

Crustacea Decapoda : Review on the genus *Cinetorhynchus* Holthuis, 1995 from the Indo-West Pacific (Caridea : Rhynchocinetidae)

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ABSTRACT

Cinetorhynchus Holthuis, 1995 established as a subgenus of the genus *Rhynchocinetes* H. Milne Edwards, 1837, is elevated to the generic rank. In addition to the definitions pointed out by HOLTHUIS (1995), this genus is distinguished from the type genus by having two rows of spines on the ischia and meri of the third to fifth pereopods. *Cinetorhynchus* is composed of *C. rigens* (Gordon, 1936), the type species, from the Madeira Islands, eastern Atlantic, and the following six species from the Indo-West Pacific : *C. concolor* (Okuno, 1994), *C. erythrostictus* sp. nov., *C. hendersoni* (Kemp, 1925), *C. hiatti* (Holthuis & Hayashi, 1967), *C. reticulatus* sp. nov. and *C. striatus* (Nomura & Hayashi, 1992). The key for the morphological characters and the color photographs of the live-coloration of each species are provided for the identification of the species.

INTRODUCTION

The caridean family Rhynchocinetidae has been composed of the single genus, *Rhynchocinetes* H. Milne Edwards, 1837 (HOLTHUIS, 1993), which contains 15 species. Most shrimps are inhabitant of tropical to temperate reefs, and commonly known as hinge-beak shrimp in having the typically movable rostrum which is articulated with the carapace.

Recently, the rhynchocinetid shrimps were clearly divided into two subgenera based on the following morphological characters (HOLTHUIS, 1995). The subgenus *Rhynchocinetes* has two acute teeth at median carina of carapace behind the distinct rostral articulation, a supraorbital spine and no spine on the posterolateral margins of fourth and fifth abdominal somites, whereas the subgenus *Cinetorhynchus* Holthuis, 1995 has three teeth at

median carina of carapace behind the indistinct articulation, no supraorbital spine and one spine each at the posterolateral margins of fourth and fifth abdominal somites.

During the revisional study of these shrimps, I could find another significant difference between two subgenera, which was the meristic difference of the spines on the ischia and meri of the third to fifth pereopods. I warrant to elevate *Cinetorhynchus* as the generic rank on account of the several morphological differences and the absence of intermediate species between them.

In the most recent taxonomic study on the *Cinetorhynchus* species, OKUNO (1994b) recognized the following five species as the member of the group : *R. hendersoni* Kemp, 1925, *R. rigens*, Gordon, 1936, *R. hiatti* Holthuis & Hayashi, 1967, *R. striatus* Nomura & Hayashi, 1992 and *R. concolor* Okuno, 1994. In this review, I added two species in the genus *Cinetorhynchus*, as mentioned below.

Cinetorhynchus rigens (= *R. rigens*) was originally described by GORDON (1936) on the basis of the specimens from Madeira, eastern Atlantic. FUJINO (1975) recorded three specimens from the Ryukyu Islands as *R. rigens* and concluded that there was no evidence to deal with the specimens from the isolated localities as each subspecies by his direct comparison. I could scrutinize several specimens of *rigens* from the Atlantic Ocean and the western Pacific. As the result of the careful comparison, it was considered that the western Pacific population was distinguished from *rigens* at the specific rank. Thus, the western Pacific species are given a new specific name, *Cinetorhynchus erythrostickus*.

During the efforts to collect the rhynchocinetid shrimps in southern Japan, I obtained an uncertain species from Hachijo-jima Island of the southern Izu Islands and Amami-Ohshima Island of the northern Ryukyu Islands. Furthermore, among the samples collected by MUSORSTOM cruise and the collections deposited at NTM were several specimens corresponding to the species in question. The shrimp closely resembles *hendersoni* in the number of claws on the dactyli of the third to fifth pereopods and in having the stylocerite falling distinctly short of the distal end of the antennular peduncle and the mottled coloration in life. However, the former is readily distinguishable from the latter by the form of the coxae of first and third pereopods and the spination of the carpi of third and fourth pereopods. The species related to *hendersoni* is described herein as new to science based on 26 males, 13 ovigerous females and 10 females, under the name of *Cinetorhynchus reticulatus*.

Therefore, the new genus from the Indo-West Pacific contains four described species, *C. concolor* (Okuno, 1994), *C. hendersoni* (Kemp, 1925), *C. hiatti* (Holthuis & Hayashi, 1967) and *C. striatus* (Nomura & Hayashi, 1992) and two new species, *C. erythrostickus* and *C. reticulatus*. These species are reviewed herein in view of the taxonomic study, with some comments of their distributional patterns.

MATERIALS AND METHODS

The material examined in this study were originated mainly from the samples collected by MUSORSTOM, the collections deposited in the Museum of the Northern Territory, Darwin, Australia and the specimens collected from the shallow water on the coast of southern Japan by myself. They were listed in order of the northern to the southern localities in Material Examined of each species.

The selected measurements were taken in accordance with Fig. 1.

Distribution maps were based only on the materials examined directly and the records from literatures were not incorporated on the maps.

The institutional names are abbreviated as follows :

AMNH- American Museum of Natural History, New York.

BPBM- Bernice Pauahi Bishop Museum, Honolulu.

CBM- Natural History Museum and Institute, Chiba.

KMNH- Kitakyushu Museum of Natural History, Kitakyushu.

KUMB- Kagoshima University, Marine Biological Laboratory, Kagoshima.

MNHN- Muséum National d'Histoire Naturelle, Paris.

NSMT- National Science Museum, Tokyo.

NTM- Museum of the Northern Territory, Darwin.

QM- Queensland Museum, Brisbane.

SMF- Natur-Museum und Forshungs-Institut Senckenberg, Frankfurt-Main.

SUF- Shimonoseki University of Fisheries, Shimonoseki.

USNM- National Museum of Natural History, Smithsonian Institution, Washinton, D. C.

YCM- Yokosuka City Museum, Yokosuka.

For comparison, the following specimens were also examined :

Cinetorhynchus rigens (Gordon, 1936) : 3 ♂ (USNM 156441, 14.9-15.8 mm CL) ; 1 ♂ & 3 ovig. ♀ (MNHN-Na 1847, 12.4-18.3 mm CL), Madeira, eastern Atlantic. 1 ♂ (USNM 104744, 9.1 mm CL), Florida. 2 ♂ & 1 ovig. ♀ (USNM 189007, 14.0-16.4 mm CL) ; 6 ♂ (USNM 189009, 9.4-10.8 mm CL), Bahamas. 3 ♂ (USNM 189004, 9.4-13.5 mm CL), Virgin Islands.

Rhynchocinetes australis Hale, 1941 : 2 ♂ (NTM. Cr. 006932, 8.3 & 6.7 mm CL), Port Turton, Jetty, South Australia.

R. balssi Gordon, 1936 : 1 ♂ (NTM. Cr. 000545, 4.0 mm CL), Load Howe Island, Australia.

R. brucei Okuno, 1994 : 1 ♂ (NTM. Cr. 003618, holotype, 10.0 mm CL), Long Ke Wan, Hong Kong. 1 ♂ (NTM. Cr. 000678, paratype, 9.3 mm CL), Lizard Island, Queensland, Australia.

R. conspiciocellus Okuno & Takeda, 1992 : 1 ♂ (NSMT-Cr 1670, 5.7 mm CL), Hachijo-jima Island, Izu Islands, Japan. 1 ♂ (NSMT-Cr 2190, 12.3 mm CL), Okinawa Island, Ryukyu Islands, Japan.

R. durbanensis Gordon, 1936 : 1 ♂ (NSMT-Cr 2173, 15.0 mm CL), Ie-shima Island, Ryukyu Islands, Japan.

R. ikatere Yaldwyn, 1971 : 1 ♀ (Dom. Mus. Z. Cr 1871, holotype, 11.0 mm CL) ; 1 ♀ (Dom. Mus. Z. Cr 2183, paratype, 11.0 mm CL), Bay of Plenty, North Island, New Zealand (examined by Dr. J. C. YALDWYN).

R. kuiteri Tiefenbacher, 1983 : 1 ♂ (NSMT-Cr 1958, 14.7 mm CL), southern Australia, detailed collection site unknown.

R. rugulosus Stimpson, 1860 : 1 ovig. ♀ (NTM. Cr. 003616, 12.0 mm CL), Manly, Sydney, New South Wales, Australia.

R. typus H. Milne Edwards, 1837 : 1 ♂ (MNHN-Na 1843, «type», 23.2 mm CL), Indian Ocean.

R. uritai Kubo, 1942 : 1 ♂ (NSMT-Cr 1681, 10.6 mm CL), Kuzura, Izu Peninsula, Japan. 1 ♀ (NSMT-Cr 11106, 8.6 mm CL), Hachijo-jima Island, Izu Islands, Japan.

SYSTEMATIC ACCOUNT

Family Rhynchocinetidae Ortmann, 1890

Cinetorhynchus Holthuis, 1995

TYPE SPECIES. — *Rhynchocinetes rigens* Gordon, 1936.

DIAGNOSIS. — Body subcylindrical. Carapace and abdomen covered with numerous transverse striae, bearing a sharply acute antennal spine directed forwards, not supported by carina ; three acute teeth on median carina of carapace behind to rostral articulation, posterior two teeth indistinctly articulated with carapace ; supraorbital spine absent. Rostrum well developed, dentate, usually elongated beyond tip of scaphocerite, jointed with carapace by an indistinct articulation, feeble lateral carina running proximal to midlength of rostrum, continuous with upper orbital margin. Fifth abdominal somite with an acutely pointed spine posterolaterally, directed posteriorly ; sixth somite with distoventral spine. Telson armed dorsally with three pairs of small spines, midpoint of posterior margin prominent, bearing three pairs of spinules at each side. Antennule with developed stylocerite tapering to acute tip. Scaphocerite well developed, with an acute spine distolaterally ; antennal basicerite covered with numerous striae resembling those of carapace and abdomen. Mandible with three segmented palp. First maxilla with two rows of spines on mesial margin of distal lacinia. First maxilliped with elongate, three-segmented palp, intermediate segment longest of all, distal segment very small. Third maxilliped with dark horny claws at tip of ultimate segment. First and second pereopods with chela, the former stouter and shorter than the latter. Ischia of third to fifth pereopods armed each with articulated spines on outer surface and

on ventral margin, but ischium of fifth pereiopod rarely unarmed. Meri of third to fifth pereiopods bearing two rows of articulated spines on outer surface and on ventral margin. Endopod of male first pleopod with slender, distally narrow appendix interna. Endopod of male second pleopod with both appendices interna and masculina; the former slightly longer than the latter.

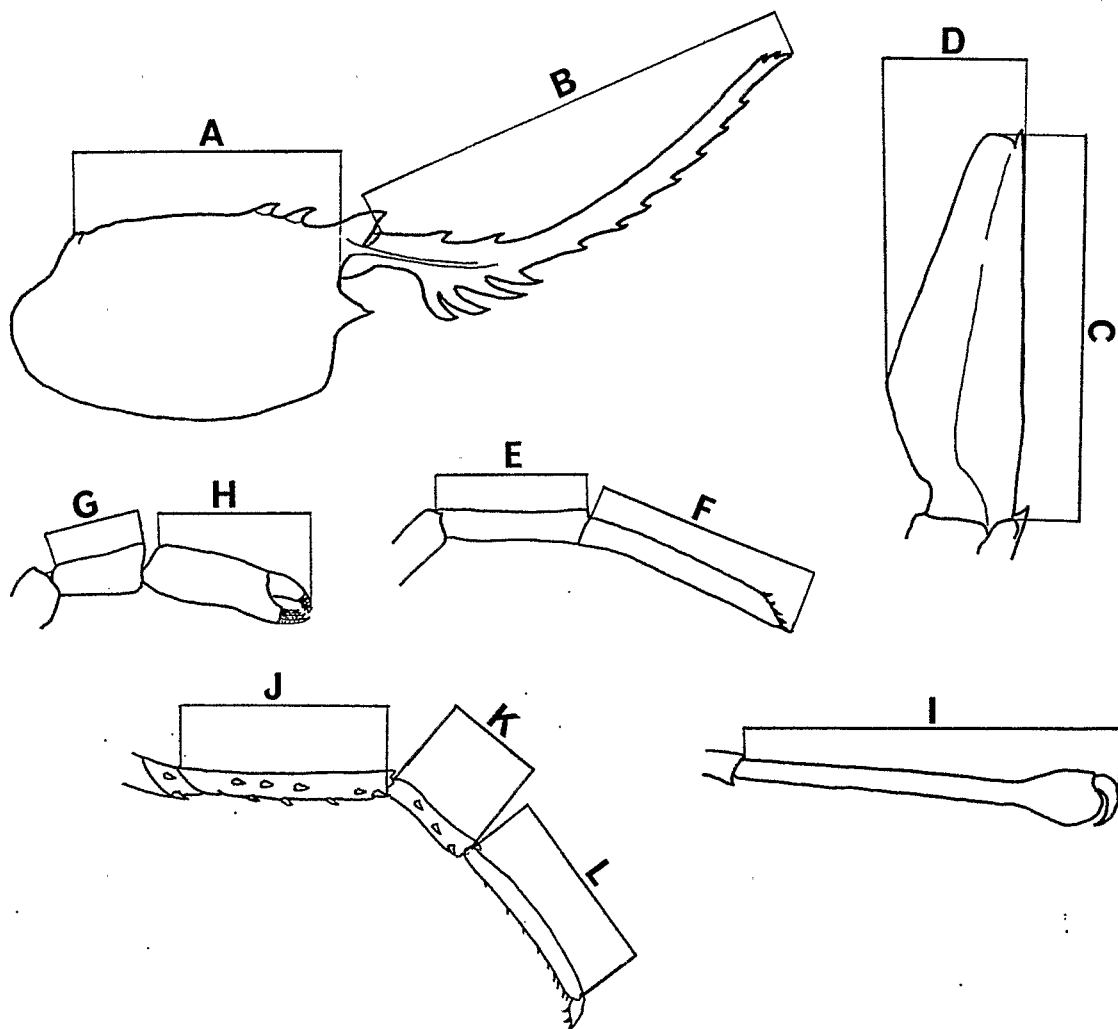


Fig. 1. — Measurements as used in the present publication. A, length of carapace; B, rostral length; C, length of scaphocerite; D, width of scaphocerite; E, length of penultimate segment of third maxilliped; F, length of ultimate segment of third maxilliped; G, carpal length of first pereiopod; H, length of first chela; I, length of first chela of mature male (in *C. hendersoni* and *C. reticulatus*); J, meral length of third pereiopod; K, carpal length of third pereiopod; L, propodal length of third pereiopod.

SYSTEMATIC POSITION. —The family Rhynchocinetidae proposed by ORTMANN (1890) has been considered as a monogeneric family of the caridean shrimps. YALDWYN (1960) reestablished the taxonomic status of the Rhynchocinetidae including *Eugonatonotus* Schmitt, 1926 and *Lipkius* Yaldwyn, 1960, but the subsequent investigators regarded that the present family contained a single genus *Rhynchocinetes*, and thus *Eugonatonotus* was returned to the Eugonatonotidae and *Lipkius* was related to the Nematocarcinidae (THOMPSON, 1966; FOREST, 1977; CHRISTOFFERSEN, 1990; CHACE, 1992; HOLTHUIS, 1993).

Therefore, I regard that the Rhynchocinetidae is composed of two genera, the type genus, *Rhynchocinetes*, and the genus, *Cinetorhynchus*.

ECOLOGY. — The shrimps of *Cinetorhynchus* usually occur in shallow waters from temperate to tropical regions. As mentioned by BURKENROAD (1939) and OKUNO (1993,1994b), they inhabit in the deeper crevices and the submarine caves of coral and rocky reefs. They completely hide in these places during day time, and actively move to feed on the surfaces of coral head and rock at night.

REMARKS. — This genus is closely related to the genus *Rhynchocinetes*, but readily distinguished from the latter by the differences noticed by HOLTHUIS (1995), and the additional difference established in this paper. The species of *Cinetorhynchus* are armed each with ischial spine on outer surface and on ventral margin, and two rows of the meral spines, one on outer surface and the other on ventral margin in third to fifth pereopods, whereas the species of *Rhynchocinetes* have the single ischial spine and a row of the meral spines on third to fifth pereopods (Fig. 2). All the differences are summarized in Table 1.

Tab. 1. — Comparisons between *Rhynchocinetes* H. Milne Edwards, 1837 and *Cinetorhynchus* Holthuis, 1995.

	<i>Rhynchocinetes</i>	<i>Cinetorhynchus</i>
Rostral articulation	distinct	indistinct
Numbers of teeth on median carina of carapace	2	3
Supraorbital spine	present	absent
Posterolateral spine of 5th abdominal somite	absent	present
Spines on ischia and meri of 3rd to 5th pereopods	1 row	2 rows
Numbers of species	10	7

Rhynchocinetes ikatere described by YALDWYN (1971) based on the specimens from deep water at New Zealand represented the intermediate structure between two genera of the Rhynchocinetidae in having the combined characters of two teeth on the median carina of the carapace and no supraorbital spine. Through the personal communication with Dr. J. C. YALDWYN, I was able to confirm that the arrangement of spines on ischia and meri of the third to fifth pereopods of *R. ikatere* agreed well with those of the members of the typical genus. Furthermore, judging from the figure of the species shown by RICHARDSON & YALDWYN (1958), I recognized that the supraorbital spine of *R. ikatere* was rudimentally present rather than absent. On account of the above characters, *R. ikatere* is definitively contained to the type genus.

The present study represented that the meristic characters were usually overlapped with each species of *Cinetorhynchus*, and three species, *C. hiatti*, *C. hendersoni* and *C. reticulatus* revealed the intraspecific variability in the presence or absence of the pterygostomial spine, which was considered as one of the distinguishing characters. Although the best diagnosis is the live-coloration, which is constant in each species, the species may be distinguished by the following key based on the morphological characters.

Key to species of *Cinetorhynchus*

1. Dactyli of third to fifth pereopods with two claws posterior to terminal claw 2
- Dactyli of third to fifth pereopods with three claws posterior to terminal claw 4
2. Second maxilliped typically without podobranch ; carpi of third and fourth pereopods

- usually with a single spine *C. rigens* (Gordon, 1936)
- Second maxilliped with podobranch 3
3. Carpi of third and fourth pereopods usually with 3 spines ; stylocerite subequal to, or slightly exceeding distal end of antennular peduncle *C. erythrostickus* sp. nov.
- Carpi of third and fourth pereopods usually with a single spine ; stylocerite distinctly exceeding distal end of antennular peduncle *C. hiatti* (Holthuis & Hayashi, 1967)
4. Ventral margin of rostrum with 4-5 proximal teeth distinctly isolated from distal series ; inner margin of antennular proximal segment with 2-4 teeth ventrally
..... *C. concolor* (Okuno, 1994)
- Ventral margin of rostrum with equidistant teeth, decreasing in size distally ; inner margin of antennular proximal segment with a single tooth ventrally 5
5. Stylocerite reaching distal end of antennular peduncle ; distolateral spine of scaphocerite not reaching tip of lamella ; fifth pereopod overreaching midlength of scaphocerite
..... *C. striatus* (Nomura & Hayashi, 1992)
- Stylocerite not reaching distal end of antennular peduncle ; distolateral spine of scaphocerite reaching or overreaching tip of lamella ; fifth pereopod not reaching midlength of scaphocerite 6
6. Coxae of first and third pereopods with distinct corneous projections ; carpi of third and fourth pereopods usually with 2 spines *C. hendersoni* (Kemp, 1925)
- Coxae of first and third pereopods without corneous projections ; carpi of third and fourth pereopods usually with 3 spines *C. reticulatus* sp. nov.

Cinetorhynchus erythrostickus sp. nov.

(Pl. 1 A, B & Figs. 2 A, 3, 4 A-C)

Rhynchocinetes rigens ; FUJINO, 1975 : 297, figs. 1-2. — TIEFENBACHER, 1976 : 317 (in part). — HIRATA *et al*, 1988 : 59, fig. unnumbered. — KAMEZAKI *et al*, 1988 : 72, fig. unnumbered. — NOMURA & MATSUKUBO, 1992 : 22, figs. 1, 3. — OKUNO, 1994b : 69 (in part), figs. 3 D, 4 H (not GORDON, 1936).

TYPE SERIES. — Holotype, 1 ovig. ♀ 16.0 mm CL (NSMT-Cr 2155), Ryukyu Islands, Aka Harbor, Aka-jima Islet, Kerama Group, 26°11.2'N, 127°17.1'E, 3 m, May 17, 1993.

PARATYPES. — 36 specimens. **Japan.** — Honshu, Sabiura, Kushimoto, southern point of Kii Peninsula, 33°28.3'N, 135°47.0'E, 1-2 m, January 8, 1993 : 1 ♂ 9.1 mm CL (NSMT-Cr 2586), 1 ♂ 11.4 mm CL (NSMT-Cr 2584) ; February 5, 1993 : 1 ♂ 10.8 mm CL (NSMT - Cr 2585). — Izu Islands, Sokodo, Hachijo-jima Island, 33°07.3'N, 139°49.2'E, 15 m, August 2, 1995 : 1 ♂ 11.3 mm CL, 2 ovig. ♀ 14.0 & 15.2 mm CL (CBM-ZC 1981). — Submarine cave at Occho-ga-hama, Hachijo-jima Island, 33°03.5'N, 139°47.9'E, 10 m, June 17, 1993 : 1 ♂ 11.4 mm CL (NSMT-Cr 2620), 1 ♂ 11.4 mm CL (NSMT-Cr 2621). — Ohsumi Islands, Anbo, Yaku-shima Island, 30°19.0'N, 130°39.9'E, February 26, 1965 : 1 ♀ 15.0 mm CL (KMNH, uncatalogued). — Amami Islands, Tidepool on Keraji, Kikai-shima Island, 26°16.9'N, 129°59.1'E, March 28, 1979 : 2 ♂ 11.4 & 15.2 mm CL, (SUF 530-2-489).

Ryukyu Islands. — Submarine cave at Ie-shima Island, 26°42.9'N, 127°50.1'E, 25 m, June 17, 1990 : 1 ♂ 7.3 mm CL (NSMT-Cr 1421). — Okinawa Island, Naha Harbor, 26°14.2'N, 127°40.2'E, 1 m, May 23, 1993 : 1 ♂ 12.2 mm CL (NSMT-Cr 2071), 1 ♂ 17.3 mm CL (CBM-ZC 1980). — Aka Harbor, Aka-jima Islet, Kerama Group, 26°11.2'N, 127°17.1'E, 3 m, May 17, 1993 : 1 ovig. ♀ 13.0 mm CL (NSMT-Cr 2156). — Hizushi-hama, Aka-jima Islet, Kerama Group, 26°11.2'N, 127°16.8'E, 3 m, May 20, 1993 : 1 ♂ 10.7 mm CL (NSMT-Cr 2146), 1 ♂ 10.3 mm CL (NSMT-Cr 2158), 1 ♂ 9.4 mm CL (NSMT-Cr 2165). — Hiyajo, Kume-jima Island, 26°23.2'N, 126°47.7'E, 5 m, November 23, 1992 : 1 ♀ 13.7 mm CL (NSMT-Cr 2572). — Kuroishi, Kume-jima Island, 26°17.6'N, 126°47.8'E, 5 m, November 24, 1992 : 1 ♂ 10.9 mm CL

(NSMT-Cr 2573), 1 ♂ 11.0 mm CL (NSMT-Cr 2574).

New Caledonia. — Récif externe de Taenia, 20°00.4'S, 163°56.3'E, 8 m, March 25, 1990 : 2 ♂ 9.8 & 10.0 mm, 1 ♀ 10.5 mm CL (MNHN-Na 12939). — Côte Est, Récif Ana, 21°22.2'S, 165°56.4'E, 3-10 m, September 11, 1989 : 1 ♀ 15.4 mm & 2 ovig. ♀ 14.6 & 15.1 mm CL (MNHN-Na 12946). — Passe de Saint Vincent, 22°05.1'S, 165°58.0'E, 5 m, March 21, 1990 : 2 ♂ 8.4 & 8.6 mm, 1 ovig. ♀ 12.0 mm CL (MNHN-Na 12937).

Loyalty Islands. — Uvea Island, 20°29.2'S, 166°14.4'E, Haute Islet, 11 m, November 19, 1991 : 4 ♂ 9.7-11.5 mm CL, 1 ovig. ♀ 13.3 mm CL (MNHN-Na 12938). — Passe de la Meurthe, 22°36.5'S, 166°16.8'E, 6-10 m, November 16, 1991 : 1 ovig. ♀ 13.0 mm CL (MNHN-Na 12947).

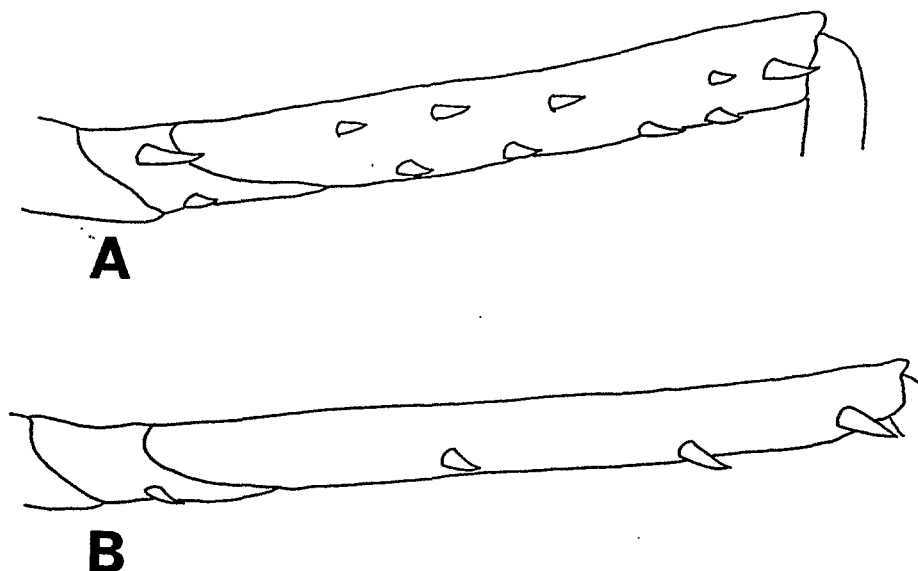


Fig. 2. — Comparison of ischium and merus of third pereiopod. A, *Cinetorhynchus erythrostickus* sp. nov. (male paratype, NSMT-Cr 2165, 9.4 mm CL) ; B, *Rhynchocinetes conspicuicellus* Okuno & Takeda, 1992 (male, NSMT-Cr 2190, 12.3 mm CL).

DESCRIPTION. — Carapace with pterygostomial angle rounded, without spine.

Rostrum upturned distally, 1.2-2.0 times as long as carapace, armed dorsally with 2 large teeth proximally, 2 (rarely 1) small teeth subterminally, armed ventrally with 10-12 (rarely 9) acute teeth decreasing in size distally.

Antennular peduncle reaching proximal quarter of rostrum, inner margin of proximal segment armed ventrally with an acute tooth ; stylocerite strongly acute, subequal to, or slightly overreaching distal end of ultimate segment ; thickened part of upper flagellum not reaching series of rostral teeth distodorsally.

Scaphocerite falling slightly short of level of midlength of rostrum, 0.6-0.9 times as long as carapace, 2.8-4.0 times as long as its maximum width, distolateral spine exceeding slightly beyond tip of lamella.

Mouthparts typical. Second maxilliped with a small podobranch at proximal upper margin of epipod. Third maxilliped reaching proximal two thirds of scaphocerite, exceeding slightly beyond distal margin of antennular terminal segment ; ultimate segment 0.4-0.5 times as long as carapace, 1.2-1.5 times as long as penultimate segment, with 7-8 dark horny claws distally.

First pereiopod reaching proximal third of scaphocerite, chela 0.3-0.4 times as long as carapace, 1.5-1.9 times as long as carpus. Second pereiopod reaching midlength of scaphocerite, chela 0.3 times as long as carapace, carpus 0.4 times as long as carapace, 1.3-1.5 times as long as chela.

Ambulatory pereiopods slender, each dactylus with small 2 horny claws posterior to terminal claw. Third pereiopod exceeding slightly beyond tip of scaphocerite ; ischium with each articulated spine on outer surface and ventral margin ; merus 0.7-0.8 times as long as carapace, 2.2-2.5 times as long as carpus, with 4-8 (usually 5)

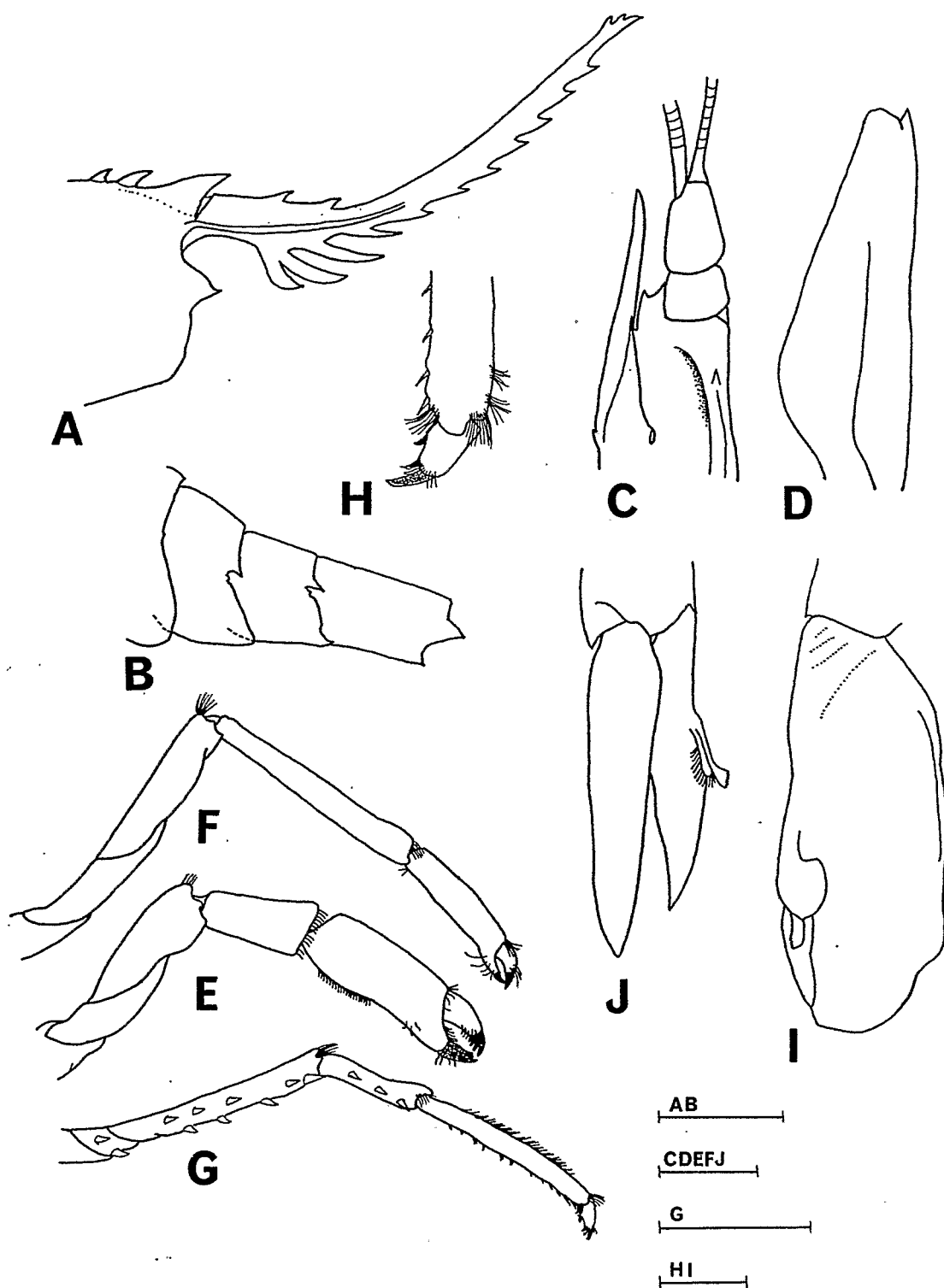


Fig. 3. — *Cinetorhynchus erythrostickus* sp. nov. Male paratype (NSMT-Cr 2574, 11.0 mm CL). A, anterior part of carapace with rostrum ; B, fourth to sixth abdominal somites ; C, antennular peduncle, ventral view ; D, scaphocerite ; E, first pereopod ; F, second pereopod ; G, third pereopod ; H, dactylus of third pereopod ; I, endopod of first pleopod ; J, second pleopod. Scales for A, B, G = 5 mm ; C-F = 2 mm ; H-J = 1 mm.

articulated spines on outer surface, 2-6 (usually 2-4) similar spines on ventral margin ; carpus 0.3 times as long as carapace, with 2-4 (usually 3) articulated spines on outer surface ; propodus 0.5-0.6 times as long as carapace, 1.8-1.9 times as long as carpus. Fourth pereopod reaching proximal two thirds of scaphocerite ; spination of ischium agrees with that of third pereopod ; merus 0.6-0.7 times as long as carapace, 2.0-2.3 times as long as carpus, with 4-7 (usually 5-6) articulated spines on outer surface, 2-5 (usually 2-3) similar spines on ventral margin ; proportion of carpus resembling that of third pereopod, with 2-3 (usually 3) articulated spines on outer surface ; propodus 0.5-0.6 times as long as carapace, 1.8-2.0 times as long as carpus. Fifth pereopod reaching midlength of scaphocerite ; merus 0.5-0.6 times as long as carapace, 1.6-2.0 times as long as carpus, with 3-6 (usually 4-5) articulated spines on outer surface, 1-3 similar spines on ventral margin ; proportion of carpus resembling above two pereopods, with 1-3 (usually 2-3) articulated spines on outer surface ; proportion of propodus similar to that of fourth pereopod.

Endopod of male first pereopod with distal end slightly truncated.

COLORATION. — Ground color of whole body pale, mottled with numerous red spots and patches densely on carapace and abdomen, except for anterolateral part of carapace ; third abdominal somite with conspicuously large red patch dorsolaterally. Rostrum red, with white apex. Chelae of first and second pereopods and carpi, propodi and dactyli of third to fifth pereopods pinkish.

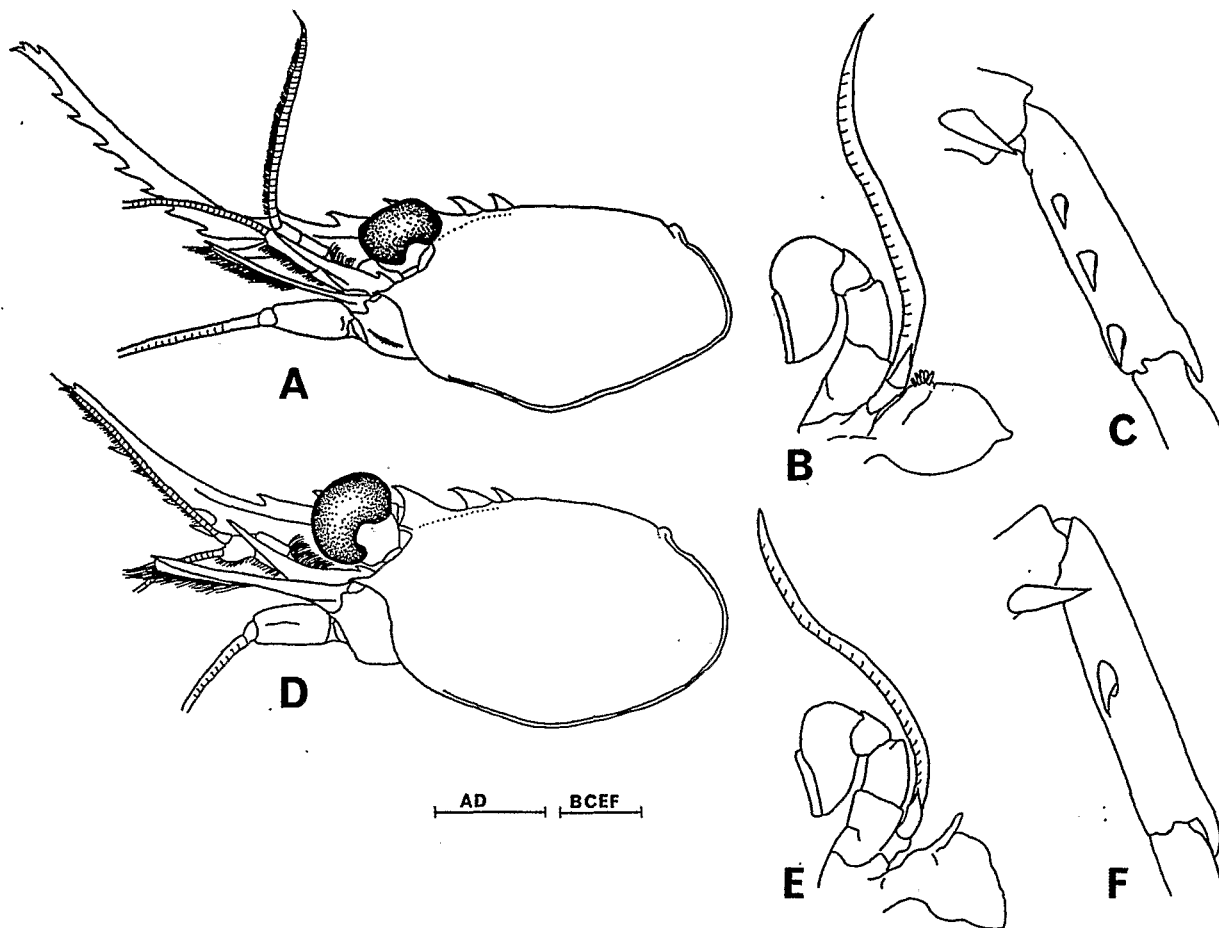


Fig. 4. — Comparisons of *C. erythrostickus* sp. nov. (A-C, male paratype, NSMT-Cr 2574, 11.0 mm CL) and *C. rigens* (Gordon, 1936)(D-F, male, USNM 189009, 10.8 mm CL). A & D, anterior part of body ; B & E, second maxilliped ; C & F, carpus of third pereopod. Scales for A, D = 5 mm ; B, C, E, F = 1 mm.

DISTRIBUTION. — The present species is known from southern Japan, New Caledonia and the Loyalty Islands in the western Pacific. The closely allied species, *C. rigens*, is recorded from several localities on the Atlantic Ocean (GORDON, 1936 ; BURKENROAD, 1939 ; FIGUEIRA, 1960 ; MANNING, 1961 ; TIEFENBACHER, 1976 ; WIRTZ *et al.*, 1988 ; MANNING & CHACE, 1990). Both species have not been known from the eastern Pacific.

ETYMOLOGY. — The specific name *erythrostickus* is coined from two Greek words, *erythros* meaning red and *stiktos* meaning the dapple, in allusion to many red spots on the body in alive.

REMARKS. — As identified with *rigens* by previous authors (cf. synonymous list), *C. erythrostickus* strongly resembles that species. They are differentiated from each other by the following characters.

1) The thickened part of the upper antennular flagellum is falling distinctly short of the distal series of the rostral dorsal teeth in *C. erythrostickus* (Fig. 4 A), whereas it reaches the distal series of the teeth in *C. rigens* (Fig. 4 D).

2) *C. erythrostickus* has a small podobranch on the epipod of the second maxilliped (Fig. 4 B) ; *C. rigens* has the rudimental podobranch at the maxilliped typically, and possesses an accessory lobe on the epipod (Fig. 4 E), except two specimens from Madeira, which has an indistinct podobranch on the tip of the accessory lobe.

3) *C. erythrostickus* nearly always possesses three spines on the carpi of the third and fourth pereopods (Fig. 4 C), whereas the normal complement for *C. rigens* appears to be a single spine (Fig. 4 F).

4) In alive, *C. erythrostickus* is not covered with the red spots at the carapace anterolaterally, coloring pale uniformly, whereas *C. rigens* is uniformly covered with the numerous red spots and patches on the whole surface of the carapace.

5) In alive, the sixth abdominal somite is covered with the red spots in the present new species, while in *C. rigens*, the somite has a longitudinal red and white bands.

The characters of 1) and 5) are originally indicated by FUJINO (1975), and 3) has been previously suggested by TIEFENBACHER (1976).

The present comparisons revealed that the other distinctions proposed by FUJINO (1975) were unavailable to determine, because they were strongly variable within each species.

Tab. 2. — Frequency distribution of rostral ventral teeth counts of *Cinetorhynchus*. * : Including the counts of the holotype.

No. of teeth	7	8	9	10	11	12	13	14
Species								
<i>C. erythrostickus</i>			1	9	12*	7		
<i>C. rigens</i>			1	10	4			
<i>C. hiatti</i>		4	4*	1		2		
<i>C. concolor</i>			2	2*	13	3	1	
<i>C. striatus</i>					1	5	5	3
<i>C. hendersoni</i>	5	8	18	5	5			
<i>C. reticulatus</i>		1	8	13	13*			

Cinetorhynchus hiatti (Holthuis & Hayashi, 1967) comb. nov.
(Pl. 1 C & Fig. 5)

Rhynchocinetes rigens ; HIATT, 1948 : 78. — HIATT, 1954 : 25, pl. 5, fig. 5 (not GORDON, 1936).

Rhynchocinetes hiatti Holthuis, 1953 : 54 (*nomen nudum*). — MORRISON, 1954 : 18 (*nomen nudum*).

Rhynchocinetes hiatti Holthuis & Hayashi, 1967 : 162, figs. 1-2 (Type locality : Taiwan). — TIEFENBACHER, 1976 : 318 (in part). — BRUCE, 1984 : 209, fig. 1. — OKUNO, 1993 : 5, fig. 5. — OKUNO, 1994b : 69 (in part), figs. 3C & 4G. — OKUNO, 1995 : 2, fig. 3.

Not *Rhynchocinetes hiatti* ; MONOD, 1972 : 15, figs. 27-64. — MIYAKE, 1975 : 105, fig. unnumbered. — TAKEDA, 1982 : 35, fig. unnumbered [= *C. hendersoni* (Kemp, 1925)].

Rhynchocinetes, Hawaiian species; Anonymous, 1982 : 404, fig. unnumbered.

Not *Rhynchocinetes hiatti*; KAMEZAKI *et al*, 1988 : 71, fig. unnumbered [= *C. concolor* (Okuno, 1994)].

Not *Rhynchocinetes hiatti*; COLEMAN, 1991 : 104, fig. unnumbered [= *C. striatus* (Nomura & Hayashi, 1992)].

MATERIAL EXAMINED. — 14 specimens. - **Japan. Ogasawara Islands.** Chichi-jima Island : 1 ♀ (NSMT-Cr 2133, 7.8 mm CL). — Ani-jima Island : 1 ♂ (SUF 530-2-1681, 10.0 mm CL). — Ryukyu Islands. Iriomote-jima Island : 1 ovig. ♀ (SUF 530-2-1680, 12.0 mm CL).

Taiwan. Koshi Bay : 1 ♂ (KMNH, uncatalogued, holotype of *Rhynchocinetes hiatti*, 13.3 mm CL).

Hawaii. Oahu Island : 1 ♀ (BPBM, uncatalogued, 13.6 mm CL), 1 ♂ (NSMT-Cr 2419, 17.1 mm CL).

Mariana Islands. Guam Island : 1 ovig. ♀ (NSMT-Cr 1723, 10.6 mm CL), 1 ♀ (NSMT-Cr 1756, 12.7 mm CL).

Marshall Islands. Enewetok Atoll : 1 ♂, 2 ovig. ♀ (MNHN-Na 2775, 8.7-10.9 mm CL).

Marquesas Islands. Nuku Hiva : 2 ovig. ♀ (BPBM S11280, 11.0 & 11.7 mm CL).

Loyalty Islands. Uvea Island : 1 ovig. ♀ (MNHN-Na 12948, 14.2 mm CL).

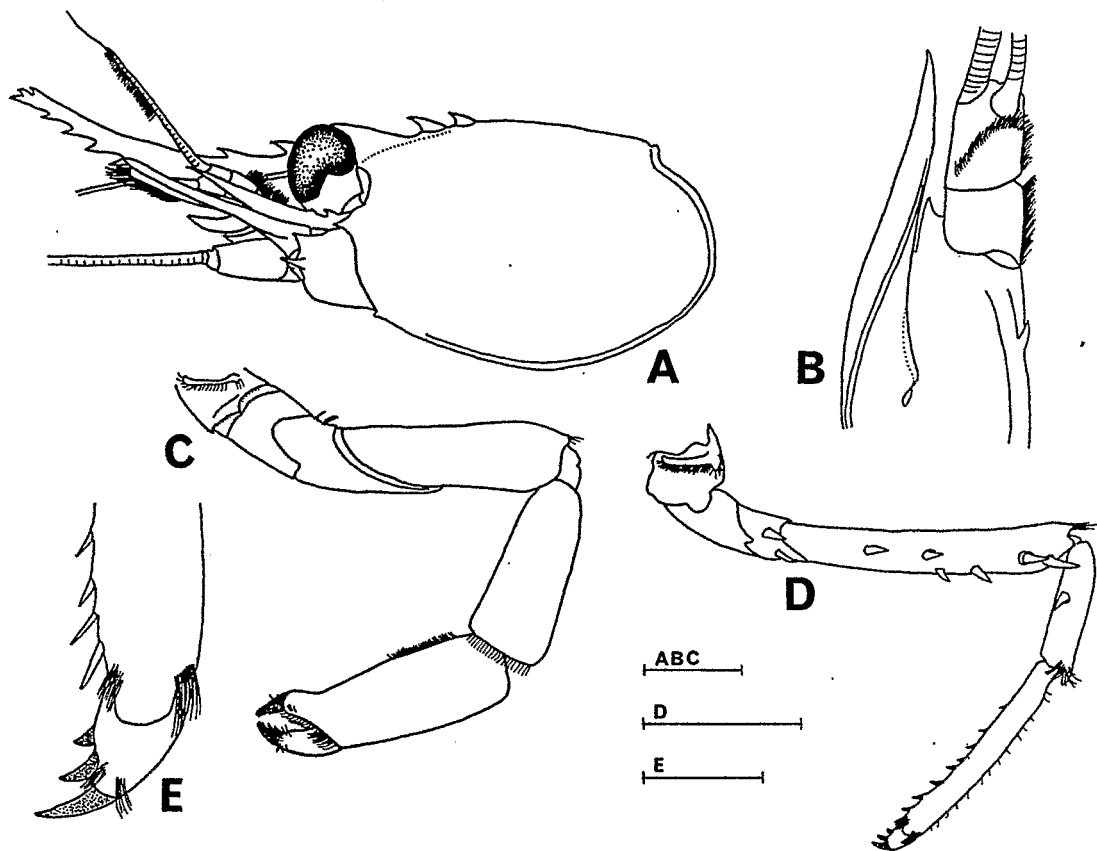


Fig. 5. — *Cinetorhynchus hiatti* (Holthuis & Hayashi, 1967). Ovigerous female (MNHN-Na 12948, 14.2 mm CL). A, anterior part of body ; B, antennular peduncle, ventral view ; C, first pereopod ; D, third pereopod ; E, dactylus of third pereopod. Scales for A, D = 5 mm ; B, C = 2 mm ; E = 1 mm.

DESCRIPTION. — Carapace with pterygostomial angle usually with a blunt spine, rarely without spine, rounded. Rostrum curved dorsad, 0.8-1.6 times as long as carapace, armed dorsally with 2 large teeth proximally, 2 (rarely 3) small teeth subterminally, armed ventrally with 8-12 teeth decreasing in size distally.

Antennular peduncle reaching, or slightly overreaching midlength of rostrum, inner margin of proximal segment armed ventrally with an acute tooth ; stylocerite considerably exceeding distal end of ultimate segment.

Scaphocerite slightly overreaching midlength of rostrum, 0.6-0.8 times as long as carapace, 2.7-3.4 times as long as its maximum width, with distolateral spine overreaching tip of lamella ; basicerite typically with two acute

spines, directed anteriorly, rarely with a single spine just below a rounded lobe anterodorsally.

In female and small male, third maxilliped subequal to, or slightly over reaching tip of scaphocerite, falling short of rostral apex, ultimate segment armed with 5-7 dark corneous claws at apex ; in mature male, the maxilliped overreaching rostral apex by midlength of ultimate segment armed with 3 claws at its apex.

First pereopod reaching distal end of scaphocerite, coxa with small, blunt spine anterolaterally. Second pereopod reaching midlength of scaphocerite.

Ambulatory pereopods considerably stouter than those of the congeners, with carpi typically armed with a single spine on outer surface, situated at level of the midlength ; dactyli with 2 small claws posterior to terminal claw. Third pereopod reaching midlength of scaphocerite ; merus with 2-4 (usually 4) spines on outer surface, 1-2 (usually 1) spines on ventral margin. Fourth pereopod reaching midlength of scaphocerite ; merus with 4 (rarely 2) spines on outer surface, 1-2 (usually 1) spines on ventral margin. Fifth pereopod reaching base of scaphocerite ; ischium usually without spine ; merus with 2-4 (usually 3) spines on outer surface, usually with a single spine (rarely unarmed) on ventral margin.

COLORATION. — Ground color of whole body deep orange. Carapace with three oblique pale bands fringing with red lines on posterolateral surface, the posterior band continuous with that on the first abdominal somite. Rostrum uniformly pale orange except white apex. Each somite of abdomen with transverse white band bordering by red lines ; the band of the sixth somite usually broken, forming two white spots circumscribing with red circle, rarely forming a complete band.

DISTRIBUTION. — Western and central Pacific within an area bounded by the Ogasawara Islands in the north and the Loyalty Islands in the south. Usually occurs in 1-10 m depths. The deepest record is 24 m of the specimens from Nuku Hiva of the Marquesas Islands. Records now available suggest that this species mainly occurs in the oceanic islands of the central Pacific rather than in the continental islands.

Tab. 3. — Frequency distribution of number of spines on outer surface of meri of 3rd to 5th pereopods. * : Including the counts of the holotype.

Pereopods	3rd											4th						5th					
	2	3	4	5	6	7	8	9	10	11	2	3	4	5	6	7	2	3	4	5	6		
Species																							
<i>C. erythrostictus</i>			5	21*	7	2	2						2	14	17*	4			4	18*	13	1	
<i>C. rigens</i>				5	13	1							7	13				10	6	3			
<i>C. hiatti</i>	1	2	11*								1		12*				1	10*	3				
<i>C. concolor</i>			2	23*	2	1	1						1	1	25*	1			16	12	1*		
<i>C. striatus</i>				11	6	2	1			1				11	9	1				4	14	3	
<i>C. hendersoni</i>		2	17	21	3	3							3	29	13	1	8	31	3	1			
<i>C. reticulatus</i>		3	21	15*	1									2	33*	6	2	31*	6	2			

REMARKS. — The holotype of *hiatti*, a male specimen from Taiwan, is housed at the collection of KMNH on account of the transference from the Zoological Laboratory of Kyushu University.

Cinetorhynchus hiatti is morphologically characterized by the combination of the stylocerite distinctly overreaching the distal end of the antennular peduncle (Fig. 5 B), and the carpi of the ambulatory pereopods nearly always armed with a single spine (Fig. 5 D), the lower number of the spines on the meral ventral margin of the third and fourth pereopods and the dactyli bearing two small claws posterior to the terminal claw in the ambulatory pereopods (Fig. 5 E). This species has the antennal basicerite typically armed with two acute spines (HOLTHUIS & HAYASHI, 1967). Although this character reveals the intraspecific variation noted in the above lines, it may be available to determine it from the other congeners having the basicerite constantly armed with a single spine anteriorly. TIEFENBACHER (1976) compared the forms of the coxal spine of the first pereopod between *C. hiatti* and *C. hendersoni*. The indistinctive spine, as bearing in *C. hiatti*, is appeared in all the

congeners except *C. hendersoni*, which possesses a lobate corneous projection on the coxa.

HIATT (1948, 1954) recorded the Hawaiian specimens identified with *R. rigens*. I could not examine these specimens which were not designated as the type series of *hiatti*. Because the morphological characters between *C. hiatti* and *C. rigens* closely resemble each other and *C. hiatti* is not uncommon in the Hawaiian waters, I regarded that HIATT's specimens may belong to *C. hiatti*. In the popular publications with the color photographs were several records under the name of *hiatti* (MIYAKE, 1975 ; TAKEDA, 1982 ; KAMEZAKI *et al.*, 1988 ; COLEMAN, 1991). These specimens were not identical with *C. hiatti* but with the other congeners (cf. synonymous list).

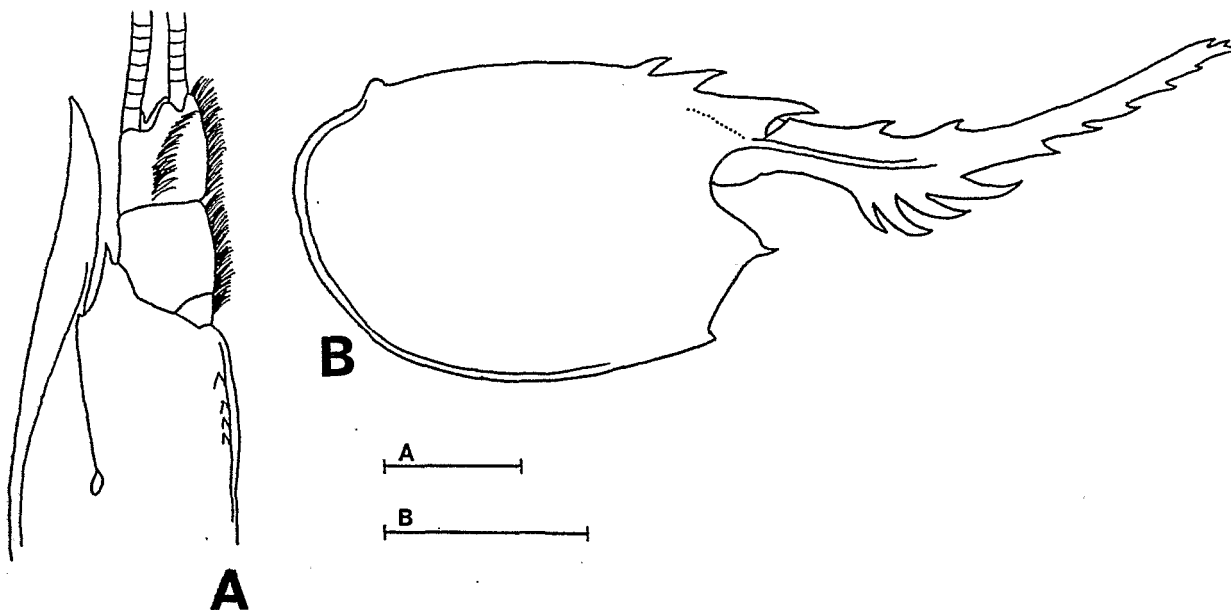


Fig. 6. — *Cinetorhynchus concolor* (Okuno, 1994). A, male (MNHN-Na 12941, 11.6 mm CL), antennular peduncle, ventral view ; B, juvenile (NSMT-Cr 3316, 3.2 mm CL), carapace with rostrum. Scales 2 mm.

Cinetorhynchus concolor (Okuno, 1994) comb. nov.
(Pl. 1 D & Fig. 6)

Rhynchocinetes hiatti ; Kamezaki *et al.*, 1988 : 71, fig. unnumbered (not HOLTHUIS & HAYASHI, 1967).

Rhynchocinetes sp. STEENE, 1990 : 76, fig. unnumbered.

Rhynchocinetes concolor Okuno, 1994b : 65, figs. 1-2, 3A, 4A-D. — OKUNO, 1995 : 2, figs. 1-2.

MATERIAL EXAMINED. — In addition to the type series, the following 20 specimens were examined in the present study :

Japan. Izu Islands. Hachijo-jima Island : 1 juv. (NSMT-Cr 3315, 4.3 mm CL), 1 juv. (NSMT-Cr 3316, 3.2 mm CL).

Chesterfield Islands. 1 ♂ (MNHN-Na 12940, 8.3 mm CL).

New Caledonia. Récif Taenia : 2 ♀ (MNHN-Na 12942, 8.2 & 9.1 mm CL), 1 ♂, 1 ♀ (MNHN-Na 12943, 5.7 & 8.3 mm CL). — Récif Anna : 2 ♂ (MNHN-Na 12963, 11.7 & 13.7 mm CL). — Baie de Canala : 1 ♂ (MNHN-Na 12941, 11.6 mm CL).

Loyalty Islands. Uvea Island : 2 ♂ (MNHN-Na 12959, 12.7 & 14.4 mm CL), 1 ♀ (MNHN-Na 12960, 11.4 mm CL), 1 ovig. ♀ (MNHN-Na 12961, 10.9 mm CL), 1 ovig. ♀ (MNHN-Na 12962, 11.8 mm CL), 3 ♂, 1 ovig. ♀ & 1 juv. (MNHN-Na 12944, 4.4-14.4 mm CL).

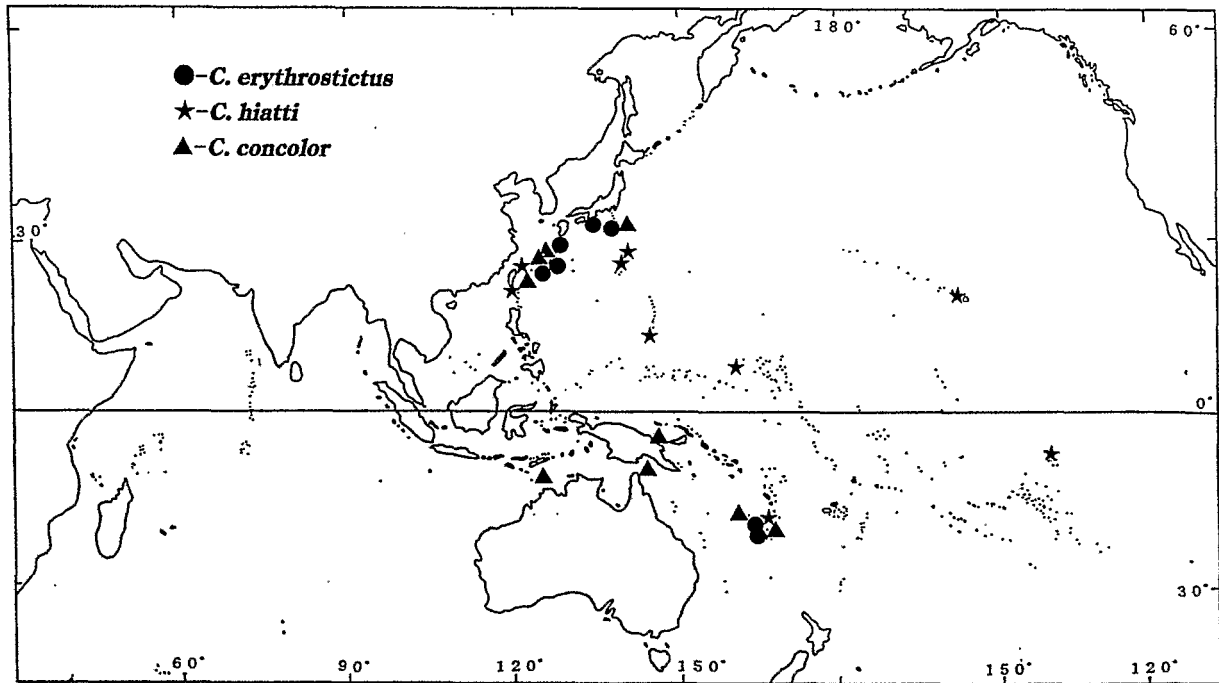


Fig. 7. — Distributions of *Cinetorhynchus erythrostickus*, *C. hiatti* and *C. concolor*.

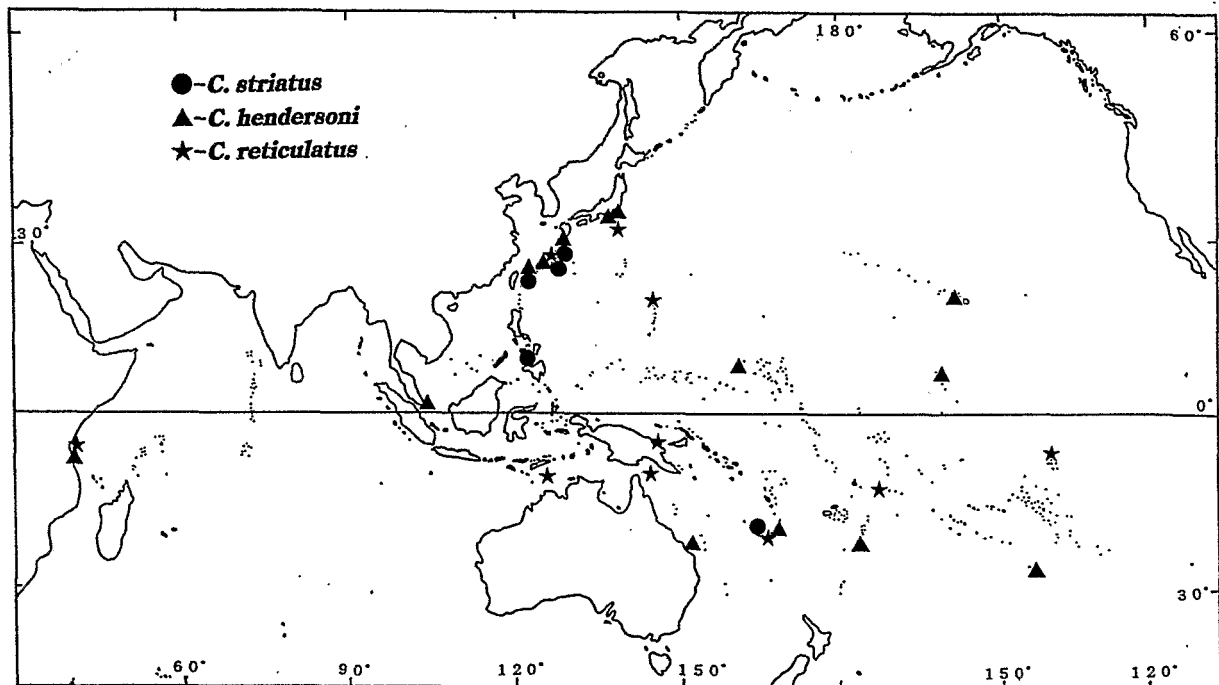


Fig. 8. — Distributions of *Cinetorhynchus striatus*, *C. hendersoni* and *C. reticulatus*.

DESCRIPTION. — Carapace without pterygostomial spine. Rostrum distinctly upturned distally, 1.3-1.8 times as long as carapace, armed dorsally with 2 large teeth proximally, 2 small teeth subterminally, armed ventrally with 9-13 (usually 11) teeth, proximal 4 (rarely 5) teeth acutely pointed, directed anteriorly, separated by the distinct interval from proximal tooth of distal series, distal 5-9 (usually 7) teeth small, equidistant, ultimate tooth subterminally.

Antennular peduncle reaching proximal third of rostrum, inner margin of proximal segment armed ventrally with 2-4 (usually 2) acute teeth ; stylocerite over reaching distal end of ultimate segment ; upper flagellum not reaching distal series of rostral dorsal teeth.

Scaphocerite reaching midlength of rostrum, 0.7-0.9 times as long as carapace, 2.8-3.9 times as long as width, with distolateral spine overreaching tip of lamella ; basicerite armed with an acute spine anteriorly.

Third maxilliped reaching midlength of rostrum, subequal to tip of scaphocerite, ultimate segment armed with 5-7 dark corneous claws at its apex.

First pereiopod reaching midlength of scaphocerite. Second pereiopod reaching slightly beyond midlength of scaphocerite.

Ambulatory pereiopods with coxae with indistinctive spines, external margin rounded ; dactyli with 3 small claws posterior to terminal claw. Third pereiopod overreaching tip of scaphocerite ; merus with 4-8 (usually 5) spines on outer surface, 2-4 (usually 2) spines on ventral margin ; carpus with 1-4 (usually 2) spines on outer surface. Fourth pereiopod reaching distal third of scaphocerite ; merus with 3-6 (usually 5) spines on outer surface, 1-3 (usually 2) spines on ventral margin ; carpus with 2 (rarely 3) spines on outer surface. Fifth pereiopod reaching midlength of scaphocerite ; merus with 3-4 (rarely 5) spines on outer surface, 1-2 (rarely 3) spines on ventral margin ; carpus with 2 (rarely 1) spines on outer surface.

COLORATION. — The coloration of the additional materials agree quite well with those of the type specimens (OKUNO, 1994b).

Tab. 4. — Frequency distribution of number of spines on ventral margin of meri of 3rd to 5th pereiopods. * : Including the counts of the holotype.

Pereiopods	3rd						4th					5th				
	No. of spines	1	2	3	4	5	6	1	2	3	4	5	0	1	2	3
Species																
<i>C. erythrostictus</i>		9*	18	8	1	1		18*	16	2	1		8*	18	10	
<i>C. rigens</i>	4	14	1					5	15				15	4		
<i>C. hiatti</i>	11*	3						11*	3				1	12*		
<i>C. concolor</i>		21*	5	3				2	20*	6			9	19*	1	
<i>C. striatus</i>		1	11	7		2		1	4	15	1		1	14	6	
<i>C. hendersoni</i>		5	30	9	1			1	7	29	8		13	22	9	
<i>C. reticulatus</i>		3	27*	8	2	1		14	24*	4			10	19*	12	

DISTRIBUTION. — In addition to the previously known localities, viz., the Amami and Ryukyu Islands of the southern Japan, Papua New Guinea and the northern Australian waters, this species has been collected from Hachijo-jima Island of the Izu Islands, Japan and the New Caledonian waters including the Chesterfield and the Loyalty Islands.

REMARKS. — In the further examination on this species, I additionally found the diagnostic character of *C. concolor* ; the inner margin of the antennular proximal segment is armed ventrally with 2-4 acute teeth (Fig. 6 A) instead of a single tooth in the other congeners.

The present study represented that three juveniles (3.2-4.4 mm CL) have a small pterygostomial spine (Fig. 6 B) and the stylocerite falling distinctly short of the distal end of the antennular peduncle. Although these morphological characters vary due to the development, there is no difference in the live-coloration through the development.

Cinetorhynchus striatus (Nomura & Hayashi, 1992) comb. nov.
(Pl. 1 E)

Rhynchocinetes sp. DEBELIUS, 1983 : 68, fig. unnumbered. — DEBELIUS, 1984 : 68, fig. unnumbered. — KAMEZAKI *et al.*, 1988 : 74, fig. unnumbered.

Rhynchocinetes hiatti ; COLEMAN, 1991 : 104, fig. unnumbered (not HOLTHUIS & HAYASHI, 1967).

Rhynchocinetes striatus Nomura & Hayashi, 1992 : 199, figs. 1-4 (Type locality : Ryukyu Is.). — OKUNO, 1994b : 69 (in part), figs. 3E, 4F. — OKUNO, 1995 : 3, fig. 4.

MATERIAL EXAMINED. — 21 specimens. **Japan.** Amami Islands. Amami-Oshima Island : 1 ♂ (YCM-CM 977, 8.7 mm CL). — Ryukyu Islands. Ie-shima Island : 1 ♂ (NSMT-Cr 2170, 16.9 mm CL), 1 ♂ and 2 ovig. ♀ (NSMT-Cr 2171, 19.3-20.7 mm CL). — Okinawa Island : 1 ♂ (NSMT-Cr 2037, 20.3 mm CL), 3 ovig. ♀ (NSMT-Cr 2192, 21.0-22.5 mm CL). — Aka-jima Islet : 1 ovig. ♀ (NSMT-Cr 2159, 18.8 mm CL). — Kuro-shima Islet : 1 ♂ (SUF 530-2-1360, paratype of *Rhynchocinetes striatus*, 16.5 mm CL), 1 ♀ (SUF 530-2-1361, paratype of *R. striatus*, 18.3 mm CL), 1 ♀ (SUF 530-2-1362, paratype of *R. striatus*, 13.2 mm CL). — Iriomote-jima Island : 2 ♂ (SUF 530-2-1682, 11.5 & 13.2 mm CL).

Philippines. Cebu Island, Sumilon Island : 1 ovig. ♀ (BPBM S11283, 18.5 mm CL).

New Caledonia. East coast, Récif Ana : 1 ♂ and 4 ovig. ♀ (MNHN-Na 12955, 10.8-19.4 mm CL).

DESCRIPTION. — Carapace with pterygostomial angle rounded, without spine. Rostrum strongly upturned distally, 1.4-2.1 times as long as carapace, armed dorsally with 2 large teeth proximally, 2 (rarely 3) small teeth subterminally, armed ventrally with 11-14 (usually 12-13) sharply acute teeth decreasing in size distally.

Antennular peduncle reaching proximal third of rostrum, inner margin of proximal segment armed ventrally with an acute tooth ; stylocerite subequal to distal end of ultimate segment.

Scaphocerite broad, 0.7-0.8 times as long as carapace, 2.4-3.2 times as long as its maximum width, distolateral spine falling distinctly short of tip of lamella.

Third maxilliped reaching distal third of scaphocerite. First pereopod reaching base of scaphocerite. Second pereopod subequal to midlength of scaphocerite.

Ambulatory pereopods very slender, with dactyli with 3 small claws posterior to terminal claw. Third pereopod overreaching tip of scaphocerite by distal third of propodus ; merus with 5-8 (usually 5-6, rarely 11) spines on outer surface, 2-6 (usually 3-4) spines on ventral margin ; carpus slender, with 2-4 (usually 2) spines on outer surface. Fourth pereopod slightly overreaching tip of scaphocerite ; merus with 5-7 (usually 5-6) spines on outer surface, 1-4 (usually 3) spines on ventral margin ; carpus with 2-3 spines on outer surface. Fifth pereopod subequal to tip of scaphocerite ; merus with 4-6 (usually 5) spines on outer surface, 1-3 (usually 2) spines on ventral margin ; carpus with 2-3 (usually 2) spines on outer surface, rarely unarmed.

COLORATION. — The coloration of the additional specimens agrees well with the description and the figure 1 by NOMURA and HAYASHI (1992) and no further description is necessary.

DISTRIBUTION. — Presently known from the Ryukyu Islands, the Philippines and New Caledonia. Usually found at rocky reef of 1-20 m depths.

Cinetorhynchus hendersoni (Kemp, 1925) comb. nov.
(Pl. 1 F & Figs. 9, 12 D-F)

Rhynchocinetes rugulosus ; HENDERSON, 1893 : 438. — THURSTON, 1895 : 120. — FUJINO, 1975 : 300 (not STIMPSON, 1860).

Rhynchocinetes hendersoni Kemp, 1925 : 265, figs. 3-5, 7 (Type locality : Gulf of Manaar). — GORDON, 1936 : 82. — HOLTHUIS, 1947 : 80. — BRUCE, 1976 : 4. — TIEFENBACHER, 1976 : 318 (in part). — DEBELIUS, 1983 : 76, fig. unnumbered. — DEBELIUS, 1984 : 76, fig. unnumbered. — KAMEZAKI *et al.*, 1988 : 70, fig. unnumbered. — OKUNO, 1993 : 4, figs. 1-4. — OKUNO, 1994b : 69 (in part), figs. 3B, 4E.

? *Rhynchocinetes hendersoni* ; BOONE, 1935 : 109, pls. 28-29.

Not *Rhynchocinetes hendersoni* ; ARMSTRONG, 1941 : 12 [= *C. reticulatus* sp. nov.].

Rhynchocinetes intermedius Edmondson, 1952 : 72, fig. 3.

Rhynchocinetes marshallensis Edmondson, 1952 : 75, figs. 4-6.

Rhynchocinetes hiatti ; MONOD, 1972 : 15, figs. 27-64. — MIYAKE, 1975 : 105, fig. unnumbered. — TAKEDA, 1982 : 35, fig. unnumbered (not HOLTHUIS & HAYASHI, 1967).

Rhynchocinetes rigens ; TIEFENBACHER, 1976 : 317 (not GORDON, 1936).

Rhynchocinetes sp. DEBELIUS, 1983 : 68, fig. unnumbered.

MATERIAL EXAMINED. — 47 specimens. **Japan.** Sagami Bay : 3 ♂ (NSMT-Cr 1702, 10.8-12.3 mm CL), 2 ♂ (NSMT-Cr 1717, 10.3 & 12.4 mm CL), 1 ♂ (NSMT-Cr 1755, 9.5 mm CL), 1 ♂ (NSMT-Cr 1812, 10.9 mm CL). — Suruga Bay : 1 ♂ (SUF, uncatalogued, 12.0 mm CL). — Kagoshima Bay : 2 ♂, 5 ♀ (KUMBCr 1046-1052, 9.9-14.0 mm CL). — Ryukyu Islands, Okinawa Island : 5 ♂, 2 ♀, 2 ovig. ♀ (NSMT-Cr 2191, 6.8-13.2 mm CL), 1 ovig. ♀ (NSMT-Cr 2193, 10.5 mm CL). — Kuro-shima Islet. 1 ♀ (NSMT-Cr 1939, 6.2 mm CL).

Hawaii. Oahu Island : 1 ♂ (BPBM 5766, syntype of *Rhynchocinetes intermedius*, 12.6 mm CL), 1 ovig. ♀ (BPBM S5635, syntype of *R. intermedius*, 10.2 mm CL).

Marshall Islands. Enewetok Atoll : 1 ♂ (BPBM 5637, holotype of *Rhynchocinetes marshallensis*, 8.8 mm CL).

Line Islands. Fanning Island : 1 ♂ (BPBM S8481, 5.0 mm CL).

Singapore : 1 ♂ (SMF, uncatalogued, 11.3 mm CL).

New Caledonia. Recif Larégnère : 1 ovig. ♀ (MNHN-Na 12952, 8.8 mm CL). — Récif Anna : 1 ♂ (MNHN-Na 12954, 10.6 mm CL), 2 ♂, 1 ovig. ♀ (MNHN-Na 12951, 7.4-8.9 mm CL). — Baie Laugier : 1 ♂ (MNHN-Na 12949, 8.4 mm CL).

Loyalty Islands. Uvea Island : 1 ♂ (MNHN-Na 12950, 9.6 mm CL), 1 ovig. ♀ (MNHN-Na 12953, 9.6 mm CL).

Australia. Heron Island : 3 ♂ (NTM. Cr. 003619, 7.0-7.7 mm CL).

Tonga. Tongatapu Island : 1 ovig. ♀ (NTM. Cr. 004252, 12.3 mm CL).

Austral Islands. Rapa Island : 2 ♂ (BPBM S8590, 7.8 & 8.5 mm CL), 1 ♂ (MNHN-Na 12964, 11.7 mm CL).

Zanzibar : 1 ♂ (NTM. Cr. 003621, 8.9 mm CL).

DESCRIPTION. — Carapace usually with small pterygostomial spine, rarely absent. Rostrum usually straight, slightly upward obliquely, 1.0-1.8 times as long as carapace, armed dorsally with 2 large teeth proximally, 1-2 (usually 2) small teeth subterminally, armed ventrally with 7-11 (usually 8-9) acute teeth decreasing in size distally ; lateral carina indistinct, reaching proximal quarter of rostrum, continuous with upper orbital margin through the level of the mid-depth of rostrum proximally.

Fourth abdominal somite usually armed with an acute spine posterolaterally, directed posteriorly, rarely unarmed. Fifth somite constantly with an acute spine posterolaterally, directed posteriorly.

Antennular peduncle usually reaching midlength of rostrum, rarely proximal third of rostrum, inner margin of proximal segment armed ventrally with an acute tooth ; stylocerite falling slightly short of distal end of ultimate segment.

Scaphocerite 0.7-0.9 times as long as carapace, 3.1-4.1 times as long as its maximum width, distolateral spine reaching or overreaching tip of lamella.

In female and small male, third maxilliped reaching proximal two thirds of scaphocerite ; in large male, third maxilliped reaching rostral apex.

In female and small male, first pereopod usually reaching midlength of scaphocerite, coxa with a corneous projection acutely pointed or bifid distally ; in large male, first pereopod distinctly elongated and stout, overreaching rostral apex by carpopodial articulation, coxa with a lobate corneous projection, chela with palm more or less arched, strongly compressed distally, covered with fine granules at lower margin, 2.1-2.3 times as long as carapace, dactylus strongly curved directed ventrally, forming subchela. Second pereopod usually reaching mid-length of scaphocerite.

Ambulatory pereopods slender, meri slightly compressed, each dactylus with 3 horny claws posterior to dark terminal claw. Third pereopod reaching proximal two thirds of scaphocerite ; coxa with an acutely pointed spine distally ; merus with 3-7 (usually 4-5) articulated spines on outer surface, 2-5 (usually 3) articulated spines on ventral margin ; carpus with 2 (rarely 1) articulated spines on outer surface. Fourth pereopod usually reaching mid-length of scaphocerite ; coxa without spine ; merus with 3-6 (usually 4) articulated spines on outer surface, 1-4 (usually 3) articulated spines on ventral margin ; carpus with 2-3 (rarely 0 or 1) articulated spines on outer

surface. Fifth pereopod reaching proximal third of scaphocerite ; coxa without spine ; merus with 2-5 (usually 3) articulated spines on outer surface, 1-3 (usually 2) articulated spines on ventral margin ; carpus with 2 articulated spines on outer surface.

COLORATION. — Background color pale gray, covered with reddish brown mottles on carapace and with irregular lines of the same color of mottles on abdominal somites ; intermediate space between mottles on carapace usually wide, but narrow in some specimens. Rostral apex white, marked with red-white-red bands subterminal to distal third of rostral length ; all the pereopods colored with reddish brown uniformly.

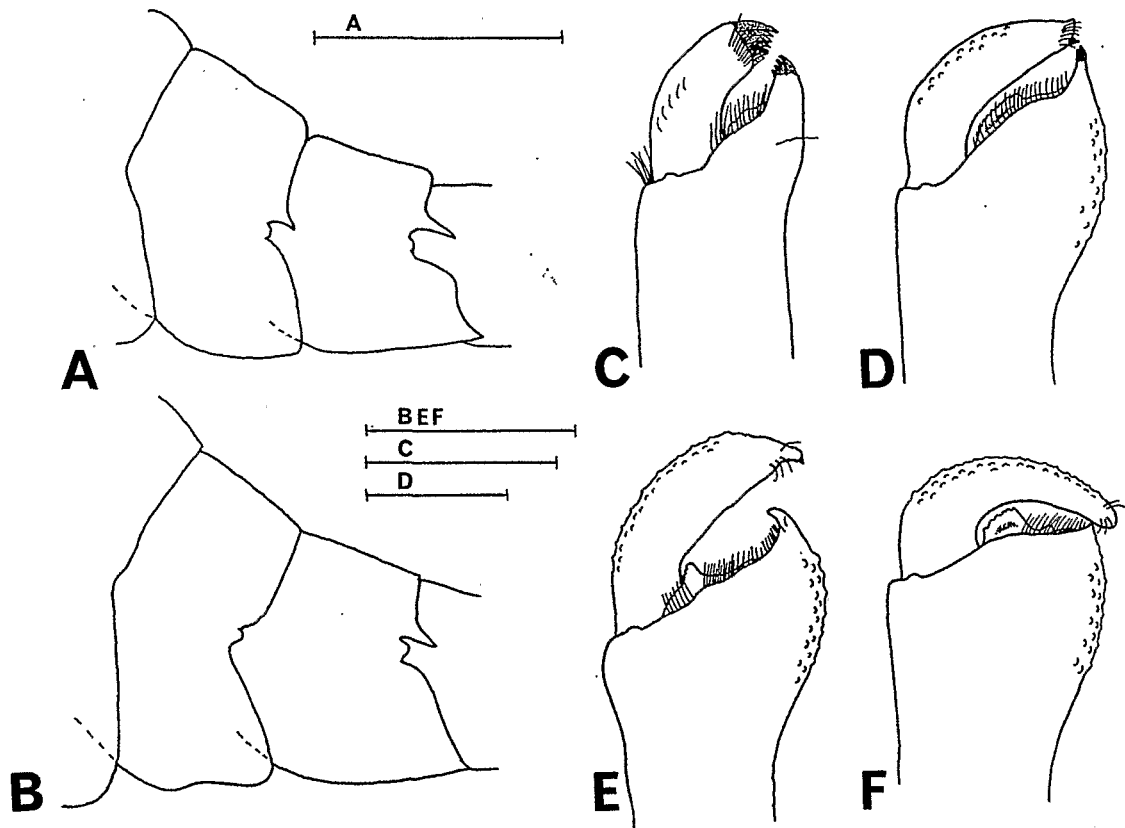


Fig. 9. — *Cinetorhynchus hendersoni* (Kemp, 1925). Fourth and fifth abdominal somites (A, B) and development of chelae of male first pereopod (C-F). A & D, NSMT-Cr 1717, 10.3 mm CL ; B & F, NSMT-Cr 2191, 13.1 mm CL ; C, NSMT-Cr 1755, 9.5 mm CL ; E, NSMT-Cr 2191, 13.2 mm CL. Scales for A, B, E, F = 5 mm ; C, D = 2 mm.

DISTRIBUTION. — Known throughout the Indo-Pacific region from Zanzibar on the East coast of Africa to Rapa Island of the Austral Islands. This species is commonly found in littoral zone at depths of 1-10 m. I have often observed the specimens which are living on the breakwaters at night. Its deepest record is from off Oahu at the depth of 30 m (EDMONDSON, 1952).

REMARKS. — This species was originally described by KEMP (1925) on the basis of a male and a female specimens from Pamban and Kilakarai of the Gulf of Mannar, central Indian Ocean. The present materials can be identical with *hendersoni* by the combination of the shorter rostrum, the shorter stylocerite and the carpal spination of the third pereopod. MONOD (1972) recorded 3 males, a female and 2 ovigerous females from the New Caledonian waters as *R. hiatti*. TIEFENBACHER (1976) re-examine these specimens and the Fijian

specimen recorded by KEMP (1925), and indicated that they have a corneous projection on the coxa of the first pereopod. All the specimens of *hendersoni* examined herein have this projection (Fig. 12 D), and I additionally found an acute corneous spine on the coxa of third pereopod of *hendersoni* (Fig. 12 E). However, these projection and spine were absent in any of the congeners. Although I could not confirm the presence or absence of them in the type specimens, which have been deposited in the Calcutta Museum (BOONE, 1935), I regard these characters as the best diagnosis of *hendersoni* (Fig. 12 E).

The pterygostomial angle is typically armed with a small spine, but some specimens are lacking of it. The form of the posterolateral spine of the fourth abdominal somite is also variable, typically acute (Fig. 9 A), but completely absent in some specimens (Fig. 9 B). These differences were without reference to the sex, the development and the geographic form, and the sexual dimorphism appeared within the mature male specimens was represented by the distinctly elongated first pereopod with subchela (Fig. 9 D-F), described above. The specimens from the lower latitude form the dimorphism in smaller size than those from the higher latitude.

EDMONDSON (1952) proposed two new species, *Rhynchocinetes intermedius* from off Oahu of Hawaii and *R. marshallensis* from Enewetok Atoll of the Marshall Islands. Through the courtesy of Dr. L. G. ELDREDGE, I could re-examine the type specimens while I visited the Bernice P. Bishop Museum, and found they have the coxal projection and spine discussed just above. Therefore, my identifications agreed quite well with the indication that two species described by EDMONDSON (1952) were junior synonym of *hendersoni* by HOLTHUIS and HAYASHI (1967).

Cinetorhynchus reticulatus sp. nov.
(Pl. 1 G, H & Figs. 10, 11, 12 A-C)

Rhynchocinetes hendersoni; ARMSTRONG, 1941 : 12 (not KEMP, 1925).

Rhynchocinetes sp. DEBELIUS, 1984 : 68, fig. unnumbered. — BAENSCH & DEBELIUS, 1992 : 545, figs. unnumbered. — HAYASHI *et al.*, 1994 : 268.

TYPE SERIES. — Holotype, Male, 8.0 mm CL (MNHN-Na 12957), Loyalty Islands, Banya Islet, Uvea Island, 20°35.8'S, 166°16.7'E, 27 m, November 18, 1991.

PARATYPES. 48 specimens. **Japan.** Izu Islands, Nazumado, Hachijo-jima Island, 33°08.5'N, 139°44.4'E, 13 m, September 28, 1993 : 2 ♂ 4.7 & 5.1 mm CL (NSMT-Cr 2626) ; September 8, 1994 : 1 ♂ 7.0 mm & 1 ♀ 10.0 mm CL (NSMT-Cr 3317). — Occho-ga-hama, Hachijo-jima Island, 33°03.5'N, 139°47.9'E, 15 m, September 28, 1993 : 1 ovig. ♀ 10.0 mm CL (NSMT-Cr 2625). — Amami Islands, Fukaura, Amami-Oshima Island, 28°13.8'N, 129°17.4'E, 20 m, September 2, 1993 : 1 ♂ 10.0 mm CL (YCM-CM 979). — Sakinome, Amami-Oshima Island, 28°11.2'N, 129°16.0'E, 28 m, September 2, 1993 : 1 ♂ 5.3 mm CL (YCM-CM 978).

Mariana Islands. Pagan Island, 18°04.8'N, 145°27.6'E, 4-10 m, May 27, 1992 : 2 ovig. ♀ 7.6 & 8.1 mm CL (CBM-ZC 1467, 1469), 1 ♂ 6.0 mm CL (CBM-ZC 1468). — Pagan Island, shore, May 24, 1992 : 1 ♂ 4.8 mm CL (CBM-ZC 1466).

Papua New Guinea. Madang, northern end of Kranket Island, 5°09.6'S, 145°49.7'E, 23 m, October 27, 1991 : 1 ♂ 8.6 mm CL (NTM. Cr. 009895). — Rasch Passage, 5°10.0'S, 145°50.0'E, 22 m, October 26, 1991 : 1 ♂ 9.1 mm CL (NTM. Cr. 010236). — Pik Island, 5°08.5'S, 145°49.7'E, 12-17 m, October 31, 1991 : 8 ♂ 5.0-9.8 mm, 6 ovig. ♀ 6.7-8.6 mm & 5 ♀ 3.7-4.9 mm CL (NTM. Cr. 011320).

Marquesas Islands. Nuku Hiva, west side of Sentinelle de l'Ouest, 8°33.6'S, 140°00.0'W, 24 m, May 1, 1971 : 1 ovig. ♀ 9.1 mm (BPBM S 11281) & 1 ♀ 11.1 mm CL (BPBM S 11282).

Australia. Coral Sea, Queensland, Ashmore Reef, 10°13.2'S, 144°24.9'E, 20-30 m, January 22, 1993 : 1 ♀ 8.9 mm CL (NTM. Cr. 010300).

Western Samoa. Savaii, Eastern Reef, 13°26.4'S, 177°10.8'W, October 17, 1936 : 1 ♂ 4.7 mm & 1 ovig. ♀ 4.6 mm CL (AMNH. 9312).

Loyalty Islands. Uvea Island, Banya Islet, 20°35.8'S, 166°16.7'E, 27 m, November 18, 1991 : 1 ♂ 6.8 mm & 1 ovig. ♀ 8.9 mm CL (MNHN-Na 12945).

New Caledonia. Grotte Merlet, St. 250, 22°42.4'S, 166°41.2'E, 30 m, January 20, 1993 : 1 ovig. ♀ 10.3 mm CL (MNHN-Na 12956).

Timor Sea. Western Australia, Hibernia Reef, 12°00.0'S, 123°18.0'E : 2 ♂ 5.4 & 6.3 mm CL (QM W17809). —

Western Australia, Asmore Reef, east side of West Pass, 12°14.0'S, 123°10.0'E, 20-21 m, September 26, 1987 : 1 ♀ 6.8 mm CL (NTM. Cr. 006368).

Zanzibar, Pange Reef, 6°02.0'S, 39°24.0'E, 10 m, June 6, 1974 : 4 ♂ 8.1-11.8 mm, 1 ♀ 10.4 mm & 1 ovig. ♀ 9.8 mm CL (NTM. Cr. 010749).

DESCRIPTION. — Carapace with pterygostomial angle usually unarmed, rarely armed with small blunt spine.

Rostrum slightly upturned gradually, 1.3-1.8 times as long as carapace, armed dorsally with 2 large teeth proximally, 2 (rarely 3) small teeth subterminally, armed ventrally with 8-11 (usually 10-11) acute teeth decreasing in size distally ; lateral carina continuous with supraorbital margin through the ventral margin of rostrum proximally.

Fourth abdominal somite usually armed with a posterolateral spine directed posteriorly, rarely unarmed. Fifth somite constantly with a posterolateral protrusion directed posteriorly.

Antennular peduncle usually reaching midlength of rostrum, rarely reaching proximal third of rostrum, inner margin of proximal segment armed ventrally with an acute tooth ; stylocerite falling slightly short of distal end of ultimate segment ; thickened part of upper flagellum usually reaching subterminal of rostrum.

Scaphocerite slightly overreaching midlength of rostrum, 0.8-0.9 times as long as carapace, 2.9-3.8 times as long as its maximum width, with distolateral spine subequal or slightly overreaching tip of lamella.

Mouthparts typical. Second maxilliped with a distinct podobranch at proximal upper margin of epipod. In female and small male, third maxilliped reaching proximal two thirds of scaphocerite, ultimate segment 0.5 times as long as carapace, 1.3-1.6 times as long as penultimate segment, with 7-8 dark horny claws at apex. In large male, third maxilliped reaching rostral apex ; ultimate segment distinctly elongated, 0.6-0.7 times as long as carapace, 1.6-1.8 times as long as penultimate segment.

In female and small male, first pereiopod usually reaching midlength of scaphocerite, chela 0.3-0.6 times as long as carapace, 1.3-1.8 times as long as carpus, carpus 0.2-0.3 times as long as carapace ; in large male, first pereiopod developed and stout, forming subchela, beyond rostral apex by carpopropodial articulation, chela with palm strongly compressed distally, covered with sparse tubercles at ventral margin, 1.7-2.4 times as long as carapace, 2.3-3.5 times as long as carpus, dactylus strongly curved directed ventrally, carpus 0.6-0.7 times as long as carapace.

Second pereiopod usually reaching mid-length of scaphocerite, chela 0.3-0.4 times as long as carapace, carpus 0.4-0.6 times as long as carapace, 1.4-2.0 times as long as chela.

Ambulatory pereiopods slender, coxae without spine, each dactylus with 3 horny claws posterior to terminal claw. Third pereiopod reaching proximal two thirds of scaphocerite ; merus 0.7-0.8 times as long as carapace, 2.0-2.8 times as long as carpus, with 3-6 (usually 4-5) spines on outer surface, 2-6 (usually 3) spines on ventral margin ; carpus 0.3-0.4 times as long as carapace, with 3 (rarely 2 or 4) spines on outer surface ; propodus 0.6-0.7 times as long as carapace, 1.8-2.5 times as long as carpus. Fourth pereiopod reaching mid-length of scaphocerite ; merus 0.6-0.8 times as long as carapace, 1.7-2.4 times as long as carpus, with 3-5 (usually 4) spines on outer surface, 2-4 (usually 3) spines on ventral margin ; carpus 0.3-0.4 times as long as carapace, with 1-3 (usually 3) spines on outer surface ; propodus 0.6-0.8 times as long as carapace, 1.7-2.3 times as long as carpus. Fifth pereiopod reaching proximal third of scaphocerite ; merus 0.6-0.8 times as long as carapace, 1.6-2.3 times as long as carpus, with 2-5 (usually 3) spines on outer surface, 1-3 spines on ventral margin ; proportion of carpus resembling that of two former pereiopods, with 0-3 (usually 2) spines on outer surface ; proportion of propodus resembling that of fourth pereiopod.

Endopod of male first pleopod with distal end moderately pointed.

COLORATION. — Ground color of carapace red, posterior margin pale, with distinct white spots ventrolaterally. Rostral apex red, white-red-white bands at subterminal to distal third of rostral length, proximal two thirds more or less transparent. Abdomen mottled with red and white, with broad white area at anterior part of third somite. All pereiopods with red and white bands, except for chela of the mature male first pereiopod, uniformly reddish, dactylus and tip of palm dark brownish.

ETYMOLOGY. — The specific name *reticulatus* is Latin, meaning netted, in reference of the live-coloration of the present new species.

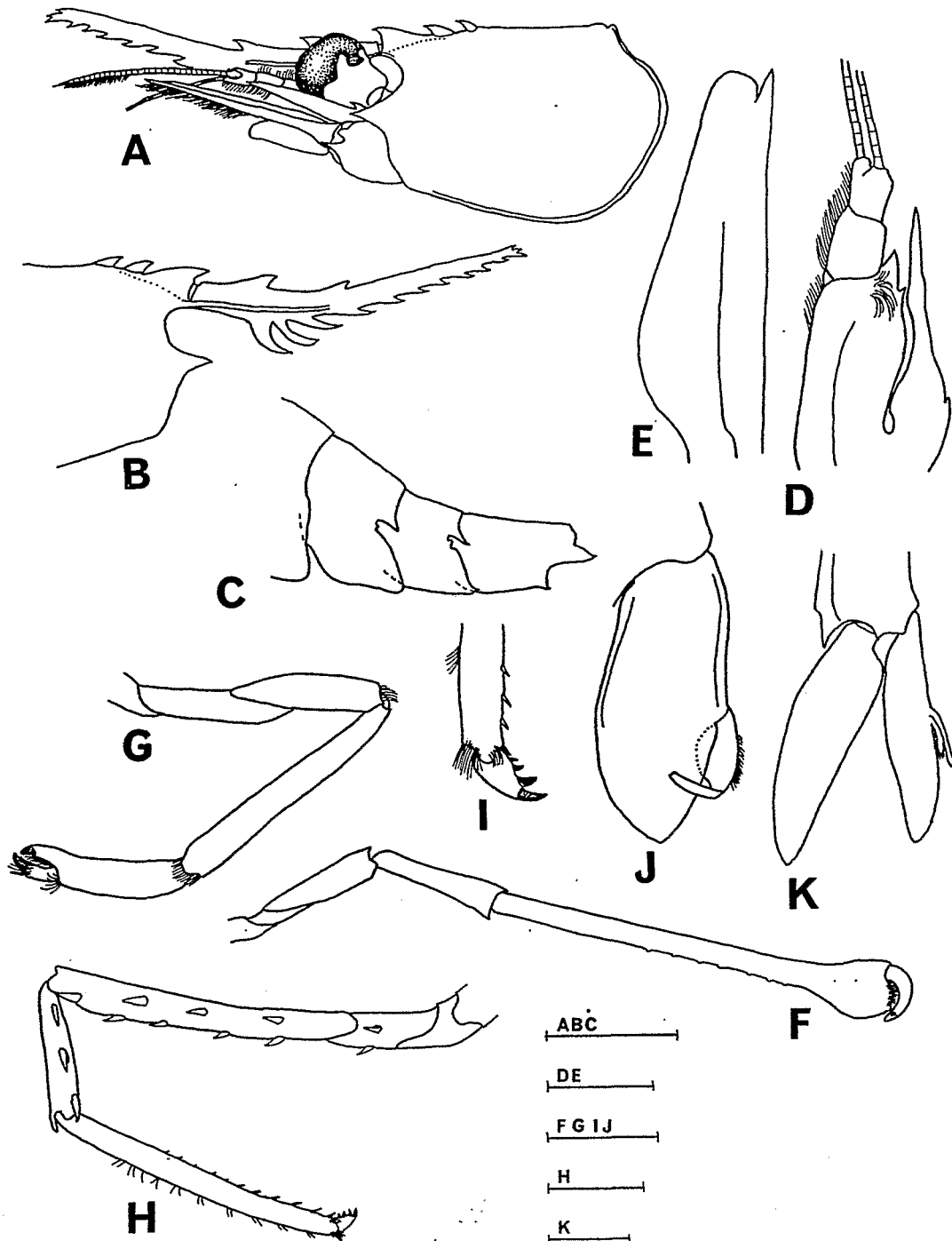


Fig. 10. — *Cinetorhynchus reticulatus* sp. nov. Male paratype (NTM. Cr. 010749, 8.1 mm CL). A, anterior part of body ; B, anterior part of carapace with rostrum ; C, fourth to sixth abdominal somites ; D, antennular peduncle, dorsal view ; E, scaphocerite ; F, first pereiopod ; G, second pereiopod ; H, third pereiopod ; I, dactylus of third pereiopod ; J, endopod of first pleopod ; K, second pleopod. Scales for A-C, F = 5 mm ; D, E, G, H = 2mm ; I-K = 1 mm.

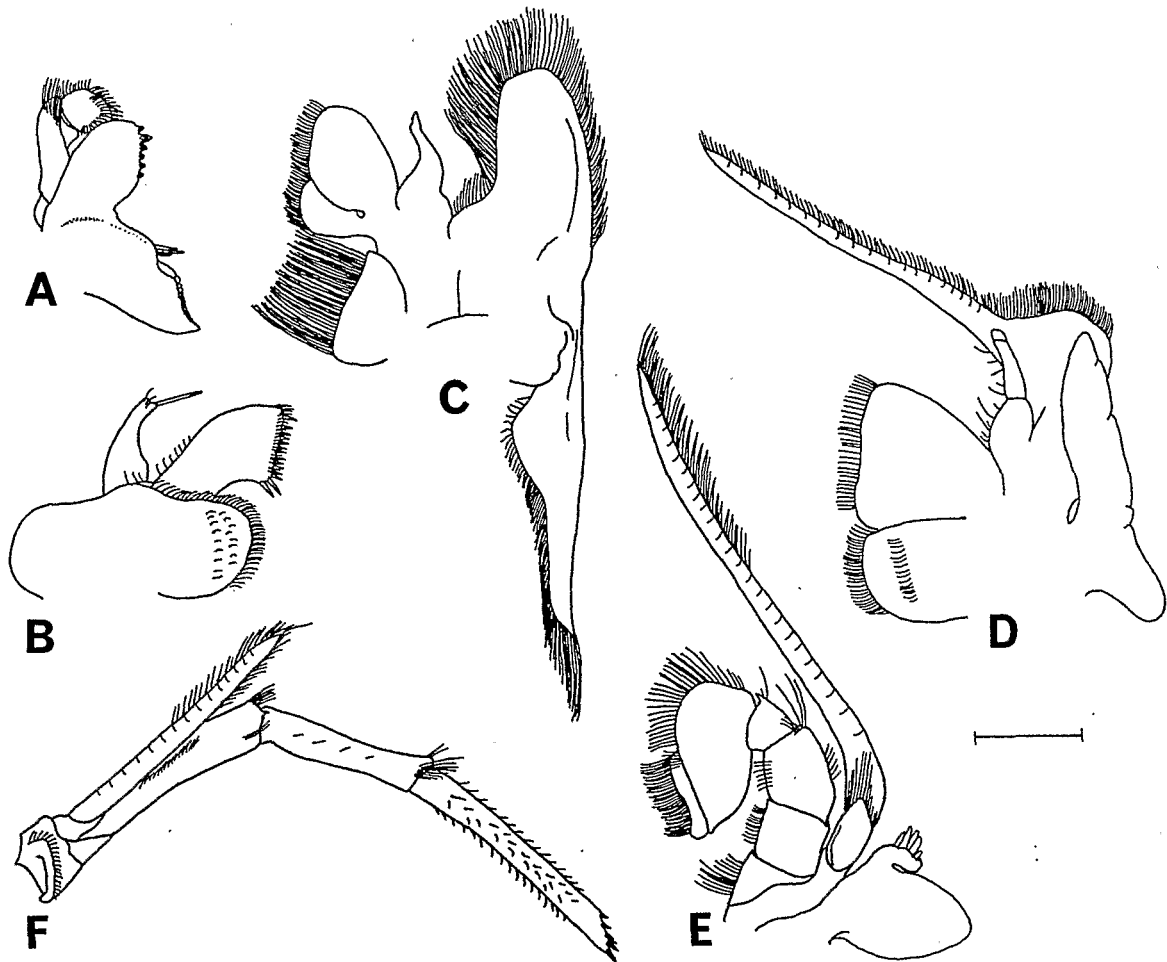


Fig. 11. — *Cinetorhynchus reticulatus* sp. nov. Female paratype (NSMT-Cr 3317, 10.0 mm CL). A. Mandible ; B, first maxilla ; C, second maxilla ; D, first maxilliped ; E, second maxilliped ; F, third maxilliped. Scales for A-E = 1 mm ; F = 2 mm.

DISTRIBUTION. — Known from various localities on the Indo-Pacific, from Zanzibar, the eastern coast of Africa to the Marquesas Islands, northward to Hachijo-jima Island, the Izu Islands, Japan. Commonly captured at rocky bottom in 15-30 m depths.

REMARKS. — This new species most resembles *C. hendersoni* (KEMP, 1925) from which it mainly differs in lacking the corneous projection on the coxa of the first pereopod (Fig. 12 A) and the spine on the coxa of the third pereopod (Fig. 12 B), and in having nearly always three spines on the carpi of third and fourth pereopods (Fig. 12 C).

The horizontal ranges of the new species and *C. hendersoni* are overlapped, however, the habitat of the former may be deeper than that of the latter ; *C. reticulatus* commonly inhabits at the depths of 15-30 m, instead of 1-15 m depths in *C. hendersoni*.

The first pereopods of small male and female specimens are not distinctly elongated, thus, the external feature of them are closely related to that of *C. erythrostictus* sp. nov., described above. However, the present new species is readily distinguished from the latter in having the dactyli of the ambulatory pereopods armed with three horny claws posterior to the terminal claw (Fig. 10 D), whereas the dactyli of *C. erythrostictus* bear two claws posterior to the terminal claw (Fig. 2 H).

It was represented that the specimens previously recorded from Savaii, Western Samoa (ARMSTRONG, 1941) and from Pagan Island, the northern Mariana Islands (HAYASHI *et al.*, 1994) were identified with *C. reticulatus* as the result of the re-examinations.

Tab. 5. — Frequency distribution of number of spines on outer surface of carpi of 3rd to 5th pereopods. * : Including the counts of the holotype.

Pereiopods	3rd				4th				5th			
	1	2	3	4	0	1	2	3	0	1	2	3
Species												
<i>C. erythrostickus</i>		3	32*	2			4	33*		5	19	12*
<i>C. rigens</i>	14	4	1			14	6			17	2	
<i>C. hiatti</i>	14*					13*	1			14*		
<i>C. concolor</i>	1	26*		1			27*	1		1	27*	
<i>C. striatus</i>		18	1	2			14	7	1		18	2
<i>C. hendersoni</i>	1	45			1	1	42	2		2	42	
<i>C. reticulatus</i>		4	35*	1		1	6	34*	1	2	36*	2

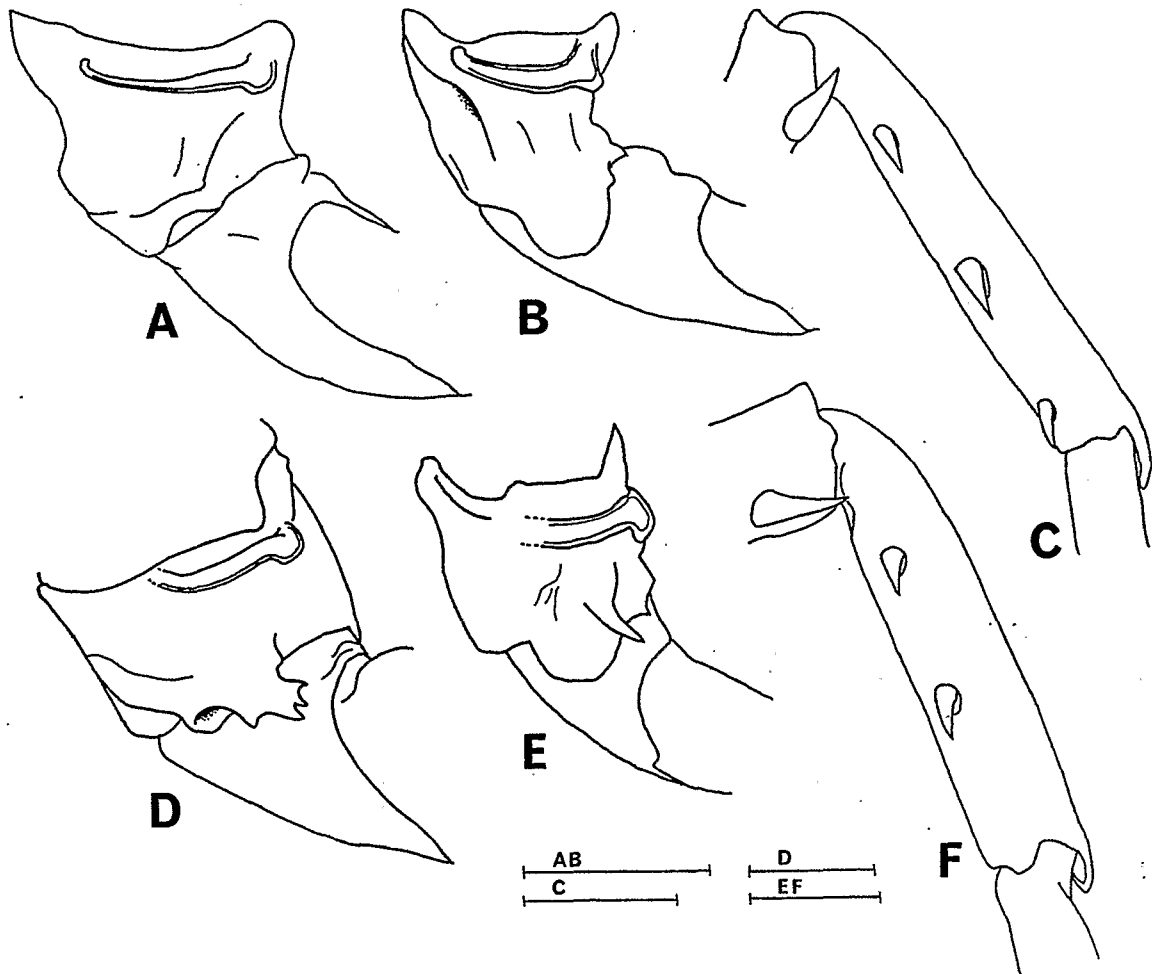
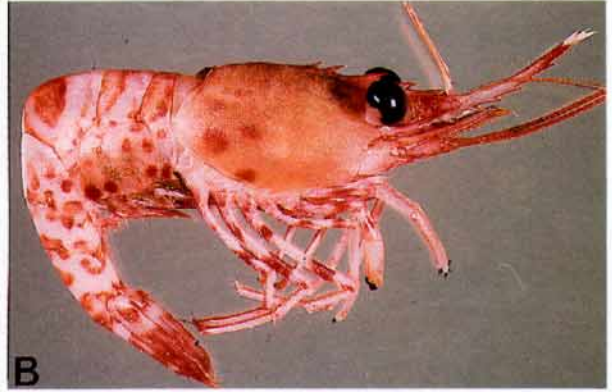


Fig. 12. — Comparisons between *Cinetorhynchus reticulatus* sp. nov. (A-C, holotype, MNHN-Na 12957, 8.0 mm CL) and *C. hendersoni* (Kemp, 1925)(D-F, male, NSMT-Cr 1717, 10.3 mm CL). A & D, coxa of first pereopod ; B & E, coxa of third pereopod ; C & F, carpus of third pereopod. Scales 1 mm.

Pl 1. — A. *Cinetorhynchus erythrostickus* sp. nov. Holotype, female (NSMT-Cr 2155, 16.0 mm CL), alive in aquarium. Photograph J. OKUNO. — B. *Cinetorhynchus erythrostickus* sp. nov. Ovigerous female paratype (MNHN-Na 12947, 13.0 mm CL), fresh, lateral view. Photograph J. L. MENO (ORSTOM). — C. *Cinetorhynchus hiatti* (Holthuis & Hayashi, 1967). Ovigerous female (MNHN-Na12948, 14.2 mm CL), fresh, lateral view. Photograph J. L. MENO (ORSTOM). — D. *Cinetorhynchus concolor* (Okuno, 1994). Male (MNHN-Na 12959, 12.7 mm CL), fresh, lateral view. Photograph J. L. MENO (ORSTOM). — E. *Cinetorhynchus striatus* (Nomura & Hayashi, 1992). Ovigerous female (NSMT-Cr 2159, 18.8 mm CL), alive in aquarium. Photograph J. OKUNO. — F. *Cinetorhynchus hendersoni* (Kemp, 1925). Male (NSMT-Cr 1812, 10.9 mm CL), alive in aquarium. Photograph J. OKUNO. — G. *Cinetorhynchus reticulatus* sp. nov. Holotype, male (MNHN-Na 12957, 8.0 mm CL), fresh, lateral view. Photograph J. L. MENO (ORSTOM). — H. *Cinetorhynchus reticulatus* sp. nov. Male paratype (YCM-CM 978, 5.3 mm CL), alive in aquarium. Photograph J. OKUNO.



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