

NEW RECORDS OF FISH PARASITIC MARINE
ISOPOD CRUSTACEANS
(CYMOTHOIDAE, SUBFAMILY ANILOCRINAE)
FROM THE INDO-WEST PACIFIC

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Abstract.—New records of Indo-Pacific Anilocrinae are reported on, principally from the collections of the Smithsonian Institution, British Museum (Natural History), and the Zoologisch Museum, Amsterdam. Twenty-nine species from the genera *Anilocra*, *Creniola*, *Nerocila*, *Pleopodias* and *Renocila* are recorded or reported on, with remarks given for all species, and figures for those species that are poorly known. The hosts of three isopod species are recorded for the first time, and new host records are given for a further six species.

New figures are given for *Anilocra marginata* (Bleeker), *Anilocra rhodotaenia* Bleeker is relegated to *species inquirenda*. The following new synonyms are recorded: *Nerocila arres* Bowman & Tareen with *N. sigani* Bowman & Tareen; *Anilocra acuminata* Haller with *A. capensis* Leach; and *Pleopodias superatus* Williams & Williams with *P. diaphus* Avdeev.

Bruce (1987a, b, c) recently revised the Australian genera and species of the subfamily Anilocrinae. In the course of that work the type material of most species of *Anilocra*, *Nerocila*, *Renocila* and *Pleopodias* was examined and drawn. In 1986 the senior author visited the Smithsonian Institution, the British Museum (Natural History), and other museums in Europe. Using the new taxonomy (Bruce 1987a, b, c) and unpublished drawings of the types, it was possible to identify nearly all anilocrine species encountered. Many species here have had their reported distribution greatly expanded. Figures are given for the less well known species.

A total of 29 species is reported on. Of all the specimens examined only five apparently undescribed species were encountered. All these are in the collection of the Smithsonian Institution. These were a large species of *Renocila* from the Philippines (identified by Richardson 1910, as *R. ovata*), *Anilocra* sp. of Monod (1976) (6 spec-

imens from Ambon, two from Madang, Papua New Guinea, all of which show they are distinct from *Anilocra apogonae* Bruce), another *Anilocra* from Madang, and a number of specimens belonging to the *Anilocra dimidiata-leptosoma* complex of species. The low number of unnamed taxa encountered suggests the probability that most of the Indo-Pacific Anilocrinae have now been described. Notwithstanding Williams & Williams (1986, 1987) have recently described several new taxa from Japanese waters.

The synonymization of a recently described species of *Nerocila* merits some discussion. *Nerocila sigani* was described from the holotype only. Since then, Bruce (1987a) has shown species of *Nerocila* to be far more variable in morphology than related genera. It would seem therefore that while describing other distinctive species of cymothoids from single adult specimens is potentially acceptable, it is not advisable to do so for *Nerocila* species. The synonymization here

of *Pleopodias superatus* Williams & Williams, 1987 with *Pleopodias diaphus* Avdeev, 1975 highlights the need for thorough literature coverage when dealing with the Cymothoidae. Poorly described species are still a problem in the family. There are still several such species of Indo-Pacific Anilocrinae (listed by Bruce 1987a, b, c) to which can be added *Anilocra huacho* Rokitsky, 1984 from the East Pacific.

This work therefore has two aims: to record the new data and synonymies for those species treated herein, and to provide additional figures and data for several of the poorly known Indo-Pacific species.

All measurements are in millimeters.

Abbreviations.—BMNH—British Museum of Natural History, London; USNM—National Museum of Natural History, Smithsonian Institution, Washington, D.C.; MHNG—Museum d'Histoire Naturelle, Geneva; NRS—Naturhistoriska Riksmuseet, Stockholm; NTM—Northern Territory Museum, Australia; QM—Queensland Museum, Australia; RMNH—Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands; ZMA—Zoologisch Museum, Amsterdam, The Netherlands.

Genus *Anilocra* Leach, 1818

Anilocra alloceraea Koelbel

Restricted synonymy.—*Anilocra alloceraea*.—Bruce, 1987a:93, figs. 4, 5.

Material examined.—2 ♀♀ (ovig 17.5, non-ovig 24.5), Singapore, 26 Aug 1967, coll. Chun (USNM 233273). ♀, Sero, near Karang, Indonesia, 23 Mar 1908, on *Stolopherus* (ZMA).

Remarks.—Distribution here extended westwards to Singapore.

Anilocra amboinensis Schiödte & Meinert
Fig. 1

Anilocra amboinensis.—Schiödte & Meinert, 1881:116, pl. 8, fig. 9.

Anilocra amboinensis.—Nierstrasz, 1915:

87; 1931:129.—Monod, 1976:856, figs. 5–7.—Trilles, 1979:247.

Material examined.—Holotype, ♀ (30.0 mm), Amboina, Moukkon, coll. E. W. Lu-deking (RMNH 17). 2 ♀♀ (ovig 29.0, 27.5), Gane (Gillola) Island, 1 Dec 1909 (USNM 233274); ♀ (ovig 27.0), Dowarra Island, 2 Dec 1909 (USNM 233275); ♀ (ovig 31.5), Uki, Bouri Island, N.I., Indonesia, 9 Dec 1909 (USNM 233276); ♀ (ovig 29.0), Limbe Strait, Celebes, Indonesia, 11 Nov 1909 (USNM 233277); all coll. U.S. Bureau of Fisheries *Albatross* Expedition 1907–9. ♀ (ovig 28.5), Saparna Island, SE tip of Haria Bay, Indonesia, 03°35'S, 128°36'E, 5 Mar 1974, 1.5–5.0 m depth (USNM 231186). 2 ♀♀ (ovig 25.5, 22.5), Tandjung, Honimau, northeast of Ambon Island, Indonesia, 03°30.5'S, 128°20.0'E, 16 Mar 1974 (USNM 231185). ♀, west coast of Binongha, Indonesia, 1–3 Nov 1899, Siboga Expedition Sta 220, on *Ballistes* sp. (ZMA).

Remarks.—Widely distributed in Indonesia and the Philippines. This large species is easily recognized by its wide body, broadly rounded pleotelson, and uropods that are usually concealed in dorsal view.

The similarity between this species and the holotype of *Anilocra marginata* Miers suggests that further study and redescription may show them to be synonymous.

Hosts.—Monod (1976) recorded *Naso thynnoides* (F. Acanthuridae) as host; also recorded from *Ballistes* sp. (F. Balistidae).

Anilocra apogonae Bruce

Anilocra apogonae Bruce, 1987a:112, figs. 22, 23.

Material.—♀ (ovig 13.0), off Port Moresby, Papua New Guinea, 20 Jun 1970, coll. B. B. Collette (Sta 1527) (USNM 233272).

Remarks.—The range is here extended to southern Papua New Guinea. Examination of material in the USNM shows that *Anilocra* sp. recorded by Monod (1976) is not

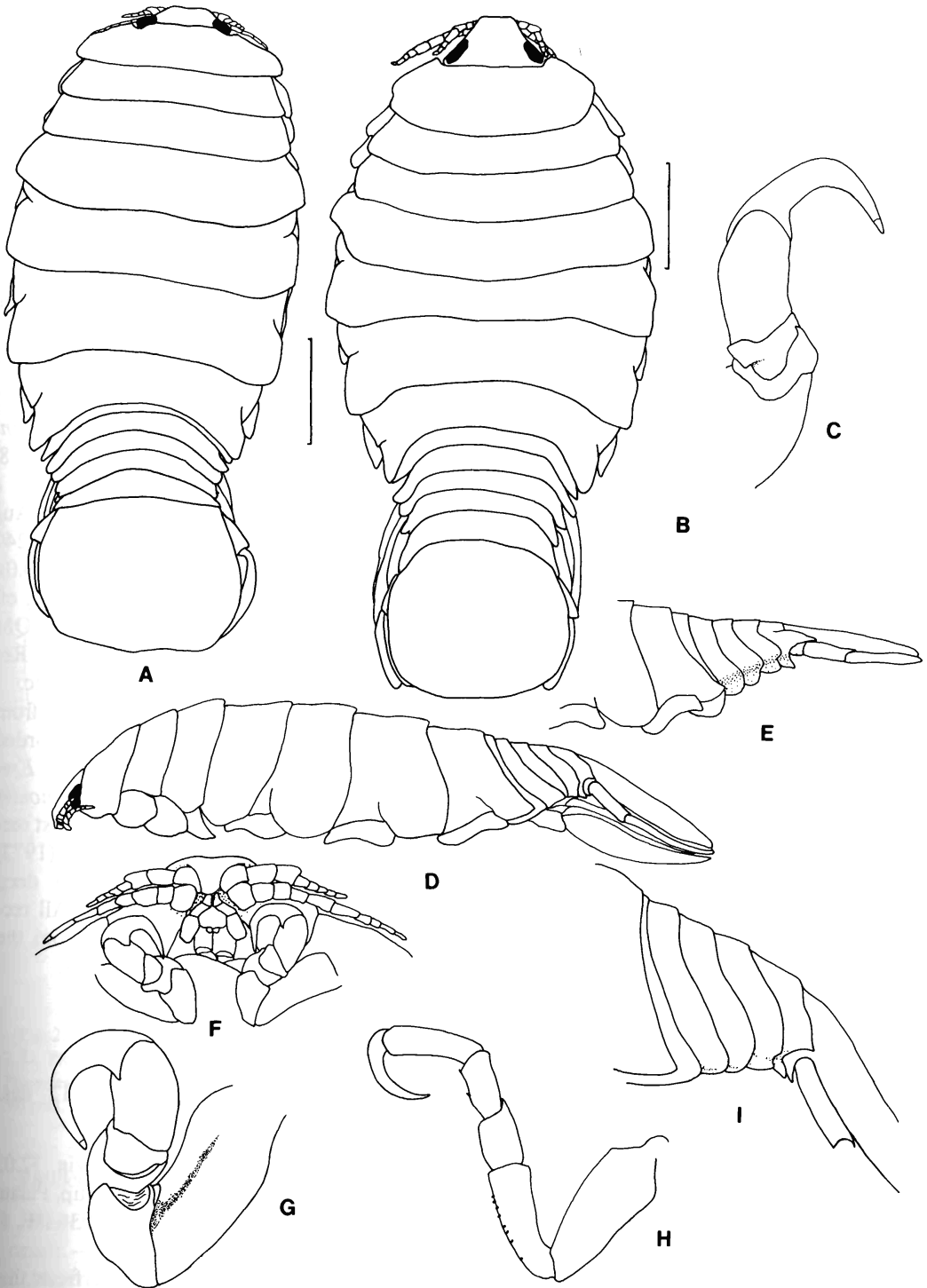


Fig. 1. *Anilocra amboinensis*, A, D, F-I, holotype, remainder Celebes, USNM 233277. A, Dorsal view; B, Dorsal view; C, Pereopod 1; D, Lateral view; E, Pleon, lateral view; F, Frons; G, Pereopod 1; H, Pereopod 7; I, Pleon, lateral view. Scale lines represent 5.0 mm.

conspecific, contrary to the synonymy given by Bruce (1987a).

Anilocra capensis Leach

Restricted synonymy.—*Anilocra capensis*.—Trilles, 1975:304, pl. 1, fig. 1.

Anilocra acuminata.—Haller, 1880:389, 393, pl. 18, figs. 18, 19 (new synonymy).

Remarks.—Examination of the two syntypes of *A. acuminata* from Mauritius (MHNG 13) reveals no difference from the type material of *Anilocra capensis*, and the species is here placed in synonymy with *Anilocra capensis*.

Trilles (1975) cites records from Indonesia, but the majority of records are from southern Europe, West Africa and southern Africa. Mauritius falls well within the distribution of this species.

Anilocra cavicauda Richardson

Restricted synonymy.—*Anilocra cavicauda*.—Bruce, 1987a:95, fig. 6.

Material examined.—2 ♀♀ (ovig 36.0, 32.0), Cataingua Bay, Philippines, 17 Apr 1908, coll. U.S. Bureau of Fisheries *Albatross* Philippine Expedition, 1907–9 (USNM 233271).

Remarks.—The specimens recorded here were not reported on by Richardson (1910), but agree well with the figures of the holotype given by Bruce (1987a). There exist no host records for this species.

Anilocra dimidiata Bleeker

Restricted synonymy.—*Anilocra dimidiata*.—Bruce, 1987a:99, figs. 9–11; 1988.

Material examined.—2 ♀♀ (non-ovig 19.0, 19.5), Tsiuipaika Bay, Madagascar, ca. 1959, coll. A. Crosnier (USNM 109233). 4 ♀♀ (ovig 23.5, 21.5, 20.5, 19.5), Galle Harbour, Sri Lanka, 06°01.0'N, 80°14.2'E, 26 May 1970, 2–5 m depth, coll. T. Iwamoto (USNM 233278). ♀ (ovig 22.0), Palk Bay, 6 Feb 1902, coll. Herdman (BMNH 1928.12.1:893–

894). 2 ♀♀ (ovig 25.5, 26.5), Tana Keke Island, Philippines, 21 Dec 1909, coll. U.S. Bureau of Fisheries *Albatross* Philippines Expedition, 1907–9 (USNM 233279). ♀ (ovig 19.0), Salayer, 26 Oct 1899, Siboga Expedition Sta 213 (ZMA).

Remarks.—Previously recorded from the Indo-Malaysian area, Australia (Bruce 1987a) and Hong Kong (Bruce 1988), the range is here extended, and now includes the tropical western Indian Ocean, Sri Lanka and Philippines.

Anilocra gigantea (Herklots)

Restricted synonymy.—*Anilocra gigantea*.—Trilles, 1972:9, figs. 1, 2, photos. 7, 8.

Material examined.—♀ (ovig 72.0), ♂ (37.0), off Suva reefs, Suva, Fiji, 30 Aug 1980, off gills of *Epinephelus* sp., depth 240 m (QM W13118); ♀ (non-ovig 59.0), ♂ (30.0), off Suva reefs, Suva, Fiji, 17 Sep 1980, off gills of *Pristipomoides flavipinnis* (QM W14305); both coll. Institute of Marine Resources, University of the South Pacific.

Remarks.—This is the second record from the Pacific, having been previously recorded from New Caledonia (Trilles 1972). *Epinephelus* (F. Serranidae) and *Pristipomoides flavipinnis* (F. Lutjanidae) are new host records for *Anilocra gigantea*. Trilles (1972) recorded the species from another deep water lutjanid *Etelis carbunculus*. All records of position on the host are from the gills, a position unique in the genus.

Anilocra koolanae Bruce

Fig. 2H

Anilocra koolanae Bruce, 1987a:112, figs. 20, 22.

Material examined.—2 ♀♀ (ovig 32.0, 25.0), Pulan Tikos Pulau Pari Group, Pulau Seribu, Indonesia, 05°51.0'S, 100°34.0'E, 6 Apr 1974, (USNM 231182).

Remarks.—Known previously from the holotype, this specimen extends the distribution to southern Indonesia.

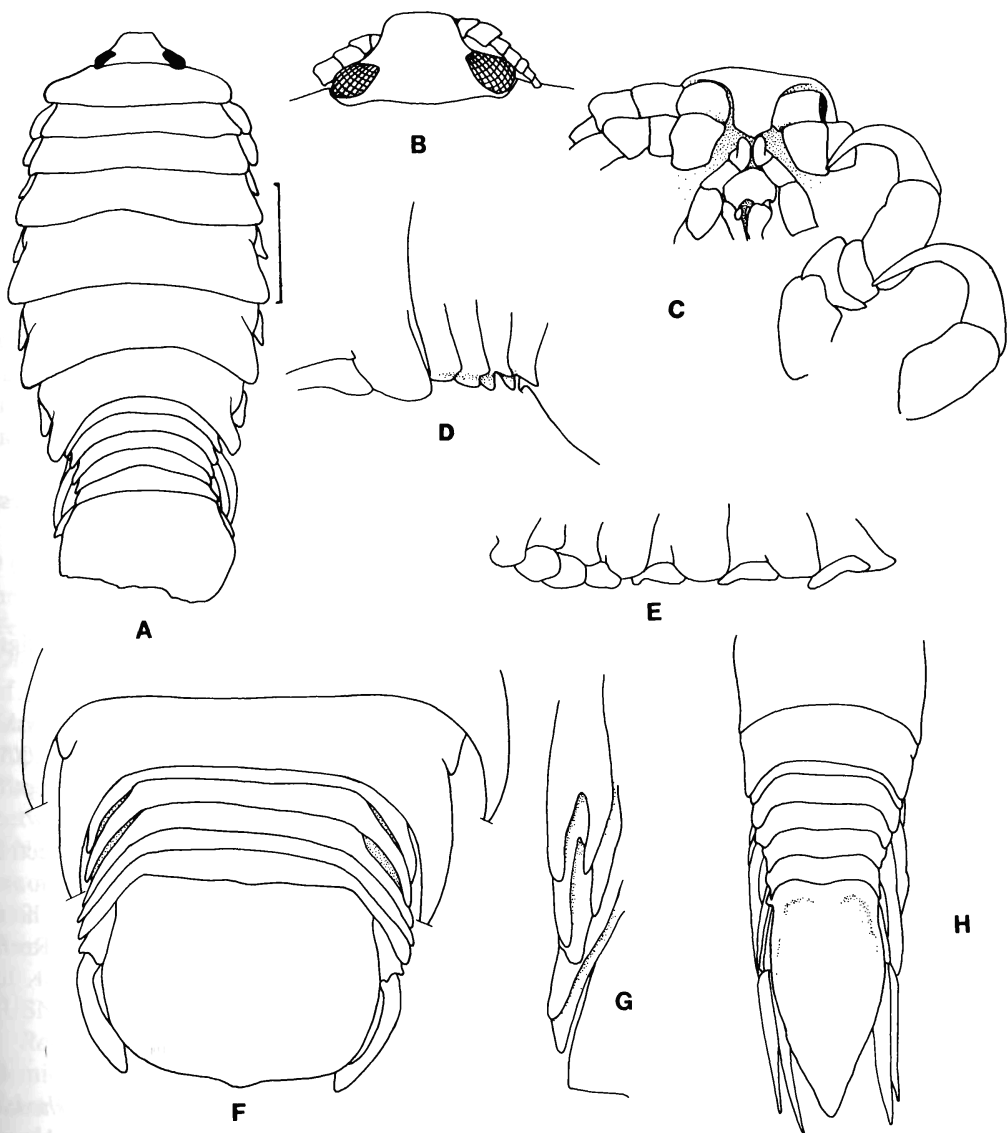


Fig. 2. *Anilocra marginata*, ? Syntype 23.0 mm. A, Dorsal view; B, Cephalon; C, Frons, and pereopods 1, 2; D, Pleonites, detail; E, Pereon lateral view. *Creniola breviceps*: F, Pleon, dorsal view, USNM 231178; G, Pleonites, ventral view, USNM 231177. *Anilocra koolane*, USNM 231182; H, Pleon. Scale line represents 5.0 mm.

Anilocra longicauda Schiödte & Meinert

Restricted synonymy.—*Anilocra longicauda*.—Bruce, 1987a:117, figs. 24, 25.

Material examined.—♀ (ovig 39.0), Ragay Gulf, Pasacao, Philippines, 9 Mar 1909, coll. U.S. Bureau of Fisheries *Albatross Ex-*

pedition 1907–9 (USNM 40999). ♀ (non-ovig 27.0), Maribuyoc Bay, Bohol Island, Philippines, 26 Mar 1909, coll. U.S. Bureau of Fisheries *Albatross Expedition* 1907–9 (USNM 40997).

Remarks.—Recently redescribed by Bruce (1987a), the present material falls within the

known distribution of the species. The specimens differ from the lectotype and Australian material described by Bruce (1987a) in having the antennae extending to the posterior of pereonite 1.

Anilocra prionuri Williams & Williams, 1981, is very similar to this species, and can best be separated by having a distinctly shorter pleotelson which is exceeded by the uropod rami, and a bulbous rather than triangular-digitiform rostral fold. Japanese material has longer antennae (Williams & Williams 1986) than Australian (Bruce 1987a), but antennal length varies, and in view of Philippine specimens with longer antennae, this difference cannot be regarded as species specific.

Anilocra marginata (Bleeker)

Fig. 2A-E

Cymothoa marginata Bleeker, 1857:21, 36, pl. 2, fig. 14.

Anilocra marginata Miers, 1880:462.

Material examined.—♀♀ (23.0, 14.5), Malaysia, presumed syntypes of *Cymothoa marginata* Bleeker (BMNH 80.6).

Remarks.—This specimen has a label "*Cymothoa marginata* Blekr." Most of Bleeker's (1857) type specimens are held by the Rijksmuseum van Natuurlijke Historie in Leiden, but a search of the collections there did not locate material of *Cymothoa marginata*. Miers (1880) remarked that he was examining Bleeker's material. In view of the label identifying it as *Cymothoa marginata* and the correspondence of Bleeker's figure to the present material, it seems probable that these are the syntypes of that species.

The exact distribution of this species is unknown, but it is likely to be Indonesia, where all of Bleeker's material came from.

Anilocra morsicata Bruce

Anilocra morsicata Bruce, 1987a:122, figs. 29, 30.

Material examined.—3 ♀♀ (non-ovig 16.8, 22.1, 23.4), 1 immature (13.3), 20 km east of Cape Moreton, southeastern Queensland, 16 Aug 1987, from *Astronesthes lucifer* in stomach of yellowfin tuna, coll. N. L. Bruce and D. Parsons (QM W14305).

Remarks.—The specimens agree with the description given by Bruce (1987a). *Astronesthes lucifer* is a deepwater benthopelagic fish (H. Masuda et al. 1984) and as well as being the first host record for *A. morsicata*, it is the first time a mesopelagic host has been recorded for *Anilocra*. The position on the host was dorsal, anterior to the dorsal fin.

Hosts.—*Astronesthes lucifer* (F. Astronesthidae).

Anilocra pomacentri Bruce

Anilocra pomacentri Bruce, 1987a:124, figs. 31, 32.

Material examined.—♀ (ovig 10.6), Ashmore Reef, Western Australia, 12°15.0'S, 122°59.0'E, 22 Jul 1986, 10–12 m depth, coll. L. Vail (NTM Cr 004512).

Remarks.—The specimen was collected at a fish poison station and was not in association with its host. The range is here extended from the Great Barrier Reef, Queensland, to Western Australia.

Anilocra rhodotaenia Bleeker

Restricted synonymy.—*Anilocra rhodotaenia*.—Trilles, 1979:249, pl. 7, fig. 1.

Remarks.—The status of this species is uncertain. Bleeker (1857) examined five specimens, but I have not been able to locate that material. Bleeker's description does not allow the identity of his species to be established although it does appear to belong to the *A. leptosoma*-*A. dimidiata* group of species. Trilles (1979) gave a figure of *A. rhodotaenia*, and although his photograph does not allow for specific assessment, the animal figured appears similar to *A. nemip-*

teri Bruce (Trilles' (1979) material was not available for examination).

All museum material identified as *A. rhodotaenia* that I have examined has proved to be conspecific with *A. amboinensis*.

Without recourse to type material the identity of *Anilocra rhodotaenia* cannot be established, and the species should be regarded as *species inquirenda*.

Genus *Creniola* Bruce, 1987

Creniola breviceps (Schiodt & Meinert)

Fig. 2F–G

Restricted synonymy.—*Creniola breviceps*.—Bruce, 1987c:391, 401, fig. 32.

Material examined.—All Oahu, Hawaii. ♀ (ovig 20.0), Honauma Bay, 14 Apr 1961, on caudal fin of *Priacanthus* sp., coll. Nick Ferris (USNM 231178). ♀ (ovig 21.5), off Diamond Head, 5 Sep 1959, on pectoral fin of *Acanthurus dussumieri*, coll. A. Lewis and Sam Kaolulu (USNM 231177). ♀ (ovig 19.5), Pupukea, 14 May 1961, coll. E. and L. B. Trott (USNM 232014). ♀ (ovig 19.0), ♂ (8.0) between Diamond Head and Koko Head, 7 Nov 1959, on *Ctenochus otrigosus*, 19–25 m, coll. Sam Kaolulu and A. Lewis (USNM 232013). ♀ (ovig 19.0), Coconut Island, Kaneohe Bay, 13 Aug 1959, on caudal fin of *Acanthurus dussumieri*, coll. A. Lewis (USNM 232011).

Remarks.—Apparently a Hawaiian endemic, all specimens having been collected from Oahu. Host identity has not been recorded previously for this species.

Hosts.—*Priacanthus* sp. (F. Priacanthidae), *Acanthurus dussumieri*, and *Ctenochaetus otrigosus* (F. Acanthuridae).

Genus *Nerocila* Leach, 1818

Nerocila congener Miers

Restricted synonymy.—*Nerocila congener*.—Bruce, 1987c:366, figs. 8, 9.

Material examined.—♀ (ovig 33.5), Cebu market, Cebu, Indonesia, 3 Sep 1909, U.S.

Bureau of Fisheries *Albatross Expedition* 1907–9 (USNM 232073).

Remarks.—Widely distributed, recorded from Indonesia, Philippines and Australia. No host has been recorded for this species.

Nerocila depressa Milne Edwards

Fig. 3

Nerocila depressa Milne Edwards, 1840:254, pl. 31, fig. 17–21.—White, 1847:108.—Schiodt & Meinert, 1881:15, pl. 1, figs. 10–11.—Stebbing, 1893:351.—Lanchester, 1900:265, pl. XII, fig. 5.—Thielemann, 1910:33.—Nierstrasz, 1931:124.—Trilles, 1975:318, pl. II, fig. 13; 1979:251.—Bruce, 1987c:404; 1988: in press. *Nerocila dolichostylis* Koelbel, 1879:411, pl. II, fig. 3a–b.—Bruce, 1987c:404.

Nerocila pigmentata Bal and Joshi, 1959:565, pl. 2, figs. 6–10.—Bruce, 1987c:406.

Nerocila pigmenta.—Joshi and Bal, 1960:446 (? lapsus).

Not *Nerocila pigmentata*.—Parimala, 1984:180–181, fig. 1 (= *Nerocila* sp.?).

Material examined.—♀ (ovig 11.5), Gulf of Siam, 3 Jul 1923, H.S. 32, fish host, Pla Sai Tan (= *Cyclocheilichthys apogon* Cuvier & Valenciennes) coll. H. Smith (USNM 232075). ♀ (ovig 12.0), Chao Phya River, Thailand, 21 May 1925, side of *Engraulis* sp., 8.5 cm long, (USNM 232074). ♀ (ovig 11.0), Bagan api api, Sumatra, 1912, on *Coilia dussumieri*, coll. Herbst (ZMA).

Remarks.—Two characters readily distinguish this species from the similar *N. loveni*: the coxae and posterolateral corners of the pleonites are posteriorly directed and are not bent dorsally. The species has been recorded from the northern Indian and Pacific oceans with a probable range from India eastwards to Hong Kong.

Parimala (1984) gives a photograph of a species that is of uncertain identity, but clearly not *N. depressa*.

Hosts.—*Coilia dussumieri*, *Engraulis* sp., both Engraulidae; *Cyclocheilichthys apo-*

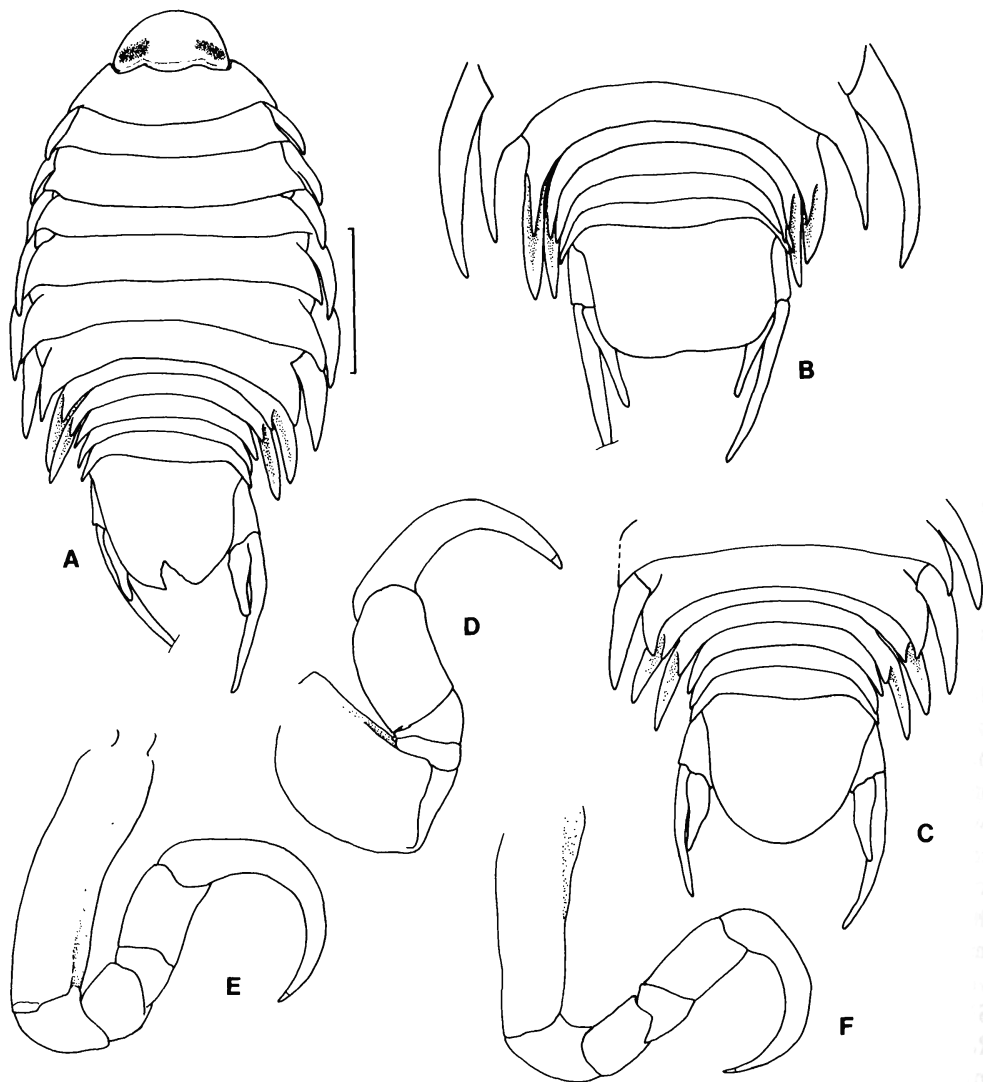


Fig. 3. *Nerocila depressa*. A, D–F, female, Gulf of Siam, USNM 232075. A, Dorsal view; B, Pleon, female, Thailand, USNM 107850; C, Pleon, female, Paknam, USNM 232074; D, Pereopod 1; E, Pereopod 6; F, Pereopod 7. Scale line represents 3.0 mm.

gon (Cyprinidae). Bal & Joshi (1959) recorded the host *Opisthopterus turtoor* (= *O. tardoore*); Bruce (1988) recorded *Sardinella fimbriata* (F. Clupeidae).

Nerocila exocoeti Pillai

Fig. 4

Nerocila exocoeti Pillai, 1954:12.—Kurochkin, 1980:289.—Bruce, 1987c:404.

Material examined.—♀ (ovig 24.0), Keelung, Taiwan, 6 Jun 1957, on *Parexocoetus brachypterus*, coll. H. Teng (USNM 227097). ♀ (ovig 20.0), Papua New Guinea, 08°00'S, 144°32'E, 27 Sep 1976, from *Scomberomorus multiradiatus* gut contents (USNM 233280). ♀ (ovig 22.5), Poeloe Nako, ? Indonesia, no date, coll. Kleiveg de Zwaan (ZMA).

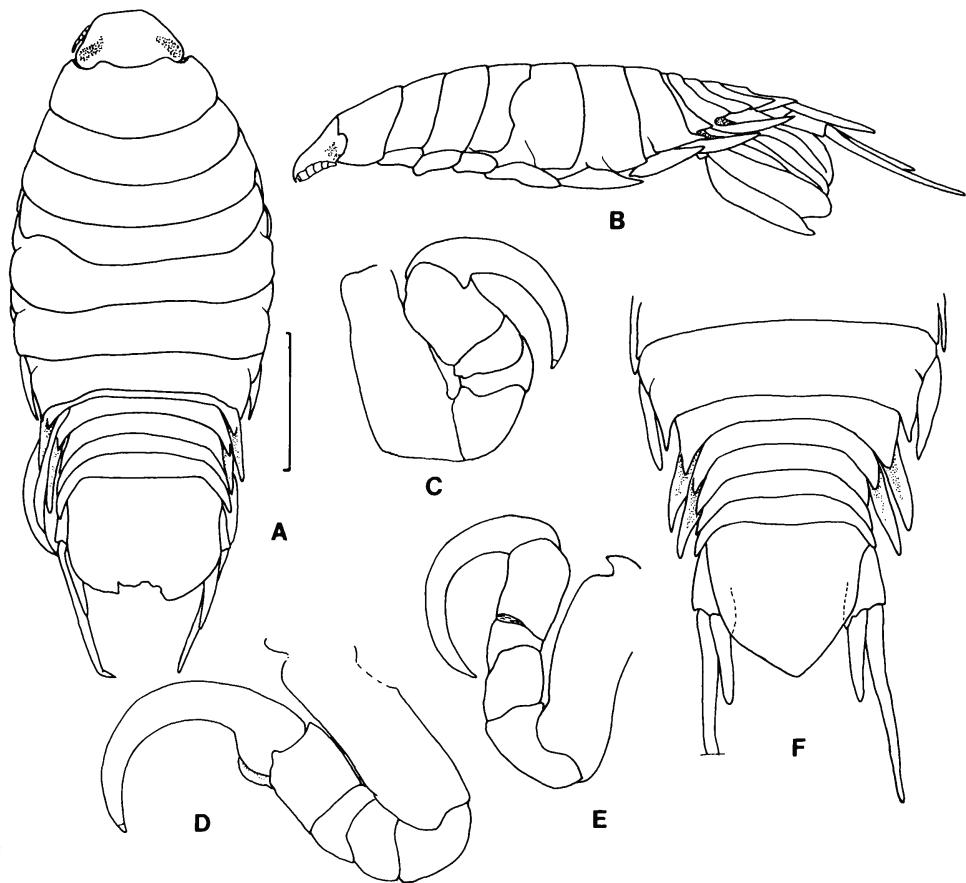


Fig. 4. *Nerocila exocoeti*, A-E, female, Taiwan, USNM 227079. A, Dorsal view; B, Lateral view; C, Pereopod 1; D, Pereopod 6; E, Pereopod 7; F, Pleon, female, Papua New Guinea, USNM 233280. Scale line represents 3.0 mm.

Remarks.—No figures have been published for this inadequately described and poorly known species, but as the host has been identified as *Parexocoetus brachypterus*, the assumption is made here that these specimens are *N. exocoeti*. *Nerocila exocoeti* belongs to a group of species characterized by short coxae and lack of, or reduced posterolateral pereonite extensions. *Nerocila trichiura*, parasitic on flying fishes of the genera *Exocoetus* and *Cypselurus*, has the coxae and pereonite posterolateral extensions bluntly rounded.

Distribution is here extended from southern India to Papua New Guinea, Indonesia, and Taiwan.

Nerocila kisra Bowman & Tareen

Nerocila kisra Bowman & Tareen, 1983:8, figs. 6–8.—Bruce, 1987c:404.

Material examined.—6 ♀♀, Kuwait, on *Helotes* and *Therapon* (BMNH 1982:84–86).

Remarks.—This material agrees well with the original description.

Nerocila loveni Bovallius

Fig. 5

Nerocila lovéni Bovallius, 1887:6, pl. 1, figs. 13–17, pl. 2, figs. 18–21.—Stebbing, 1893: 352, pl. 15.

Nerocila loveni.—Nierstrasz, 1915:73; 1931:

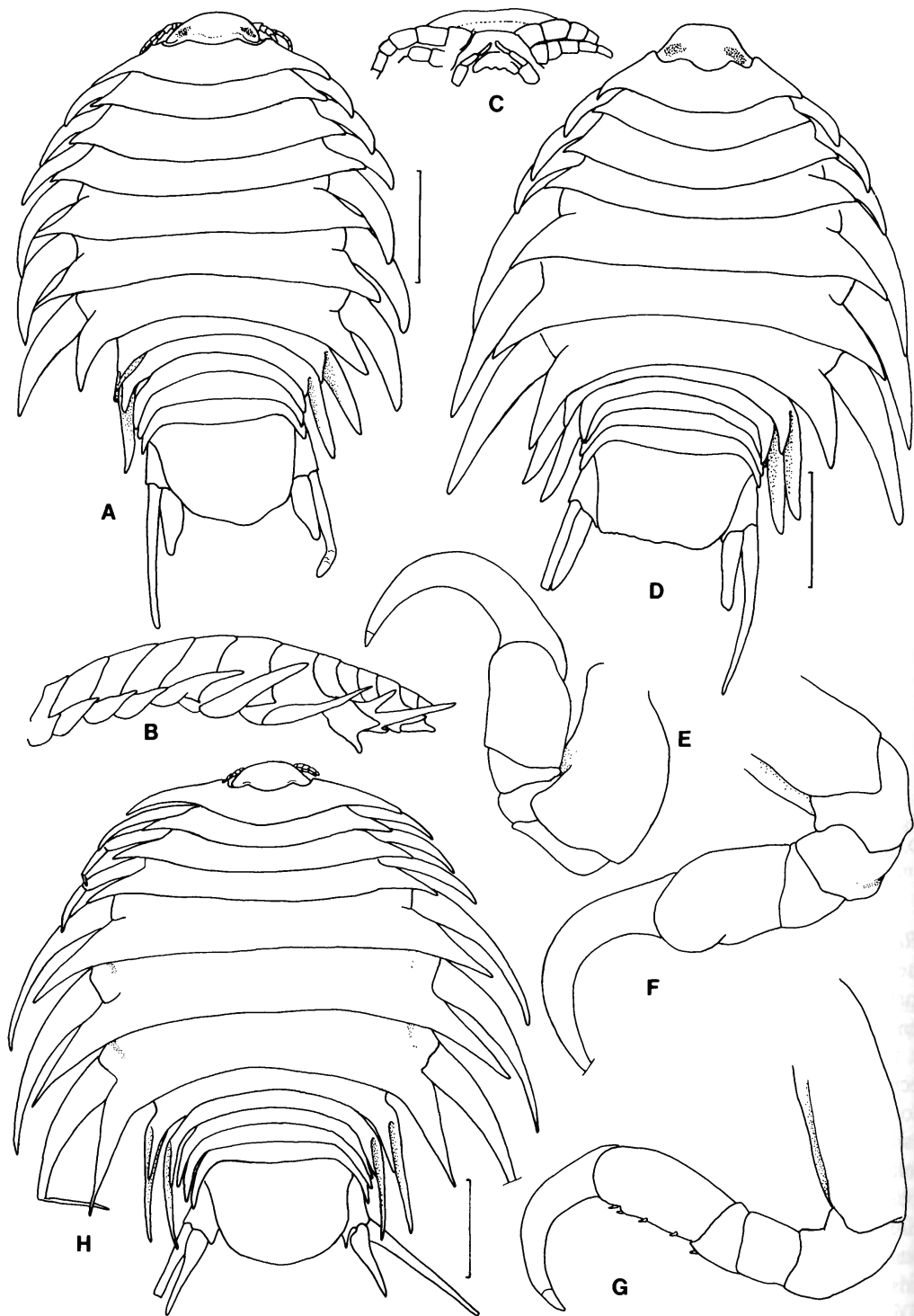


Fig. 5. *Nerocila loveni*, C-G, female, Gulf of Siam, USNM 232077. A, Female, Singapore, USNM 232077; B, Lateral view of pereon and pleon, USNM 232076; C, Frons; D, Dorsal view; E, Pereopod 1; F, Pereopod 6; G, Pereopod 7; H, Female, Sarawak, BMNH 1986: 421. Scale lines represent 3.0 mm.

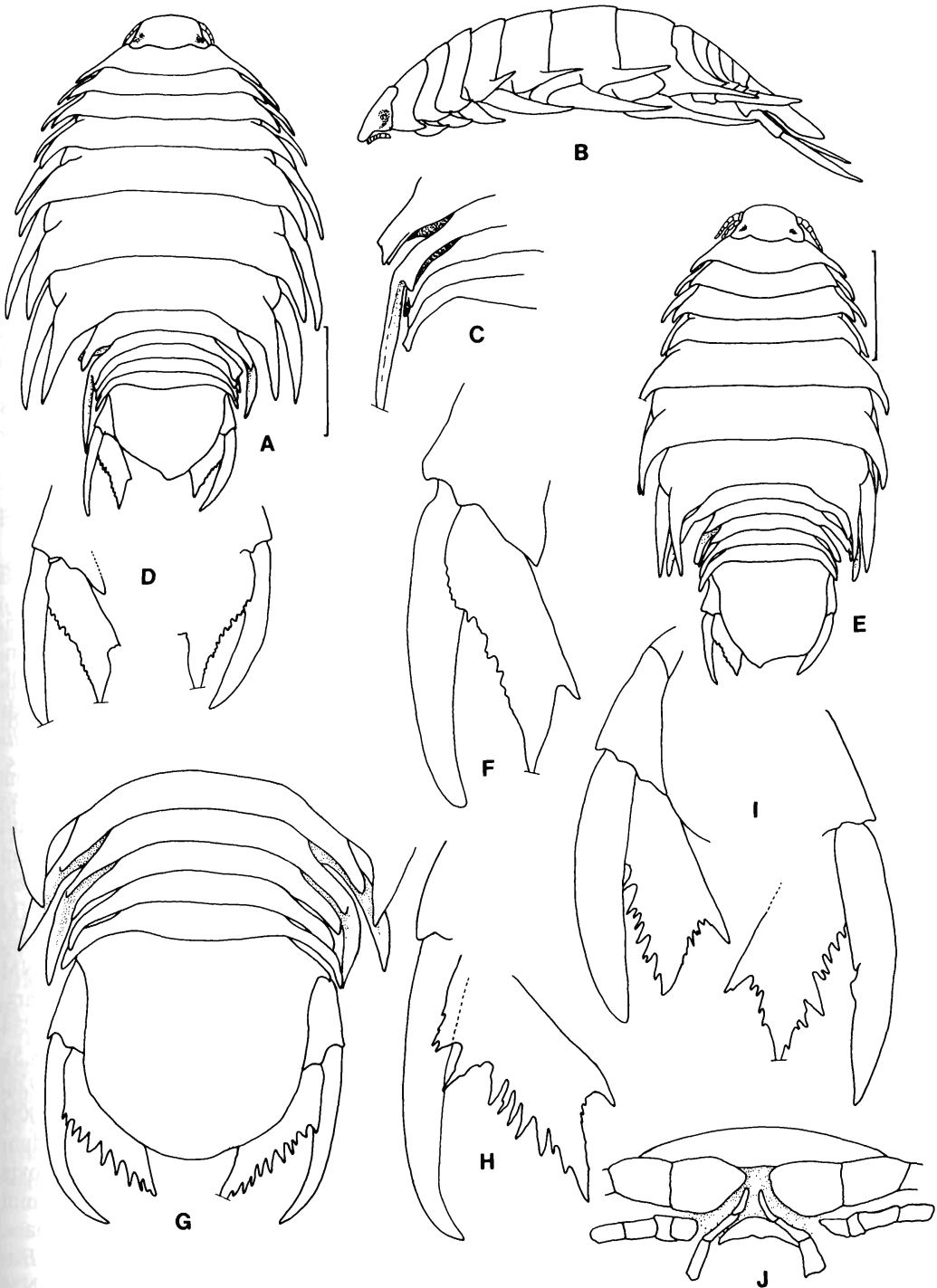


Fig. 6. *Nerocila serra*, A–F, female syntype, NRS Is. 4974. A, Dorsal view; B, Lateral view; C, Left pleonites; D, Left and right uropods; E, female, Jaffna Lagoon, BMNH 1980: 141.1; F, Uropod, female, Jaffna Lagoon. *Nerocila sigani*: G, Pleon, female, Taiwan, USNM 232017; H, Uropod, female, Penang, USNM 232015; J, Frons, USNM 232017. *Nerocila monodi*: I, Left and right uropods, female, Trobriand Islands, USNM 232071. Scale lines represent 5.0 mm.

124.—Trilles, 1979:251, pl. 7, fig. 2.—Bruce, 1987c:404.

Material examined.—♀ (non-ovig 13.5), Singapore, 20 Feb 1908, no host, coll. Chun (USNM 232076). ♀ (ovig 13.5), off Tachalom, Gulf of Siam, 20 Jul 1923, from pla pan pak moo (host presumably), coll. H. Smith (USNM 232077). ♀ (ovig 9.5), Lem Nam Point, southeast Lem Nam Peninsula, Gulf of Siam, 12°02.9'N, 102°35.6'E, 29 Oct 1957, GVF Sta 29 (USNM 107850). 13 ♀♀ (8 ovig, 5 non-ovig, 11–17.5), Borneo, coll. Hose (BMNH 1895:7:2:1–10). ♀ (ovig 15.0), Sarawak, pre-1895, on caudal peduncle of *Leiognathus* sp., coll. Hose (BMNH 1986:421).

Remarks.—This species can be distinguished from *N. depressa* by having the coxae and pereonite posterolateral extensions bent dorsally, and expressed laterally rather than posteriorly.

Distributed in the northern central Indo-Pacific region: Singapore, Thailand, Borneo and Sarawak.

Hosts.—*Leiognathus* sp. (Leiognathidae).

Nerocila monodi Hale

Fig. 61

Restricted synonymy.—*Nerocila monodi.*—Bruce, 1987c:384, figs. 20–22.

Material examined.—♀ (ovig 22.0), Tana Keke, 21 Dec 1909, dynamite station (100% linen tag 13592), U.S. Bureau of Fisheries Albatross Philippines Expedition, 1907–9 (USNM 232072). ♀ (ovig 24.0), Labuandata Bay, Gulf of Bori, Philippine Islands, 18 Dec 1909, dynamite station, coll. U.S. Bureau of Fisheries Albatross Philippines Expedition, 1907–9 (USNM 232070). ♀ (ovig 18.5), Babelthvav Island, Karamado Bay, Palau, 7°30.01'N, 134°31.03'E, 7 Sep 1955, coll. H. A. Fehlmann, S. Pierce and R. Harry, George Vanderbilt Foundation (USNM 233291). ♀ (ovig 14.0), Kiriwina Inlet, Trobriand Islands, Papua New Guinea, 6 Jun 1970, BBC Sta 1506, coll. B. B. Collette

(USNM 232071). ♀ (ovig 17.5), as previous, and beach seine (USNM 232069). ♀ (25.0), ♂ (15.0), Port Moresby, Papua New Guinea, no date or host, coll. N. T. Talbot (BMNH).

Remarks.—A common species in northern and eastern Australia (Bruce 1987c), material recorded here shows the species to be widespread in the tropical western Pacific extending northwards to the Philippines.

Nerocila orbigny (Guérin-Menèville)

Restricted synonymy.—*Nerocila orbigny.*—Bruce, 1987c:374, figs. 12–17.

Remarks.—One specimen of this species was recorded from Eilat, Red Sea, Israel, by Bruce (1987c).

Nerocila phaiopleura Bleeker

Restricted synonymy.—*Nerocila phaiopleura.*—Bruce, 1987c:384, figs. 18, 19.

Material examined.—4 ♀♀ (ovig 21.0, 19.5, 19.0, 18.5), Kaneda Bay, Tokyo Bay, Japan, 3 Feb 1978, on *Sardinops melanosticta*, coll. I. Mitani (USNM 184998). 12 aegathoids (18.0–19.5), as previous, but on *Engraulis japonica* (USNM 184999). 4 ♀♀ (ovig 18.5, 18.5, 13.5, non-ovig 15.0), Chantabru River, Thailand, 7 Aug 1927, coll. H. M. Smith (USNM 232068). 2 ♀♀ (ovig 22.0, 20.5), Lem Sing, Thailand, 18 Nov 1933, sides of *Chirocentrus*, coll. H. M. Smith (USNM 232067). ♀ (ovig 21.5), Pak Poon, Thailand, 20 Oct 1923, on clupeid, HS35 (USNM 233282). 2 ♀♀ (ovig 22.0, 18.5), Pak Nakara, 20 Oct 1923, side of *Engraulis*, H. S. '34 (USNM 233284). 3 ♀♀ (ovig 20.0, 19.0, 18.5), Paknam Chao Phya, Thailand, 17 Feb 1928, on *Sardinella fimbriata* (label reports 100% infestation on pectoral fin or caudal peduncle), coll. H. Smith (USNM 233283). ♀ (ovig 18.0), Gulf of Siam, on *Clupea*, coll. H. Smith (USNM 233285). ♀ (ovig 19.5), off Paknam, Gulf of Siam, 11 Aug 1923, on side of *Ha-rengula* (H.S. 30) coll. H. Smith (USNM 233281). 1 ♀ (ovig 17.0), Singapore, 20 Feb 1968, coll. Elwin (USNM 232066). 2 ♀♀ (ovig 19.0, 17.0), Kakinada, India, 29 Apr 1977,

on *Illisha melastoma* (BMNH). ♀ (ovig 26.0), Tamil Nadu, Bay of Bengal, circa 1982, on *Formio niger* (BMNH 1983:54:1).

Remarks.—A common Indo-Pacific species, not previously recorded from Japan. All host species recorded here are new records.

Hosts.—*Sardinops melanosticta*, *Sardinella fimbriata*, *Illisha melastoma* (F. Clupeidae), *Engraulis japonica* (F. Engraulididae), *Parastromateus niger* (F. Carangidae). Previous host records given by Bowman & Tareen (1983) and Bruce (1987c).

Nerocila serra Schiödte & Meinert
Fig. 6A–F

Restricted synonymy.—*Nerocila serra*.—Bruce, 1987c:390.

Material examined.—♀ syntype (21.0), Bangka Str. Salmin (NHR Is. 4974). 2 ♀♀ (ovig 19.0, 23.5), Chantabun River, Thailand, 7 Aug 1927, coll. H. M. Smith (USNM 232020). ♀ (non-ovig 20.5), Jaffna Lagoon, Sri Lanka, circa 1979, coll. D. Thiagarajah (BMNH 1980:145:1).

Remarks.—This species is poorly known, and has been considered a junior synonym of *N. trivittata* Milne Edwards by Trilles (1979). This view has not been supported by Bowman & Tareen (1983) or Bruce (1987c). Bowman & Tareen (1983) described three new species of *Nerocila* with serrate uropods, and prior records of *N. serra* and *N. trivittata* can no longer be accepted as accurate.

The exact distribution of this species is uncertain. Reliable records are one from Australia (Bruce 1987c), the original record by Schiödte & Meinert (1881), and the material recorded here; the distribution appears to be Indo-Malaysian.

Nerocila sigani Bowman & Tareen
Fig. 6G, H, J

Nerocila (Nerocila) sigani Bowman & Tareen, 1983:12, fig. 9.

Nerocila (Nerocila) arres Bowman & Tar-

een, 1983:12, figs. 10–12 (new synonymy).

Nerocila sigani.—Bruce, 1987c:406.

Material examined.—2 ♀♀ (non-ovig), Eilat, Israel, 585, Paperna (USNM 232019). ♀ (ovig 14.5), Maintirano, west coast of Madagascar, no date, on *Sciaenia dussumieri*, coll. A. Crosnier (USNM 109239). ♀ (ca. 22.0), ♂ (15.0), Richards Bay, South Africa, date?, on *Argyrosomus hololepidotus* (BMNH 1979:285:2). 6 ♀♀ (ovig and non-ovig 19.5–24.0), 4 ♂♂, Durban Bay, South Africa, date?, on *Pomadasyss* sp. (BMNH 1979:224:10). 1 ♀ (14.0), Hikkaduwa, Sri Lanka, 13 Feb 1970, 15 m depth, poison station, coll. C. Koenig (USNM 232010). ♀ (ovig 18.0), Tamil Nadu, India, Bay of Bengal, circa 1980, on *Formio niger*, coll. S. K. Baru (BMNH 1983:51:1). 1 ♀ (ovig 17.0), southeast of Pu Kendi Island, southwest Penang, Malaysia, 05°12'N, 100°11'E, 6 May 1969, (Sta 6975, 3818), coll. Schwartz (USNM 232015). ♀ (ovig 23.0), Keelung, Taiwan, 4 Aug 1957, on *Argyrosoma macrocephalus* (Tang), coll. H. T. Teng (USNM 232016). ♀ (ovig 25.5), Keelung, Taiwan, 1 Nov 1956, on *Argyrosoma nibe* (Jordan & Thompson), base of caudal fin, coll. H. C. Yang (USNM 232017).

Remarks.—Bowman & Tareen (1983) described three species of *Nerocila*, all with serrate uropodal endopods. One, *N. kisra*, they placed in the subgenus *Emphyllia*, the remaining two in *Nerocila (Nerocila)*. Bruce (1987c) placed all three species in a redefined “*Emphyllia* group.”

Nerocila sigani, described from a single specimen, and *N. arres* were separated by: 1, presence or absence of a caudomedial lobe; 2, presence or absence of dactylus nodules; 3, antennule articles 1 and 2 being distinct or partially fused; 4, uropod exopod linear or curved; 5, deeper uropod serrations in *N. arres* than in *N. sigani*.

Of these character states, antennule articles often show varying degrees of fusion (as in *Nerocila monodi*), and uropod serration

is similarly variable. The presence or absence of a caudomedial lobe on the pleotelson is a similarly unreliable character, and is frequently found to be absent from species such as *N. orbigny* and *N. monodi* that "normally" have it. This leaves only the presence or absence of dactylus nodules, which can also vary in prominence, to separate the two species.

In the material examined here there is a specimen with a rounded pleotelson (Taiwan, USNM 232017 on *A. nibe*) but with uropods the same as those of *N. arres*: a specimen from Eilat with linear uropodal exopods (= *N. sigani*), but with a distinct caudomedial lobe (= *N. arres*). In view of the variable morphology of many *Nerocila* species, and the specimens examined here that are intermediate between the two species, it is concluded that *Nerocila sigani*, which has page precedence, is the senior synonym to *Nerocila arres*.

Nerocila sigani is now known from the western Indian Ocean: Arabian Gulf, Red Sea, Madagascar, and South Africa. Other records are from the northern Indo-Pacific: Sri Lanka, Bay of Bengal, Penang, and Taiwan. It is probable that records of *N. serra* from South Africa (Barnard 1925, Kensley 1978) are actually *N. sigani*.

Hosts.—New records: *Sciaenia dussumieri*, *Argyrosoma hololepidotus*, *A. macrocephalus*, *A. nibe* (F. Sciaenidae); *Parastromateus niger* (F. Carangidae); *Pomadasyd* sp. (F. Pomadasyidae). Bowman & Tareen (1983) recorded: *Siganus orami* (F. Siganidae); *Epinephilus tauvina* (F. Epinephiliidae); *Acanthopagrus latus* (F. Sparidae); *Nemipterus japonicus*, *N. tolu* (F. Nemipteridae).

Nerocila sundaica Bleeker

Restricted synonymy.—*Nerocila sundaica*.—Bowman, 1978:35, figs. 1–7.—Trilles, 1979:252.

Material examined.—♀ (ovig 16.5), Paknam Chao, Thailand, Phya, pong pang net,

16 Aug 1924 (H.S. 27) (USNM 233286). ♀ (ovig 23.5), Lem Sing, Thailand, 12 Jan 1924 (H.S. 26) on throat of *Sciaena* (USNM 233287). ♀ (ovig 22.5), off Menam, Gulf of Siam, 12 Jul 1923, on *Eleutheronema* (H.S. 36), coll. H. M. Smith (USNM 233288). ♀ (ovig 18.5), as previous, but 12 Jan 1924 (H.S. 29) (USNM 233289). ♀ (ovig 23.0), Tachalon, Thailand, 26 Jul 1923, on *Mugil* sp. (H. S. 28) (USNM 233290).

Remarks.—Redescribed in great detail by Bowman (1978), this is one of the most common Indo-Pacific species of *Nerocila*, but has only been recorded from the northern Indian and Pacific oceans.

Hosts.—There exist few records of the hosts used by *N. sundaica*. Here recorded from *Sciaena* sp. (F. Sciaenidae), *Eleutheronema* sp. (F. Polynemidae) and *Mugil* sp. (F. Mugilidae).

Nerocila trichiura (Miers)

Fig. 7

Restricted synonymy.—*Nerocila trichiura*.—Trilles, 1979, pl. 2, fig. 10; 1976; 621.—Kurochkin, 1980:289.—Bruce, 1987c:406.

Material.—Holotype, ♀ (27.0), Mauritius, pres. R. Templeton, BMNH 186:104. ♀ (22.0), south of India, 10°20'S, 70°00'E, 7 Jun 1963, on *Exocoetus volitans*, base of pectoral fin, coll. A. Brown (USNM 128555). (Also examined, ♀ (27.0 mm), Dakar Harbour, Senegal, 1 Sep 1964, coll. Geronimo, USNM 119490.)

Remarks.—A widespread species occurring in the Atlantic, Pacific and Indian oceans. At present it does not seem possible to separate *N. excisa* Richardson, 1901, from *N. trichiura*, both having similar coxae, pereonal and pleonal morphology. Unfortunately the holotype of *Nerocila excisa* is in poor condition with the pleotelson torn and the uropods missing (Bruce 1987c, fig. 34F). It seems probable that the two species are conspecific, there being no discernable differences between the holotype of *N. excisa* and specimens of *N. trichiura*.

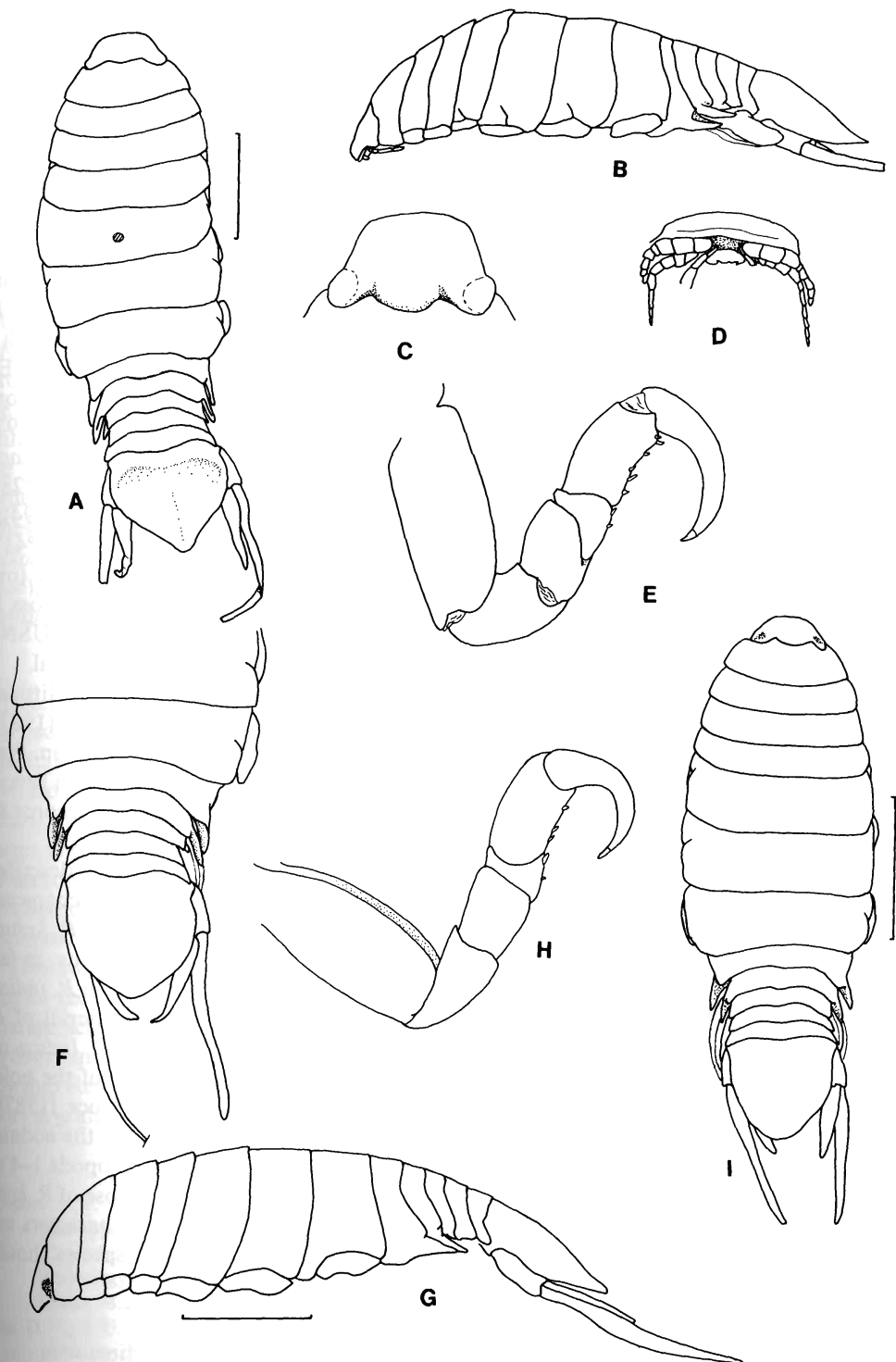


Fig. 7. *Nerocila trichiuri*. A-E, holotype; F-H, female, Senegal, USNM 119490. A, Dorsal view; B, Lateral view; C, Cephalon; D, Frons; E, Pereopod 7; F, Pleon and pleotelson; G, Lateral view; H, Pereopod 7; I, Female, South of India, USNM 128555. Scale lines represent 6.0 mm.

Hosts.—*Exocoetus volitans*, as are all previous records.

Genus *Pleopodias*, 1910
Pleopodias diaphus Avdeev

Pleopodias diaphus Avdeev, 1975:254, figs. 1–11.

Pleopodias superatus Williams & Williams, 1986:656, figs. 62–68 new synonymy).

Remarks.—Williams & Williams (1986) were clearly unaware of *Pleopodias diaphus* recorded from the East China Sea by Avdeev (1975), nor was the species mentioned by Bruce (1987a) in the remarks for that genus. Although Avdeev's figures are not as detailed as those of Williams & Williams, the correspondence of the pleotelsonic notch, somatic morphology and antennule and antennal morphology of the two species clearly indicates that *Pleopodias superatus* is a junior synonym of *P. diaphus*.

Distribution.—East China Sea (=Sea of Japan) (Avdeev 1975) and off Honshu, Japan (Williams & Williams 1986).

Hosts.—Avdeev (1975) recorded the host *Diaphus coeruleus* (F. Myctophidae), a species of deep water lantern fish.

Genus *Renocila* Miers, 1880

Remarks.—Two recent papers (Bruce 1987b; Williams & Williams 1987) described new taxa within *Renocila*. Bruce (1987b) offered a revised diagnosis of the genus, while Williams & Williams (1987) gave a key to the world species. This key does not include the new data given by Bruce (1987b). That is two new species and two new combinations, the synonymization of *R. dubia* with *R. ovata*, and furthermore that *R. periophthalma* Stebbing, *R. recta* (Nierstrasz) and *R. limbata* (Schiodte & Meinert) are juveniles or males and are unrecognizable. Identification of Indo-Pacific *Renocila* is best achieved by using the species descriptions given in both papers rather than the key of Williams & Williams (1987). New

World *Renocila* can be identified from the descriptions of Williams & Williams (1980).

Renocila indica Schiodte & Meinert

Renocila indica Schiodte & Meinert, 1884: 417, pl. 18, figs. 14–16.—Bruce, 1987b: 170, fig. 1.

Material examined.—Saint Brandon's Shoals (=Cargados Carajos) Mauritius, Indian Ocean: ♀ (ovig 19.0), lagoon south of Saint Brandon's Shoals, 16°28'S, 59°37'E, 8 Apr 1976, 4 m (USNM 231191); 2 ♀♀ (ovig 19.5, 15.5), 16°32'S, 59°41'E, 30 Mar 1976, 2 m (USNM 231189); 2 ♀♀ (ovig 18.0, non-ovig 12.5), SE side of Grande Passe, 16°28'S, 59°40'E, 5 Apr 1976 (USNM 231194); ♀ (ovig 17.5), Tortue Island, 16°29'S, 59°41'E, 7 Apr 1976 (USNM 231184); 2 ♀♀ (ovig 18.5, 16.5), northwest shoal, Albatross Island, 16°15'S, 59°35'E, 25 m (USNM 231193); all coll. V. G. Springer et al.

Remarks.—This species has been little recorded since first described. Bruce (1987b) gave new figures of the type specimen. Present material is the first record with precise locality data. There are no host records for this species.

Williams & Williams (1987) described *Renocila kohnoi* from Japan. The characters which they used to discriminate *R. kohnoi* from all other species in the genus, in fact fail to distinguish *R. kohnoi* from *R. indica*.

Comparison of the type material of *R. kohnoi* to the specimens of *R. indica* reported on here, and drawings of the holotype of *R. indica* given by Bruce (1987b) revealed but a single difference: the nodules on the anterior margin of pereopods 1–4 of *R. indica* are distinct, while those of *R. kohnoi* are subtle. Unless these characters are shown to intergrade the two species should be regarded as distinct.

Renocila ovata Miers

Restricted synonymy.—*Renocila ovata*.—Bruce, 1987b:172, figs. 2–3.

Material examined.—♀ (non-ovig 17.5), Gomono Island, Philippines, 3 Dec 1909, on *Chaetodon pleini*, coll. U.S. Bureau of Fisheries (Linen tag #9642) (USNM 233270). ♀ (non-ovig 9.5), south of Param, Indonesia, 06°59.5'N, 158°15.7'E, 6 Sep 1980, coll. V. G. Springer et al. (USNM 231190). ♀ (ovig 19.5), ♂ (10.0), Talabassi Bay, Big Damalawa Islet, Kabaeng Island, Celebes, Indonesia, 05°17.3'S, 122°04'E, 25 Feb 1974, 2–15 m depth (USNM 231188).

Remarks.—*Renocila ovata* has been recorded from Australia and Indonesia (Bruce 1987b); the range is here extended to the Philippines, the first Pacific record. The precise habitat of this species has not been recorded, but recorded hosts are coral reef fishes.

Hosts.—*Chaetodon pleini* (F. Chaetodontidae), the only previous host record is *Eupomacentrus fasciolatus*.

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Literature Cited

- Avdeev, V. V. 1975. New representative of the parasitic isopod genus *Pleopodias* Richardson, 1910 (Cymothoidae).—*Fisheries, Oceanography, Hydrobiology and Fish Parasitology of the Pacific Ocean* 98:254–256.
- Bal, D. V., & U. N. Joshi. 1959. Some new isopod parasites on fishes.—*Journal of the Bombay Natural History Society* 56:563–569.
- Barnard, K. H. 1925. Contributions to the crustacean fauna of South Africa. No. 9. Further additions to the list of Isopoda.—*Annals of the South African Museum* 20:381–410.
- Bleeker, P. 1857. Recherches sur les Crustacés de L'Inde Archipelagique. II. Sur les Isopodes Cymothoadiens de L'Archipel Indien.—*Naturkundige Vereeniging in Nederlandsche-Indie, Batavia, Verhandelingen* 2:20–40, pl. 1, 2.
- Bovallius, C. 1887. New or imperfectly known Isopoda. Part III.—*Bihang till Kögelige Svenska Vetenskapsakademiens Handlingar* 18(4):1–21, pl. 1–4.
- Bowman, T. E. 1978. Restoration of the subgenus *Emphyllia* Koelbel for the parasitic isopod *Nerocila sundaica* Bleeker (Flabellifera, Cymothoidae).—*Crustaceana* 34:33–44.
- , & I. U. Tareen. 1983. Cymothoidae of Kuwait (Arabian Gulf) (Crustacea: Isopoda).—*Smithsonian Contributions to Zoology* 382:1–30.
- Bruce, N. L. 1987a. Australian *Pleopodias* Richardson, 1910 and *Anilocra* Leach, 1818 (Isopoda: Cymothoidae), crustacean parasites of marine fishes.—*Records of the Australian Museum* 39:85–130.
- . 1987b. Australian *Renocila* Miers, 1880 (Isopoda: Cymothoidae), crustacean parasites of marine fishes.—*Records of the Australian Museum* 39:169–182.
- . 1987c. Australian species of *Nerocila* Leach, 1818, and *Creniola* n. gen., (Isopoda: Cymothoidae), crustacean parasites of marine fish.—*Records of the Australian Museum* 39:355–412.
- . 1988. New records of isopod crustaceans (Flabellifera) from Hong Kong. In *Proceedings of the Second International Marine Biological workshop: The Marine Flora and Fauna of Hong Kong* (in press).
- Haller, G. von. 1880. Über einige neue Cymothöinen.—*Archiv für Naturgeschichte, Berlin, Jahrbuch* 46:375–395, pl. 18.
- Joshi, U. N., & D. V. Bal. 1960. Some new isopod parasites on fishes.—*Proceedings of the 47th Indian Science Congress, Part III, Abstracts*, p. 446.
- Kensley, B. 1978. Guide to the marine isopods of southern Africa.—*South Africa Museum, Cape Town*, 173 pp.
- Koelbel, K. 1879. Über einige neue Cymothoiden.—*Sitzungsberichte der Mathematisch-Naturwissenschaftlichen Klasse der Kaiserlichen Akademie der Wissenschaften* (1878) 78(1):401–416, pl. 1, 2.
- Kurochkin, Y. V. 1980. On the parasitic fauna of flying fishes (family Exocoetidae) in the world ocean.—*Akademii Nauk, Trudy Instituta Okeanologii* 97:276–295. [In Russian with English summary, p. 295.]
- Lanchester, W. F. 1900. On some malacostracous

- crustaceans from Malaysia in the collection of the Sarawak Museum.—*Annals and Magazine of Natural History*, (7)6:249–265.
- Masuda, H., K. Amaoka, C. Araga, & T. Yoshino (editors). 1984. *The Fishes of the Japanese Archipelago*. Text. Tokai University Press, Tokyo, 427 pp.
- Miers, E. J. 1880. On a collection of Crustacea from the Malaysian Region—Part IV. Stomatopoda, Isopoda, Suctorina, and Xiphosura.—*Annals and Magazine of Natural History* (5)5:457–467.
- Milne Edwards, H. M. 1840. Histoire naturelle des Crustacés comprennent l'anatomie la physiologie et la classification de ces animaux. III:1–638, pl. 1–42. Paris.
- Monod, T. 1976. Expedition Rumphius II (1975). Crustacés parasites, commensaux, etc. (T. Monod et R. Seréne, ed.). III. Crustacés Isopodes (Ire partie: Corallanidae, Anilocridae, Cymothoidae).—*Bulletin du Muséum National d'Histoire Naturelle*, 3 série, 391, *Zoologie* 273:853–870.
- Nierstrasz, H. F. 1915. Die Isopoden-Sammlung im Naturhistorischen Reichsmuseum zu Leiden.—1. Cymothoidae.—*Zoologische Mededeelingen, Rijksmuseum van Natuurlijke Historie te Leiden* 1:71–108, pl. 3, 4.
- . 1931. Die Isopoden der Siboga-Expedition. 3. Isopoda Genuina. 2. Flabellifera. *Siboga Expedition* 32c:123–233, pl. 10, 11.
- Parimala, S. 1984. *Nerocila pigmentata* Bal and Joshi (Isopoda: Cymothoidae) parasitic on *Nematolosa nasus* (Bloch).—*Journal of the Marine Biological Association of India* 21 (for 1979):180–181.
- Pillai, N. K. 1954. A preliminary note on the Tanaidacea and Isopoda of Travancore.—*Bulletin of the Central Research Institute, University of Travancore*, (C) 3:1–21.
- Richardson, H. 1901. Papers from the Hopkins Stanford Galapagos Expedition, 1898–1899. VI. The isopods.—*Proceedings of the Washington Academy of Science* 3:565–568.
- . 1910. Marine isopods collected in the Philippines by U.S. Fisheries steamer *Albatross* in 1907–1908. Department of Commerce and Labor, Bureau of Fisheries Document 736:1–44.
- Rokitsky, J. 1984. A new isopode, *Anilocra huacho* sp. n. of the family Cymothoidae from the coastal waters of Peru.—*Parazitologiya* 18:242–244.
- Schiödte, J. C., & Fr. Meinert. 1881. Symbolae ad monographiam cymothoarum crustaceorum isopodum familiae. II. Anilocridae.—*Naturhistorisk Tidsskrift* (3) 12:1–66, pls. 1–10.
- , & ———. 1884. Symbolae ad monographiam cymothoarum crustaceorum isopodum familiae. IV. Cymothoidae Trib. II. Cymothoinae. Trib. III. Livonecinae.—*Naturhistorisk Tidsskrift* (3) 14:221–454, pls. 6–13.
- Stebbing, T. R. R. 1893. A history of the Crustacea. Recent Malacostraca.—*International Scientific Series*, LXXIV. Kegan, Paul and Trench, London, 466 pp.
- Thielemann, M. 1910. Beiträge zur Kenntnis der Isopodenfauna Ostasiens. Beiträge zur Naturgeschichte Ostasiens.—*Abhandlungen der Mathematisch-Physikalischen Klasse der Königlich Bayerischen Akademie der Wissenschaften* 2. Suppl.-Bund 3:1–110.
- Trilles, J.-P. 1972. Sur quatre isopodes cymothoides der Pacifique (Nouvelle Calédonie).—*Cahiers de l'Office de Recherche Scientifiques et Techniques Outre Mers, serie Océanographique* 10:3–17.
- . 1975. Les Cymothoidae (Isopoda, Flabellifera) des collections du Muséum National d'Histoire Naturelle de Paris. II. Les Anilocridae Schiödte et Meinert, 1881. Genres *Anilocra* Leach, 1818, et *Nerocila* Leach, 1818.—*Bulletin du Muséum National d'Histoire Naturelle*, Paris, 3e série, 290. *Zoologie* 200:303–340, pl. 1, 2.
- . 1979. Les Cymothoidae (Isopoda, Flabellifera; parasites des poissons) du Rijksmuseum van Natuurlijke Historie te Leiden. II. Afrique, Amérique et régions Indo-Ouest-Pacifique.—*Zoologische Mededeelingen, Rijksmuseum van Natuurlijke Historie te Leiden* 54:245–275.
- . 1986. Les Cymothoidae (Crustacea, Isopoda, Flabellifera) d'Afrique.—*Bulletin du Muséum Nationale d'Histoire Naturelle*, Paris, 4e serie 8(3), section A *Zoologie*: 617–636.
- White, A. 1847. List of the specimens of Crustacea in the collection of the British Museum.—*British Museum, London*, 143 pp.
- Williams, L. B., & E. H. Williams, Jr. 1987. Three new species of *Nerocila* (Crustacea: Isopoda, Cymothoidae) external parasites of coral reef fishes from the Ryukyu Islands of Japan.—*Proceedings of the Biological Society of Washington* 100:417–432.
- Williams, E. H. Jr., & L. B. Williams. 1980. Four new species of *Nerocila* (Isopoda: Cymothoidae) the first reported from the new world.—*Proceedings of the Biological Society of Washington* 93:573–592.
- , & ———. 1986. The first *Anilocra* and *Pleopodias* isopods (Crustacea: Cymothoidae) parasitic on Japanese fishes, with three new species.—*Proceedings of the Biological Society of Washington* 99:647–657.

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