Korean J. Syst. Zool. Vol. 22, No. 1: 51-55, May 2006

Two New Records of Caridean Shrimps (Crustacea: Decapoda) from the Korean Continental Slope of the East Sea

Jung Nyun Kim[1,*] and Jung Hwa Choi[2]

[1]Department of Marine Biology, Pukyong National University, Busan 608-737, Korea
[2]Fisheries Resources Research and Management Division, National Fisheries Research and Development Institute, Busan 619-902, Korea

ABSTRACT

Two caridean shrimps, *Eualus biunguis* (Rathbun, 1902) and *Argis toyamaensis* (Yokoya, 1933), collected from the Korean continental slope of the East Sea at depths of 850-870 m are reported as new to the Korean caridean fauna with brief descriptions and illustrations. A hippolytid shrimp, *E. biunguis*, is distinguished from the congeners by the minute chelalike appearance of dactyli of the last three pereopods and the large pyriform eye. A crangonid shrimp, *A. toyamaensis*, differs from the Korean species of the genus in having the posterior acute spines of submedian carinae on the sixth abdominal somite.

Key words: *Eualus biunguis, Argis toyamaensis*, Caridea, Decapoda, continental slope, Korea

INTRODUCTION

The East Sea is 1,361 m deep in average and the deepest depth is 3,762 m, so that the continental slope and ocean floor with the depth of water more than 200 m are wider than the continental shelf. From the continental slope and ocean floor of the sea, the caridean shrimps were known for 34 species of three families (Komai, 1994). Of these, 14 species (4 in the Hippolytidae, 3 in the Pandalidae and 7 in the Crangonidae) were found in the area of Korean side (Kim and Kim, 1997; Cha et al., 2001). During an ongoing study of caridean shrimps, the following two species were collected from the Korean continental slope of the East Sea at depths 850-870 m: *Eualus biunguis* (Rathbun, 1902) and *Argis toyamaensis* (Yokoya, 1933). The former belonging to the family Hippolytidae is widely distributed in the northern North Pacific from off Oregon to the East Sea, while the latter in the family Crangonidae is endemic to the East Sea. Both are new members of the Korean caridean fauna and are commercially important as local fishery resources. Morphological descriptions and illustrations are given for the two species.

Specimens examined are deposited in the Laboratory of Invertebrate Zoology, Department of Marine Biology, Pukyong National University (PUIZ). Postorbital carapace length (cl) is used as an indication of the size of the specimens.

*To whom correspondence should be addressed
Tel: 82-51-620-6264, Fax: 82-51-624-5387
E-mail: jnkim@pknu.ac.kr

[1]*집게발꼬마새우(신칭)

SYSTEMATIC ACCOUNTS

Family Hippolytidae Bate, 1888

[1]***Eualus biunguis* (Rathbun, 1902) (Fig. 1)**

Spirontocaris biunguis Rathbun, 1902, p. 899; 1904, p. 97, fig. 44; Yokoya, 1933, p. 27, fig. 9.

Eualus biunguis: Derjugin and Kobjakova, 1935, p. 142; Kobjakova, 1936, p. 211, fig. 27; 1937, p. 120; Holthuis, 1947, p. 10; Vinogradov, 1950, p. 207, fig. 60; Miyake and Hayashi, 1967, p. 248, fig. 1; Igarashi, 1969, p. 6, pl. 6, fig. 18, pl. 15, fig. 45; Birstein and Zarenkov, 1970, p. 421; Butler, 1980, p. 192, unnumbered fig.; Hayashi, 1993, p. 243, figs 242, 243.

Material examined. 11♀♀(cl 17.7-23.2 mm), 18 ovig. ♀♀(cl 18.0-25.8 mm), East Sea, 36°26.1′N 129°58.9′E, 18 Oct. 2002, by otter trawl at 850-870 m in depth, PUIZ 203.

Description. Integument moderately thin, glabrous. Rostrum (Fig. 1A) straight or slightly upwards, long, 1.04-1.49 times as long as carapace, with well-developed lateral carina; dorsal margin with 4-6 teeth, of these, posterior 2 teeth on carapace, ventral margin with 3-9 teeth. Carapace (Fig. 1A) smooth; antennal spine large, separated from suborbital lobe; pterygostomian spine small. Abdomen (Fig. 1A) smooth dorsally; pleura of first to fourth somites rounded posteriorly, that of fifth somite pointed posteriorly.

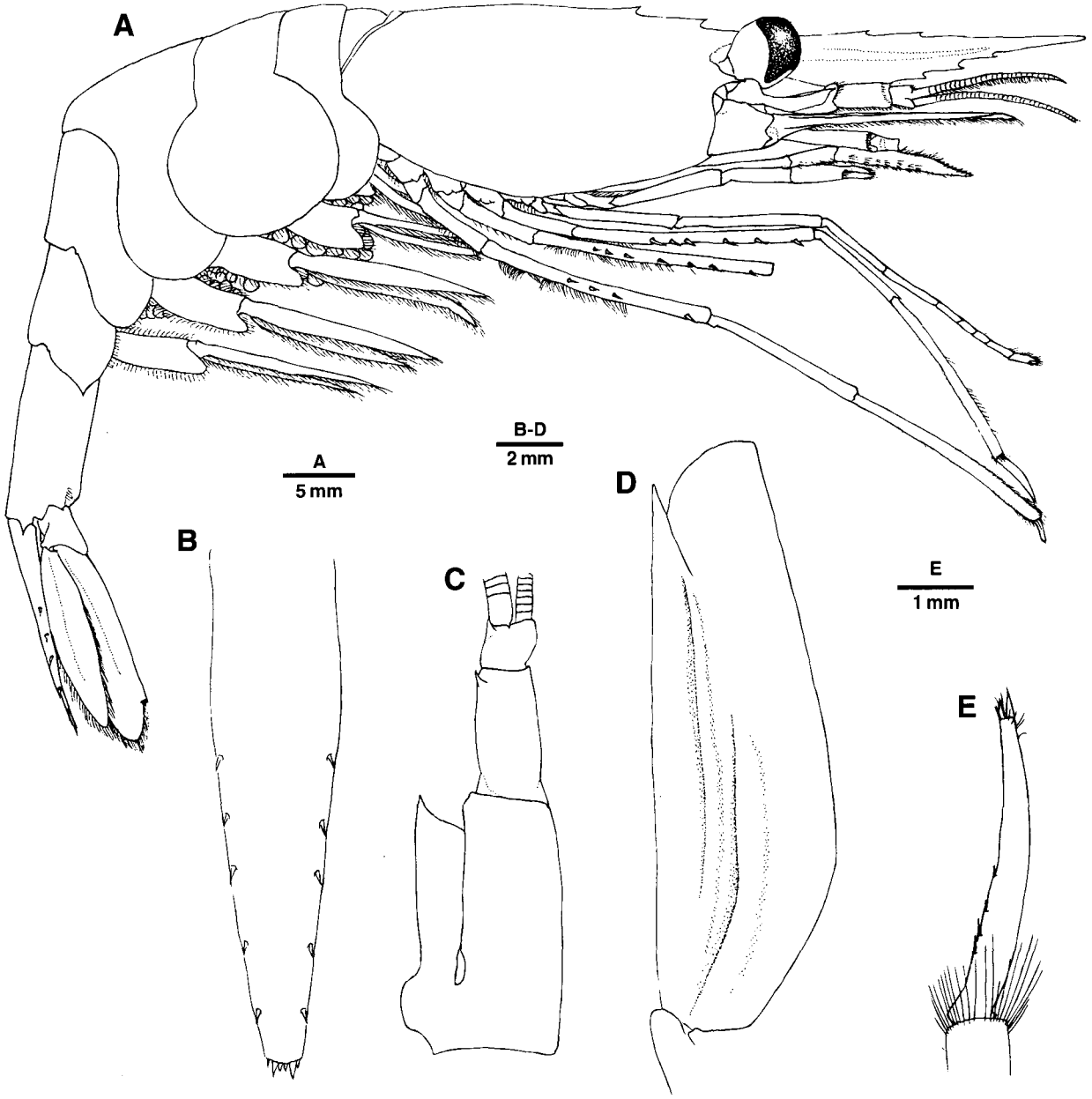

Fig. 1. *Eualus biunguis* (Rathbun, 1902). Female (CL 21.6 mm, PUIZ 203) from the East Sea. A, entire animal, lateral, dactylus to carpus of fourth pereopod missing; B, telson, dorsal; C, left antennular peduncle, dorsal; D, left scaphocerite, dorsal; E, right dactylus of third pereopod, mesial.

Telson (Fig. 1B) with basically 5 pairs of minute spines on dorsolateral margin, sometimes 4 or 6 spines on either side; posterior margin with 3 pairs of small spines, second spine longest. Eye (Fig. 1A) large, pyriform; cornea well-developed. Antennular peduncle (Fig. 1C) reaching middle of scaphocerite of antenna; stylocerite broad, ending in sharp tooth; second and third segments each with small tooth at anterior part of dorsal margin. Antenna with scaphocerite (Fig. 1D) large, 0.70-0.89 times as long as carapace, 2.94-3.38 times as long as wide; distolateral spine falling short of distal margin of scaphocerite. Third maxilliped with exopod and epipod. Pereopods without epipod. Posterior 3 pereopods (Fig. 1A) long and slender; meri with 3-7 spines; dactyli with 3-5 spinules on posteroventral margin, distal spine developed and situated against terminal claw, giving appearance of minute chela (Fig. 1E). Eggs small, 0.92-1.20 × 0.80-1.04 mm in diameter.

Parasites. Two specimens (cl 17.7, 20.1 mm) were infected

with the bopyrid isopod, *Hemiarthrus abdominalis* (Krøyer, 1840) on the abdominal sternum between the first and second pleopods.

Coloration. Body yellowish brown; lateral carina of rostrum, branchial region of carapace, and cephalic, thoracic and abdominal appendages red; plura of first to third abdominal somites each with transverse whitish band at middle part.

Type locality. Off Cape St. James, Queen Charlotte Islands, British Columbia, 876 fms (=1,592 m).

Distribution. Northern North Pacific from Bering Sea to Oregon, Okhotsk Sea, East Sea, and Pacific coast of Hokkaido, Japan; 91-2,090 m (Kobjakova, 1937).

Remarks. Although seven species of the genus *Eualus* are recorded in the continental slope of the East Sea (Komai, 1994), only two species, *E. middendorffi* Brashnikov, 1907 and *E. spathulirostris* (Yokoya, 1933) are reported from the area of Korean waters (Cha et al., 2001). The present species, *E. biunguis*, is unique in the genus in having the minute chelalike appearance of dactyli of the last three pereopods (Fig. 1E) and the large pyriform eye (Fig. 1A). Furthermore, the species differs from the other Korean species of the area in having an epipod on the third maxilliped and lacking an epipod on all pereopods, while in *E. middendorffi* an epipod is absent on the third maxilliped and the pereopods and in *E. spathulirostris* an epipod is present on the third maxillip-

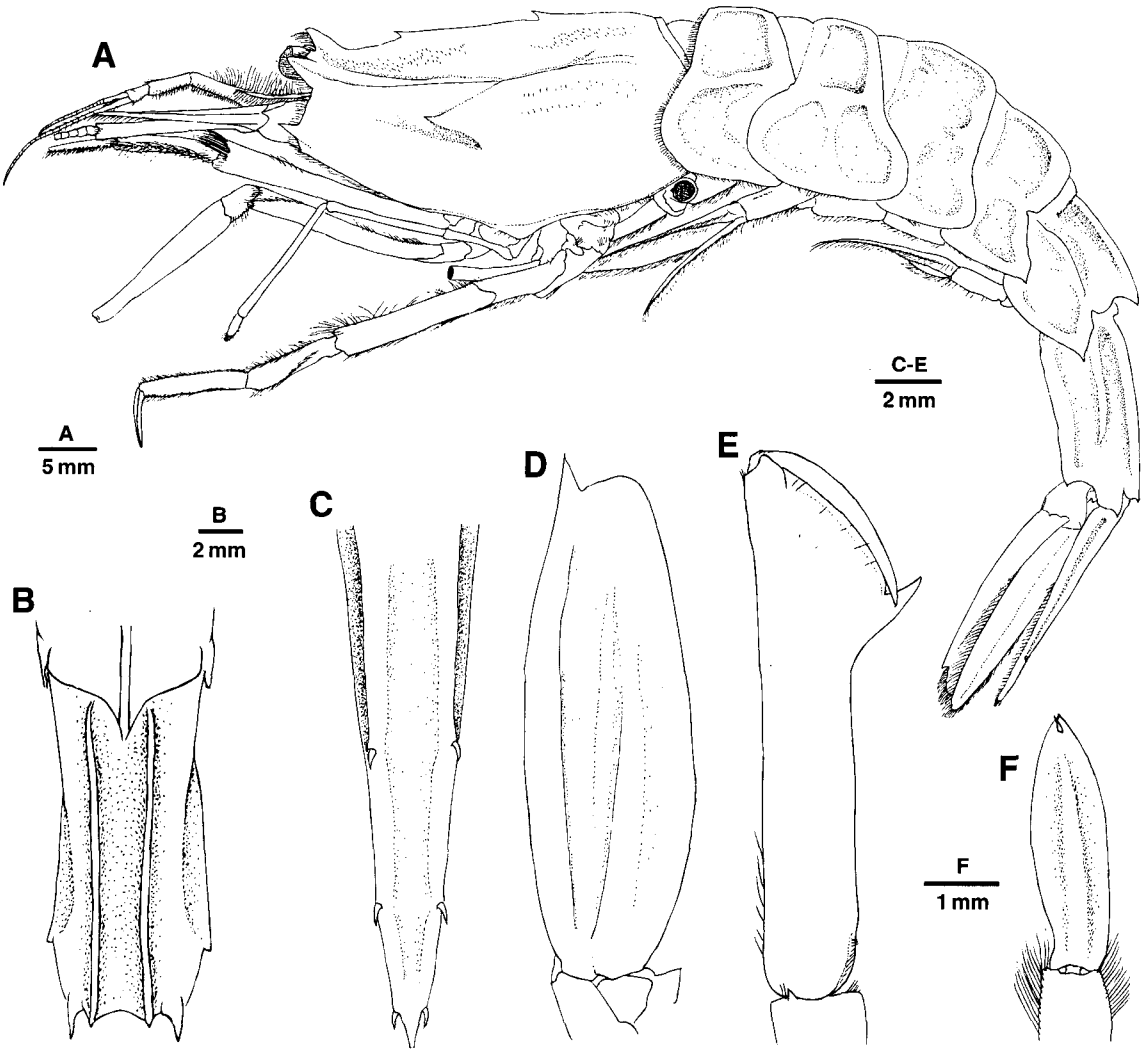

Fig. 2. *Argis toyamaensis* (Yokoya, 1933). A, B, D, E, female (CL 29.0 mm, PUIZ 204) from the East Sea; C, female (CL 24.0 mm, same lot); F, female (CL 19.5 mm, same lot). A, entire animal, lateral, dactylus to merus of third pereopod and dactylus to basis of fifth pereopod missing; B, sixth abdominal somite, dorsal; C, telson, dorsal; D, left scaphocerite, dorsal; E, left chela of first pereopod, dorsal; F, left dactylus of fourth pereopod, ventral.

ed and the first to third pereopods.

Family Crangonidae Haworth, 1825

[1]***Argis toyamaensis* (Yokoya, 1933) (Fig. 2)**

Nectocrangon toyamaensis Yokoya, 1933, p. 39, fig. 20.

Nectocrangon dentata: Derjugin and Kobjakova, 1935, p. 142; Kovjakova, 1936, p. 225, fig. 26; 1937, p. 140 (in part); 1958, p. 224; Igarashi, 1969, p. 11, pl. 12, fig. 34, pl. 17, fig. 57, pl. 20, fig. 63; Komai et al., 1992, p. 195. [Not *Argis dentata* (Rathbun, 1902)].

Argis toyamaensis: Holthuis, 1955, p. 132, fig. 95c; Miyake et al., 1962, p. 124; Komai, 1997, p. 144, figs 8-11.

Material examined. 5♀♀(cl 19.5-29.0 mm), 2 ovig. ♀♀ (cl 27.0, 28.8 mm), East Sea, 36°26.1′N 129°58.9′E, 18 Oct. 2002, by otter trawl at 850-870 m in depth, PUIZ 204.

Description. Integument thick, sparsely pubescent. Rostrum (Fig. 2A) very short, ascending, with acute or subacute apex. Carapace (Fig. 2A) with median carina bearing 2 spines, posterior median spine situated at 0.64-0.67 length of carapace; postorbital carina weak; branchial carina distinct; antennal spine long; branchiostegal spine moderately strong, rather divergent; pterygostomian spine small; hepatic spine large. Abdomen (Fig. 2A) with median carina on first to fifth somites; pleura of fourth and fifth somites each with small posteroventral tooth; sixth somite (Fig. 2B) 2.01-2.29 times as long as proximal width, submedian carinae subparallel, terminating posteriorly in acute tooth. Telson (Fig. 2C) tapering to acute tip, dorsally with deep median groove, bearing 3 pairs of dorsolateral spines and terminally unarmed. Eyestalk (Fig. 2A) with dorsal tubercle relatively small, rounded distally. Outer antennular flagellum (Fig. 2A) long, 1.73-2.06 times as long as distal 2 antennular segments combined, consisting of 21-25 articles. Scaphocerite (Fig. 2D) stout, 0.46-0.54 times as long as carapace, 2.50-2.86 times as long as wide; distolateral spine distinctly reaching beyond distal margin of blade. First pereopod with palm (Fig. 2E) elongate, 4.81-5.34 times as long as wide. Fourth and fifth pereopods moderately stout, with dactyli (Fig. 2F) subspatulate. Eggs large, 2.17-2.33 × 1.83-2.17 mm in diameter.

Coloration. Entirely reddish brown, abdomen margined by rather pale tint.

Type locality. Toyama Bay, Sea of Japan (East Sea), 311 m.

Distribution. Known with certainty only from the East Sea; 200-2,090 m (Komai, 1997).

Remarks. Argis (or *Nectocrangon*) *dentata* from the East Sea was reported by Derjugin and Kobjakova (1935), Kobjakova (1936, 1958), Igarashi (1969), and Komai et al. (1992), and they proved to be the present species by Komai (1997) who examined many topotypic specimens of *A. toyamaensis* and *A. dentata* from the Bering Sea in order to clarify the taxonomic problem between *A. toyamaensis* and *A. dentata* s.l. The present specimens agree well with Komai's (1997) description, especially in the relatively slender body, the acute rostrum, the conspicuous branchial carina on the carapace, and the slender sixth abdominal somite and scaphocerite.

In Korean waters, only two species of the genus, *A. lar* (Owen, 1839) and *A. hozawai* (Yokoya, 1939), are reported from the East Sea (Kim, 1977). *Argis toyamaensis* is distinguished from the two species by the posterior acute spines of submedian carinae on the sixth abdominal somite (Fig. 2B). In the two species, the submedian carinae are terminated posteriorly in a round lobe.

ACKNOWLEDGEMNETS

We cordially thank Dr. Ken-Ichi Hayashi of the Shrimp & Prawn Research Laboratory, Shimonoseki, Japan for his critical reading of the manuscript. This work was supported by Korean Research Foundation Grant (KRF-2004-037-C00031) to the first author (JNK).

REFERENCES

Birshtein, Y.A. and N.A. Zarenkov, 1970. Bottom decapods (Crustacea, Decapoda) of the Kurile-Kamchatka Trench area. *In* V. G. Bogorov, ed., Fauna of the Kurile-Kamchatka Trench and its Environment. Trudy Instituta Okeanologii, 86: 420-426. (in Russian)

Brashnikov, V., 1907. Materiali po fauni Russkikh vostochnikh morei, sovrannie shkhnoju "Storoz" vi 1899-1902 gg. [Materials on the fauna of Russian Eastern Sea collected by the schooner "Storoz" during the year 1899-1902]. Zapiski Imperatorskoi Akademii Nauki, po phiziki-matematichekomu otdilenileniju, 20: 1-185.

Butler, T.H., 1980. Shrimps of the Pacific coast of Canada. Canadian Bull. Fish. Aquat. Sci., 202: 1-280.

Cha, H.K., J.U. Lee, C.S. Park, C.I. Baik, S.Y. Hong, J.H. Park, D.W. Lee, Y.M. Choi, K. Hwang, Z.G. Kim, K.H. Choi, H. Sohn, M.H. Sohn, D.H. Kim and J.H. Choi, 2001. Shrimps of the Korean Waters. National Fisheries Research and Development Institute, Pusan, pp. 1-188.

Derjugin, K.M. and Z.I. Kobjakova, 1935. Zur Decapodenfauna des Japanischen Meeres. Zool. Anz., 112: 141-147.

Hayashi, K.-I., 1993. Prawns, shrimps and lobsters from Japan (72). Family Hippolytidae-genus *Eualus* (1). Aquabiology

[1]*가시진흙새우(신칭)

87, 15(4): 241-244. (in Japanese)

Holthuis, L.B., 1947. The Hippolytidae and Rhynchocinetidae collected by the Siboga and Snellius Expeditions with remarks on other species. *In* The Decapoda of the Siboga Expedition, Part IX. Siboga-Exped. Monogr., 39a[8]: 1-100.

Holthuis, L.B., 1955. The recent genera of the caridean and stenopodidean shrimps (Class Crustacea, Order Decapoda, Supersection Natantia) with keys for their determination. Zool. Verhand., 26: 1-157.

Igarashi, T., 1969. A list of marine decapod crustaceans from Hokkaido, deposited at the Fisheries Museum, Faculty of Fisheries, Hokkaido University, I. Macrura. Cont. Fish. Mus., Fac. Fishe., Hokkaido Univ., 11: 1-15.

Kim, H.S., 1977. Macrura. Illustrated Flora and Fauna of Korea, vol. 19. Samwha Publishing Co., Seoul, pp. 1-414. (in Korean)

Kim, H.S. and W. Kim, 1997. Order Decapoda. *In* The Korean Society of Systematic Zoology, ed., List of Animals in Korea (excluding insects), Academy Publishing Co., Seoul, pp. 212-223.

Kobjakova, Z.I., 1936. Zoogeographicheskii obzor fauny Decapoda Okhotkogo i Japonskogo morei. [Zoogeographical review of the Decapoda fauna from the Okhotsk and Japanese Seas]. Trudy Leningrad Obshestva Estestvois-pitatelei, 65: 185-228.

Kobjakova, Z.I., 1937. Desyatinogie raki (Decapoda) Okhots-kogo i Japonskogo morei. [Systemaic review of the Deca-poda of the Okhotsk and Japanese seas]. Uchenie Zapiski Leningrad Universtaet, 15: 93-154.

Kobjakova, Z.I., 1958. Decapoda from the vicinity of the southern Kurile Islands. Invest. Far East Seas USSR, 5: 220-248. (in Russian)

Komai, T., 1994. Taxonomic synopsis of Caridea (Pandalidae, Hippolytidae, Crangonidae) occurring on continental shelf of the Sea of Japan. Cont. Fish. Res. Japan Sea Block, 31: 81-107.

Komai, T., 1997. Revision of *Argis dentata* and related species (Decapoda: Caridea: Crangonidae), with description of a new species from the Okhotsk Sea. J. Crust. Biol., 17 (1): 135-161.

Komai, T., S. Maruyama and K. Konishi, 1992. A list of deca-pod crustaceans from Hokkaido, northern Japan. Res. Crust., 21: 189-205.

Miyake, S. and K.-I. Hayashi, 1967. Studies on the hippolytid shrimps from Japan, I. Revision of the Japanese species of the genus *Eualus*, with description of two new species. J. Fac. Agr., Kyushu Univ., 14(2): 247-265.

Miyake, S., K. Sakai and S. Nishikawa, 1962. A fauna-list of the decapod Crustacea from the coasts washed by the Tsus-hima warm current. Rec. Oceanogr. Wrk. Japan, Spec. Num. 6: 121-131.

Rathbun, M.J., 1902. Description of new decapod crustaceans from the west coast of North America. Proc. US Nat'l Mus., 24: 885-905.

Rathbun, M.J., 1904. Decapod crustaceans of the northwest coast of North America. Harriman Alaska Exped., 10: 1-210.

Vinogradov, L.G., 1950. Classification of shrimps, prawns and crabs from Far East. Bull. TINRO, 33: 179-358.

Yokoya, Y., 1933. On the distribution of decapod crustaceans inhabiting the continental shelf around Japan, chiefly based upon the materials collected by S.S. Sôyô-Maru, during the years 1923-1930. J. Coll. Agr. Toyko Imp. Univ., 12: 1-222.

Yokoya, Y., 1939. Macrura and Anomura of decapod Crustacea found in the neighbourhood of Onagawa, Miyagi-ken. Sci. Rep. Tohoku Imp. Univ., (4) 14: 261-289.

Received December 20, 2005
Accepted April 12, 2006