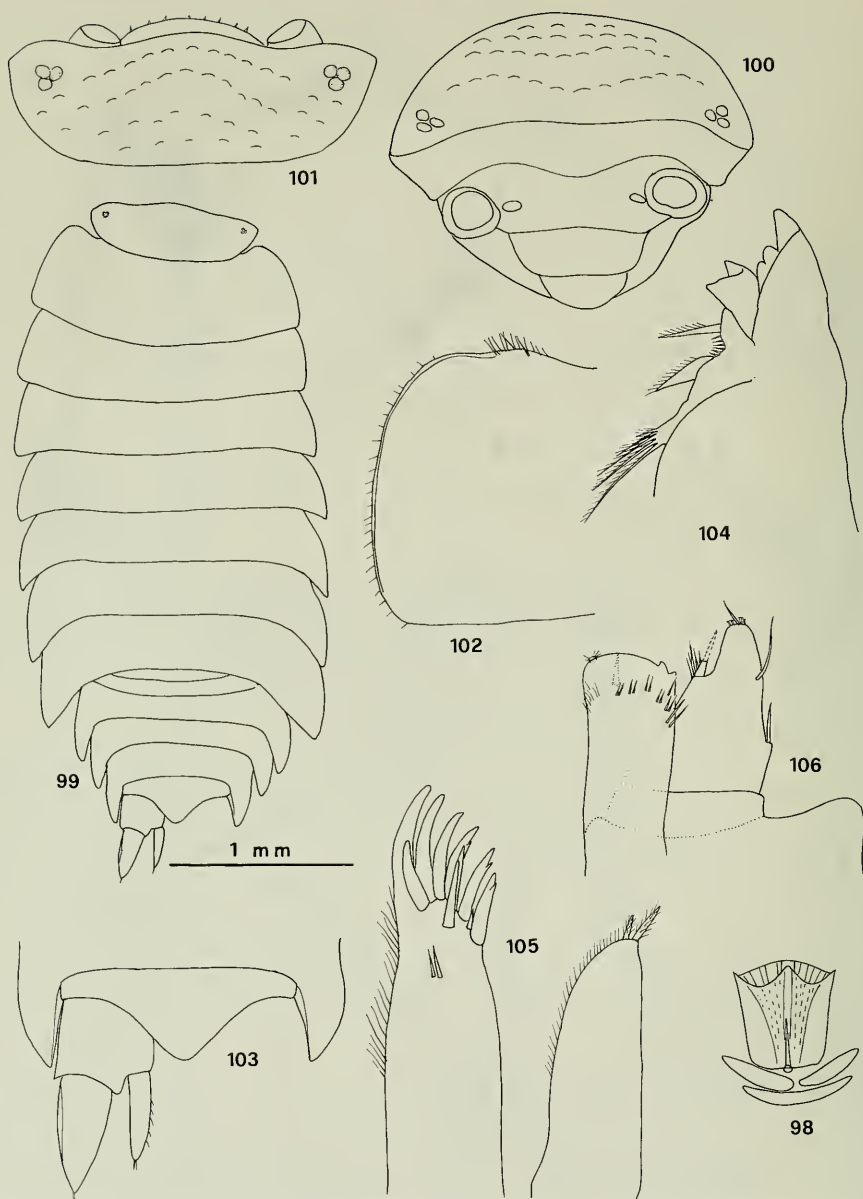
Figs. 87-92. *Burmoniscus lobatus* n. sp. - 87. Co-ordinates of noduli laterales; - 88. Paratype ♀ in dorsal view; - 89. Cephalon, frontal view; - 90. Right epimeron of pereonite 7; - 91. Pleonites 4-5, telson and right uropod; - 92. Antennule.

right-angled, slightly protruding outwards; frontal line almost straight, supra-antennal line bent down in the middle. Pereonites 1-2 with posterior margin straight and postero-lateral corners rounded. Pereonites 3-7 with corners progressively pointing further backwards. Pleonal epimera 3-5 falciform, directed backwards.



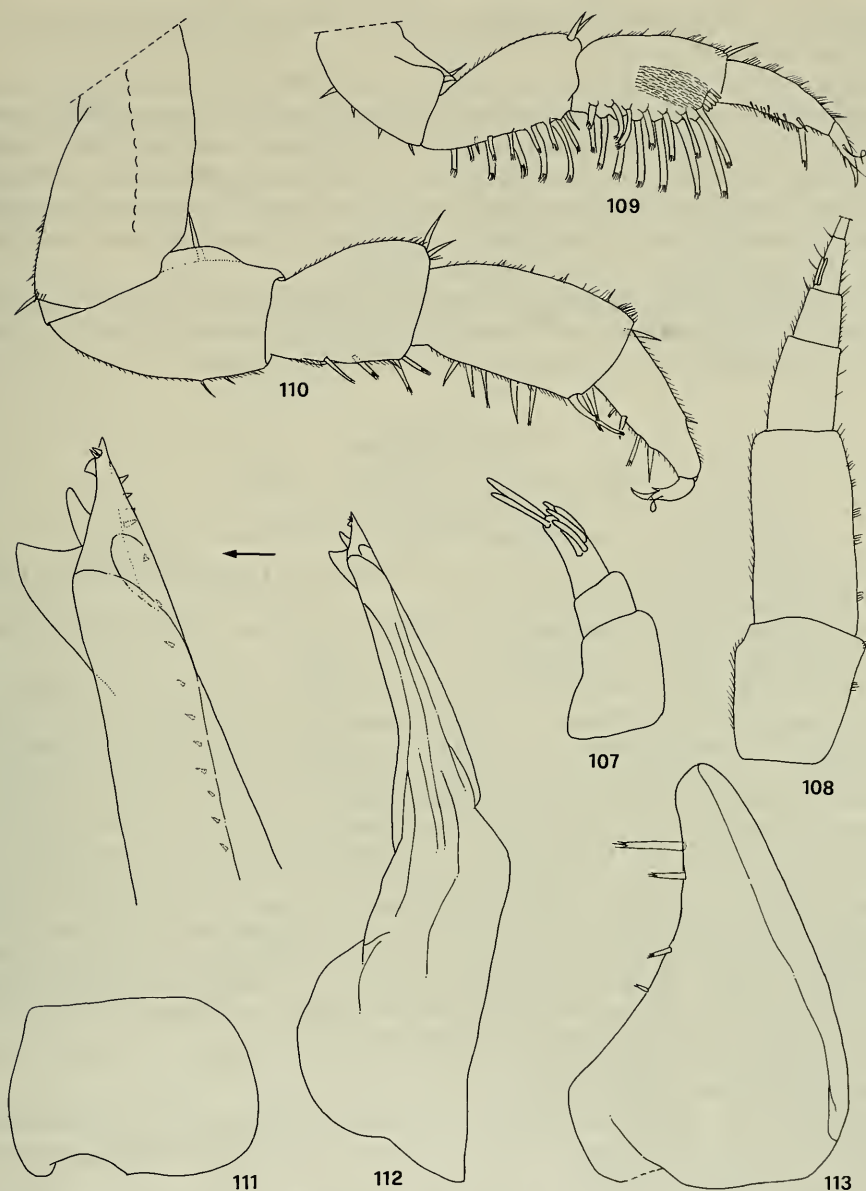
Figs. 93–97. *Burmoniscus lobatus* n. sp.; ♂. — 93. Pereopod 1; — 94. Pereopod 7; — 95. Pleopod 1; — 96. Pleopod 2; — 97. Pleopod 5 exopod.

Telson over twice as wide as long, with concave sides and rounded apex. Antennule with three articles; distal article with some superimposed aesthetascs in the middle and two at the apex. Antenna with fifth article of peduncle as long as flagellum; ratio of flagellar articles 5:3:3. Mandible with molar penicil consisting of some plumose setae, arising from a common stalk. Maxillular outer branch with 4 + 5 (3 cleft) long



Figs. 98–106. *Exalloniscus silvestrii* n. sp., – 98. Dorsal scale-spine; – 99. Holotype in dorsal view; – 100. Cephalon, frontal view; – 101. Cephalon, dorsal view; – 102. Left epimeron of pereonite 1; – 103. Pleonite 5, telson and left uropod; – 104. Mandible; – 105. Maxillule; – 106. Maxilliped.

+ 1 small teeth; inner branch with two thin plumose penicils at apex. Maxilliped with a minute penicil on endite. Pleopodal exopods without respiratory structures. Uropodal protopod surpassing tip of telson; exopod short and stout, slightly longer than protopod; endopod inserted slightly proximal to exopod. –



Figs. 107–113. *Exalloniscus silvestrii* n. sp.; ♂. — 107. Antennule; — 108. Antenna; — 109. Pereopod 1; — 110. Pereopod 7; — 111. Pleopod 1 exopod; — 112. Pleopod 1 endopod; — 113. Pleopod 2 exopod.

Male. Pereopods 1–2 with brushes of spines on carpus and merus. Pereopod 7 ischium with a large flat rounded lobe on rostral surface, clearly protruding compared with tergal margin. Pleopod 1 exopod almost quadrangular; endopod with apical part bearing three triangular lobes on outer margin, diminishing in size distally, apex pointed with two short spines. Pleopod 2 exopod as in Fig. 113 (endopods broken off).

Etymology: The species is named after the late Prof. FILIPPO SILVESTRI, Portici, who collected these specimens.

Remarks: The genus *Exalloniscus* includes with certainty 16 species found in the Oriental Region and in the Manchurian Subregion (TAITI & FERRARA 1988; MANICASTRI & TAITI 1991). *Exalloniscus silvestrii* n. sp. appears morphologically similar to *E. cortii* Arcangeli, 1927 from which it is readily distinguished by the male pereopod 7 ischium with larger rounded lobe, male pleopod 1 exopod quadrangular instead of triangular, and different shape of the apex of the male pleopod 1 endopod (compare Fig. 112 and in KWON 1993: Fig. 6D). —

Almost all the species of the genus *Exalloniscus* are found in association with ants or termites (TAITI & FERRARA 1988; FERRARA, MASCHWITZ, STEGHAUS KOVAC & TAITI 1988). No data are available on the ecology of the new species.

8. Trachelipidae

Genus *Nagurus* Holthuis, 1949

8.1. *Nagurus sundaicus* (Dollfus, 1898) (Figs. 114–122)

Porcellio (*Nagara*) *pallidipennis*: ARCANGELI 1927: 249 (in part: Canton, China; Taipò, Hong Kong; Repulse Bay, Hong Kong).

Nagara (*Nagara*) *verhoeffi*: ARCANGELI 1952: 303 (in part: Canton, China; Taipò, Hong Kong; Repulse Bay, Hong Kong).

Nagurus Verhoeffi: ARCANGELI 1963: 14 (in part: Canton, China; Taipò, Hong Kong).

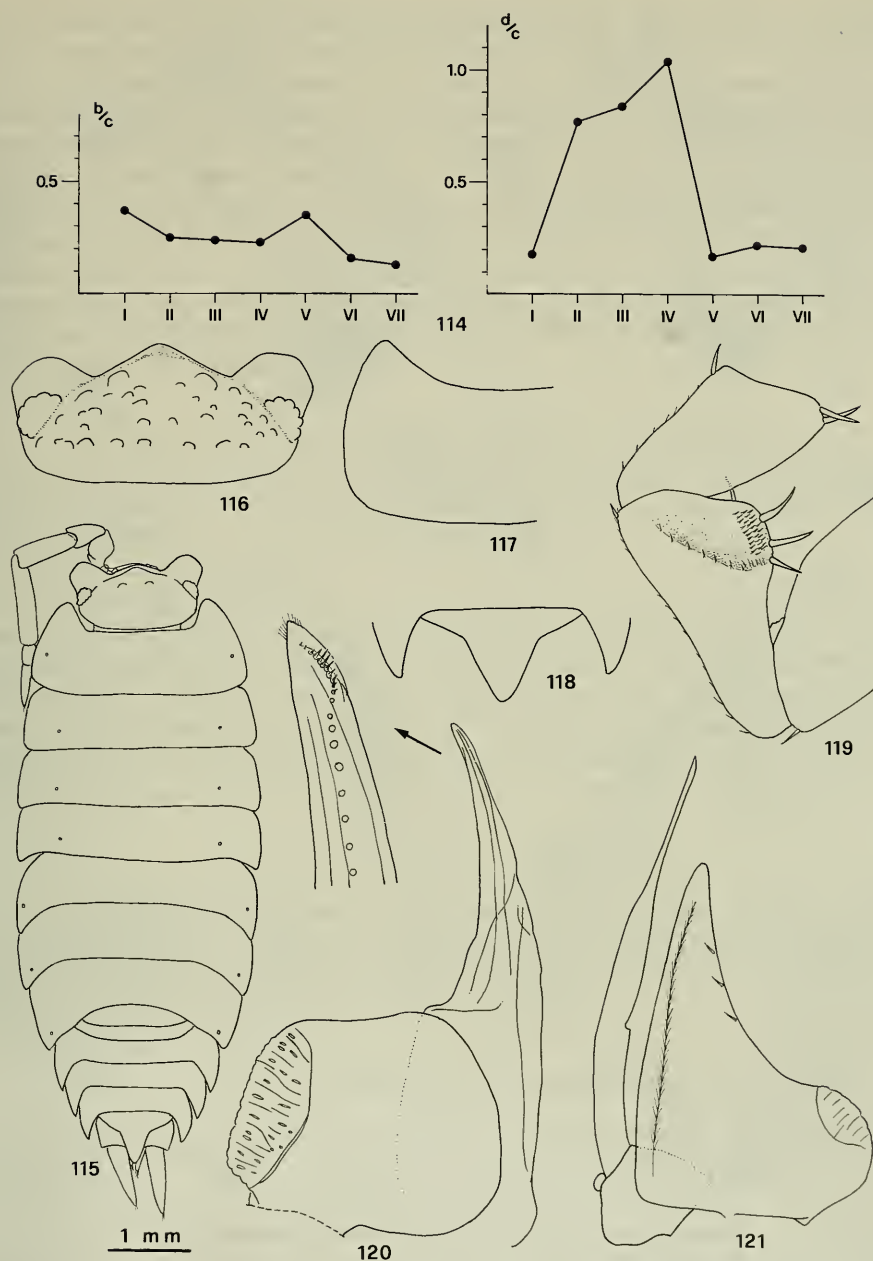
Specimens examined: China: 1 ♂, 1 ♀, Yunnan, Chishui County, Cave Yan Dong, leg. BERON 12. I. 1989 (NNHMS). — 1 ♂, 2 ♀♀, Guangdong, Canton, leg. SILVESTRI 1. V. 1925 (DEAP). — 1 ♂, 3 ♀♀, Guangdong, Canton, Yamon, leg. SILVESTRI 3. V. 1925 (DEAP) [specimens identified as *Porcellio* (*Nagara*) *pallidipennis* by ARCANGELI 1927 and as *Nagara* (*Nagara*) *verhoeffi* by ARCANGELI 1952]. — Hong Kong: 2 ♂♂, 4 ♀♀, University City, leg. OSELLA & COTTARELLI 26. I. 1981 (MZUF). — 1 ♀, Tai Po, 20 km from Tai Lou, leg. OSELLA 26. I. 1981 (MZUF). — 1 ♂, 1 ♀, Taipò [= Tai Po], leg. SILVESTRI 24. XII. 1924 (DEAP) [specimens identified as *Porcellio* (*Nagara*) *pallidipennis* by ARCANGELI 1927 and as *Nagara* (*Nagara*) *verhoeffi* by ARCANGELI 1952]. — 9 ♂♂, 10 ♀♀, Repulse Bay, leg. SILVESTRI 18. I. 1925 (DEAP) [specimens identified as *Porcellio* (*Nagara*) *pallidipennis* by ARCANGELI 1927 and *Nagara* (*Nagara*) *verhoeffi* by ARCANGELI 1952]. — 1 ♀, same locality, leg. SILVESTRI 31. I. 1925 (DEAP) [specimen identified as *Porcellio* (*Nagara*) *pallidipennis* by ARCANGELI 1927 and *Nagara* (*Nagara*) *verhoeffi* by ARCANGELI 1952].

Type specimens re-examined: Sumatra: lectotype ♂, paralectotypes 6 ♂♂, 7 ♀♀, Singkarak, leg. WEBER 1988/89 (ZMA).

Distribution: This species seems to be widely distributed in the Oriental and Australian regions. To date it has been recorded from China, Hong Kong, Indonesia (Sumatra) and Loyalty Islands.

Remarks: This species was originally described as *Porcellio sundaicus* by DOLLFUS (1898) from specimens collected in Sumatra, Java and Sulawesi. Re-examination of this material deposited in ZMA proved it includes three different species: i) the specimens from Sumatra, from which the lectotype is here designated, are considered to be *Nagurus sundaicus*; ii) the specimen from Sulawesi (1 ♂, Makassar) is *Nagurus nanus*; iii) the specimens from Java (2 ♂♂, 1 ♀, Buitenzorg) are very small, maybe juveniles (♂, 2.3 mm long; ♀, 3.0 mm long) and are certainly neither *N. sundaicus* nor *N. nanus*, but a safe identification is not possible.

The main characters of *N. sundaicus* are here illustrated from the lectotype and the new material. VANDEL (1973) stated that probably *N. sundaicus* is a senior synonym



Figs. 114–115. *Nagurus undaicus*; ♂ from Hong Kong. – 114. Co-ordinates of noduli laterales; – 115. Male specimen in dorsal view.

Figs. 116–121. *Nagurus undaicus*; lectotype from Sumatra. – 116. Cephalon; – 117. Left epimeron of pereonite 1; – 118. Pleonite 5 and telson; – 119. Pereopod 7; – 120. Pleopod 1; – 121. Pleopod 2.

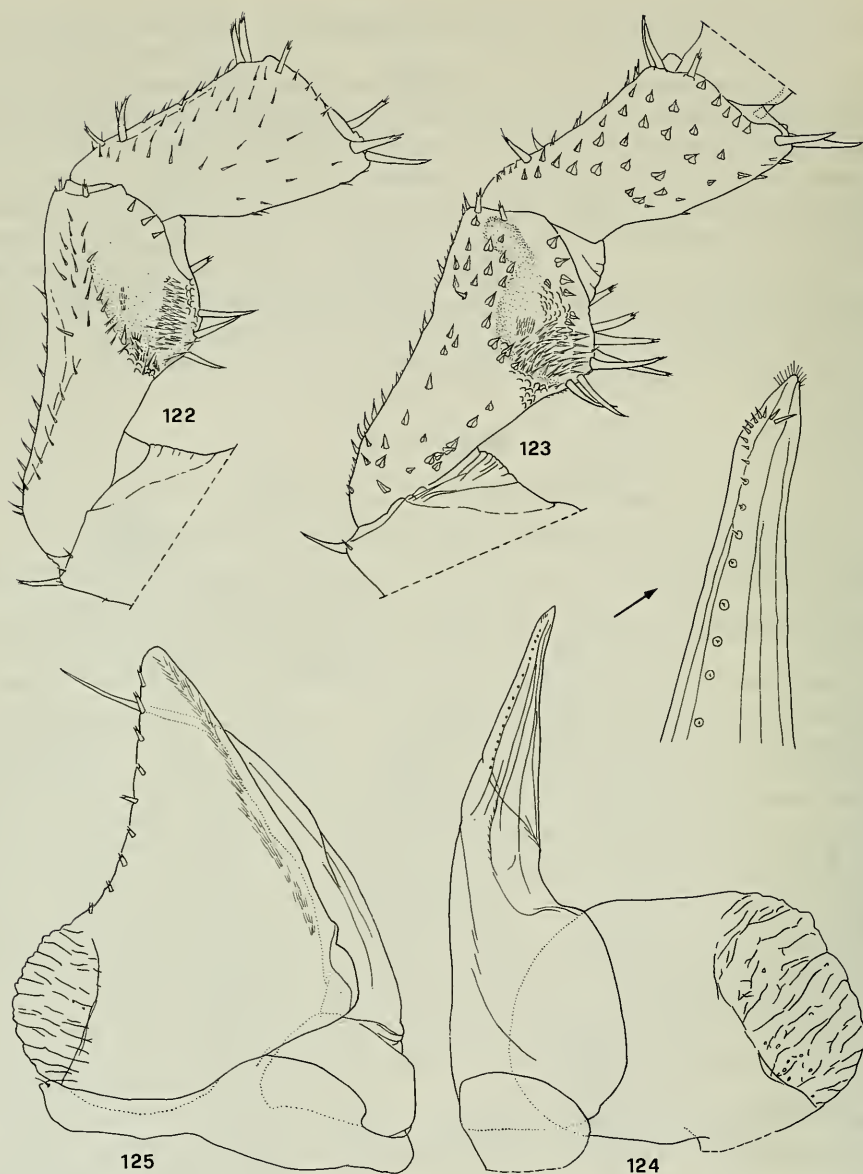


Fig. 122. *Nagurus sundaicus*; ♂ from Hong Kong; Pereopod 7.
 Figs. 123–125. *Nagurus nanus*; ♂ from Hainan Dao. — 123. Pereopod 7; — 124. Pleopod 1;
 — 125. Pleopod 2.

of *N. nanus*. In our opinion *N. sundaicus* is morphologically close to, but certainly distinct from *N. nanus*. The main difference is found in the male pereopod 7: in *N. sundaicus* the ischium is distally enlarged with 4–5 strong spines on rounded tergal margin and a large setose depression on the rostral surface, while in *N. nanus* it has 7–8 spines on the obtuse angled tergal margin and a reduced setose depression (compare Fig. 122 and Fig. 123). —

Re-examination of type specimens of *Nagara insularum* described by VERHOEFF (1926) from Loyalty Islands deposited in NHMB (2 ♂♂, 4 ♀♀, Ouvea, Fayaoué, 15. V. 1912) proved this species to be a junior synonym of *N. sundaicus*. —

Re-examination of the specimens first identified as *Porcellio (Nagara) pallidipennis* Dollfus, 1898 by ARCANGELI (1927) and then as *Nagara (Nagara) verhoeffi* by ARCANGELI (1952) from Indocina, Macao, Hong Kong, China (Canton) and Philippines (Luzon) showed that they belong to five different species: 1) *Nagurus modestus* (Dollfus, 1898) (Vinh, Annam, Indocina, 2 ♂♂, 3 ♀♀); 2) *Nagurus nanus* (Aguilar, Luzon, Philippines, 1 ♂, 10 ♀♀); 3) *Nagurus sundaicus* (Canton, China; Taipò and Repulse Bay, Hong Kong); 4) (?) *Nagurus verhoeffi* (Macao, see below); 5) *Exalloniscus papillosus* (Budde-Lund, 1912) (1 ♂ mixed with the specimens of *N. nanus* from Aguilar, Luzon).

8.2. *Nagurus nanus* (Budde-Lund, 1908) (Figs. 123–125)

Specimens examined: **China:** 1 ♂, 3 ♀♀, Hainan Dao, Haikou, sea shore, leg. BERON 15. X. 1988 (NNHMS). — 2 ♂♂, 2 ♀♀, Hainan Dao, Qingdao, 200–300 m, leg. BERON 14. X. 1988 (SMNS). — 3 ♂♂, 1 ♀, same data (MZUF).

Distribution: Pantropical.

Remarks: For diagnostic characters of this widespread species see FERRARA & TAITI (1983: Figs. 92–97), FERRARA & TAITI (1982: Fig. 12B) and Figs. 123–125. — NUNOMURA (1987; 1991) includes 21 species (18 new) from Japan in the genus *Nagurus*. As far as can be determined from the descriptions and figures, only two species belong to this genus: *N. miyakoensis* Nunomura, 1987 from Miyako Island, Okinawa Pref., and *N. lineatus* Nunomura, 1987 from Bonin Islands, which are most probably junior synonyms of *N. nanus* and *N. cristatus* respectively.

8.3. *Nagurus cristatus* (Dollfus, 1889)

Specimens examined: **China:** 2 ♀♀, Hainan Dao, Qingdao, 200–300 m, leg. BERON 14. X. 1988 (NNHMS). — **Hong Kong:** 3 ♀♀, forest of „Hill above Belcher's“, leg. MA II. – V. 1985 (MZUF). — 6 ♀♀, Mai Po Marshes, leg. LEE XI. 1985 (MZUF). — 4 ♀♀, University City, leg. OSELLA & COTTARELLI 26. I. 1981 (MZUF).

Distribution: Pantropical.

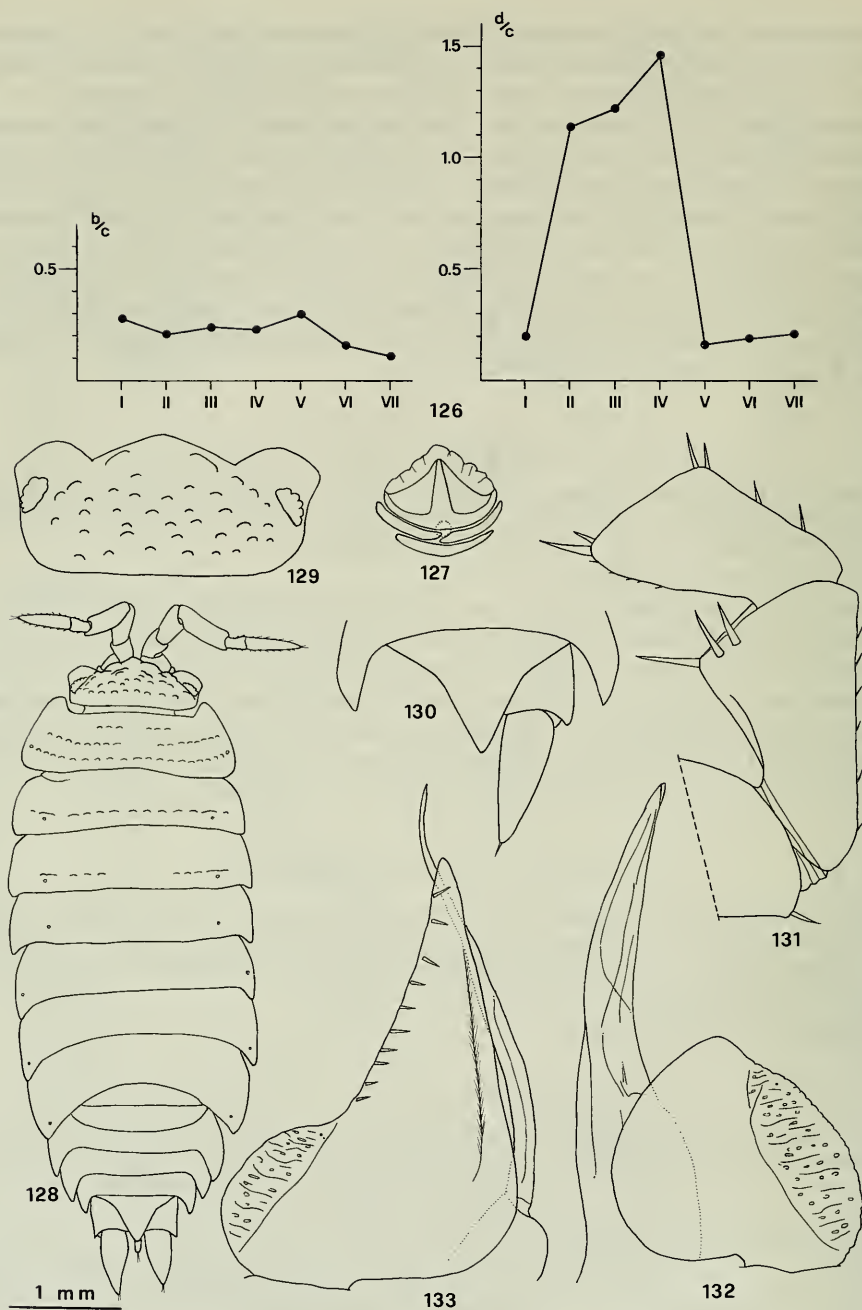
8.4. *Nagurus pallidipennis* (Dollfus, 1898) (Figs. 126–133)

Specimens examined: **China:** 1 ♂, 8 ♀♀, 1 ♂ juv., Hainan Dao, Haikou, sea shore, leg. BERON 15. X. 1988 (NNHMS). — 1 ♂, 5 ♀♀, same data (SMNS). — 2 ♂♂, 5 ♀♀, same data (MZUF). — 1 ♂, Hainan Dao, Sanya, leg. BERON 12. X. 1988 (NNHMS).

Type specimens re-examined: **Flores:** Lectotype ♂, paralectotypes 2 ♂♂, 3 ♀♀, Maumerie, leg. WEBER 1889 (ZMA).

Distribution: *Nagurus pallidipennis* has a wide distribution in the Oriental Region. At present it is known from India, Sri Lanka, Indonesia (Flores) and China (Hainan Dao).

Remarks: This species was described as *Porcellio pallidipennis* by DOLLFUS (1898: 372, Figs. 18a, b, pl. XIV, Fig. 18) from specimens collected at Maumerie, Flores. From its description and figures it was impossible to recognize this species and, even if widespread in the Oriental Region, it has never been recorded again with certainty. ARCANGELI (1927) cited *Porcellio (Nagara) pallidipennis* from Vietnam,



Figs. 126–128. *Nagurus pallidipennis*; ♂ from Hainan Dao. — 126. Co-ordinates of noduli laterales; — 127. Dorsal scale-spine; — 128. Adult specimen in dorsal view.

Figs. 129–133. *Nagurus pallidipennis*; lectotype from Flores. — 129. Cephalon; — 130. Pleonite 5, telson and right uropod; — 131. Pereopod 7; — 132. Pleopod 1; — 133. Pleopod 2.

China, Hong Kong and the Philippines, but he subsequently (ARCANGELI 1952) recognised these specimens as belonging to the new species *Nagara (Nagara) verhoeffi* (see below). Re-examination of the type specimens of *Porcellio pallidipennis* proved the species to be valid and to belong to the genus *Nagurus*. The main diagnostic characters of *N. pallidipennis* are here illustrated from both the type specimens and the new material. —

Comparison with specimens of *Nagurus travancorius* (Verhoeff, 1936) from Sri Lanka studied by FERRARA & ARGANO (1989) showed this species to be a junior synonym of *N. pallidipennis*.

8.5. (?) *Nagurus verhoeffi* Arcangeli, 1952 (Figs. 134–147)

Porcellio (Nagara) pallidipennis: ARCANGELI 1927: 249 (in part: Macao).

Nagara (Nagara) Verhoeffi: ARCANGELI 1952: 303 (in part: Macao).

Nagurus Verhoeffi: ARCANGELI 1963: 14 (in part: Macao).

Specimens examined: **Hong Kong**: 14 ♂♂, 6 ♀♀, forest of „Hill above Belcher’s“, leg. MA II.—V. 1985 (MZUF). — 5 ♂♂, 5 ♀♀, same data (SMNS). — 2 ♂♂, 4 ♀♀, University City, leg. OSELLA & COTTARELLI 12. I. 1981 (MZUF). — 2 ♀♀, Tai Po, 20 km from Tai Lou, leg. OSELLA 26. I. 1981 (MZUF).

Type specimens re-examined: **Macao**: 1 ♂ lectotype, 1 ♂, 2 ♀♀ paralectotypes, leg. SILVESTRI 17. VIII. 1924 (DEAP).

Distribution: Hong Kong and Macao.

Remarks: *Nagurus verhoeffi* was described by ARCANGELI (1952) for the specimens from Indochina, Macao, Hong Kong, China and Philippines which he (ARCANGELI 1927) had previously identified as *Porcellio (Nagara) pallidipennis*. ARCANGELI (1952) did not choose a specimen as holotype and, as stated above (see remarks under *N. sundaicus*), re-examination of the syntypes showed that he confused five different species under the same name, four of which were already known (*Nagurus nanus*, *N. sundaicus*, *N. modestus*, and *Exalloniscus papillosus*). The specimens from Macao (2 ♂♂, 2 ♀♀) belong to a separate species which we consider to be *verhoeffi* (lectotype and paralectotypes here designated). This species is here tentatively included in the genus *Nagurus* since it possesses all the characters of the genus with the exception of respiratory areas on pleopodal exopods. This character, very clear in all the species of *Nagurus*, is present only on the first exopod and is very reduced (Fig. 145). The main characters of (?) *N. verhoeffi* are shown in Figs. 134–147 from specimens from Hong Kong. The species is characterized by its small size (♂ 3.8 mm long; ♀ 4.5 mm long), slightly granulated dorsal surface of the cephalon and anterior pereonites, eye with about 11 ommatidia, cephalon with quadrangular lateral lobes and median lobe dorsally with a slight impression, triangular telson with regularly concave sides, short uropodal protopod, male pleopod 1 exopod ovoidal, and male pleopod 2 endopod styliform, much longer than exopod.

Species inquirenda

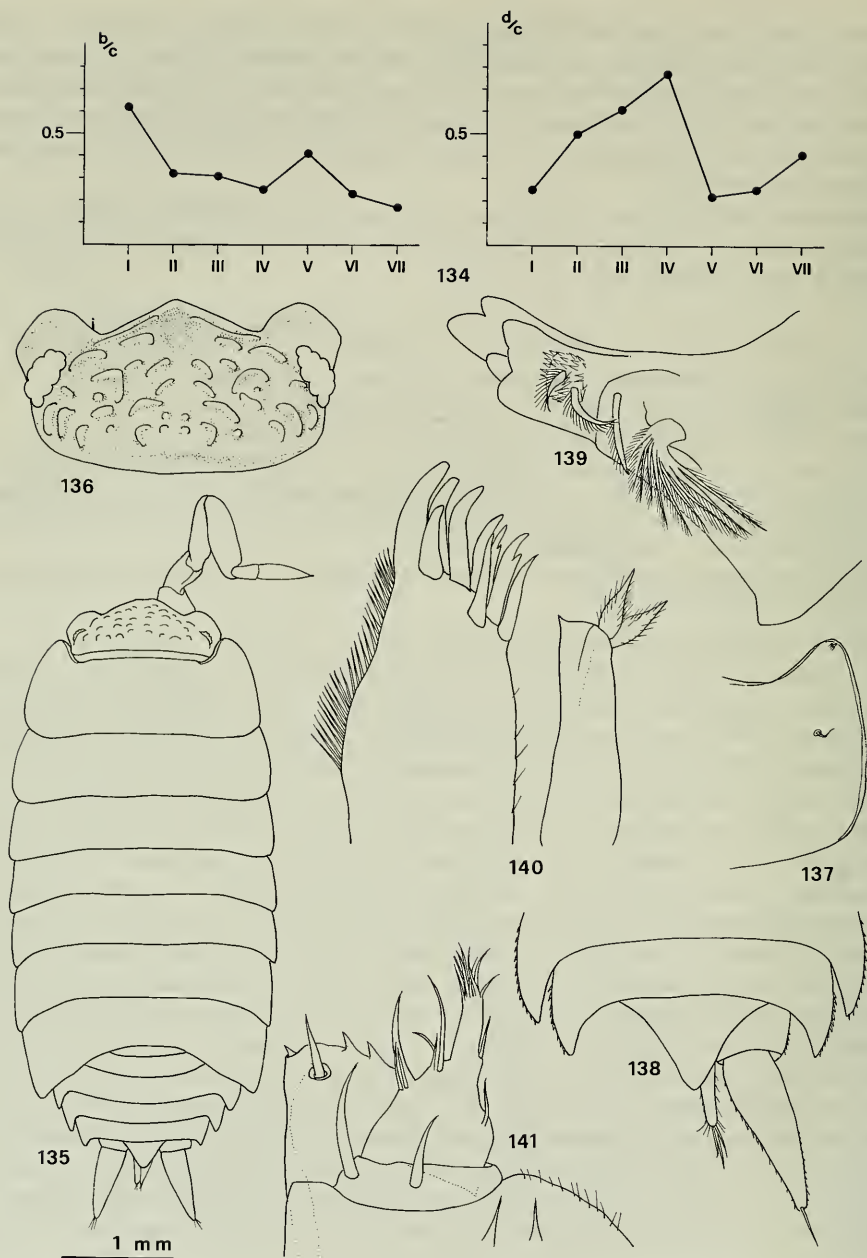
8.6. „*Nagurus*“ *vandeli* (Arcangeli, 1927)

Porcellio (Nagara) Vandeli: ARCANGELI 1927: 246, Fig. XIV.

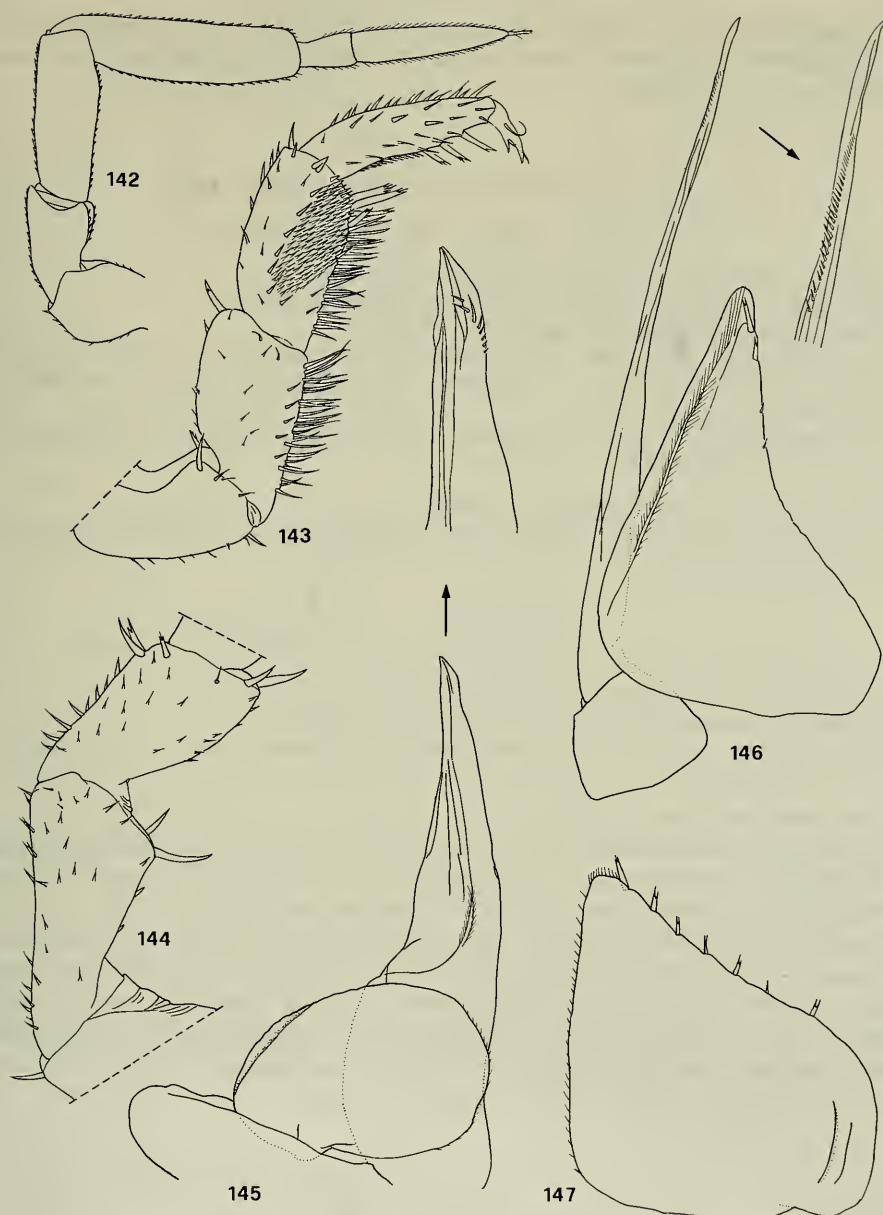
Nagara (Nagara) Vandeli: ARCANGELI 1952: 302.

Nagurus Vandeli: ARCANGELI 1963: 13.

Type specimens re-examined: **China**: syntypes 1 mutilated ♂, 1 ♀, Shanghai, leg. SILVESTRI 16. V. 1925 (DEAP).



Figs. 134-141. (?)*Nagurus verhoeffi*. - 134. Co-ordinates of noduli laterales; - 135. Adult male in dorsal view; - 136. Cephalon; - 137. Right epimeron of pereonite 1; - 138. Pleonites 4-5, telson and right uropod; - 139. Mandible; - 140. Maxillule; - 141. Maxilliped.



Figs. 142–147. (?)*Nagurus verhoeffi*; ♂ – 142. Antenna; – 143. Pereopod 1; – 144. Pereopod 7; – 145. Pleopod 1; – 146. Pleopod 2; – 147. Pleopod 3 exopod.

Distribution: Known only from the type locality: Shanghai, China.

Remarks: The type material re-examined is in very poor condition, in particular the male specimen is lacking pereonites 2–3, all pereopods and pleopods. Certainly this species does not belong to the genus *Nagurus* since it has one line of noduli laterales all at the same distance from lateral margin of the pereonites and *Protracheonis*-

cus-type pleopodal lungs (visible in the female specimen). Due to the poor condition of the specimens, this species cannot be properly ascribed to a definite genus until further material is examined.

Genus *Lucasioides* Kwon, 1993 [Arcangeli, 1952]

8.7. *Lucasioides gigliotosi* (Arcangeli, 1927)

Porcellio (*Lucasius*) *Giglio-Tosi*: ARCANGELI 1927: 234, Fig. IX.

Protracheoniscus (*Lucasioides*) *Giglio-Tosi*: ARCANGELI 1952: 299.

Lucasioides gigliotosi: KWON 1993: 143, Figs. 7–8.

Specimens examined: **China**: 3 ♀♀, Yunnan, Shilin, Stone Forest, Zi Yun Dong Cave, leg. BERON 1. X. 1988 (NNHMS). – 3 ♀♀, same locality and collector 30. IX. 1988 (SMNS). – 3 ♀♀, same data (MZUF).

Type specimens re-examined: **China**: 2 ♂♂, 2 ♀♀, paralectotypes, Shanghai, leg. SILVESTRI 19. V. 1925 (DEAP).

Distribution: China, Korea and Japan.

Remarks: For comments on the genus *Lucasioides* and redescription of *L. gigliotosi* see KWON (1993).

8.8. *Lucasioides zavattarii* (Arcangeli, 1927) (Figs. 148–157)

Porcellio (*Lucasius*) *Zavattarii*: ARCANGELI 1927: 240, Fig. XII.

Protracheoniscus (*Lucasioides*) *Zavattarii*: ARCANGELI 1952: 299.

Type specimen re-examined: **Hong Kong**: 1 ♂ holotype, Taipò (= Tai Po), leg. SILVESTRI I. 1925 (DEAP).

Distribution: Hong Kong.

Remarks: Re-examination of the holotype of *Lucasioides zavattarii* permitted full illustration of this species. For the shape of the male pleopod 1 exopod (missing in the holotype examined) see Fig. XII, 3 in ARCANGELI (1927). –

This species is morphologically close to *Lucasioides taitii* Kwon, 1993 from Korea in the cephalon with median lobe triangular, clearly protruding above vertex, and quadrangular lateral lobes; epimeron of pereonite 1 with posterior margin nearly straight, male pleopod 1 exopod with a bilobed apex, and endopod with apical part pointed and bent outwards; it differs by the cephalon with less developed median lobe, and elongated uropodal exopod, about three times as long as protopod.

8.9. *Lucasioides isseli* (Arcangeli, 1927) (Figs. 158–170)

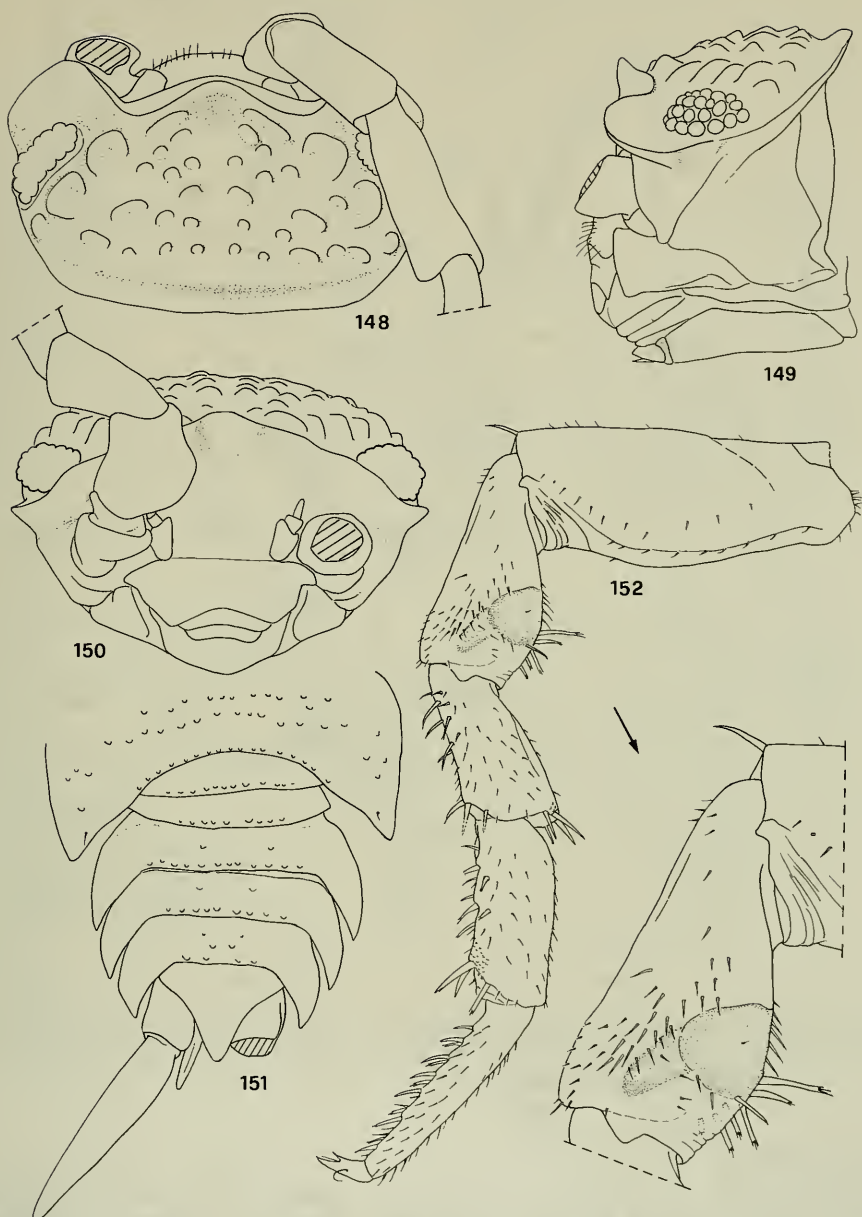
Porcellio (*Lucasius*) *Isseli*: ARCANGELI 1927: 232, Fig. VIII.

Protracheoniscus (*Lucasioides*) *Isseli*: ARCANGELI 1952: 298.

Type specimens re-examined: **China**: 1 ♂ lectotype, 2 ♂♂, 2 ♀♀ paralectotypes, Tschangsha (= Changsha), Yolushan, leg. SILVESTRI 24. X. 1925 (DEAP).

Distribution: Known only from the type locality.

Remarks: This species is close to *L. gigliotosi* in the general shape and morphology of male pleopod 1 endopod; it is distinguished by the less developed median lobe of cephalon, narrower distal part of telson, male pleopod 1 exopod bilobed with outer lobe longer than inner one. The main characters of the species are here illustrated from the type specimens.

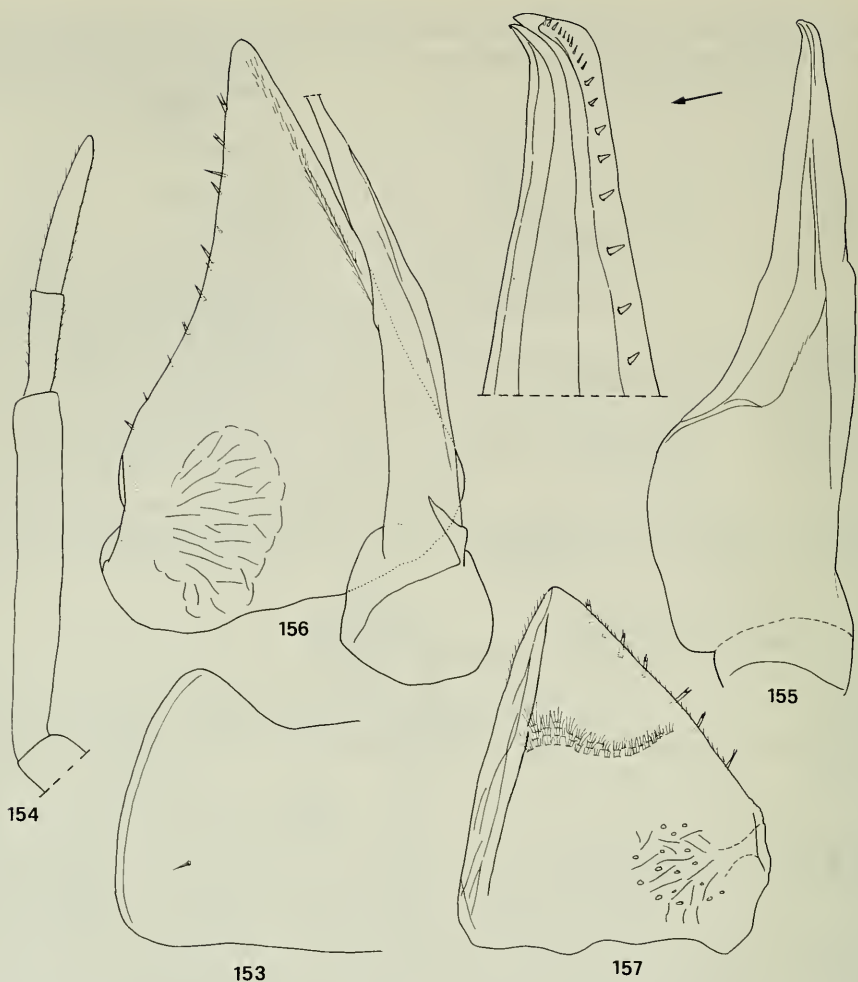


Figs. 148–152. *Lucasioides zavattarii*; holotype. – 148. Cephalon, dorsal view; – 149. Cephalon, lateral view; – 150. Cephalon, frontal view; – 151. Pereonite 7, pleon, telson and left uropod; – 152. Pereopod 7.

8.10. *Lucasioides pedimaculatus* n. sp. (Figs. 171–187)

Holotype: ♂ 5.3 mm long, **China**, Yunnan, Kunming, Xishan Park, Longmen (Dragon Gate), 2200–2280 m, leg. BERON 29. XII. 1988 (SMNS).

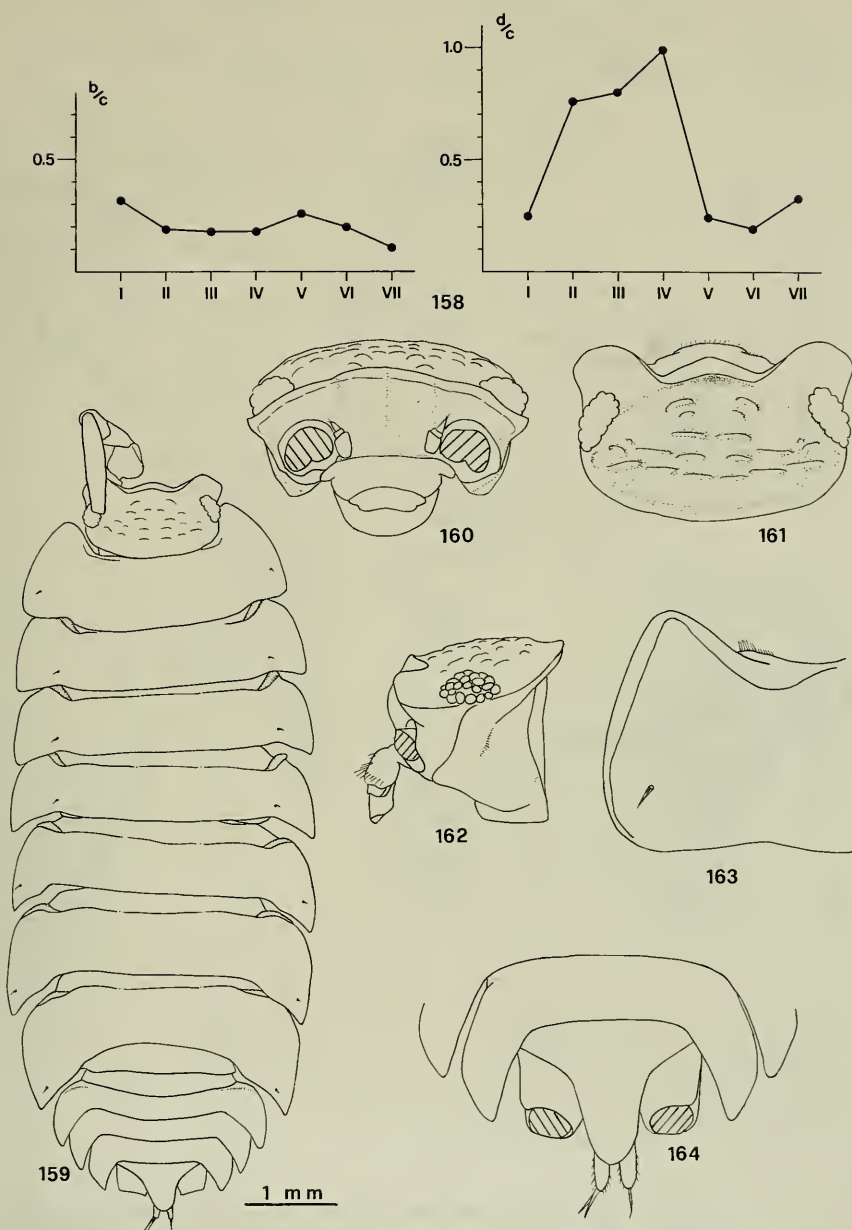
Paratypes: 9 ♂♂, 10 ♀♀, 9 juvs., same data as holotype (NNHMS). – 5 ♂♂, 5 ♀♀, same data (SMNS). – 5 ♂♂, 5 ♀♀, same data (MZUF). – 3 ♀♀, **China**, Yunnan, Kunming, Xishan, Dragon Gate, 2000–2400 m, leg. BERON 26. XII. 1988 (NNHMS).



Figs. 153–157. *Lucasioides zavattarii*; holotype. — 153. Left epimeron of pereonite 1; — 154. Antenna; — 155. Pleopod 1 endopod; — 156. Pleopod 2; — 157. Pleopod 5 exopod.

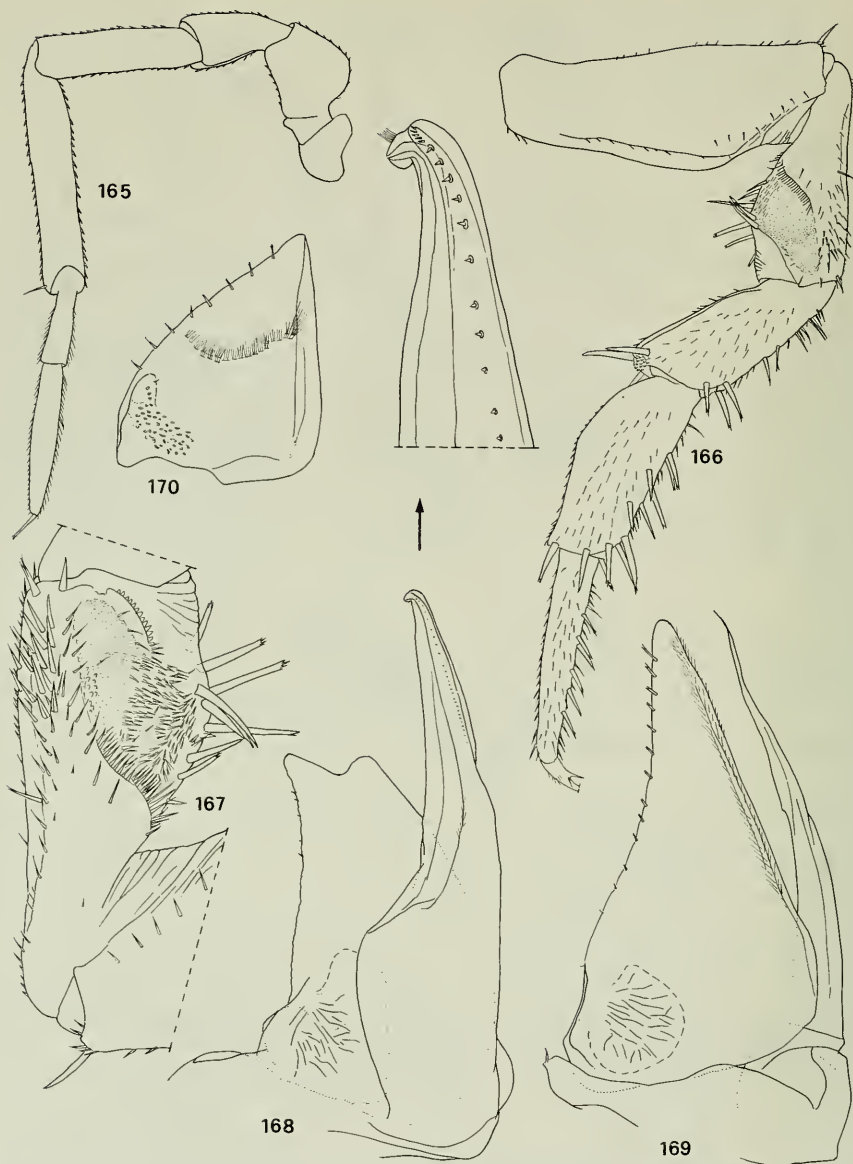
Description:

Maximum length of ♂ 6.0 mm, of ♀ 8.5 mm. Brown colour with the usual pale muscle spots; a pale spot at the base of pereonal epimera; a median light stripe on pereon and pleon; basis of pereopods with dark spot. Dorsum distinctly granulated. No gland pores. Noduli laterales on pereonites 2–4 and 7 much farther from lateral margins than those on pereonites 1, 5 and 6. Eye with 18–19 ommatidia. Cephalon with well-developed triangular median lobe, dorsally concave, and slightly protruding upwards in the middle; lateral lobes rounded. Pereonite 1 with postero-lateral corners rounded; posterior margin of epimeron almost straight. Telson triangular with slightly concave sides. Antennal flagellum with distal article 2.5 times as long as proximal one. Mandible with molar penicil consisting of numerous plumose setae; right mandible with 1 + 2 and left with 2 + 2 penicils. Maxillular outer branch with 4



Figs. 158–164. *Lucasioides isseli*; paralectotype. – 158. Co-ordinates of noduli laterales; – 159. Adult male in dorsal view; – 160. Cephalon, frontal view; – 161. Cephalon, dorsal view; – 162. Cephalon, lateral view; – 163. Left epimeron of pereonite 1; – 164. Pleonites 4–5, telson and uropods.

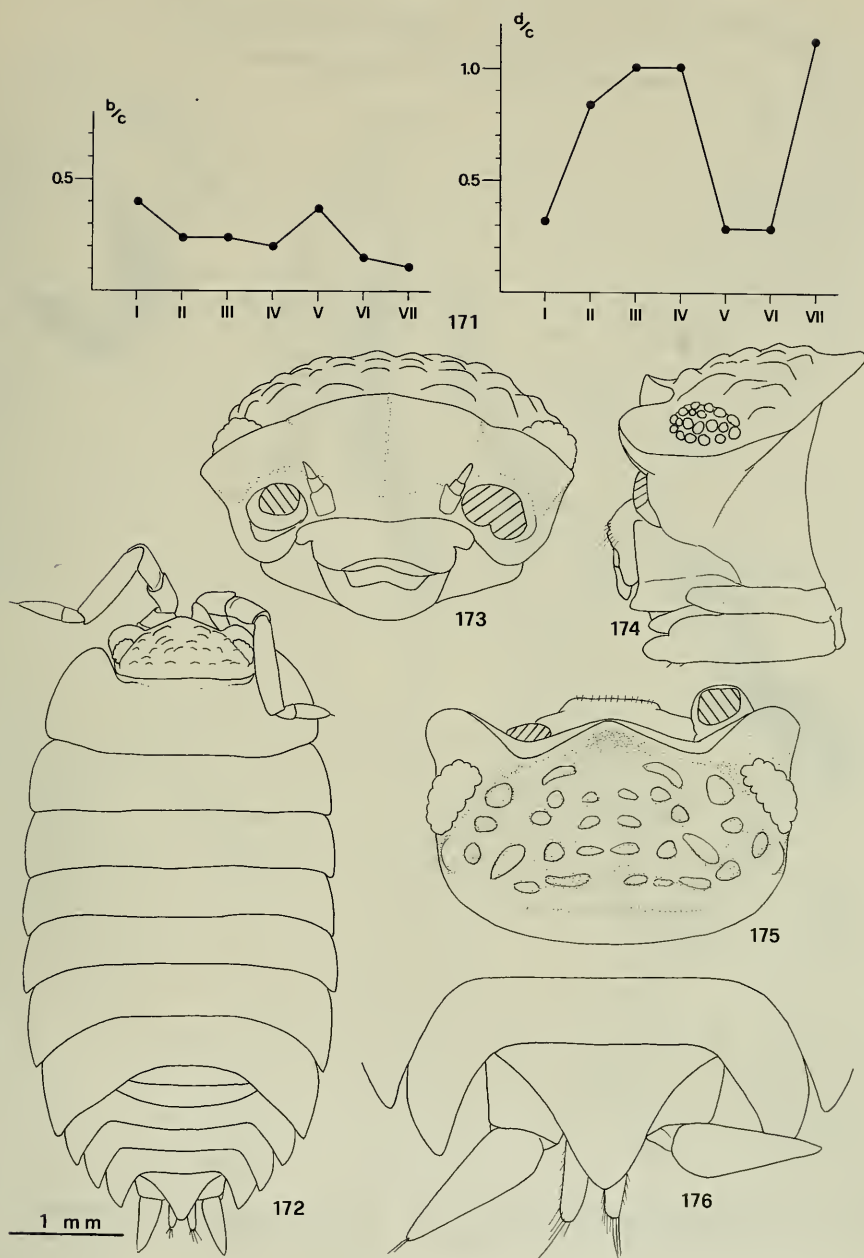
+ 6 teeth plus a minute accessory one, a strong spine on dorsal surface; inner branch with two large penicils and an acute posterior point. Maxilliped as in Fig. 181. All pleopodal exopods with *Protracheoniscus*-type lungs. Uropod with short exopod, about 1.5 times as long as protopod. –



Figs. 165–170. *Lucasioides isseli*; paralectotype ♂. — 165. Antenna; — 166. Pereopod 7; — 167. Pereopod 7 ischium; — 168. Pleopod 1; — 169. Pleopod 2; — 170. Pleopod 5 exopod.

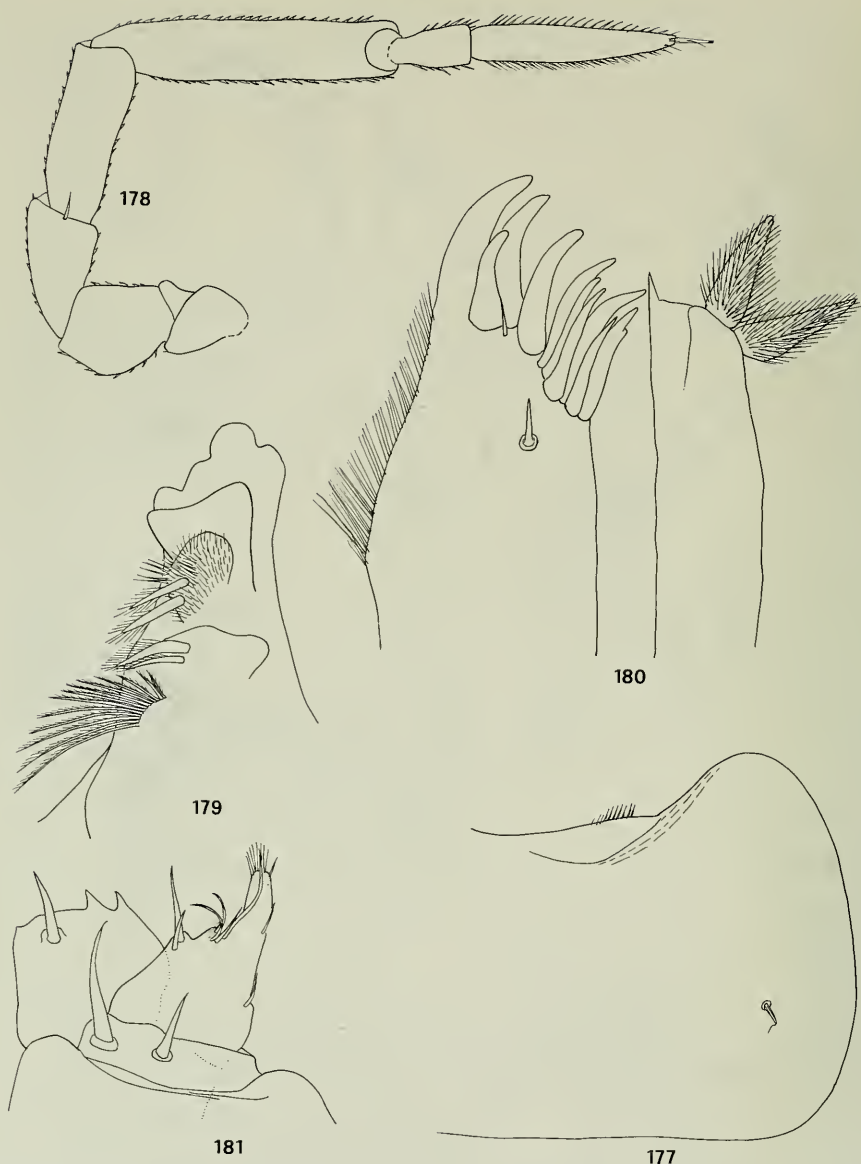
Male. Pereopods 1–4 with a brush of long bifurcated spines on carpus and merus. Pereopod 7 carpus not enlarged; ischium with depression on rostral surface, covered with small scales and some setae. Pleopod 1 exopod ovoidal, with outer margin slightly excavated near apex; endopod with rounded tip bent outwards. Pleopod 2 endopod styliform, slightly longer than exopod. Pleopod 5 exopod as in Fig. 187.

Etymology: Latin *pes* = foot + *maculatus* = spotted. The name refers to the dark spot on the pereopod basis.



Figs. 171-176. *Lucasioides pedimaculatus* n. sp. - 171. Co-ordinates of noduli laterales; - 172. Holotype in dorsal view; - 173. Cephalon, frontal view; - 174. Cephalon, lateral view; - 175. Cephalon, dorsal view; - 176. Pleonites 4-5, telson and uropods.

Remarks: This species is included in the genus *Lucasioides* because it fits all the generic characters of the genus. A small difference from all the other species in the genus is found in the d/c co-ordinates of nodulus lateralis on pereonite 7 which is

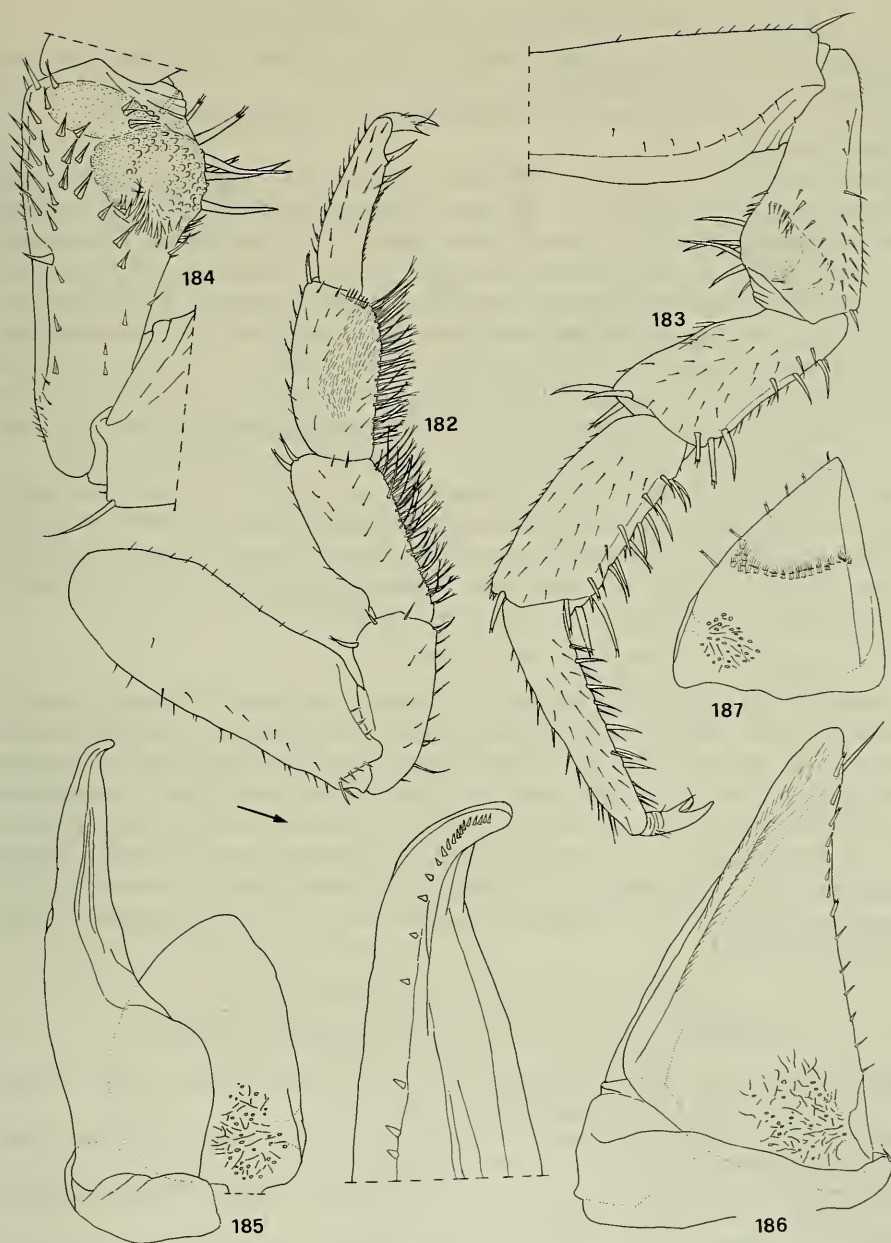


Figs. 177–181. *Lucasioides pedimaculatus*, n. sp. — 177. Right epimeron of pereonite 1; — 178. Antenna; — 179. Mandible; — 180. Maxillule; — 181. Maxilliped.

distant from the lateral margin of the segment. The real taxonomic value of this character is not known. —

Lucasioides pedimaculatus n. sp. is close to *L. zavattarii* and *L. taitii* in the colour pattern and the morphology of pereonite 1; it differs from both by having rounded (vs. quadrangular) lateral lobes of cephalon, much shorter uropodal exopods, and male pleopod 1 exopod without a clearly bilobed apex. —

This species is readily distinguished from *L. gigliotosi*, *L. isseli* and *L. mazzarellii*



Figs. 182–187. *Lucasioides pedimaculatus* n. sp.; paratype ♂. — 182. Pereopod 1; — 183. Pereopod 7; — 184. Pereopod 7 ischium; — 185. Pleopod 1; — 186. Pleopod 2; — 187. Pleopod 5 exopod.

(Arcangeli, 1927) by the posterior margin of pereonite 1 straight instead of concave at sides.

8.11. (?) *Lucasioides cavernicolus* n. sp. (Figs. 188–200)

Holotype: ♂ 8.7 mm long, China, Yunnan, Chishui County, Yan Zi Dong (Swallow Cave), leg. BERON 10. I. 1989 (SMNS).

Paratypes: 1 ♂, same data as holotype (NNHMS). – 1 ♀, same data (MZUF).

Description:

Maximum length of ♂ 8.7 mm, of ♀ 9.5 mm. Light brown colour with the usual yellowish muscle spots, a pale spot at the base of pereonal epimera and a light median stripe on pereon and pleon. Dorsum almost smooth. No gland pores. Noduli laterales with b/c and d/c co-ordinates as in Fig. 188. Eye with about 20 ommatidia. Cephalon with obtusely triangular median lobe, slightly depressed dorsally and not protruding above vertex; rounded lateral lobes. Pereonite 1 with postero-lateral corners right-angled; posterior margin slightly concave at sides. Telson triangular with acute apex and regularly concave sides. Antenna slender; ratio of flagellar articles 3:5. Buccal pieces as in *L. pedimaculatus*. All pleopodal exopods with *Protracheoniscus*-type lungs. Uropods with exopod short, about twice as long as protopod. – Male. Pereopods 1–4 with a brush of long bifurcated spines on carpus and merus. Pereopod 7 carpus slightly expanded on tergal margin; ischium without any special modifications. Pleopod 1 exopod elongated with truncate apex; endopod with folded up distal part; apex with an acute point. Pleopod 2 endopod styliform, slightly longer than exopod. Pleopod 5 exopod as in Fig. 200.

Etymology: Latin *cavernicolus* = cave dwelling.

Remarks: This species is tentatively included in the genus *Lucasioides* since it differs from all the other species in having different co-ordinates of noduli laterales (compare Fig. 188 and Figs. 158, 171) and cephalon with median lobe short and not protruding over vertex. It might belong to a distinct genus but, for the time being, we prefer not to create a new one until a comparative revision of closely related genera (*Agnara* Budde-Lund, 1908, *Protracheoniscus* Verhoeff, 1917, *Paraleptotrichus* Arcangeli, 1927, *Desertoniscus* Verhoeff, 1930, *Mongoloniscus* Verhoeff, 1930, *Koreoniscus* Verhoeff, 1937, *Tadzhikoniscus* Borutzky, 1976 and *Lucasioides* Kwon, 1993) is performed.

Genus *Mongoloniscus* Verhoeff, 19308.12. *Mongoloniscus nipponicus* (Arcangeli, 1952)

Porcellio (*Nagara*) *Van Namei*: ARCANGELI 1927: 243 (in part: Changsha, China; Fusan, Korea; Mountain Maya, Japan; Kioto, Japan).

Nagara (*Nagara*) *Van Namei*: ARCANGELI 1952: 302 (in part: Changsha, China; Fusan, Korea; Mountain Maya, Japan; Kioto, Japan).

Nagurus *Van Namei*: ARCANGELI 1963: 12 (in part: Changsha, China; Fusan, Korea; Mountain Maya, Japan; Kioto, Japan).

Mongoloniscus nipponicus: KWON, 1993: 150, Figs. 14–15.

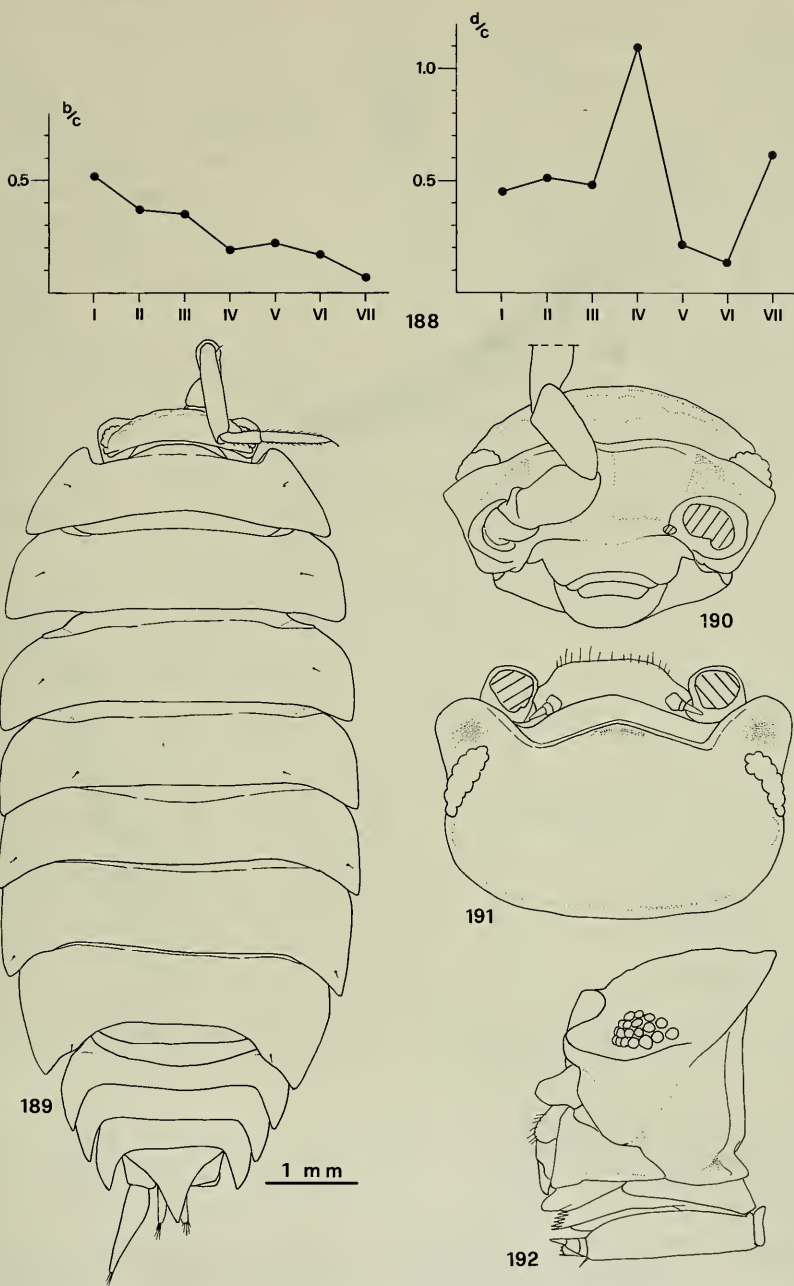
Specimen examined: China: 1 ♀, Hunan, Changsha, leg. SILVESTRI 20. X. 1925 (DEAP) [specimen identified as *Porcellio* (*Nagara*) *Van Namei* by ARCANGELI 1927].

Distribution: China, Korea and Japan.

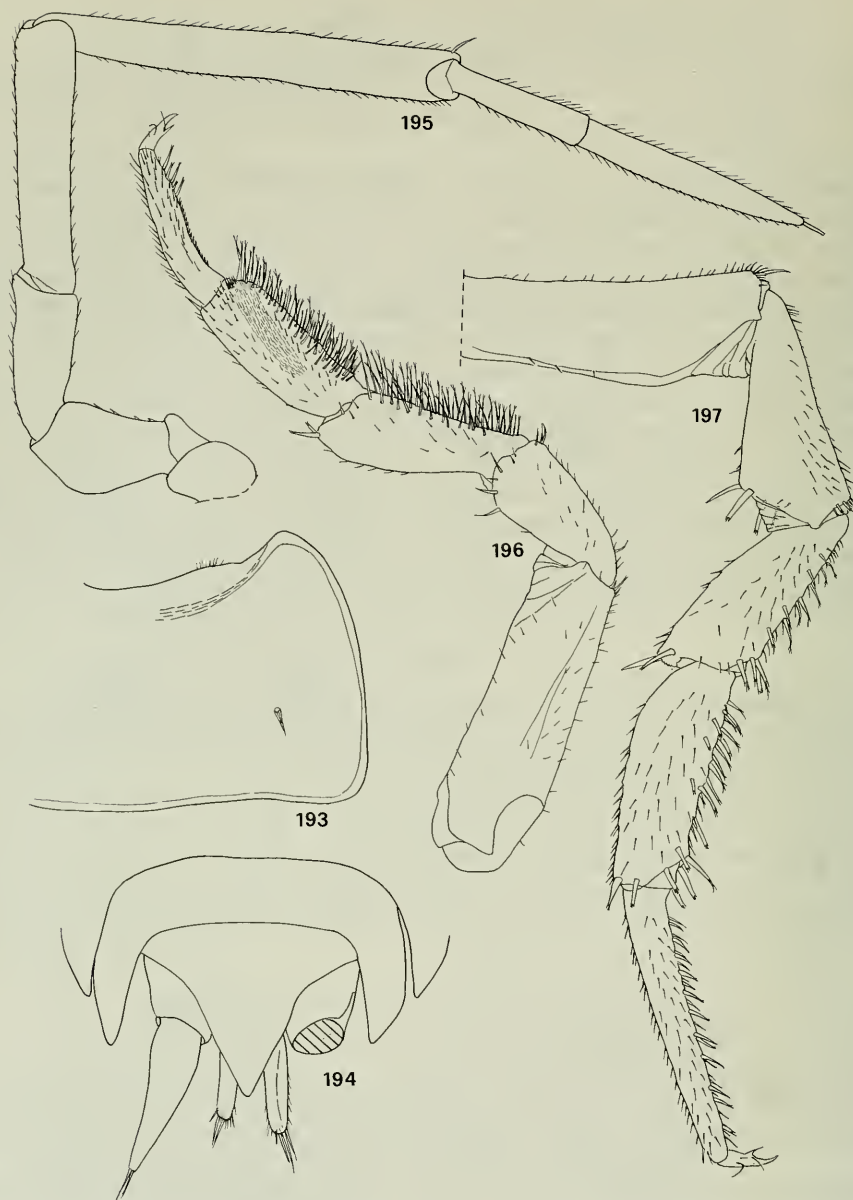
Remarks: For description and synonymy of this species see KWON (1993).

8.13. *Mongoloniscus nigrogranulatus* n. sp. (Figs. 201–218)

Porcellio (*Porcellionides*) *asiaticus*: ARCANGELI 1927: 255, Fig. XVIII (in part: Wuchang, Sanshaci and Shanghai).



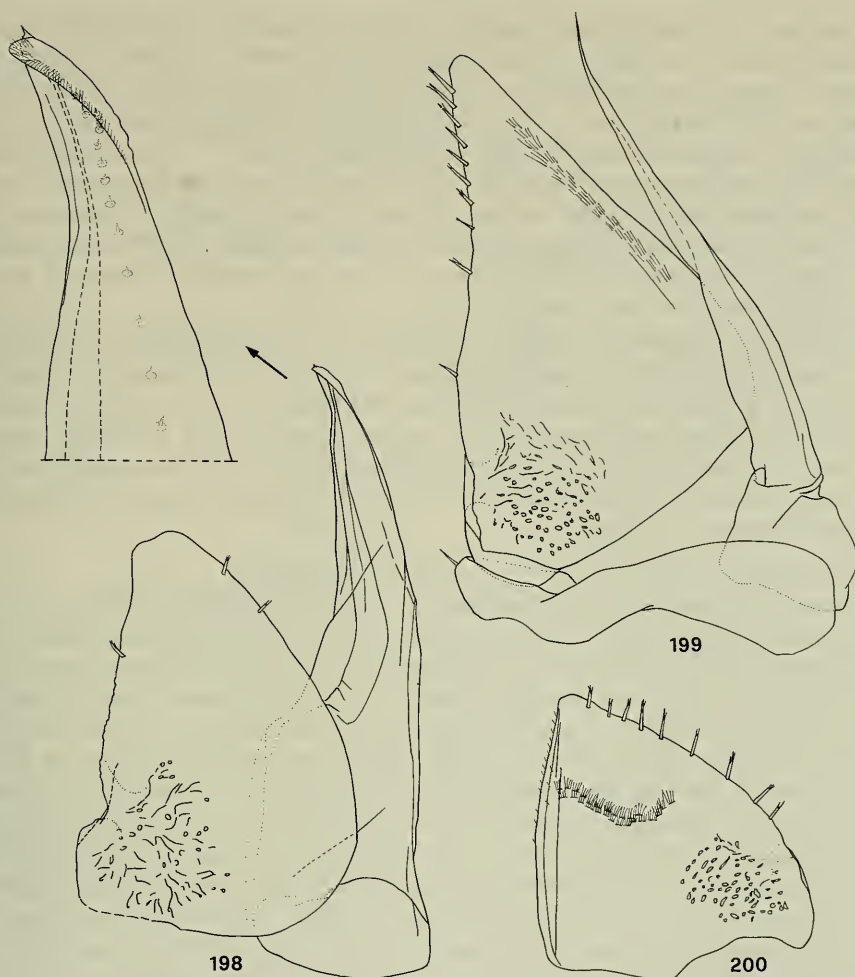
Figs. 188–192. (?)*Lucasioides cavernicolus* n. sp. – 188. Co-ordinates of noduli laterales; – 189. Holotype in dorsal view; – 190. Cephalon, frontal view; – 191. Cephalon, dorsal view; – 192. Cephalon, lateral view.



Figs. 193–197. (?)*Lucasioides carvernicolus* n. sp.; ♂. — 193. Right epimeron of pereonite 1; — 194. Pleonites 4–5, telson and uropods; — 195. Antenna; — 196. Pereopod 1; — 197. Pereopod 7.

Protracheoniscus (Mongoloniscus) sinensis: ARCANGELI 1952: 300 [in part: Wunchung (misspelling for Wuchang), Sanshaci and Shanghai].

Holotype: ♂ 7.5 mm long, **China**, Hubei, Wuchang, leg. SILVESTRI 2. XI. 1925 (SMNS) [specimen identified as *Porcellio (Porcellionides) asiaticus* by ARCANGELI 1927 and as *Protracheoniscus (Mongoloniscus) sinensis* by ARCANGELI 1952].



Figs. 198–200. (?)*Lucasioides carvernicolus* n. sp.; ♂. — 198. Pleopod 1; — 199. Pleopod 2; — 200. Pleopod 5 exopod.

Paratypes: 1 ♂, same data as holotype (DEAP). — 1 ♂, China, Guanxi Zhuangxi Zizhiqu, Guilin, leg. BERON 6. X. 1988 (NNHMS). — 1 ♂, China, Hunan, Sanshaci, leg. SILVESTRI 26. X. 1925 (DEAP) [specimen identified as *Porcellio* (*Porcellionides*) *asiaticus* by ARCANGELI 1927 and as *Protracheoniscus* (*Mongoloniscus*) *sinensis* by ARCANGELI 1952]. — 2 ♀♀, China, Shanghai, leg. SILVESTRI 19. V. 1925 (DEAP) [specimens identified as *Porcellio* (*Porcellionides*) *asiaticus* by ARCANGELI 1927 and *Protracheoniscus* (*Mongoloniscus*) *sinensis* by ARCANGELI 1952].

Description:

Maximum length of ♂ 8.5 mm, of ♀ 13.0 mm. Brown-grey colour with the usual yellowish muscle spots; a pale spot at the base of pereonal epimera; three longitudinal darker stripes, one in the middle of pereon and pleon, and two paramedian ones. Dorsum distinctly granulated. Numerous gland pores along the whole margin of pereonites. Noduli laterales almost at the same distance from lateral margin. Eye with about 20 ommatidia. Cephalon with an obtusely triangular median lobe, dor-

sally concave, and slightly protruding upwards in the middle; rounded lateral lobes directed obliquely. Pereonite 1 with postero-lateral corners rounded, distal margin straight. Telson triangular, wider than long with slightly concave sides. Antennal flagellum with distal article twice as long as proximal one. Mandible with molar penicil consisting of numerous plumose setae; right mandible with 1 + 4, left mandible 2 + 4 penicils. Maxillular outer branch with 4 + 6 teeth plus a small accessory one, a small spine on dorsal surface; inner branch with two large penicils and an acute posterior point. Maxilliped as in Fig. 210. All pleopodal exopods with *Protracheoniscus*-type lungs. Uropodal exopod about twice as long as protopod; protopod with a Δ -shaped incision on outer margin. —

Male. Pereopods 1–4 with a brush of long setae on carpus and merus. Pereopod 6 basis fringed with long setae and a distal protrusion on sternal margin. Pereopod 7 ischium with sternal margin slightly concave and fringed with setae, rostral surface with shallow depression; carpus with rounded lamellar lobe on tergal margin. Pleopod 1 exopod with apex deeply bilobed; endopod with an acute apex, bearing fine setae and bent outwards. Pleopod 2 endopod filiform, longer than exopod. Pleopod 5 exopod as in Fig. 217.

Etymology: Latin: *niger* = black + *granulatus* = granulated.

Remarks: *Mongoloniscus* was erected by VERHOEFF (1930) as subgenus of *Protracheoniscus* Verhoeff, 1917. Recently KWON (1993) considered it to be a full genus which included four valid species: *M. koreanus* (Verhoeff, 1930) from Korea, *M. sinensis* (Dollfus, 1901) from northern China, *M. nipponicus* from China, Korea and Japan, and *M. vannamei* (Arcangeli, 1927) from Japan. ARCANGELI (1927) reported *Porcellio* (*Porcellionides*) *asiaticus* Uljanin, 1875 from several localities in China (Shan-hai-kwan, Beijing, Wuchang, Sanshaci and Shanghai). STROUHAL (1929) considered ARCANGELI's material to belong to *Protracheoniscus sinensis* Dollfus, 1901 and not to *P. asiaticus*. VERHOEFF (1930), when instituting the subgenus *Mongoloniscus* for the new species *Protracheoniscus koreanus*, assigned *P. sinensis* to the subgenus, and this disposition was accepted by ARCANGELI (1952). Re-examination of ARCANGELI's specimens proved that they contained two different species, *M. sinensis* (Shan-hai-kwan and Beijing) and a new species of *Mongoloniscus* which is here described (Wuchang, Sanshaci and Shanghai). —

Mongoloniscus nigrogranulatus n. sp. is morphologically close to *M. koreanus* and *M. sinensis*. It is distinguished from the former by the shape of male pereopod 7 carpus (compare Fig. 211 and in KWON, 1993: Fig. 13D) and male pleopod 2 exopod with outer margin of distal part less concave; from the latter by its smaller size, distinctly granulated dorsum, shorter antenna with distal flagellar article longer than proximal one.

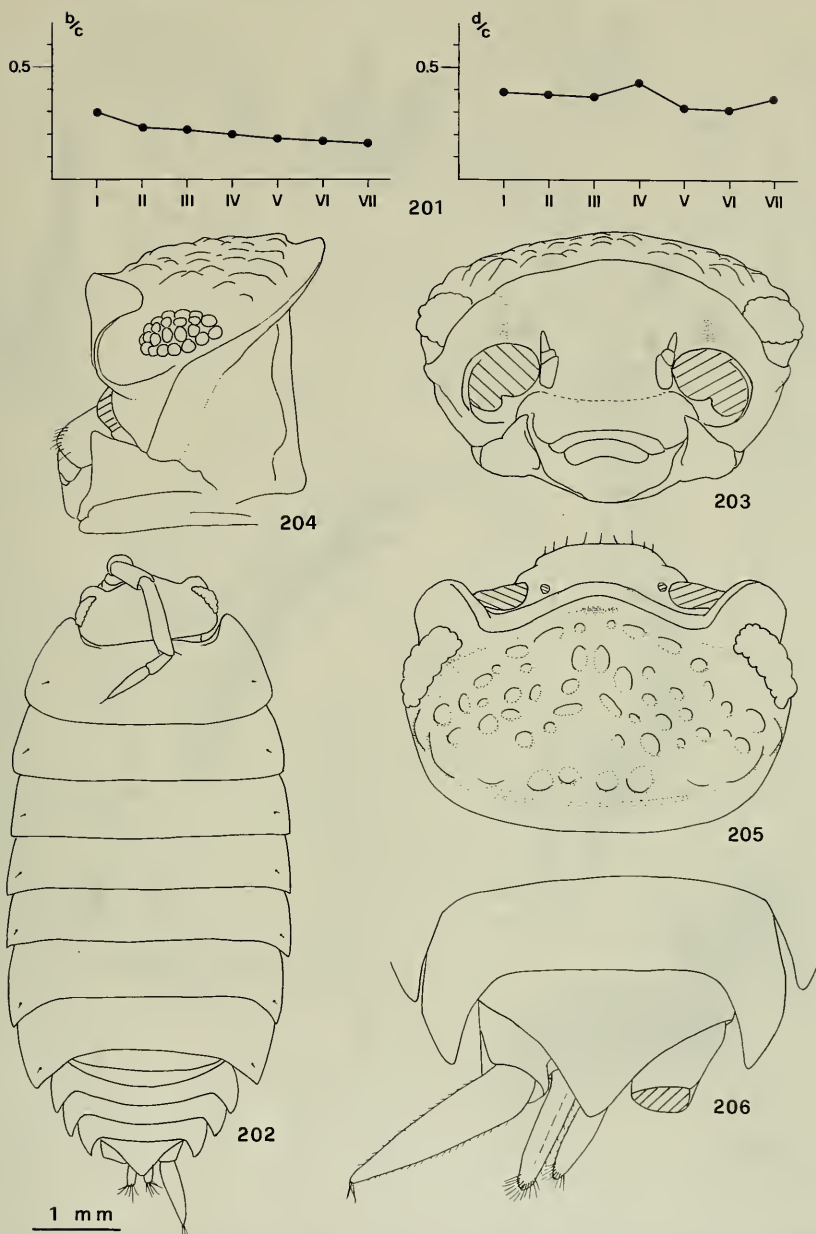
Genus *Agnara* Budde-Lund, 1908

8.14. *Agnara madagascariensis* Budde-Lund, 1908

?*Porcellio* (*Porcellionides*) *carinatus*: ARCANGELI 1927: 258 (in part: Macao).

?*Metoponorthus carinatus*: ARCANGELI 1952: 305 (in part: Macao).

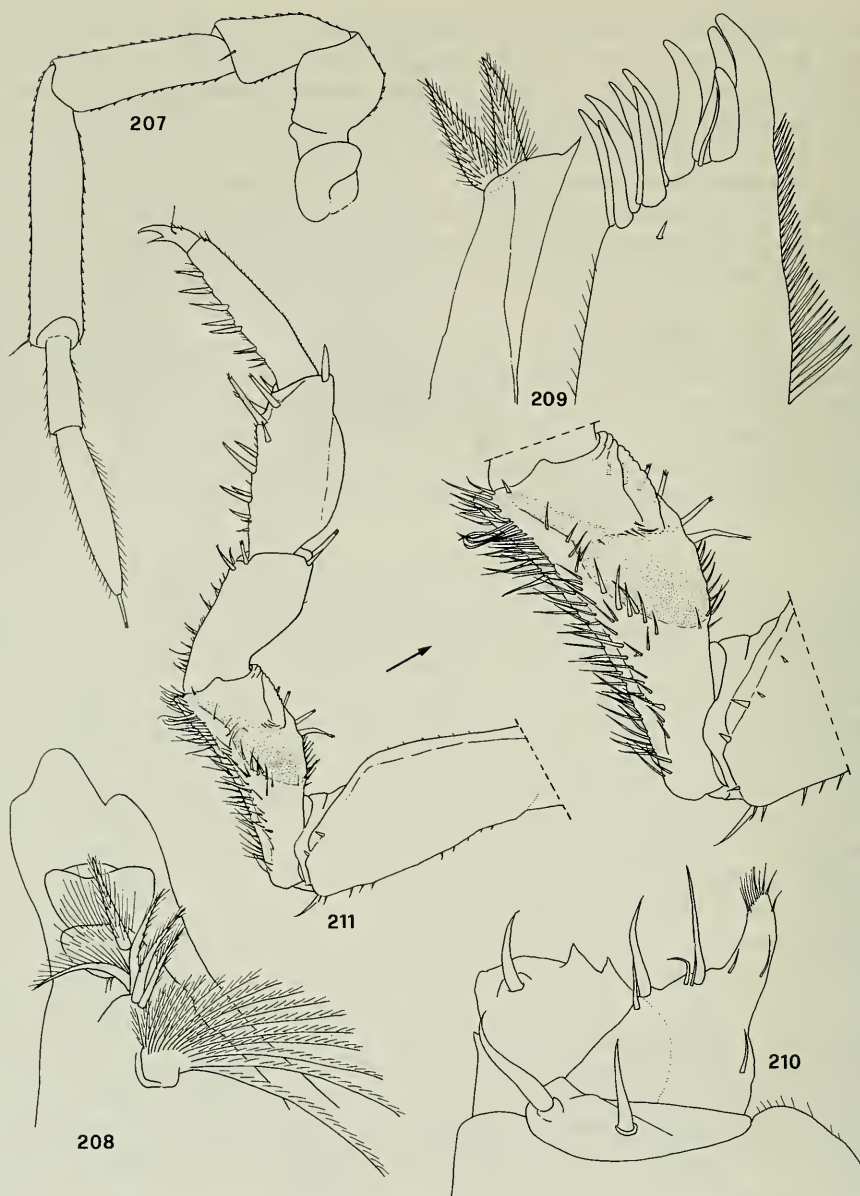
Specimens examined: **China:** 8 ♂♂, 20 ♀♀, Hainan Dao, Haikou, sea shore, leg. BERON 15. X. 1988 (NNHMS). — 4 ♂♂, 5 ♀♀, same data (SMNS). — 4 ♂♂, 5 ♀♀, same data (SMNS). — 7 ♂♂, 12 ♀♀, Hainan Dao, Sanya, leg. BERON 12. X. 1988 (NNHMS). — **Macao:** ? 1 ♀, leg. SILVESTRI 17. XI. 1925 (DEAP) [specimen identified as *Porcellio* (*Porcellionides*) *carinatus* by ARCANGELI 1927].



Figs. 201–206. *Mongoloniscus nigrogranulatus* n. sp.; ♂ from Wuchang. – 201. Co-ordinates of noduli laterales; – 202. Paratype ♂ in dorsal view; – 203. Cephalon, frontal view; – 204. Cephalon, lateral view; – 205. Cephalon, dorsal view; – 206. Pleonites 4–5, telson and uropods.

Distribution: Guinea Bissau, Senegal, Madagascar, Saudi Arabia, Oman, southern China and Macao (?).

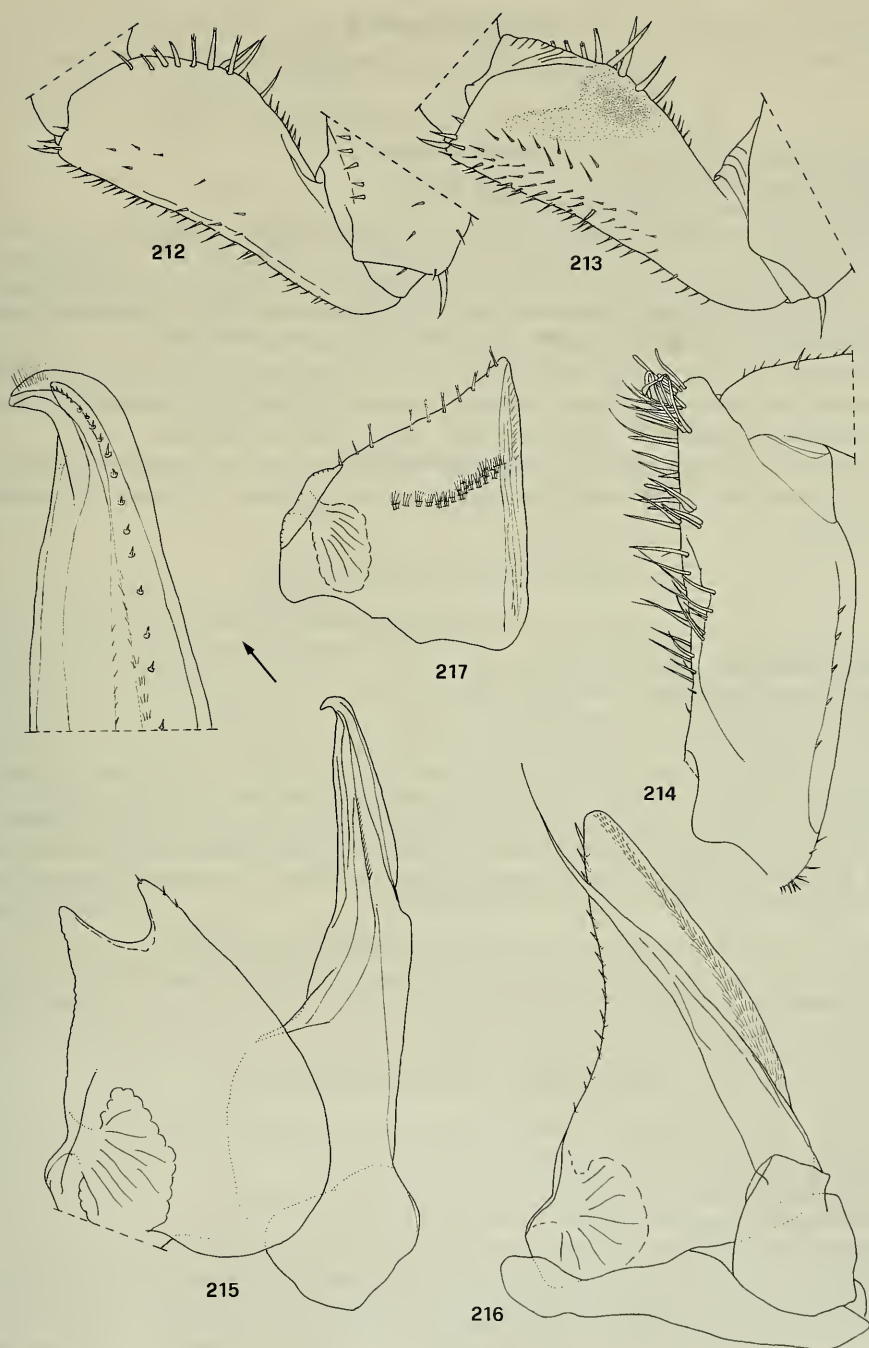
Remarks: For diagnostic characters of this species see SCHMALFUSS & FERRARA (1978: 80, Figs. 155–168) and FERRARA & TAITI (1986: 94, Figs. 1–2) as *Protracheo-*



Figs. 207–211. *Mongoloniscus nigrogranulatus* n. sp.; ♂ from Guilin. – 207. Antenna; – 208. Mandible; – 209. Maxillule; – 210. Maxilliped; – 211. Pereopod 7.

niscus inexpectatus Schmalfuss & Ferrara, 1978, junior synonym of *A. madagascariensis* (TAITI & FERRARA 1991b). –

Re-examination of the single ♀ specimen from Macao identified as *Porcellio* (*Porcellionides*) *carinatus* by ARCANGELI (1927) showed that it most probably belongs to *Agnara madagascariensis*, but lack of males prevents a definite identification.



Figs. 212–213. *Mongoloniscus nigrogranulatus* n. sp.; ♂ from Guilin. – 212. Pereopod 7 ischium, caudal surface; – 213. Pereopod 7 ischium, rostral surface.
 Figs. 214–217. *Mongoloniscus nigrogranulatus* n. sp.; ♂ from Wuchang. – 214. Pereopod 6 basis; – 215. Pleopod 1; – 216. Pleopod 2; – 217. Pleopod 5 exopod.

9. Porcellionidae

Genus *Agabiformius* Verhoeff, 19089.1. *Agabiformius lentus* (Budde-Lund, 1885)*Porcellio (Agabiformius) lentus*: ARCANGELI 1927: 251.*Porcellio* (?) *minuta*: SHEN 1949: 58, Fig. D, 1–12.*Agabiformius lentus*: ARCANGELI 1952: 304.

Specimens examined: **China**: 1 ♀, Guanxi Zhuangxi Zizhiqu, Guilin, leg. BERON 6. X. 1988 (NNHMS). – 1 ♀, Hainan Dao, Haikou, sea shore, leg. BERON 15. X. 1988 (SMNS). – 1 ♀, Hainan Dao, Sanya, leg. BERON 12. X. 1988 (MZUF). – 1 ♀, Hunan, Changsha, leg. SILVESTRI 20. X. 1925 (DEAP) [specimen identified by ARCANGELI 1927]. – **Macao**: 1 ♀, leg. SILVESTRI 17. VIII. 1924 (DEAP) [specimen identified by ARCANGELI 1927].

Distribution: All the lands round the Mediterranean Sea. It has also been recorded, as introduced, from Madeira, Canary Is., Senegal, Seychelles, Oman, China, Macao, Hawaii Is., Mexico, Haiti, Venezuela and Bermuda.

Remarks: According to the description and figures, it is very probable that *Porcellio minuta* Shen, 1949 from Ta-li Lake, Yunnan, is a junior synonym of *Agabiformius lentus*.

Genus *Porcellio* Latreille, 18049.2. *Porcellio laevis* Latreille, 1804*Porcellio laevis*: ARCANGELI 1927: 225.*Porcellio bombosus*: SHEN 1949: 53, Fig. B, 1–15.*Porcellio* (?) *elongata*: SHEN 1949: 56, Fig. C, 1–15.*Porcellio (Mesoporcellio) laevis*: ARCANGELI 1952: 297.

Specimens examined: **China**: 2 ♀♀, Yunnan, Menzi County, Wulichong, leg. BERON 6. I. 1989 (NNHMS). – 9 ♂♂, 4 ♀♀, Yunnan, Shilin, Stone Forest, leg. BERON 30. IX. 1988 (NNHMS). – 6 ♂♂, 9 ♀♀, Yunnan, Kunming, 1900 m, leg. BERON 27. IX. 1988 (SMNS). – 10 ♂♂, 8 ♀♀, Yunnan, Kunming, Xishan, Dragon Gate, 2000–2400 m, leg. BERON 26. XII. 1988 (MZUF). – 2 ♂♂, 1 ♀, Yunnan, Kunming, Xishan, Longmen (Dragon Gate), 2200–2280 m, leg. BERON 28. IX. 1988 (NNHMS).

Distribution: Cosmopolitan species of Mediterranean origin.

Remarks: According to description and figures, it is likely that *Porcellio elongata* Shen, 1949, is a junior synonym of *P. laevis*.

Genus *Porcellionides* Miers, 18779.3. *Porcellionides pruinus* (Brandt, 1833)*Porcellio (Porcellionides) pruinus*: ARCANGELI 1927: 254.*Porcellionides breviramus*: SHEN 1949: 60, Fig. E, 1–7, **syn. nov.***Porcellionides* (?) *denticulatus*: SHEN 1949: 62, Fig. F, 1–7.*Metoponorthus (Metoponorthus) pruinus pruinus*: ARCANGELI 1952: 305.

Specimens examined: **China**: 10 ♂♂, 11 ♀♀, Guanxi Zhuangxi Zizhiqu, Guilin, leg. BERON 6. X. 1988 (NNHMS). – 2 ♂♂, 4 ♀♀, Yunnan, Menzi County, under stones near the village on the plateau, 1600–1800 m, leg. BERON 31. I. 1989 (NNHMS). – 1 ♂, Yunnan, Chishui County, Cave Yan Dong, leg. BERON 12. I. 1989 (NNHMS). – 3 ♀♀, Yunnan, Shilin, Stone Forest, leg. BERON 30. IX. 1988 (NNHMS). – 10 ♂♂, 8 ♀♀, Hainan Dao, Sanya, leg. BERON 12. X. 1988 (NNHMS).

Distribution: Cosmopolitan species of Mediterranean origin.

Remarks: According to description, figures and habitat (inside houses), *Porcellionides breviramus* Shen, 1949 from Kunming, Yunnan, must be considered a junior

synonym of *P. pruinus*. Most probably *Porcellionides denticulatus* Shen, 1949, described on the basis of 3 ♀♀ from Ta-li Lake, Yunnan, is also synonymous with *P. pruinus*.

10. Armadillidiidae

Genus *Armadillidium* Brandt, 1833

10.1. *Armadillidium vulgare* (Latreille, 1804)

Armadillidium vulgare: ARCANGELI 1927: 225.

Armadillidium (*Armadillidium*) *cinereum* (= *A. vulgare*): ARCANGELI 1952: 296.

Specimens examined: China: 3 ♂♂, 3 ♀♀, Sichuan, Loochou [= Lozhou], leg. SILVESTRI 17. V. 1924 (DEAP).

Distribution: Cosmopolitan.

11. Armadillidae

Genus *Cubaris* Brandt, 1833

11.1. *Cubaris murina* Brandt, 1833

Armadillo murinus: ARCANGELI 1927: 224.

Cubaris (*Cubaris*) *murina*: ARCANGELI 1952: 295.

Specimens examined: China: 6 ♂♂, 11 ♀♀, 1 juv., Hainan Dao, Haikou, sea shore, leg. BERON 15. X. 1988 (NNHMS). — 2 juvs., Hainan Dao, Sanya, leg. BERON 12. X. 1988 (NNHMS). — Hong Kong: 1 ♀, Mai Po, marshes, leg. MA VII. 1986 (MZUF).

Distribution: Pantropical.

Genus *Troglodillo* Jackson, 1937

11.2. *Troglodillo rotundatus* n. sp. (Figs. 218–228)

Holotype: ♀ 13 mm long, China, Guanxi Zhuangxi Zizhiqu, Guilin, leg. BERON 6. X. 1988 (NNHMS).

Paratype: 1 ♀, same data as holotype (SMNS).

Description:

Maximum dimensions: 13.0 × 7.5 mm. Brown-grey colour with the usual yellowish muscle spots; pereonite 1 with a large triangular dark area in the middle; pereonite 1 with two small pale spots, and pereonites 2–7 and pleonites 4–5 with one pale spot at the base of each epimeron; pleonites 1–2 and basal part of pleonites 3–4 pale. Dorsum smooth, shiny. One nodulus lateralis per side on each pereonite; all noduli inserted far from the lateral margin of the segment, more or less on the same line. Eye with 20 ommatidia. Cephalon with frontal shield depressed and turned back on vertex in the middle, clearly protruding over vertex only at sides; in frontal view the shield presents rounded lateral margins, distinctly separated from the antennary sockets by a deep groove. Pereonite 1 with epimera thin and turned up in the anterior part; distal margin slightly sinuous on each side; postero-lateral corners rounded; a small ventral lobe on epimera, far from distal and lateral margins. Pereonite 2 quadrangular, with a tiny ventral lobe on epimera. Telson slightly longer than wide; distal part narrower than basal one with more or less parallel sides; distal margin broadly rounded. Antenna slender with flagellar articles subequal in length. Mandible with molar penicil consisting of several plumose setae arising from a single stem. Maxillular outer branch with 4 + 6 simple teeth; inner branch with two short,

stout penicils. Pereopods slender. Pleopod 1 absent; pleopods 2–3 exopod with lung formed by a single wide spiracle and a short atrium which branches out into many tubules; pleopods 4–5 exopod with lung having a single small spiracle and a long narrow atrium. Uropodal protopod elongated with triangular distal part not surpassing tip of telson; exopod long and thin, inserted near medial margin of protopod; endopod over half the length of protopod, with three thick apical setae.

Etymology: Latin: *rotundatus* = rounded. The name refers to the broadly rounded distal margin of the telson.

Remarks: *T. rotundatus* n. sp. is ascribed to the genus *Troglodillo* after comparison with the type species *T. emarginatus* Jackson, 1937 (1 ♀ lectotype here designated, 2 ♀♀ paralectotypes, North Siam, Pha-Thai, dans une grotte, 24. II. 1932, IRSNB). *Troglodillo* is certainly a valid genus, extremely close to *Sinodillo* n. gen. (see below), and at present it includes only the type species and the new one. The diagnosis of the genus proposed by JACKSON (1937: 2) must be emended with the addition of the following character: pereonites 1 and 2 with a tiny ventral lobe on epimeron. This character was not mentioned by JACKSON either in the diagnosis of the genus or in the description of *T. emarginatus*, but it is present in the type specimens re-examined, as well as in the new species. —

Troglodillo rotundatus n. sp. is readily distinguishable from *T. emarginatus* by the eye with a smaller number of ommatidia (20 vs. 29), cephalon with upper margin of the frontal shield turned back on vertex in the middle, and posterior margin of the telson broadly rounded instead of emarginate. Differences are also found in the position of the noduli laterales and in the shape of the pleopodal lungs. In *T. rotundatus*, the noduli laterales are inserted more or less on the same line, far from lateral margin of the pereonites; in *T. emarginatus*, the noduli laterales on pereonites 1–3 are about twice as far from the lateral margin as those on pereonites 4–6, while that on pereonite 7 is the farthest. Pleopodal lungs are tubular with a single opening in all exopods (pleopod 1 is absent) of *T. rotundatus*, while in *T. emarginatus* they are tubular with many openings in exopods 1–3 (Fig. 229) and single opening in exopods 4–5 (Fig. 230).

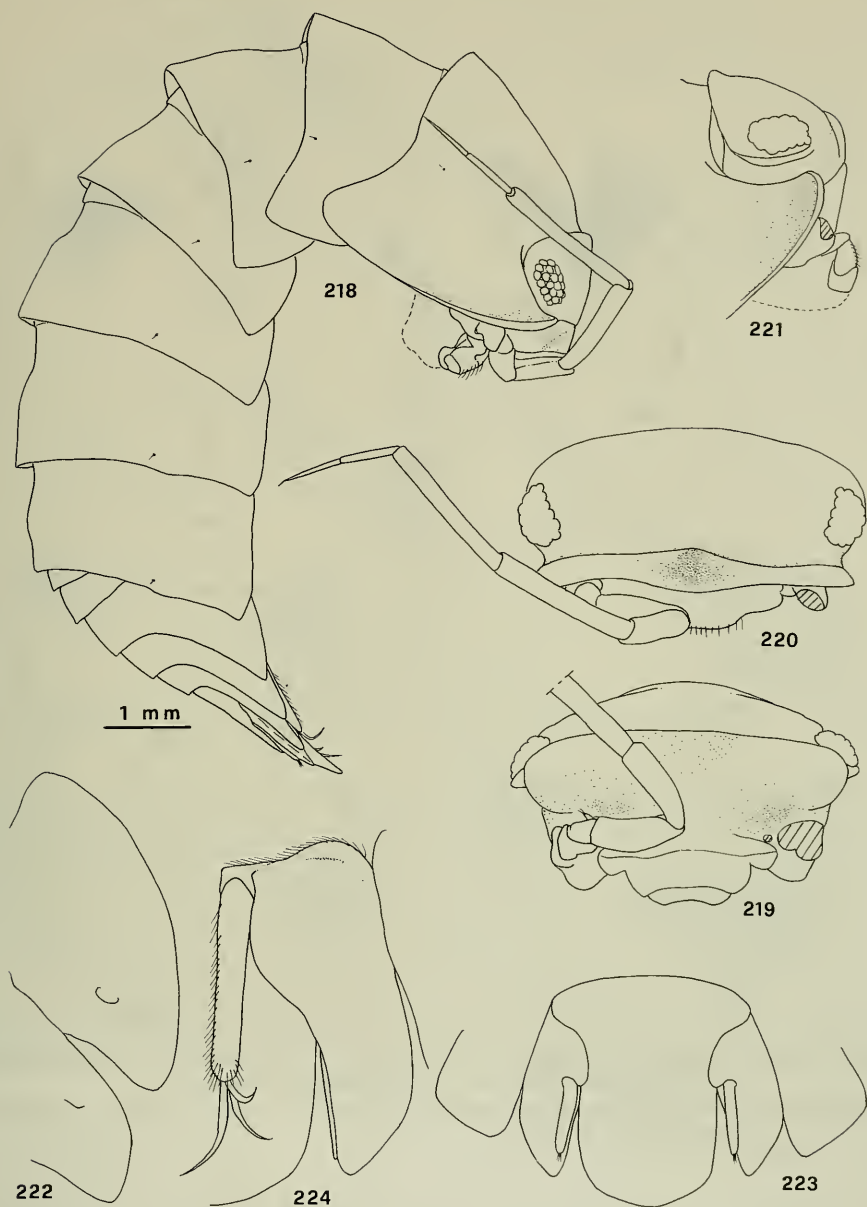
Genus *Sinodillo* n. gen.

Type-species: *Sinodillo troglophilus* n. sp.

Diagnosis: Animals able to roll up into a ball. Each pereonite with one nodulus lateralis per side; noduli laterales inserted more or less on the same line, far from lateral margin of the pereonites. Cephalon with frontal lamina not protruding above vertex. Pereonite 1 with lateral margin not thickened; epimera bent outwards, with a more or less conspicuous rounded ventral lobe. Pereonite 2 with a transversal ventral lobe. Telson with quadrangular distal part. Mandible with molar penicil consisting of several plumose setae arising from a single stem. Maxillular outer branch with 4 + 6 simple teeth; inner branch with 2 subequal stout penicils. All pleopodal exopods with *Trachelipus*-type lungs. Uropodal protopod with short exopod inserted dorsally below a median tooth.

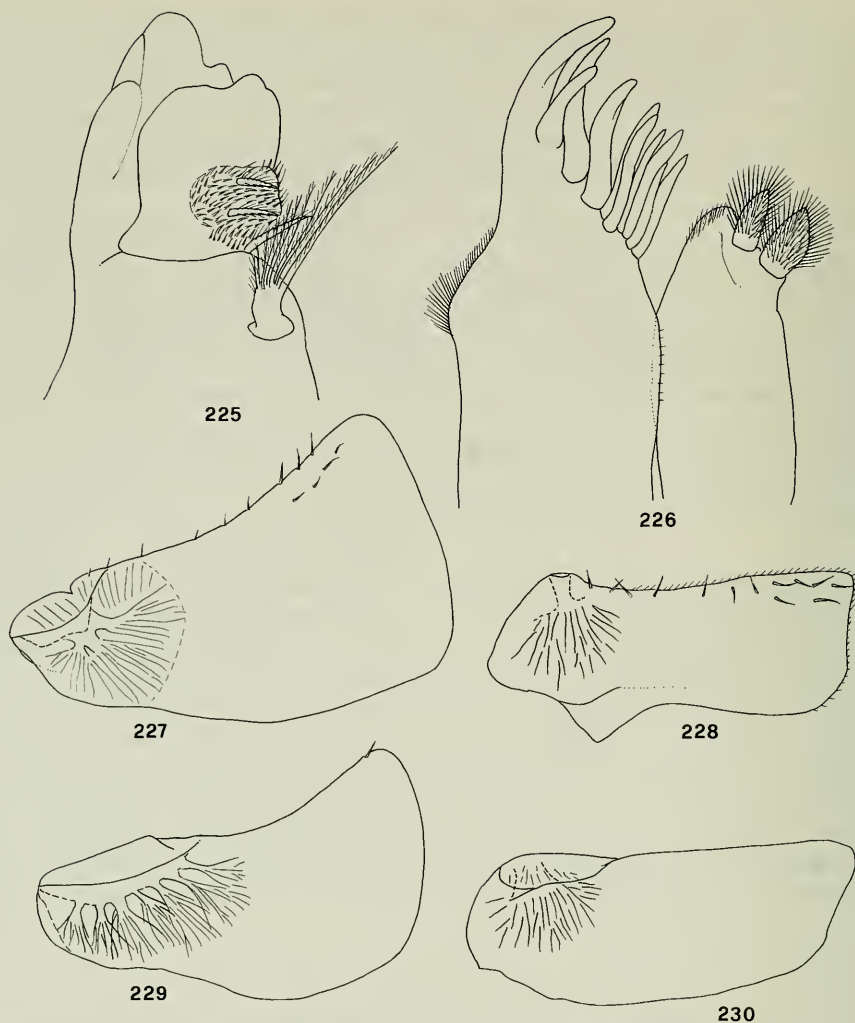
Etymology: Late Latin: *Sina* = China + suffix *dillo*. Gender masculine.

Remarks: For the presence of ventral lobes on epimera of pereonites 1 and 2 the new genus is close to the Afrotropical genera *Bethalus* Budde-Lund, 1909 and *Barnardillo* Arcangeli, 1934, to the tropical genus *Cubaris* and to the Oriental genus



Figs. 218–224. *Troglodillo rotundatus* n. sp.; holotype. — 218. Lateral view; — 219. Cephalon, frontal view; — 220. Cephalon, dorsal view; — 221. Cephalon, lateral view; — 222. Epimera of pereonites 1 and 2, ventral view; — 223. Pleonite 5, telson and uropods; — 224. Left uropod, ventral view.

Troglodillo. It is distinguished from all these genera by the *Trachelipus*-type, instead of tubular, pleopodal lungs, and uropodal exopod inserted on the dorsal surface of the protopod, instead of near the medial margin. *Sinodillo* also differs from *Bethalus*, *Barnardillo* and *Cubaris* in having short and stout, instead of long and thin, penicils



Figs. 225–228. *Troglodillo rotundatus* n. sp.; holotype. – 225. Mandible; – 226. Maxillule; – 227. Pleopod 2 exopod; – 228. Pleopod 5 exopod.

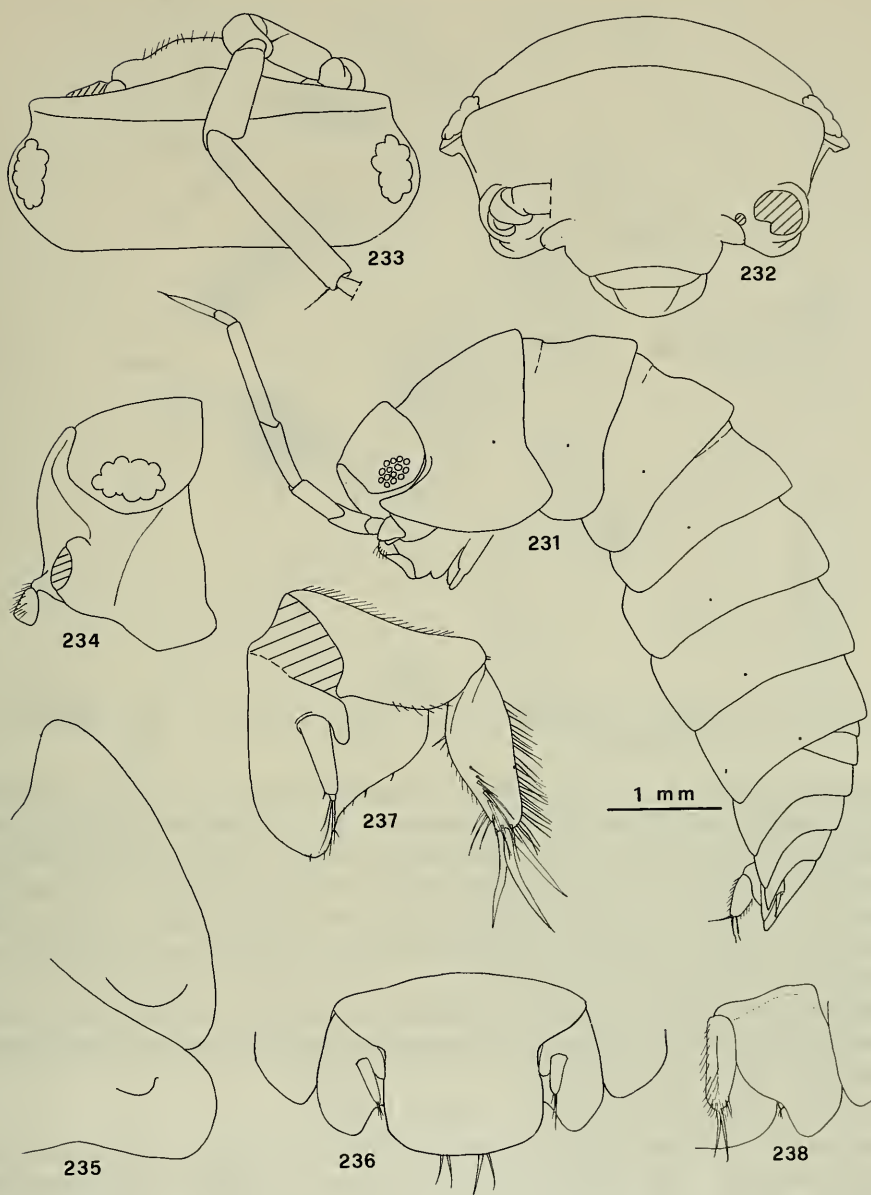
Figs. 229–230. *Troglodillo emarginatus*; paralectotype ♀. – 229. Pleopod 2 exopod; – 230. Pleopod 5 exopod.

of maxillular inner branch, a character which is shared by many genera of Armadillidae in the Oriental and Australian regions; from *Cubaris* and especially *Barnardillo* by the frontal lamina not protruding above vertex.

11.3. *Sinodillo troglophilus* n. sp. (Figs. 231–245)

Holotype: ♂ 6.5 mm long, China, Yunnan, Chinshui County, Cave Yan Dong, leg. BERON 12. I. 1989 (SMNS).

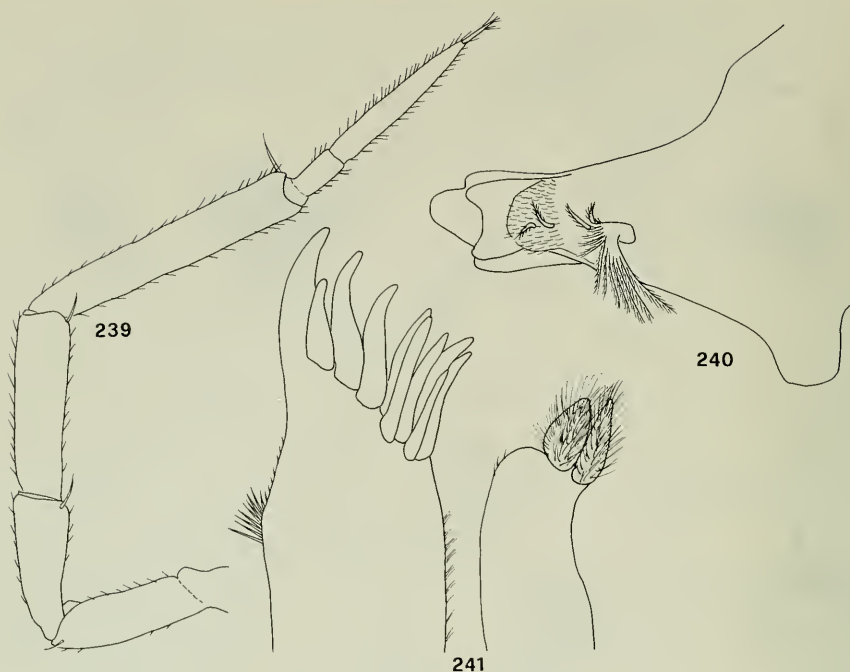
Paratypes: 1 ♂, 6 ♀♀, 6 juvs., same data as holotype (NNHMS). – 2 ♂♂, 3 ♀♀, same data (SMNS). – 3 ♂♂, 4 ♀♀, same data (MZUF).



Figs. 231–238. *Sinodillo troglophilus* n. sp. – 231. Adult female in lateral view; – 232. Cephalon, frontal view; – 233. Cephalon, dorsal view; – 234. Cephalon, lateral view; – 235. Epimera of pereonites 1 and 2, ventral view; – 236. Pleonite 5, telson and uropods; – 237. Uropod; – 238. Left uropod, ventral view.

Description:

Maximum dimensions of ♂ 6.5×3.5 mm, of ♀ 7.3×3.8 mm. Pale brown colour with a darker median stripe on dorsum; a lighter oval spot at the base of pereonal epimera. Dorsum smooth. Eye with 13–15 ommatidia. Frontal shield of cephalon slightly turned on vertex with straight upper margin in dorsal view. Pereonite 1 with



Figs. 239–241. *Sinodillo troglophilus* n. sp. — 239. Antenna; — 240. Mandible; — 241. Maxillule.

distal margin regularly concave at sides; postero-lateral corners broadly rounded; a large rounded ventral lobe far from posterior margin. Pereonite 2 with a small rounded ventral lobe. Telson wider than long, distal part about $\frac{3}{4}$ width of basal one with parallel sides, distal margin slightly convex. Antenna short, not reaching distal margin of pereonite 1; second flagellar article about three times as long as first. Pereopods slender. Uropodal protopod trapezoidal, exopod directed obliquely, not reaching medial margin of protopod. —

Male. Pereopods without particular modifications. Pleopod 1 exopod with a broadly rounded posterior lobe; endopod with pointed apex slightly bent outwards. Pleopod 2 endopod with filiform distal part.

Etymology: Greek *trōglē* = cave + *philos* = loving.

Remarks: The new species is characterized by frontal lamina with straight upper margin, pereonite 1 with a large ventral lobe, telson with a wide quadrangular distal part, slender pereopods, uropodal protopod trapezoidal and short obliquely directed exopod, male pleopod 1 exopod with a broadly rounded posterior lobe.

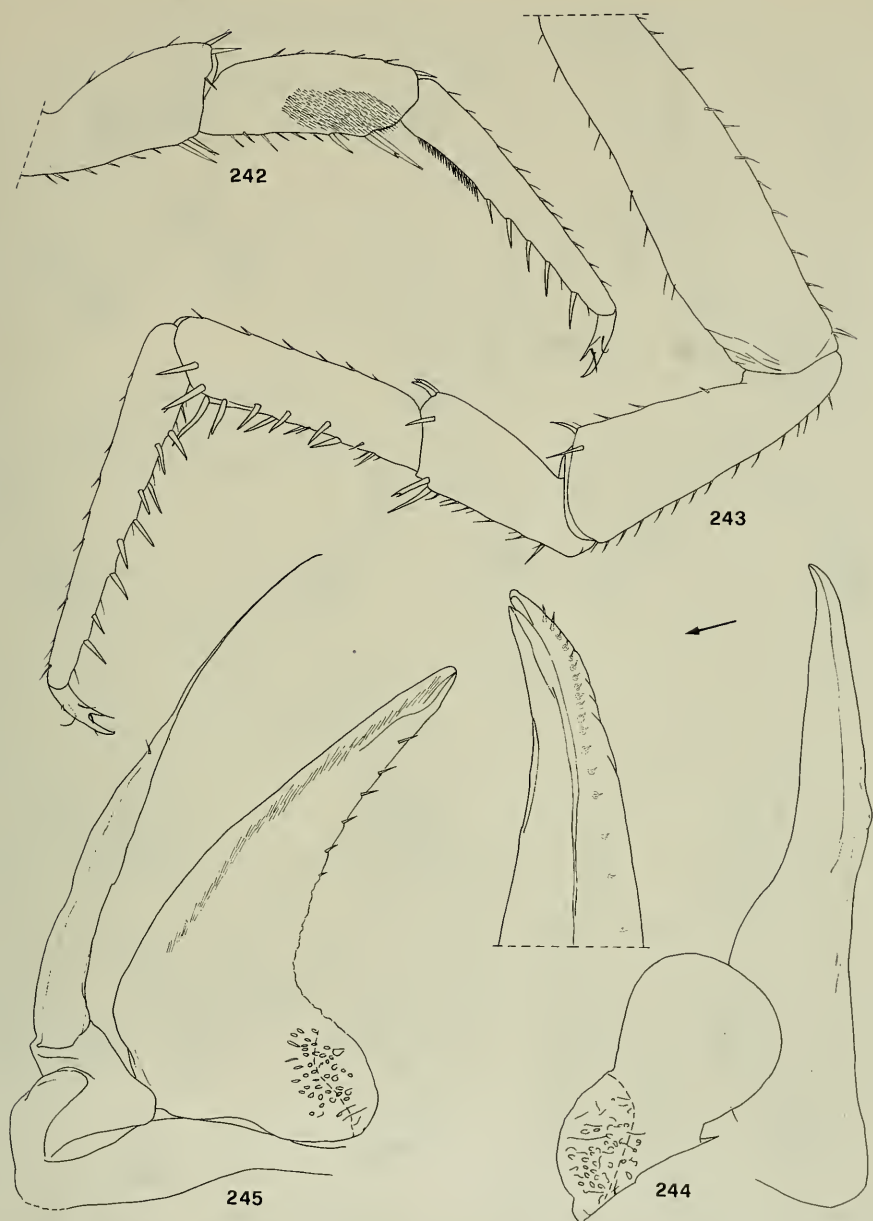
11.4. *Sinodillo ferrarai* n. sp. (Figs. 246–258)

Holotype: ♀ 6.2 mm long, **China**, Yunnan, Chinshui County, Cave Yan Dong, leg. BERON 12. I. 1989 (SMNS).

Paratype: 1 ♂, same data as holotype (NNHMS).

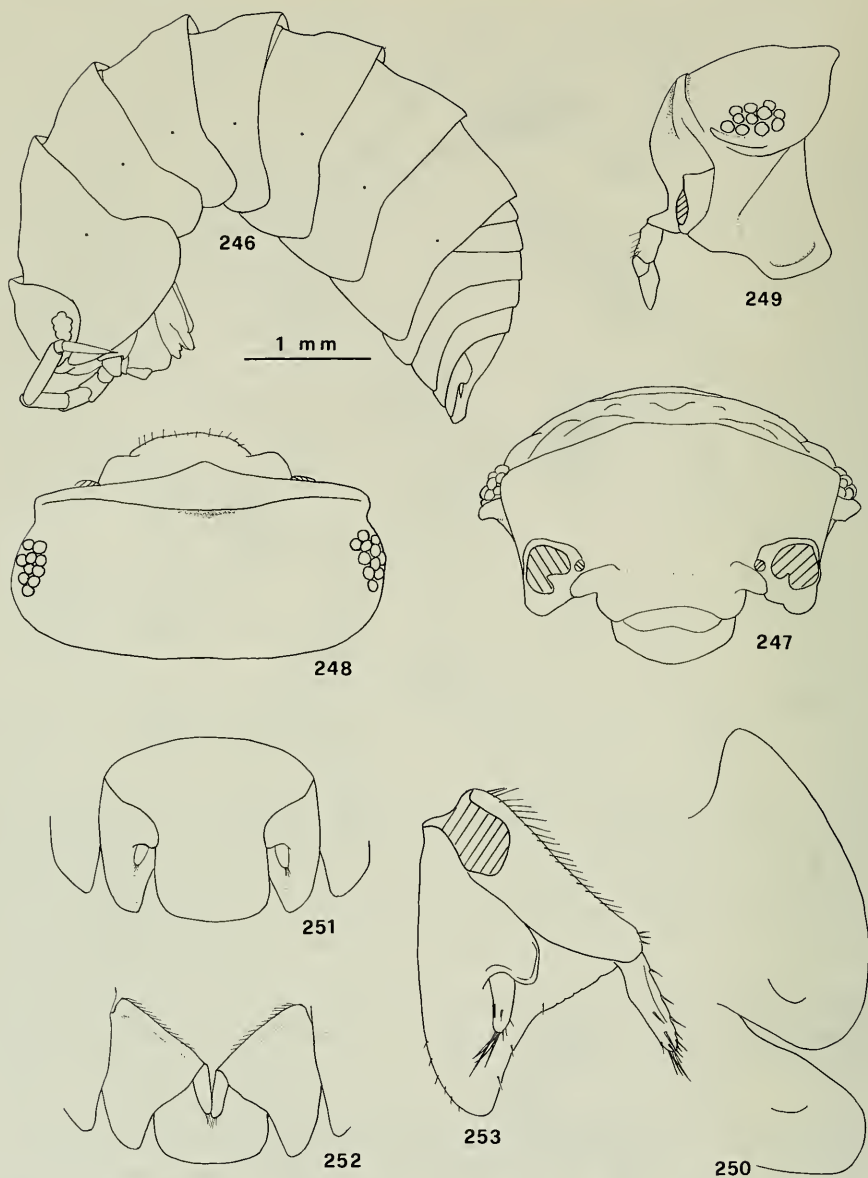
Description:

Maximum dimensions of ♂ 6.2×2.5 mm; of ♀ 6.2×3.0 mm. Pale brown colour with the usual yellowish muscle spots and a large light stripe in the middle of pereon.



Figs. 242–245. *Sinodillo troglophilus* n. sp.; ♂. – 242. Pereopod 1; – 243. Pereopod 7; – 244. Pleopod 1; – 245. Pleopod 2.

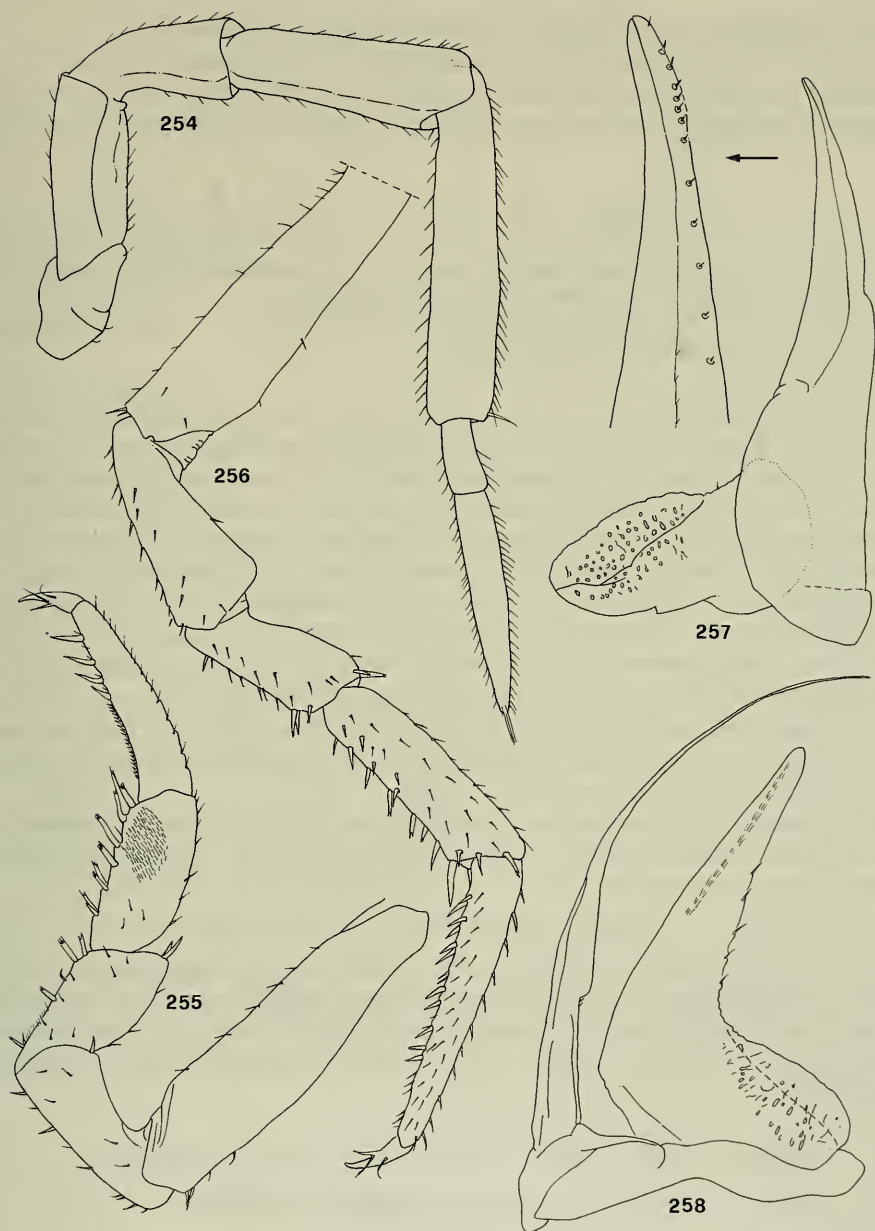
Dorsum smooth. Eye with 10–11 ommatidia. Frontal shield of cephalon slightly turned on vertex with convex upper margin in dorsal view. Pereonite 1 with postero-lateral corners broadly rounded, protruding backwards. Pereonites 1 and 2 with small rounded ventral lobe. Telson slightly wider than long, distal part about half width of basal one with parallel sides and slightly convex distal margin. Antenna short reaching posterior margin of pereonite 1; second flagellar article about three



Figs. 246–253. *Sinodillo ferrarai* n. sp. – 246. Adult female in lateral view; – 247. Cephalon, frontal view; – 248. Cephalon, dorsal view; – 249. Cephalon, lateral view; – 250. Epimera of pereonites 1 and 2, ventral view; – 251. Pleonite 5, telson and uropods; – 252. Telson and uropods, ventral view; – 253. Uropod.

times as long as first. Uropodal protopod triangular; exopod short, about half length of endopod. –

Male. Pereopods without particular modifications. Pleopod 1 exopod with a small subtriangular posterior point; endopod almost straight with rounded apex. Pleopod 2 endopod longer than exopod, with filiform distal part.



Figs. 254–258. *Sinodillo ferrarai* n. sp.; ♂. — 254. Antenna; — 255. Pereopod 1; — 256. Pereopod 7; — 257. Pleopod 1; — 258. Pleopod 2.

Etymology: The new species is named after Dr. F. FERRARA (Florence).

Remarks: *Sinodillo ferrarai* n. sp. differs from *S. troglophilus* in having frontal lamina with upper margin convex instead of straight, smaller ventral lobes on pereonites 1, 2, telson with longer and narrower distal part, triangular instead of trapezoidal uropodal protopod, shorter uropodal exopod, male pleopod 1 exopod with a

short subtriangular posterior point instead of a broadly rounded lobe. — It differs from *S. schmalfussi* n. sp. (see below) in much smaller ventral lobe on pereonite 1, longer telson, triangular instead of trapezoidal uropodal protopod, male pleopod 1 exopod with a short posterior point completely absent in *S. schmalfussi*.

11.5. *Sinodillo schmalfussi* n. sp. (Figs. 259–272)

Holotype: ♂ 4.7 mm long, **China**, Yunnan, Menzi County, under stones near village on the plateau, 1600–1800 m, leg. BERON 31. I. 1989 (SMNS).

Paratypes: 2 ♂♂, 2 ♀♀, same data as holotype (NNHMS). — 2 ♂♂, 1 ♀, same data (SMNS). — 2 ♂♂, 2 ♀♀, same data (MZUF).

Description:

Maximum dimensions of ♂ 4.7 × 2.3 mm, of ♀ 5.0 × 2.4 mm. Dark brown colour with usual yellowish muscle spots; a light median stripe on pereon and an oval pale spot at the base of pereonal epimera; pleon with a median and two paramedian light stripes; pale uropods. Dorsum smooth. Eye with 13–16 ommatidia. Frontal shield of cephalon turned on vertex with upper margin clearly convex in dorsal view; profrons slightly depressed in the middle. Pereonite 1 with distal margin regularly concave at sides and postero-lateral corners broadly rounded; a large rounded ventral lobe clearly separated from the epimeron and not reaching its distal margin. Pereonite 2 with small transversal ventral lobe. Telson wider than long, distal part about half width of basal one with parallel sides and slightly convex distal margin. Antenna short, slightly exceeding posterior margin of pereonite 1; second flagellar article about 3.5 times as long as first. Uropodal protopod trapezoidal; exopod short, about one third the length of endopod. —

Male. Pereopods without particular modifications. Pleopod 1 exopod without posterior point; endopod almost straight with pointed apex. Pleopod 2 endopod slightly longer than exopod.

Etymology: The new species is named after Dr. H. SCHMALFUSS (Stuttgart).

Remarks: *Sinodillo schmalfussi* n. sp. differs from *S. troglophilus* in having frontal shield with convex instead of straight upper margin, much larger ventral lobe on pereonite 1, shorter uropodal exopod, male pleopod 1 exopod without posterior point. The differences with *S. ferrarai* have already been discussed in the remarks on that species.

Genus *Dryadillo* Taiti, Ferrara & Kwon, 1992 [Herold, 1931]

11.6. *Dryadillo maculatus* (Arcangeli, 1952) (Figs. 273–287)

Armadillo coeruleus (non Collinge): ARCANGELI 1927: 224.

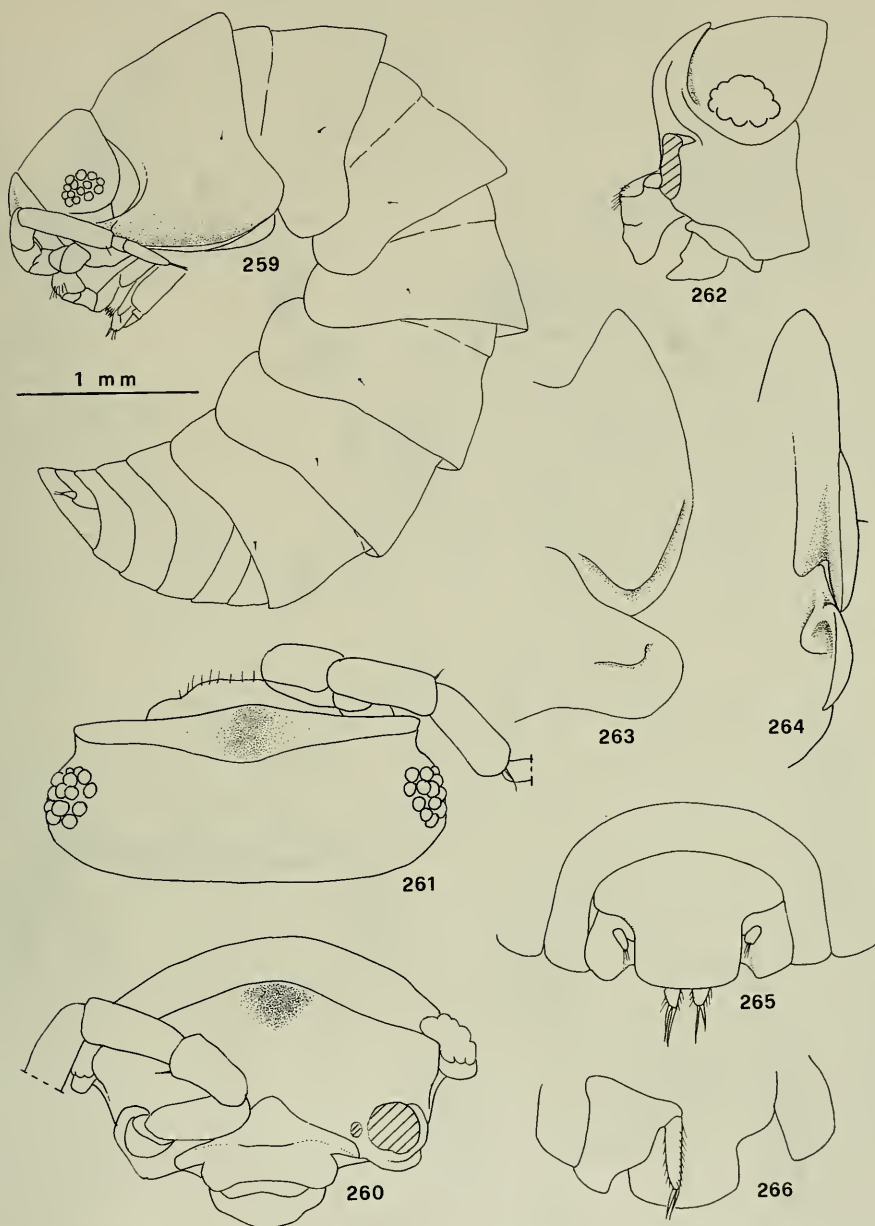
Spherillo (Orodillo) maculatus: ARCANGELI 1952: 294.

Orodillo maculatus: DUDGEON, MA & LAM 1990: 398;

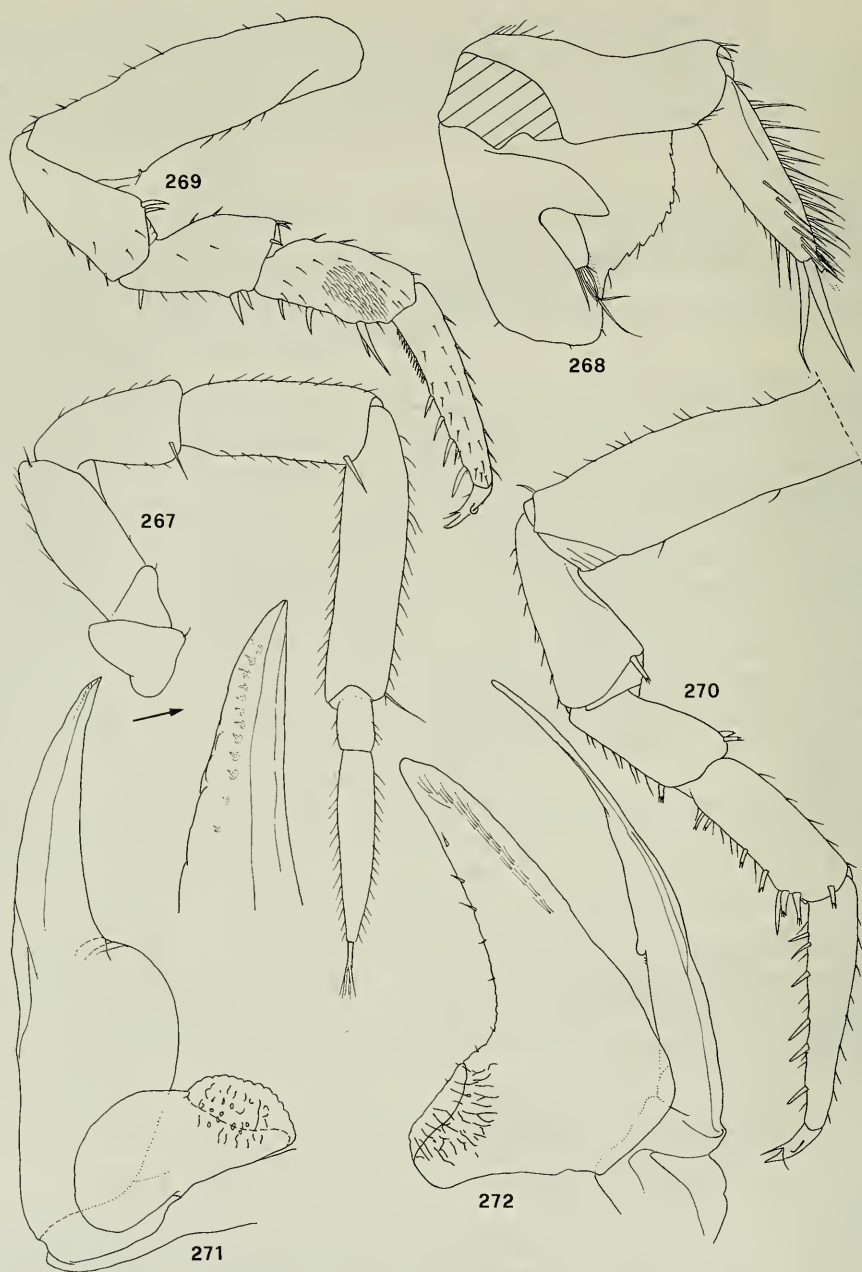
MA, DUDGEON & LAM 1991: 348;

MA, LAM & DUDGEON 1991: 678.

Specimens examined: **China**: 1 ♂, 7 ♀♀, 4 juvs., Hainan Dao, Qingdao, 200–300 m, leg. BERON 14. X. 1988 (NNHMS). — **Hong Kong**: 1 ♂, 3 ♀♀, Tai Po, shore, leg. COTTARELLI 26. I. 1981 (MZUF). — 3 ♀♀, Castle Park, leg. COTTARELLI 25. I. 1981 (MZUF). — 4 ♀♀, 3 juvs., Tai Po, 20 km from Tai Lou, leg. OSELLA 26. I. 1981 (MZUF). — 4 ♂♂, 11 ♀♀, University City, leg. OSELLA & COTTARELLI 26. I. 1981 (SMNS). — 10 ♂♂, 8 ♀♀, Forest of „Hill above Belcher’s“, leg. MA IX. 1985 (MZUF).



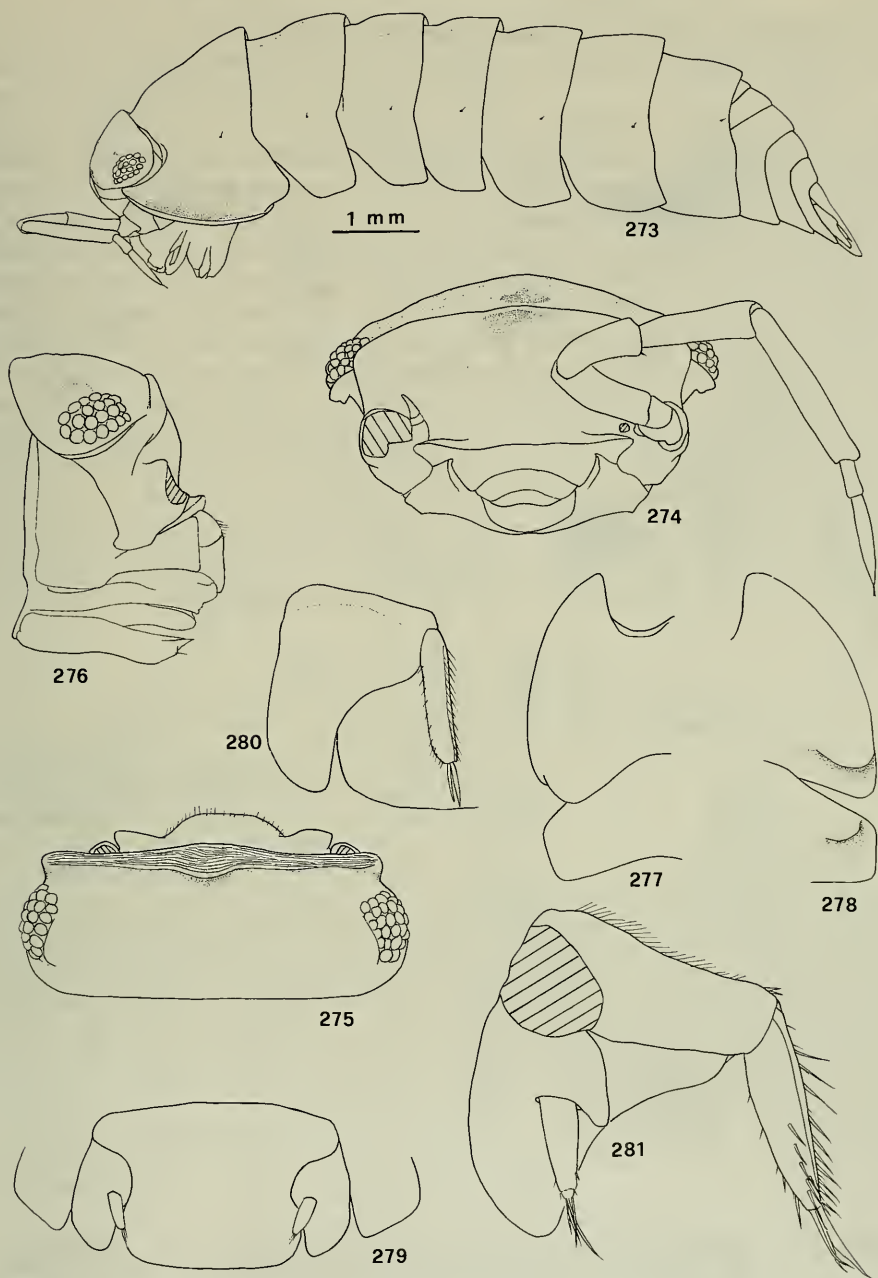
Figs. 259–266. *Sinodillo schmalzfussi* n. sp. – 259. Adult female in lateral view; – 260. Cephalon, frontal view; – 261. Cephalon, dorsal view; – 262. Cephalon, lateral view; – 263. Epimera of pereonites 1 and 2, ventral view; – 264. Epimera of pereonites 1 and 2, view from bottom; – 265. Pleonites 4–5, telson and uropods, dorsal view; – 266. Pleonite 5, telson and right uropod, ventral view.



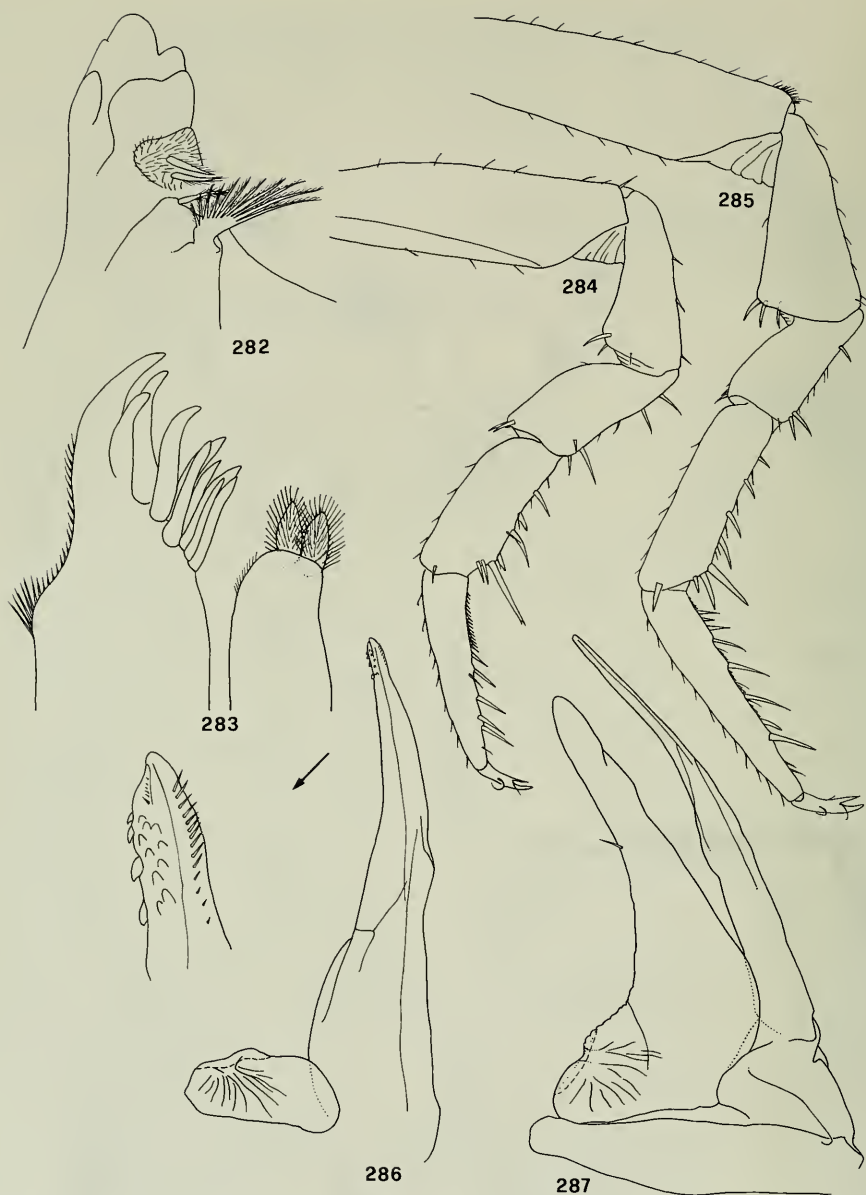
Figs. 267–272. *Sinodillo schmalfussi* n. sp.; ♂. — 267. Antenna; — 268. Uropod; — 269. Pereopod 1; — 270. Pereopod 7; — 271. Pleopod 1; — 272. Pleopod 2.

Distribution: Vietnam, China (Hainan Dao), Macao, Hong Kong and Taiwan.

Remarks: These specimens are identified as *Dryadillo maculatus* since they well correspond to the short original description provided by ARCANGELI (1952) from specimens collected by F. SILVESTRI in Hong Kong, Macao, Indochina and Taiwan.



Figs. 273–281. *Dryadillo maculatus*. – 273. Adult male in lateral view; – 274. Cephalon, frontal view; – 275. Cephalon, dorsal view; – 276. Cephalon, lateral view; – 277. Epimera of pereonites 1 and 2, dorsal view; – 278. Epimera of pereonites 1 and 2, ventral view; – 279. Pleonite 5, telson and uropods; – 280. Right uropod, ventral view; – 281. Left uropod, dorsal view.



Figs. 282–287. *Dryadillo maculatus*; ♂. — 282. Mandible; — 283. Maxillule; — 284. Pereopod 1; — 285. Pereopod 7; — 286. Pleopod 1; — 287. Pleopod 2.

Unfortunately this material is no longer present in the collections of the Portici Museum. ARCANGELI included this species in the genus *Spherillo* and subgenus *Orodillo* but this ascription is certainly incorrect according to a comparison with syntypes of the type species of *Orodillo* (*O. collaris* Verhoeff, 1926 from New Caledonia) deposited in NHMB. On the contrary, this species well corresponds to the genus *Dryadillo* as defined by TAITI, FERRARA & KWON (1992) (for *Dryadillo*

Herold, 1931, unavailable name). At present, besides *D. maculatus*, the genus *Dryadillo* include with certainty at least 11 more species from Java, Bali, Lombok, Flores and Sulawesi (TAITI, FERRARA & KWON 1992). —

The main characters of *D. maculatus* are here illustrated from specimens from Hainan Dao. For the number and position of noduli laterales (one nodulus lateralis per side on each pereonite more or less at the same distance from the lateral margin) it is close to *D. arcangelii* Herold, 1931, *D. schellenbergi* Herold, 1931 and *D. montanus* Herold, 1931, all from Lombok (according to re-examination of syntypes of these species deposited in ZMB). Five other species [*D. baliensis* Herold, 1931 from Bali, *D. hebereri* Herold, 1931 and *D. sexlineatus* Herold, 1931 from Flores, *D. rectifrons* (Dollfus, 1898) and *D. kemaensis* Taiti, Ferrara & Kwon, 1992 from Sulawesi] have one nodulus lateralis per side on pereonites 1–6, with that on pereonite 4 far from the lateral margin, and two noduli per side on pereonite 7. No information is available on the noduli laterales of *D. bedaliensis* Herold, 1931 and *D. feuerborni* Herold, 1931 from Java, and *D. magnificus* Herold, 1931 from Flores. These characters (number and position of the noduli laterales) in the Armadillidae have very seldom been considered in previous literature and their real taxonomic importance at the generic level in this family is still to be demonstrated. All the species of *Dryadillo*, however, present a very similar external morphology.

Genus *Spherillo* Dana, 1853

11.7. *Spherillo raffaelei* (Arcangeli, 1927) (Figs. 288–300)

Armadillo Raffaelei: ARCANGELI 1927: 211, Fig. I.

Spherillo (Formosillo) Raffaelei: ARCANGELI 1952: 292.

Formosillo raffaelei: DUDGEON, MA & LAM 1990: 398;

MA, DUDGEON & LAM 1991: 348;

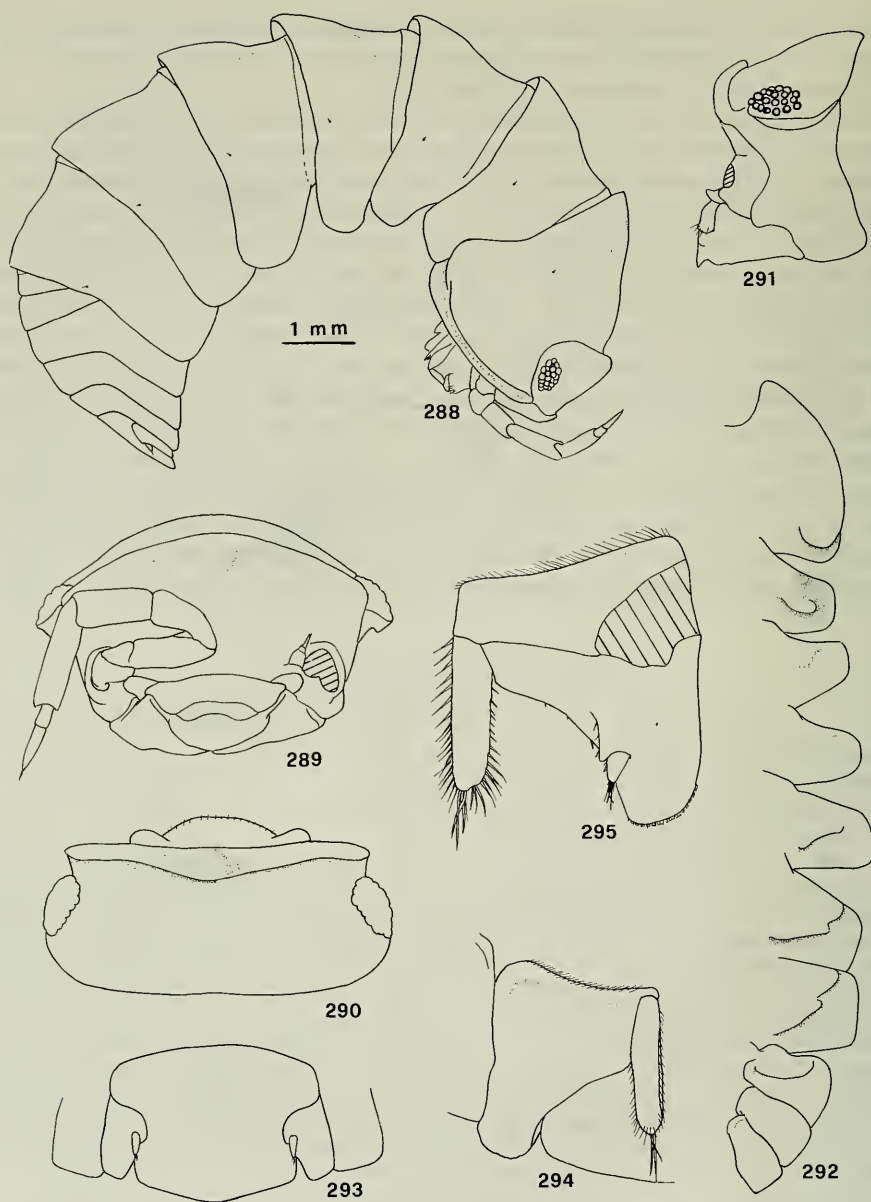
MA, LAM & DUDGEON 1991: 678.

Specimens examined: **China**: 2 ♂♂, 6 ♀♀, Yunnan, Menzi Conty, Cave Chi Be Yi Dong, leg. BERON 12. I. 1989 (NNHMS). — 1 ♂, Yunnan, Menzi County, cave near the footpath to plateau, leg. BERON 5. I. 1989 (NNHMS). — 1 ♀, Yunnan, Menzi County, Cave Wulichong, Sink hole (No. 3), leg. BERON 4. I. 1989 (NNHMS). — 2 ♀♀, Yunnan, Menzi County, Wulichong, leg. BERON 6. I. 1989 (MZUF). — 4 ♂♂, 3 ♀♀, Yunnan, Shilin, Stone Forest, leg. BERON 30. IX. 1988 (MZUF). — 2 ♂♂, 9 ♀♀, Guanxi Zhuangxi Zizhiqu, Guilin, leg. BERON 6. X. 1988 (SMNS). — 1 ♂, 8 ♀♀, Sichuan, Chengdu, Baoguang Monastery, leg. BERON 21. I. 1989 (SMNS). — 1 ♂, Sichuan, Loochou [= Luzhou], leg. SILVESTRI 17. V. 1924 (DEAP). — 1 ♀, 8 juvs., Guangdong, Canton, Yamon, leg. SILVESTRI, 3. V. 1925 (DEAP). — 2 ♀♀, 1 juv., Guangdong, Canton, leg. SILVESTRI 1. V. 1925 (DEAP). — 5 ♂♂, 6 ♀♀, Fujian, Kusang, leg. SILVESTRI 27. I. 1924 (DEAP). — **Hong Kong**: 10 ♂♂, 10 ♀♀, Forest of „Hill above Belcher’s“, leg. MA IX. 1985 (MZUF).

Distribution: China, Macao, Hong Kong and Vietnam.

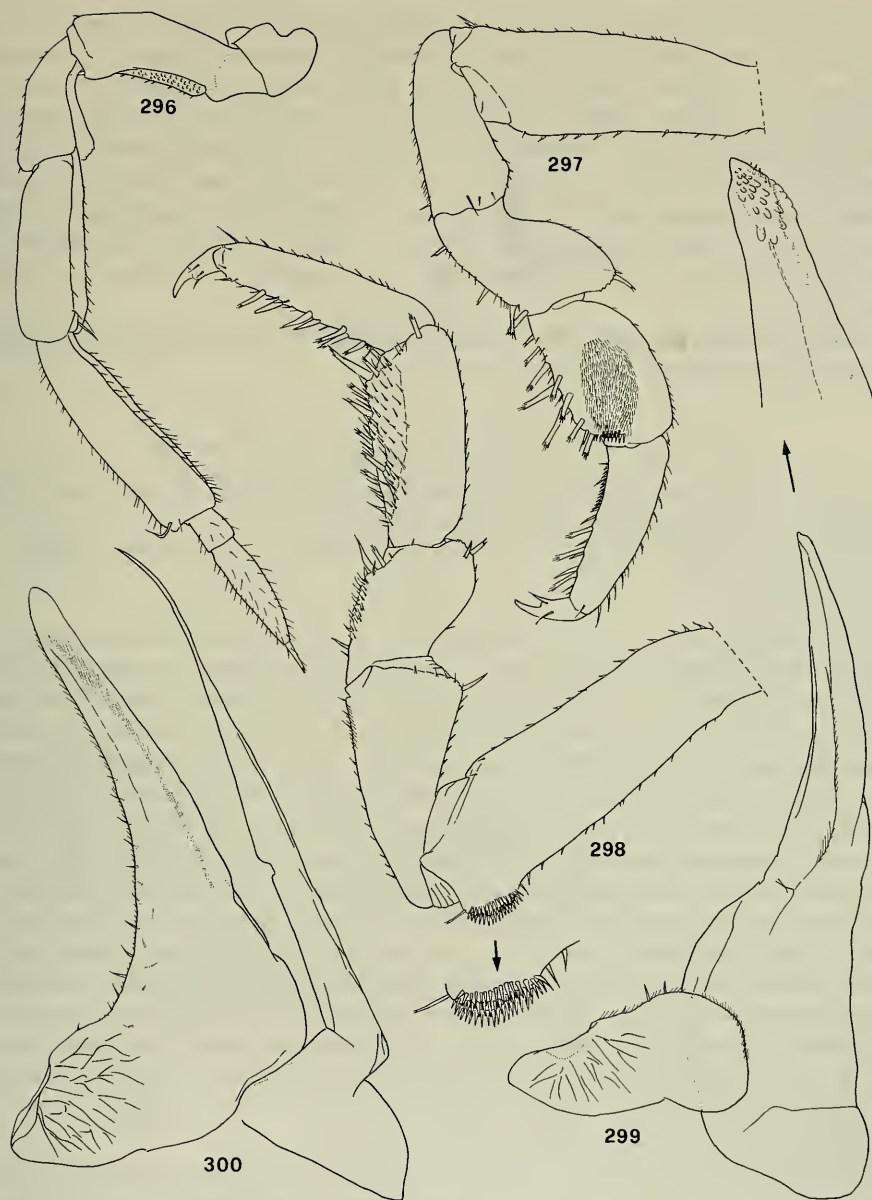
Remarks: The problem of the genus *Spherillo* has recently been solved by LEHTINEN, FERRARA & TAITI (in press) by choosing *S. vitiensis* Dana, 1853 (= *Armadillo testudinalis* Budde-Lund, 1885) as the type species. According to this designation, the genus *Spherillo* includes with certainty only the type species with its numerous junior synonyms (see TAITI, LEHTINEN & FARRARA, in preparation). —

The specimens here examined belong to *Armadillo raffaelei* described by ARCANGELI (1927). Later ARCANGELI (1952) transferred this species to the genus *Spherillo* and, for the sexual modifications of the male pereopod 7, to the subgenus *Formosillo* Verhoeff, 1928. Even if ARCANGELI could not have had an exact idea of what *Spherillo*



Figs. 288–295. *Spherillo raffaelei*. – 288. Adult female in lateral view; – 289. Cephalon, frontal view; – 290. Cephalon, dorsal view; – 291. Cephalon, lateral view; – 292. Epimera of pereonites and pleonites 3–5, ventral view; – 293. Pleonite 5, telson and uropods; – 294. Right uropod, ventral view; – 295. Right uropod, dorsal view.

was like, we agree that this species belongs to *Spherillo* since it shows all the typical characters of the genus, i. e.: cephalon with frontal lamina not or only slightly protruding over vertex; schisma of pereonite 1 deep, with inner lobe shorter than outer one; pereonite 2 with an oblique tooth-like lobe on ventral surface; presence of ven-



Figs. 296–300. *Spherillo raffaelei*; ♂. – 296. Antenna; – 297. Pereopod 1; – 298. Pereopod 7; – 299. Pleopod 1; – 300. Pleopod 2.

tral lobes on pereonites 3–7 (more distinct on pereonites 5–7) and pleonite 3 (in *S. vitensis* also on pleonites 4 and 5); telson hour-glass-shaped; maxillular inner branch with two stout plumose penicils; pleopodal lungs with single opening; uropod with a short exopod inserted on the dorsal surface of the protopod underneath a transversal tooth. Another character common to *S. raffaelei* and *S. vitensis* is the number and position of the noduli laterales (one per side on each pereonite, all more or less at the same distance from the lateral margin). –

Formosillo was instituted by VERHOEFF (1928) for the new species *F. zimmeri* from Taiwan. Re-examination of syntypes of *Formosillo zimmeri* (Taiwan: 1 ♂ without cephalon and pereonites 1 and 2, Kankan, leg. H. SAUTER VII. 1909; 2 ♀♀, Hoozon, leg. H. SAUTER I. 1910, ZMB) proved the genus *Formosillo* to be clearly different from *Spherillo*. In fact, in *F. zimmeri* the ventral lobe of the second pereonite is in the form of a rounded thickening instead of an oblique tooth, and it completely lacks ventral lobes on pereonites 3–7 and pleonites. The same kind of modification of the male pereopod 7 basis (compare Fig. 298 for *S. raffaelei* and Fig. 4 in VERHOEFF, 1928 for *F. zimmeri*) must be considered a convergence rather than a synapomorphy. —

In order to facilitate recognition of *Spherillo raffaelei*, the main diagnostic characters are here illustrated from specimens from China.

11.8. *Spherillo orientalis* n. sp. (Figs. 301–314)

Holotype: ♂ 6.5 mm long, China, Yunnan, Kunming, Longmen (Dragon Gate), Xishan Park, 2000–2280 m, leg. BERON 28. IX. 1988 (SMNS).

Paratypes: 1 ♂, 1 juv., same data as holotype (NNHMS). — 1 ♀, same data (SMNS). — 1 ♂, same data (MZUF).

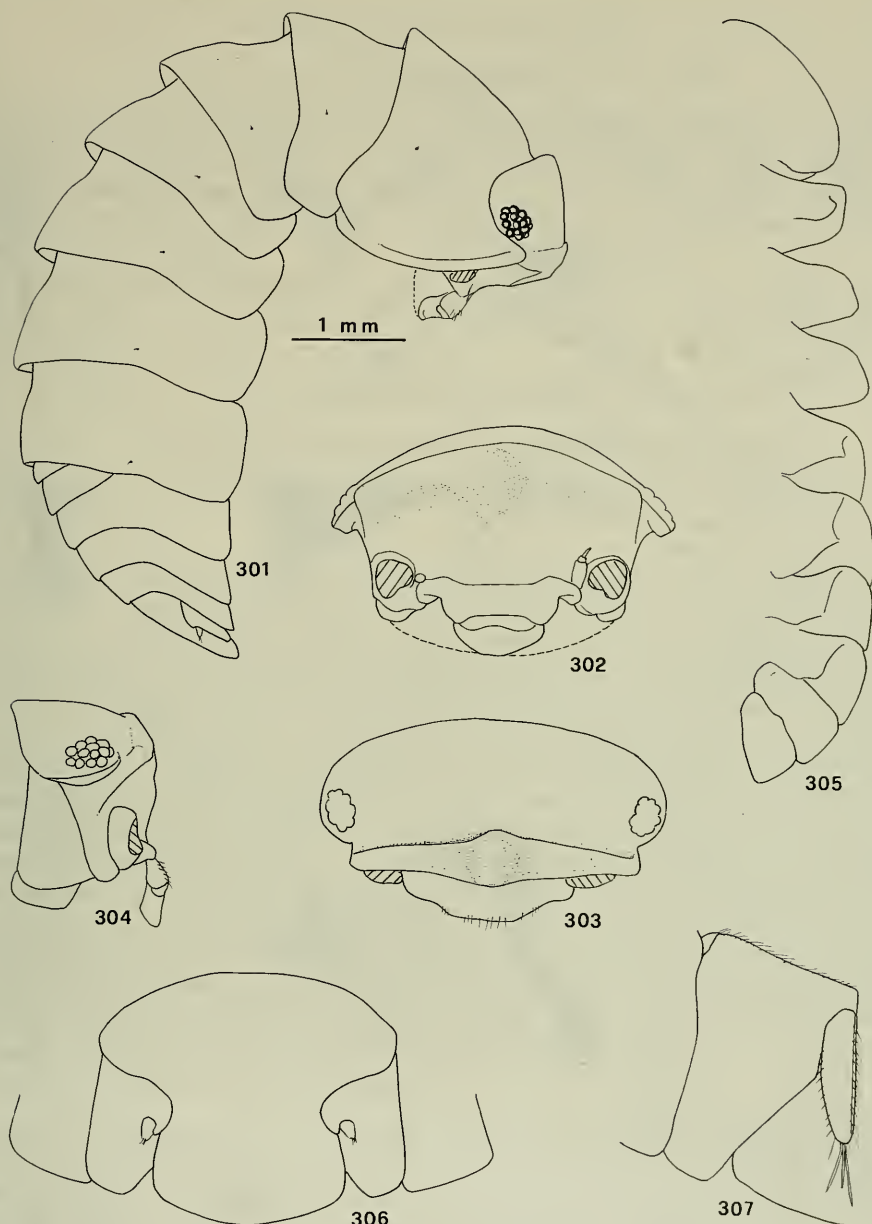
Description:

Maximum dimensions of ♂ 7.5×3.5 mm, of ♀ 8.0×3.5 mm. Colour brown-grey with the usual yellowish muscle spots, uropods pale (reddish in vivo?). Dorsum smooth with numerous tiny scale-spines. One nodulus lateralis per side on each pereonite, far from lateral margin of segment. Eye with about 15 ommatidia. Cephalon with frontal shield separated and bent over vertex, protruding only at sides; profrons depressed in the middle. Pereonite 1 with distal margin regularly curved, lateral margin not grooved, schisma with outer lobe slightly protruding backwards compared with inner one. Pereonite 2 with a large ventral tooth. Pereonites 3 and 4 with a transversal thickening, pereonites 5–7 and pleonite 3 with a quadrangular lobe on ventral surface of epimera; no ventral lobes on pleonites 4 and 5. Telson hour-glass-shaped, with basal part wider than distal one, distal margin convex. Antenna short, slightly surpassing posterior margin of cephalon; second flagellar article about 3.5 times as long as first. Mandible with molar penicil consisting of numerous plumose setae arising from a common stem. Maxillular outer branch with 4 + 6 simple teeth; inner branch with two stout plumose penicils. Uropodal protopod trapezoidal with rounded posterior corners; tiny exopod inserted on dorsal surface of protopod, beneath a short tooth. —

Male. Pereopod 7 basis with a setose depression on distal part of sternal margin. Pleopod 1 exopod much wider than long, with a very short posterior point and some spines on outer and medial margin; endopod with apical part bent slightly outwards, without special modifications. Pleopod 2 as in Fig. 314.

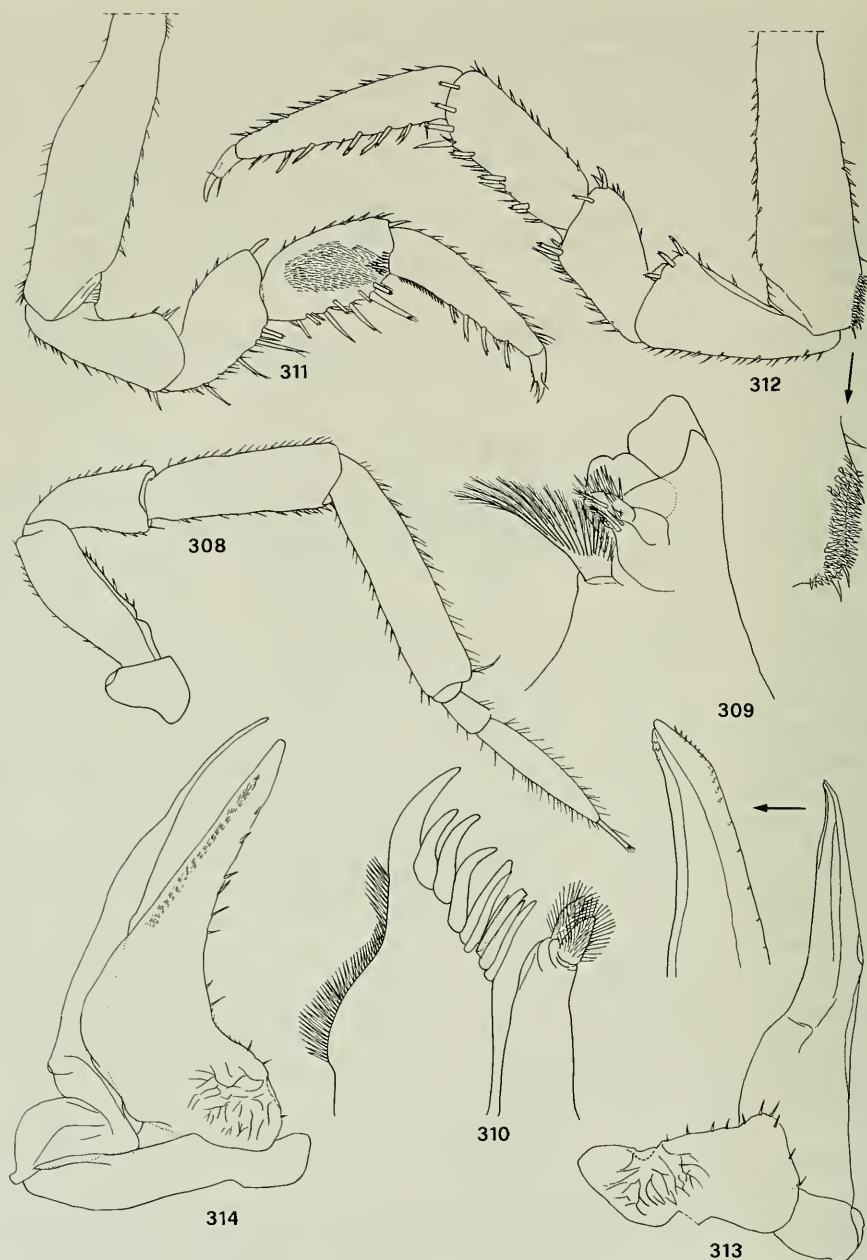
Etymology: Latin *orientalis* = oriental.

Remarks: *S. orientalis* n. sp. is morphologically close to *Spherillo raffaelei* from which it differs by the smaller number of ommatidia (15 vs. 20), ventral lobe of pleonite 3 larger and quadrangular instead of semilunar (compare Fig. 305 and Fig. 292), telson with narrower distal part, uropod with shorter basal part of the protopod and shorter and stouter exopod, male pereopod 7 with a setose depression on the basis instead of a rounded setose, protruding process (compare Fig. 312 and Fig. 298), and



Figs. 301–307. *Spherillo orientalis* n. sp. — 301. Male paratype in lateral view; — 302. Cephalon, frontal view; — 303. Cephalon, dorsal view; — 304. Cephalon, lateral view; — 305. Epimera of pereonites and pleonites 3–5, ventral view; — 306. Pleonite 5, telson and uropods; — 307. Right uropod, ventral view.

male pleopod 1 exopod with a short posterior point, completely absent in *S. raffaelei*.



Figs. 308–314. *Spherillo orientalis* n. sp.; ♂. — 308. Antenna; — 309. Mandible; — 310. Maxillule; — 311. Pereopod 1; — 312. Pereopod 7; — 313. Pleopod 1; — 314. Pleopod 2.

Genus *Venezillo* Verhoeff, 192811.9. *Venezillo parvus* (Budde-Lund, 1885)

Specimens examined: **China**: 3 ♂♂, 5 ♀♀, Nanjing, Zijin (Purple) Mt., 350–400 m, leg. BERON 9. X. 1988 (NNHMS). – 2 ♂♂, 4 ♀♀, Hainan Dao, Haikou, sea shore, leg. BERON 15. X. 1988 (NNHMS). – 1 ♂, 2 ♀♀, same date (SMNS). – **Hong Kong**: 1 ♂, 2 ♀♀, Mai Po Marshes, leg. MA VII. 1986 (MZUF). – 3 ♂♂, 17 ♀♀, 2 juvs., „Hill above Belcher's“, leg. MA V. 1986 (MZUF). – 3 ♀♀, Castle Park, leg. COTTARELLI 25. I. 1981 (MZUF).

Distribution: Pantropical.

Genus *Parakermania* Vandel, 197311.10. *Parakermania maculata* n. sp. (Figs. 315–324)

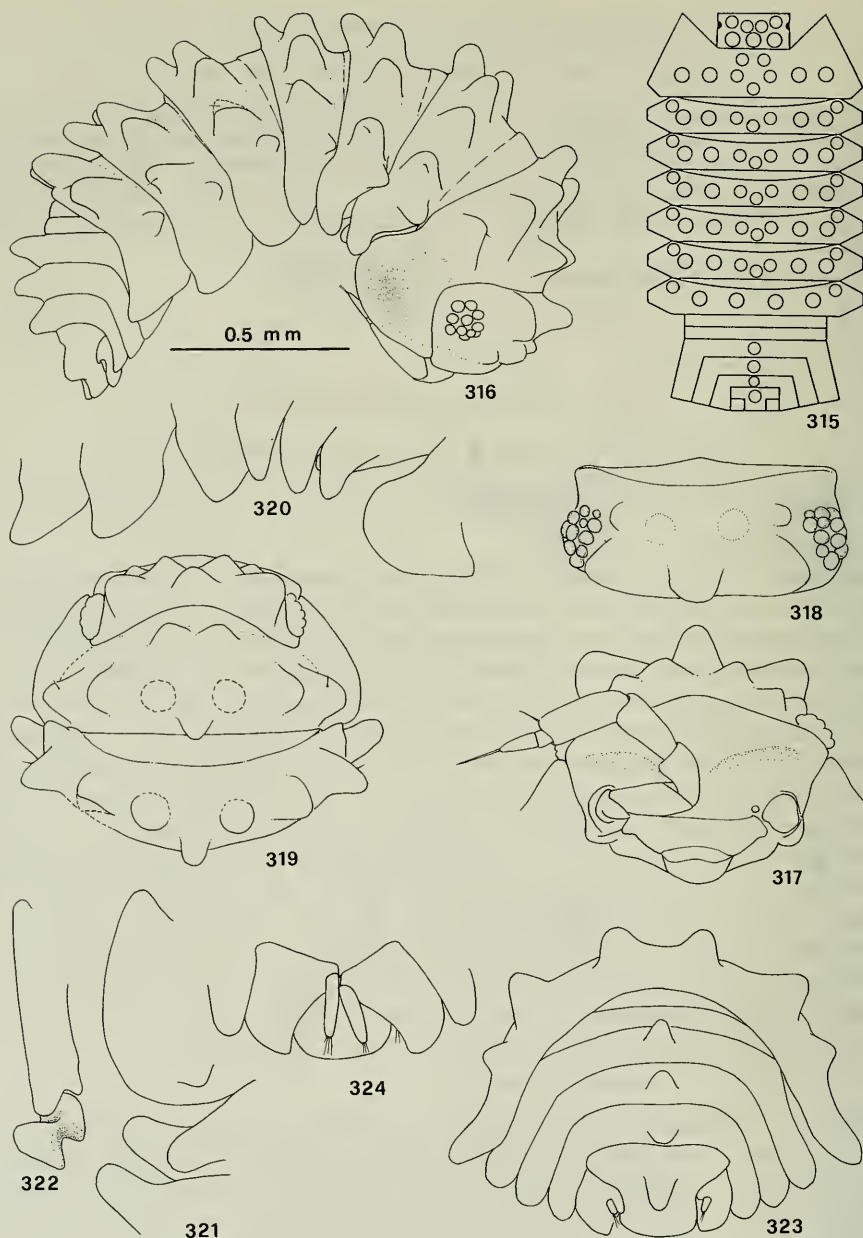
Holotype: ♀ 2 mm long, **China**, Hainan Dao, Qingdao, 200–300 m, leg. BERON 14. X. 1988 (SMNS).

Description:

Dimensions 2 × 1 mm. Creamy yellow colour; pereonites 1–2 and 5–6 brownish violet with a median pale stripe; second tubercle from lateral margin on pereonites 4 and 7 pigmented in contrast to light ground colour, and those on pereonite 5 unpigmented on dark ground colour; epimera of pleonites 3, 4 and whole pleonite 5 brownish violet; telson pigmented with lateral margin of basal part pale. Dorsum covered with 71 large tubercles arranged as in Fig. 315. Eye globose with 11 ommatidia. Cephalon with frontal shield separated from vertex with upper margin broadly convex; profrons with antennal sockets to hold antenna when the animal rolls up. Epimera of pereonites and pleonites clearly curved outwards. Pereonite 1 with posterior margin concave at sides; a small ventral lobe distant from lateral margin. Pereonites 2–4 with tapering epimera with rounded apices. Pereonite 2 with a large oblique ventral tooth clearly separated from epimeron. Pereonites 5–7 with triangular epimera. Telson 1.5 times as wide as long; distal part quadrangular with convex distal margin. Antenna short and stout with first flagellar article much shorter than second. Uropodal protopod trapezoidal with postero-lateral corners broadly rounded; minute exopod inserted dorsally beneath a small tooth.

Etymology: Latin *maculatus* = spotted.

Remarks: The genus *Parakermania* was erected by VANDEL (1973) for one species, *P. minima*, from Dyaul Island, New Ireland, Bismarck Archipelago. VANDEL did not define the new genus properly but an examination of specimens belonging to the type species (2 ♂♂, 2 ♀♀, New Ireland, Kavieng, leg. J. D. BOURNE, 29. VII. 1979, MHNG, MZUF) confirmed the validity of the genus. The main characters of *Parakermania* are the following: animals able to roll up into a perfect ball; dorsum with distinct tubercles; epimera of pereonites and pleonites curved outwards; cephalon with frontal shield slightly protruding over vertex; pereonite 1 with a small ventral lobe; pereonite 2 with large ventral tooth, directed obliquely; pereonites 2–7 with triangular epimera; telson with quadrangular distal part; antenna short and stout; uropodal exopod short, inserted dorsally on protopod. In *Parakermania minima* male pleopods 1–2 exopods are without respiratory structures while pleopods 3–5 exopods possess clear respiratory areas; in *Parakermania maculata* n. sp. it



Figs. 315–324. *Parakermania maculata* n. sp.; holotype. — 315. Disposition of dorsal tubercles; — 316. Lateral view; — 317. Cephalon, frontal view; — 318. Cephalon, dorsal view; — 319. Cephalon and pereonites 1–2, dorsal view; — 320. Right epimera of pereonites; — 321. Epimera of pereonites 1–3, ventral view; — 322. Epimera of pereonites 1 and 2, view from bottom; — 323. Pereonite 7, pleon, telson and uropods; — 324. Telson and uropods, ventral view.



Fig. 325. Recorded distribution of terrestrial isopod species in southern China, Macao and Hong Kong: 1. *Tylos minor*, – 2. *Ligia exotica*, – 3. *Ligidium denticulatum*, – 4. *Olibrinus truncatus*, – 5. *Alloniscus pigmentatus*, – 6. *Armadilloniscus ellipticus*, – 7. *Littorophiloscia aldbabrana*, – 8. *Papuaphiloscia granulata* n. sp., – 9. *P. arcangelii* n. sp., – 10. *Pseudotyphloscia alba*, – 11. *Burmoniscus ocellatus*, – 12. *B. okinawaensis*, – 13. *B. javanensis*, – 14. *B. mauritiensis*, – 15. *B. purpura* n. sp., – 16. *B. yunnanensis* n. sp., – 17. *B. flavivertex* n. sp., – 18. *B. lobatus* n. sp., – 19. *Exalloniscus cortii*, – 20. *E. rotundatus*, – 21. *E. silvestrii* n. sp., – 22. *Nagurus sundaicus*, – 23. *N. nanus*, – 24. *N. cristatus*, – 25. *N. pallidipennis*, – 26. (?) *Nagurus verhoeffi*, – 27. „*Nagurus*“ *vandeli*, – 28. *Lucasiodes gigliotosi*, – 29. *L. zavattarii*, – 30. *L. isseli*, – 31. *L. pedimaculatus* n. sp., – 32. (?) *Lucasiodes cavernicolus* n. sp., – 33. *Mongoloniscus nipponicus*, – 34. *M. nigrogranulatus* n. sp., – 35. *Agnara madagascariensis*, – 36. *Agabiformius lentus*, – 37. *Porcellio laevis*, – 38. *Porcellionides pruinosis*, – 39. *Armadillidium vulgare*, – 40. *Cubaris murina*, – 41. *Troglodillo rotundatus* n. sp., – 42. *Sinodillo troglophilus* n. sp., – 43. *S. ferrarai* n. sp., – 44. *S. schmalzfussi* n. sp., – 45. *Dryadillo maculatus*, – 46. *Spherillo raffaelei*, – 47. *S. orientalis* n. sp., – 48. *Venezillo parvus*, – 49. *Parakermania maculata* n. sp.

was not possible to check this character since no micropreparation of the pleopods was made so as not to damage the single small specimen. –

The genus *Parakermania* appears very close to *Tuberillo* Schultz, 1982 from the Oriental Region (for definition and comments on this genus see TAITI, FERRARA & KWON 1992). It is distinguished by the frontal shield protruding less over vertex, triangular instead of quadrangular pereon epimera, pereonite 1 with a small ventral lobe instead of a schisma, telson with a quadrangular distal part instead of hour-glass-shaped, and uropodal protopod with basal part not enlarged. –

Parakermania maculata n. sp. is readily distinguishable from *P. minima*, the only other species in the genus, by the different number and disposition of dorsal tubercles.

12. Discussion

A total of 49 species of terrestrial isopods are now known from southern China (south of the river Chiangjiang), Hong Kong and Macao (Fig. 325). Considering the vast area and the relatively limited sites of collections, certainly this number represents only a portion of the oniscidean fauna present in this part of China. However, the picture that we get is certainly significant of the kind of population of the area.

One genus and 16 species are described as new and other 13 species are new records for southern China, Hong Kong and Macao. Re-examination of most of the material studied by ARCANGELI (1927; 1952) permitted to correct several misidentifications and to complete illustrations of the species described by that author.

According to their present distribution, the species can be grouped in the following categories:

— 1) Cosmopolitan species (5):

Armadilloniscus ellipticus, *Agabiformius lentus*, *Porcellio laevis*, *Porcellionides pruinosus* and *Armadillidium vulgare*. All these species have a Mediterranean origin.

— 2) Pantropical species or species with a wide distribution in the tropics (13):

Tylos minor, *Ligia exotica*, *Olibrinus truncatus*, *Alloniscus pigmentatus*, *Littorophiloscia aldabrana*, *Burmoniscus okinawaensis*, *B. javanensis*, *B. mauritiensis*, *Nagurus nanus*, *N. cristatus*, *Agnara madagascariensis*, *Cubaris murina* and *Venezillo parvus*. The first five species, together with *Armadilloniscus ellipticus* from the preceding group, are littoral and halophilic with a great facility of dispersal, for instance on driftwood, while the last eight, together with the remaining species of the preceding group, are euryoecious, synanthropic, common in disturbed habitats.

— 3) Palaearctic Manchurian species (3):

Lucasioides gigliotosi, *Mongoloniscus nipponiscus* and *Exalloniscus cortii*.

— 4) Oriental species (5):

Pseudotyphloscia alba, *Burmoniscus ocellatus*, *Nagurus sundaicus*, *N. pallidipennis*, *Spherillo raffaelei*.

— 5) Endemic species (23):

Ligidium denticulatum, *Papuaphiloscia granulata*, *P. arcangelii*, *Burmoniscus purpura*, *B. yunnanensis*, *B. flavivertex*, *B. lobatus*, *Exalloniscus rotundatus*, *E. silvestrii*, (?) *Nagurus verhoeffi*, „*Nagurus*“ *vandeli*, *Lucasioides zavattarii*, *L. isseli*, *L. pedimaculatus*, (?) *L. cavernicolus*, *Mongoloniscus nigrogranulatus*, *Troglodillo rotundatus*, *Sinodillo troglophilus*, *S. ferrarai*, *S. schmalfussi*, *Dryadillo maculatus*, *Spherillo orientalis* and *Parakermania maculata*. These endemics represent 47% of the total number of species. Such a high percentage of endemics is not surprising, considering the variety of orography, climate and vegetation of this vast area, and it is very probable that it will remain high even when this part of China and surrounding countries (northern China, Myanmar, Thailand, Laos and Vietnam) are properly investigated.

As a whole, the kind of population of this southern part of China is mainly typical of the Oriental Region with a minor component of palaearctic elements. In fact, if we consider the genera represented in the area (with the exclusion of those of the cosmopolitan and pantropical species), two different elements populate this part of China: a more conspicuous tropical group (*Papuaphiloscia*, *Burmoniscus*, *Exalloniscus*, *Nagurus*, *Troglodillo*, *Sinodillo*, *Dryadillo*, *Spherillo* and *Parakermania*), and a smaller palaearctic or holarctic group (*Ligidium*, *Lucasioides*, *Koreoniscus* and

Mongoloniscus). The former group is mainly constituted of genera widely represented in the Oriental Region and by two genera (*Papuaphiloscia* and *Parakermania*) typical of the Australian Region (Austro-Malayan Subregion). The latter group is formed of three closely related genera characteristic of the Manchurian Subregion (*Lucasioides*, *Koreoniscus* and *Mongoloniscus*) and by the genus *Ligidium* which is widely represented in both Nearctic and Palaearctic Regions.

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