

A New Species of the Shrimp Genus *Neostylodactylus* Hayashi and Miyake (Crustacea: Decapoda: Stylodactylidae) from Japan

Tomoyuki Komai

Natural History Museum and Institute, Chiba
955-2 Aoba-cho, Chuo-ku, Chiba 260, Japan

Abstract *Neostylodactylus hayashii*, the fifth species of the genus, is described and illustrated on the basis of three male and two female specimens from two locations on the Pacific coast of Japan. It is distinctive among the members of the genus, characterized by its exceptionally large size, attaining 4.4 mm in the postorbital carapace length, the rostrum bearing ventral spines and the scaphocerite unarmed laterally.

Key words: *Neostylodactylus hayashii*, new species, Stylodactylidae, Caridea, Japan.

Up to now, the small stylodactylid genus *Neostylodactylus* Hayashi and Miyake, 1968, has been represented by four species from the Indo-West Pacific region (Chace, 1983; Cleva, 1990, 1994): *N. affinis* Hayashi and Miyake, 1968; *N. amarynthidis* (De Man, 1902) (type species of the genus); *N. investigatoris* (Kemp, 1925); and *N. sibogae* (De Man, 1918). From Japanese waters, all but *N. sibogae* have been known (Hayashi, 1990).

During the benthic faunal survey around Boso Peninsula, Central Japan, conducted from the RV Tansei-Marui of the Ocean Research Institute, University of Tokyo, dredging samplings were made at two stations on Okinoyama Bank, west of Sunosaki, Tateyama (stations TB18-1 and TB18-2; see Tsuchida and Kurozumi, 1996). Amongst the specimens collected from station TB18-2 was one male specimen of an undescribed species of *Neostylodactylus*. Additional specimens have been found in decapod collection from off Kushimoto, Kii Peninsula, which were made available to me through the kind cooperation of Mrs. S. Nagai and K. Nomura. The new species, *N. hayashii*, representing the fifth of the genus, is quite distinctive from previously known species of the genus.

The type material is deposited in the Natural History Museum and Institute, Chiba (CBM) with a code of ZC. The illustrations were prepared with the aid of a drawing tube

mounted on an OLYMPUS SZH stereo microscope. The postorbital carapace length (CL) is used as a standard measurement indicating the size of specimen.

Neostylodactylus hayashii sp. nov. (Figs. 1-4)

Type material. Holotype: male (CL 4.3 mm), Okinoyama, off Sunosaki, Boso Peninsula, 34°59' N, 139°39' E, 105-113 m, coarse sand mixed with gravel, 21 Apr 1995, dredge with 1 m width opening, coll. T. Komai, CBM-ZC 2558.

Paratypes: 1 male (CL 3.2 mm) and 3 females (3.2, 4.2, 4.4 mm), off Tanami, Kushimoto, Kii Peninsula, 160 m, 17 April 1995, dredge, coll. S. Nagai, CBM-ZC 2866.

Diagnosis. Large species attaining 4.4 mm in CL. Rostrum reaching or overreaching distal end of antennal scaphocerite, armed with basally articulated spines dorsally and ventrally. Pleura of anterior three abdominal somites rounded, that of fourth somite with small tooth on posterolateral margin only in females, that of fifth somite with ventrally curved tooth on posterolateral margin. Telson armed with 6 pairs of dorsolateral spines including pair arising above bases of longest pair of posterior spines. Eye with distinct ocellus. Antennal scaphocerite unarmed laterally, with distinct distal blade. Dactyls of posterior three pairs of pereopods

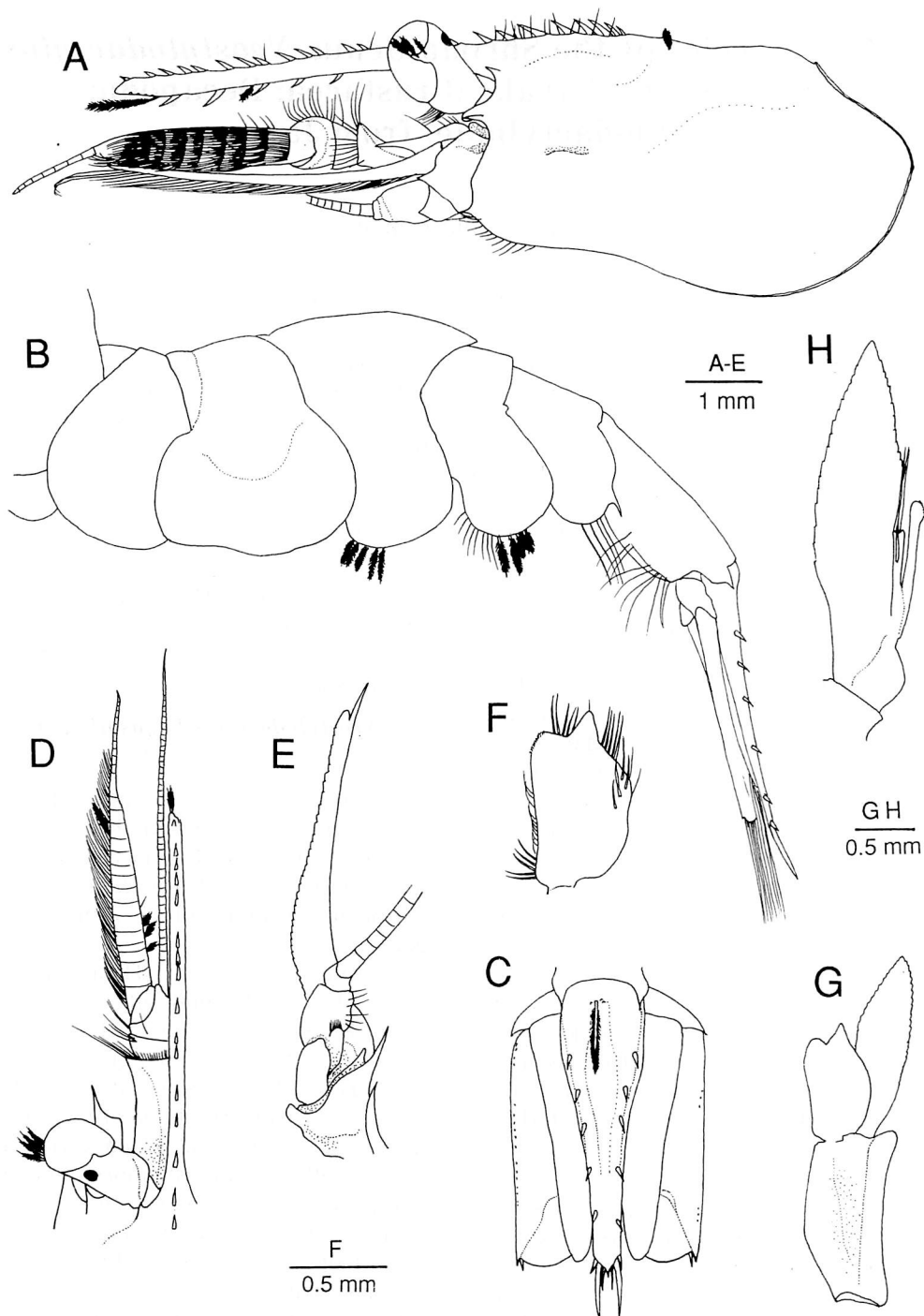


Fig. 1. *Neostylodactylus hayashii* sp. nov. Holotype male from Okinayama Bank, Boso Peninsula, CL 4.3 mm. A, carapace and cephalic appendages, lateral, apex of rostrum broken; B, abdomen and telson, lateral; C, telson and uropods, dorsal, setae on uropods omitted; D, anterior part of carapace, left eye and left antennule, dorsal; E, antenna, ventral, setae on scaphocerite omitted; F, left first pleopod, ventral, setae omitted; G, endopod of left first pleopod, ventral, setae omitted; H, endopod of left second pleopod, dorsal, setae omitted.

not elongate, about one-fourth length of propodi.

Description. Integument of body thin, almost naked, but with few stout plumose setae. Rostrum (Fig. 1A, 4A, B) straight or moderately curving dorsad, slightly or distinctly longer than carapace, reaching or overreaching anterior end of scaphocerite; dorsal margin armed with 22–24 spines, including 7–10 spines posterior to level of orbital margin, all with distinct basal suture, in males those of posterior one-third of series flanked by setae slightly longer than spines, but in females no such setae; ventral margin with five widely spaced movable spines in distal two-thirds or three-fifths length, increasing in length anteriorly, each spine subequal in length to opposing spines on dorsal series, anterior part with row of pits presumably representing basal pockets of stout plumose setae; apex not acute. Carapace (Fig. 1A, 4A, B) with distinct hepatic depression; supraorbital spine small but distinct; infraorbital lobe well developed, directed forward or ventrad, reaching or overreaching antennal spine; branchiostegal spine moderately strong, directed forward or ventrad; anterolateral margin between antennal and branchiostegal spines slightly sinuous.

Abdomen (Fig. 1B, 4C) with pleura of anterior three somites broadly rounded; pleuron of fourth somite unarmed in males, armed with small tooth directed ventrally on the posterolateral margin in females; pleuron of fifth somite with acute, ventrally curved tooth on posterolateral margin. Sixth abdominal somite 1.8 times as long as fifth somite, unarmed posteroventrally; posterolateral process moderately strong, acute. Telson (Fig. 1C) 1.4 times as long as sixth abdominal somite and 3.4 times as long as broad, terminating in acute tooth flanked by 3 pairs of dorsolateral spines, including pair arising above bases of longest pair of posterior spines; median tuft of few long, stout plumose setae near base of telson; lateral margin concave in posterior three-fourths length.

Eye (Fig. 1A, D) with large, weakly inflated cornea and moderately long stalk; protruded portion of stalk with row of stout plumose setae. Ocellus clearly separated from corneal

region, not inflated.

Antennule sexually dimorphic. In males (Fig. 1A, D) antennular peduncle slightly falling short of level of mid-length of scaphocerite; proximal segment nearly twice length of distal two segments combined, anterior margin with row of long setae; stylocerite reaching three-fourths length of proximal segment, obliquely subtruncate mesial to sharp distolateral spine; intermediate segment much shorter than distal segment, both segments unarmed; outer antennular flagellum stout, thickened portion composed of 17 articles, with thick assemblage of aesthetascs ventrolaterally and few stout plumose setae dorsomesially; inner flagellum slender, longer than outer flagellum. In females (Fig. 4B) antennular peduncle slightly overreaching mid-length of scaphocerite; proximal segment elongate, about 3 times as long as distal two segments combined; stylocerite reaching mid-length of proximal segment; intermediate segment subequal in length to distal segment, both of these segments with few spines on distal margins; outer antennular flagellum relatively slender, thickened portion composed of 8–10 articles, with fewer tufts of aesthetascs ventrally, each article bearing few bristles; inner flagellum damaged.

Antenna (Fig. 1A, E) with scaphocerite slender, lateral margin concave, unarmed, distolateral tooth far overreaching anterior margin of rounded blade. Carpocerite short and stout, not reaching level of anterior margin of proximal segment of antennular peduncle. Basicerite armed with lateral spine.

Mandible (Fig. 2A) without palp; incisor process with few multidenticulate teeth on mesial margin; lacinia mobilis-like structure arising from mesial margin. Endopod of maxillule (Fig. 2B) bilobed terminally, mesial lobe with apical plumose setae. Maxilla (Fig. 2C) with proximal endite bearing small protuberance on anterior margin; posterior lobe of scaphognathite slightly elongate, with long setae posteromesially or posteriorly. First maxilliped (Fig. 2D) with broad caridean lobe; epipod clearly bilobed. Second maxilliped (Fig. 2E) with terminal segment on flexor side much longer and broader than one on extensor side; propodus broadened

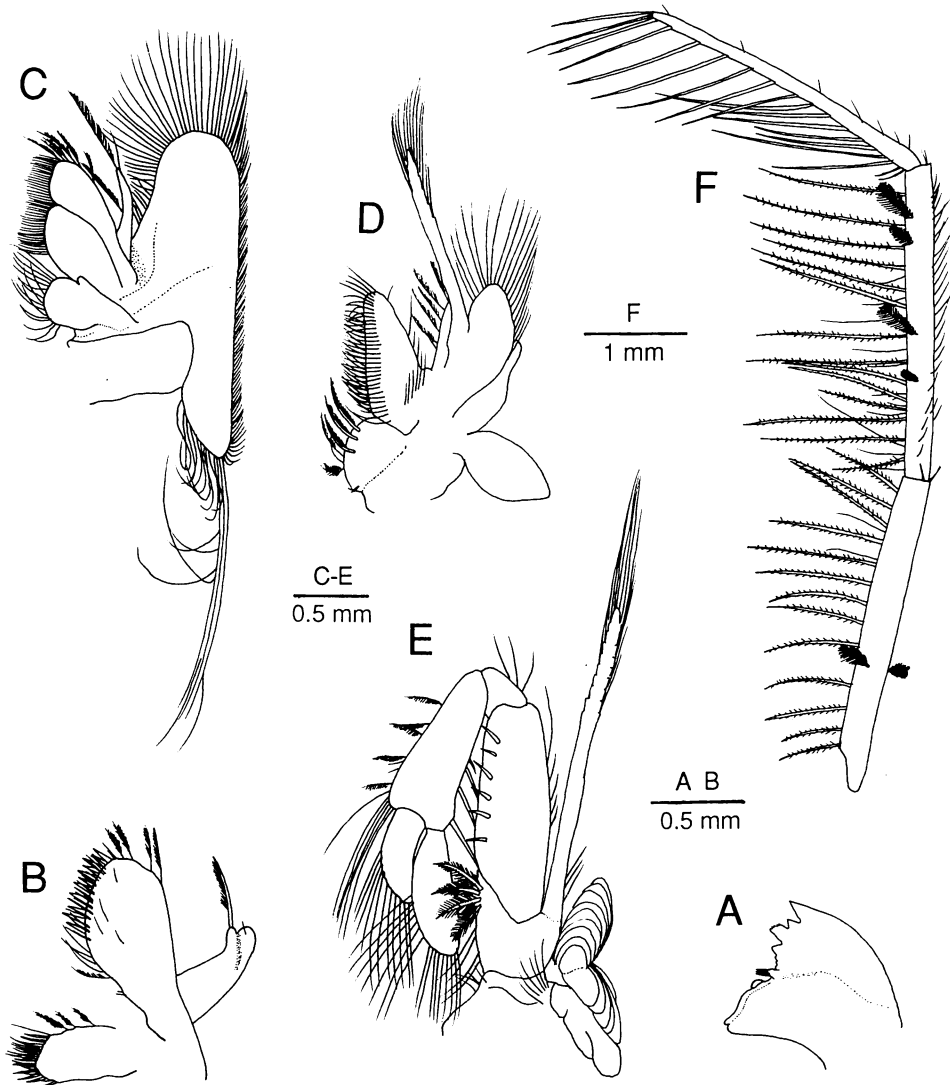


Fig. 2. *Neostylodactylus hayashii* sp. nov. Holotype male from Okinayama Bank, Boso Peninsula, CL 4.3 mm. Left mouthparts. A, mandible, external; B, maxillule, external; C, maxilla, external; D, first maxilliped, external; E, second maxilliped, external; F, third maxilliped, lateral.

distally; merus and ischium completely fused, with mesial row of spiniform setae on external surface; basis mesially with tuft of stout plumose setae; exopod far overreaching distal end of merus; epipod and podobranch well developed. Third maxilliped (Fig. 2F) overreaching scaphocerite by nearly full length of ultimate segment, flexor or ventral surfaces of distal three segments flanked by long stiff setae, setae on ultimate segment almost devoid of setules, those on remainder segments with numerous setules; penulti-

mate segment with numerous short setae on extensor surface and with some stout plumose setae; antepenultimate segment with few stout plumose setae; epipod and exopod absent.

All pereopods with merus and ischium completely fused. First pereopod (Fig. 3A) overreaching scaphocerite by full length of chela; chela slightly longer than carpus; palm greatly reduced and dactyl and fixed finger greatly elongate; flexor surfaces of dactyl and fixed finger flanked by row of long

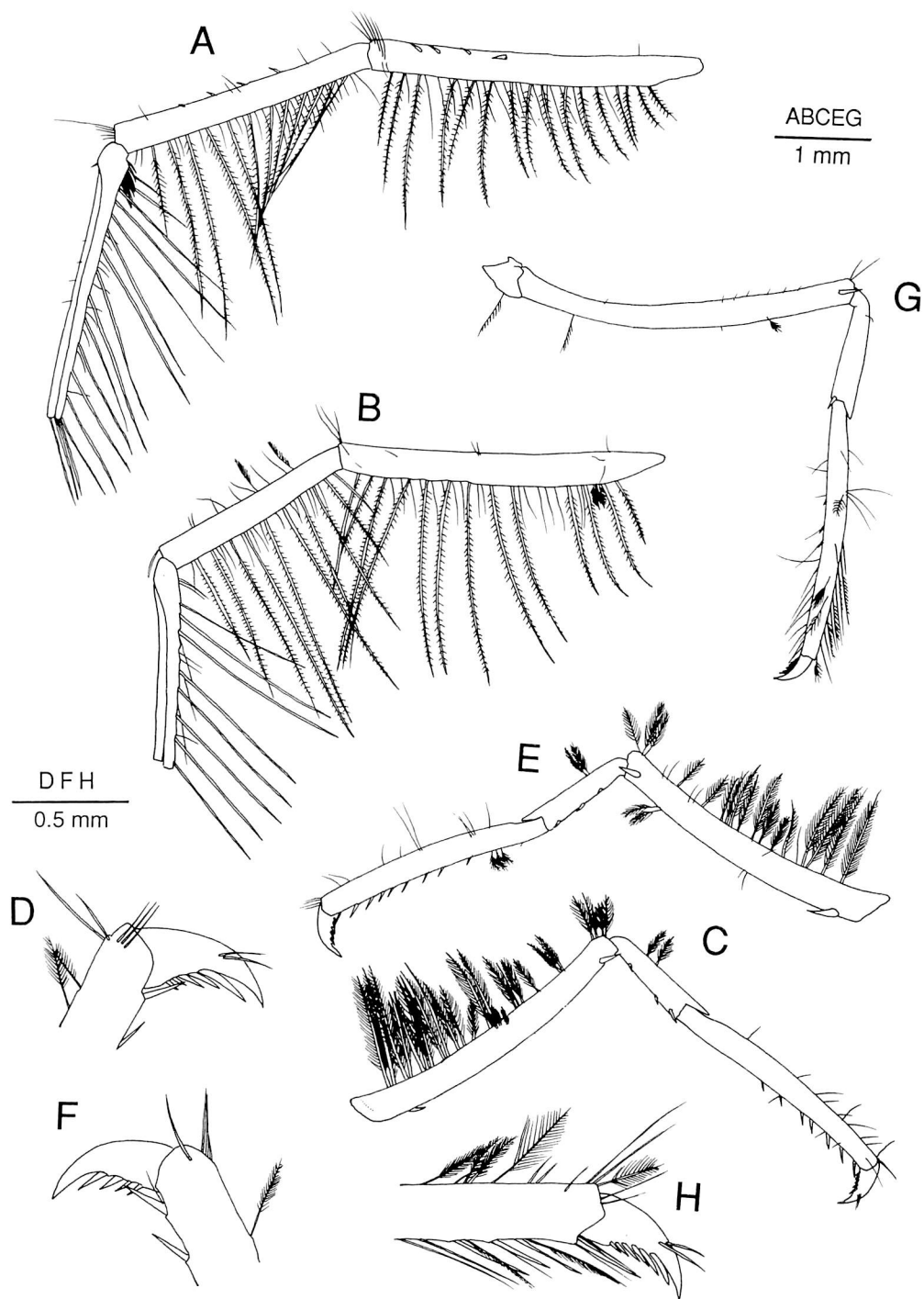


Fig. 3. *Neostylodactylus hayashii* sp. nov. Holotype male from Okinayama Bank, Boso Peninsula, CL 4.3 mm. A, left first pereopod, lateral; B, left second pereopod, lateral, distal part of fingers broken off; C, right third pereopod, lateral, D, same, dactyl and distal part of propodus, lateral; E, left fourth pereopod, lateral; F, same, dactyl and distal part of propodus, lateral; G, right fifth pereopod, lateral; H, same, dactyl and distal part of propodus, lateral.

Table 1. *Neostylodactylus hayashii* sp. nov. Branchial formula.

Male								
	Maxillipeds			Pereopods				
	1	2	3	1	2	3	4	5
Pleurobranchs	—	—	—	+	+	+	+	+
Arthrobranchs	—	—	1	1	1	1	1	—
Podobranch	—	+	—	—	—	—	—	—
Epipods	+	+	—	—	—	—	—	—
Exopods	+	+	—	—	—	—	—	—

Female								
	Maxillipeds			Pereopods				
	1	2	3	1	2	3	4	5
Pleurobranchs	—	—	—	+	+	+	+	+
Arthrobranch	—	—	1	—	—	—	—	—
Podobranch	—	+	—	—	—	—	—	—
Epipods	+	+	—	—	—	—	—	—
Exopods	+	+	—	—	—	—	—	—

simple setae, setae on outer rows much longer than inner rows; dactyl with row of spinules on extensor mesial margin; carpus with row of small spines on extensor surface, flexor surface flanked by row of long stiff setae with numerous setules; merus longer than carpus, with row of small spines on distal half; flexor surface flanked by row of long stiff setae with numerous setules. Second pereopod (Fig. 3B) slightly shorter than first, overreaching scaphocerite by length of dactyl; setation generally similar to that of first pereopod; carpus with scattered plumose setae on extensor surface, but unarmed; merus unarmed. Third pereopod (Fig. 3C) exceeding scaphocerite by tip of dactyl; dactyl (Fig. 3D) 0.25 times as long as propodus, somewhat curved, with five accessory spinules increasing in length distally; propodus with row of spines on flexor surface and with scattered moderately long setae on extensor surface; carpus with three small lateral spines and with few stout plumose setae on flexor surface; merus-ischium armed with one subdistal spine laterally and one proximal spine ventrally, dorsal surface bearing several long plumose setae. Fourth pereopod (Fig. 3E, F) similar to third, reaching beyond anterior five-sixths of scaphocerite by dactyl. Fifth pereopod (Fig. 3G) reaching anterior five-sixths of scaphocerite by tip of dactyl;

dactyl (Fig. 3H) armed with six closely set accessory spinules; propodus with scattered long plumose setae and with about 10 long spines on flexor surface obscured by setae; carpus with one subdistal spine laterally; merus-ischium armed only with one or two subdistal spines laterally, dorsal surface bearing scattered short setae.

Branchial formula shown in Table 1. Arthrobranch gill on third maxilliped much smaller in females than in males.

Endopod of male first pleopod (Fig. 1F, G) with distal margin emarginated, lateral margin somewhat inflated. Appendix masculina of male second pleopod (Fig. 1H) distinctly shorter than appendix interna, bearing some long spines distally or subdistally. Exopod of uropod (Fig. 1C) with lateral margin nearly straight, distolateral tooth nearly reaching posterior margin of blade; endopod without lateral expansion anteriorly.

Coloration. Not recorded.

Size. Largest male: 4.3 mm in CL; largest female: 4.4 mm in CL.

Variations. Curvature of the rostrum in the new species shows substantial variation from nearly straight to moderately curving (Figs. 1A, 4A, B).

Armament of the fourth abdominal pleuron seems to be variable sexually in *N. haya-*

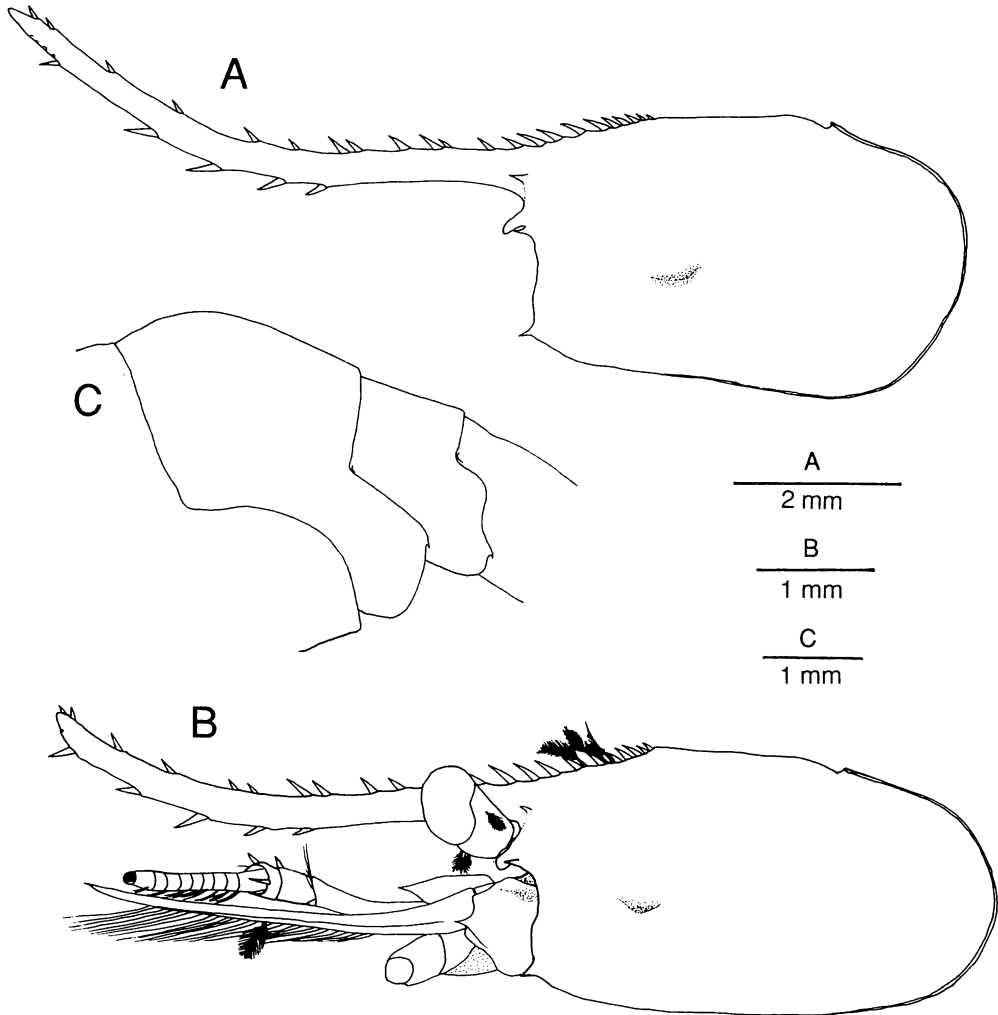


Fig. 4. *Neostylodactylus hayashii* sp. nov. Paratype females from Kushimoto, Kii Peninsula. A, CL 4.2 mm; B, C, CL 3.2 mm. A, carapace, lateral; B, carapace and cephalic appendages, lateral, apex of rostrum broken; C, fourth and fifth abdominal somites, lateral.

shii; in the two male specimens, that pleuron is unarmed (Fig. 1B), while, in the three female specimens, it bears a small tooth on its posterolateral margin (Fig. 4C). The sexual dimorphism of the branchial formula, reported first by Chace (1983) for the genus *Neostylodactylus*, is shown in the present new species (see Table 1). Setae flanking the dorsal series of spines on the carapace are present in males, but absent in females (Figs. 1A, 4A, B).

Sexual dimorphism also affects the structure and armament of the antennule (Figs. 1A, D, 4B), as mentioned in "Description". The antennular peduncle is more elongate in fe-

males than in males; the distal two segments of the peduncle are armed with a few slender spines on the distal margins in females, while in males, these segments is devoid of such spines. The outer flagellum is more stout with more numerous tufts of aesthetascs in the males than in females.

Habitat. The holotype specimen of *N. hayashii* was collected from coarse sand and gravel bottom. The species is apparently solitary and not associated with any other marine animals.

Type locality. Okinoyama Bank, off Sunosaki, Boso Peninsula, at depths of 105–113 m.

Distribution. Okinoyama Bank, off Boso

Peninsula; Kushimoto, Kii Peninsula; 105–160 m.

Etymology. It is my pleasure to dedicate this new species to Prof. Ken-Ichi Hayashi of the National Fisheries University, Shimono-seki, in recognition of his great contributions in the systematics and fishery sciences of decapod crustaceans. I also thank his generous help with my caridean studies.

Remarks. *Neostylodactylus hayashii* appears to be not closely related to any of the described species of the genus. The relatively long rostrum with ventral spines, which reaches or overreaches the distal end of the scaphocerite, and the presence of a posterolateral tooth on the fifth abdominal pleuron readily separate the new species from *N. investigatoris* and *N. sibogae*. In the latter two species, the rostrum does not reach the distal end of the scaphocerite, and its ventral margin is unarmed. The new species is distinguished easily from *N. amarynthis* and *N. affinis* in the absence of lateral spinules on the antennal scaphocerite. The scaphocerite bears about 10 spinules in *N. amarynthis* and 15 minute spinules in *N. affinis* (see Hayashi and Miyake, 1968; Hayashi, 1990). *N. hayashii* further differs from *N. amarynthis* in the absence of pleural marginal teeth on the first to third abdominal somites and the absence of lateral expansion on the uropodal endopod, and from *N. affinis* in having more numerous dorsolateral spines on the telson (five versus three).

One of the key characters of the genus *Neostylodactylus* used by Cleva (1990) and Holthuis (1993) to separate it from *Parastylodactylus* Figueira, 1971, refers to the small size of body, attaining at most 3.5 mm in CL in the former rather than at least 4.0 mm in the latter. The largest was a male specimen of *N. affinis* (see Cleva, 1990). However, the discovery of the new species, which attains 4.4 mm in CL, reveals that the body size is not reliable to characterize the genus *Neostylodactylus*.

The key to species of *Neostylodactylus* presented by Cleva (1994) can be modified to permit identification of the present new species. Couplets 2 and 3 remain unchanged.

1a. Rostrum armed ventrally with two or

more spines; abdominal pleura with one or more denticles, at least on fifth somites 1'

- b. Rostrum unarmed ventrally; pleura of first five abdominal somites without marginal denticles 3
- 1'a. Scaphocerite without spinules on lateral margin *N. hayashii* sp. nov.
- b. Scaphocerite with series of spinules on lateral margin 2

Acknowledgments

I gratefully acknowledge the assistance of the Captain and crew of the RV Tansei-Maru and the staff of the Ocean Research Institute, University of Tokyo, especially Mr. E. Tsuchida. I also sincerely thank Mrs. S. Nagai in Kushimoto and K. Nomura of the Kushimoto Marine Park for providing me with material from Kushimoto. I am indebted to Prof. K. Hayashi of National Fishery University, Dr. T.-Y. Chan of the Institute of Marine Biology, National Taiwan Ocean University, Dr. A. B. Williams of the National Marine Fisheries Service, Systematics Laboratory, National Museum of Natural History, Smithsonian Institution, and Dr. S. Naomi of the Natural History Museum & Institute, Chiba, for reviewing the manuscript.

References

- Chace, F. A., Jr. 1983. The caridean shrimps (Crustacea: Decapoda) of the *Albatross* Philippine Expedition, 1907–1910, Part 1: Family Stylodactylidae. *Smiths. Contr. Zool.* 381: i–iii, 1–21.
- Cleva, R. 1990. Crustacea Decapoda: Les genres et les espèces indo-ouest pacifiques de Stylodactylidae. In: A. Crosnier (ed.) *Resultats des campagnes MUSORSTOM Vol. 6. Mèm. Mus. natn. Hist. nat.* 145: 71–136.
- Cleva, R. 1994. Some Australian Stylodactylidae (Crustacea, Decapoda), with description of two new species. *The Beagle, Rec. Mus. Art Gall. Northern Territory* 11: 53–64.
- De Man, J.G. 1902. Die von Herrn Professor Kükenthal im Indischen Archipel gesammelten Dekapoden und Stomatopoden. In *Kükenthal, Ergebnisse einer zoologischen Forschungsreise in den Molukken und Borneo. Abhandlungen Sencenbergischen Naturforschenden Gesellschaft* 25(3): 467–929, pls. 19–27.
- De Man, J.G. 1918. Diagnoses of new species of macrurous decapod Crustacea from the Siboga-

- Expedition. Zool. Meded. 4(3): 159-166.
- Figueira, A. J. G. 1971. Materials for a revision of the family Stylodactylidae (Crustacea: Decapoda: Caridea), I. Description of a new genus and of a new species. Arq. Mus. Bocage, ser. 2a, 3(1): 1-8.
- Hayashi, K. 1990. Prawns, shrimps and lobsters from Japan (56). Family Stylodactylidae-Genus *Neostylodactylus*. Aquabiology 71: 484-487. (in Japanese)
- Hayashi, K. and S. Miyake. 1968. Notes on the family Stylodactylidae with the description of a new genus *Neostylodactylus*. J. Fac. Agric., Kyushu Univ. 14(4): 583-611.
- Holthuis, L. B. 1993. The recent genera of the caridean and stenopodidean shrimps (Crustacea, Decapoda) with an appendix on the order Amphionidacea. 328 pp. Nationaal Natuurhistorisch Museum, Leiden.
- Kemp, S. 1925. Notes on Crustacea Decapoda in the Indian Museum, XVII: On various Caridea. Rec. Ind. Mus. 27(4): 249-343.
- Tsuchida, E. and T. Kurozumi. 1996. Noteworthy molluscs dredged by the R/V Tansei-Marunear Okino-yama Bank off Boso Peninsula, Central Japan. J. Nat. Hist. Mus. Inst., Chiba 4(1): 33-49. (in Japanese with English summary)

(Accepted 1 October 1996)

日本産ハネツキエビ属 (十脚目:
コエビ下目: サンゴエビ科)
の 1 新種の記載

駒井智幸

千葉県立中央博物館
〒260 千葉市中央区青葉町 955-2

サンゴエビ科ハネツキエビ属にはこれまでに4種が知られており、これらの全てがインド西太平洋海域に分布する。房総半島沖の沖ノ山堆と紀伊半島潮岬沖から最近の調査により採集された標本(計5個体)を調べた結果、未記載種と判明したので、新種 *Neostylodactylus hayashii* sp. nov. (新称 ハヤシハネツキエビ)として記載した。本新種は、額角が触角鱗の先端に達するか、それを越える、額角下縁に棘を持つ、および触角鱗の外縁に小棘を欠くなどの点で、既知種から容易に識別される。さらに、本新種は本属の既知種のいずれよりも大型になり、体サイズは本属の定義形質として妥当ではないことが判明した。