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Isopod crustaceans collected from Aomori Prefecture Northern Japan

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ABSTRACT A total of 17 marine, a freshwater and 10 terrestrial isopod crustaceans were reported from Aomori Prefecture. And many of them are considered to be warm elements. Among them, a new species of gnathiid isopod crustacean is described as *Gnathia mutsuensis*, based on single male specimen.

KEY WORDS Isopoda / Gnathiidea / new species / *Gnathia mutsuensis* / Aomori / Mutsu Bay

Introduction

The taxonomy on isopod crustaceans has hitherto been ignored in Aomori Prefecture. Therefore, I carried out faunal surveys of marine isopods including splash zones and shore forests at several areas along the coast of Mutsu Bay, Aomori Prefecture in the summer of 1983 and in fall of 1984 (Fig. 1). Adding these, a series of specimens of isopod crustaceans were at my disposal for my study and identification through the courtesy of Dr. Makoto Tsuchiya of Asamushi Marine Biological Station.

As to the terrestrial species, I could examine several samples collected from the areas around the Mt. Iwaki, which had been sent from Prof. Yoshiaki Nishikawa. Besides the above-mentioned specimens, I could examine specimens sent from some other scientists. The specimens studied in this study will be deposited at the Toyama Science Museum.

As the results of the above-mentioned surveys, 17 marine, 1 freshwater and 10 terrestrial species are enumerated. Among them, a new species of gnathiid isopod crustacean is described as *Gnathia mutsuensis*, based on a single male specimen.

Results

Order Isopoda
Suborder Gnathiidea
Family Gnathiidae
Gnathia mutsuensis n. sp.

(Japanese name: Mutsu-umikuwagata, new)

Material examined: 1♂ (holotype 2.1 mm in body length including mandibles but excluding both antennae) form intertidal shore of Asamushi, Aomori-shi, coll. Makoto Tsuchiya, July 8, 1983. Holotype is deposited at the Toyama Science Museum (TOYA Cr-13050). No female or juvenile specimens have been collected.

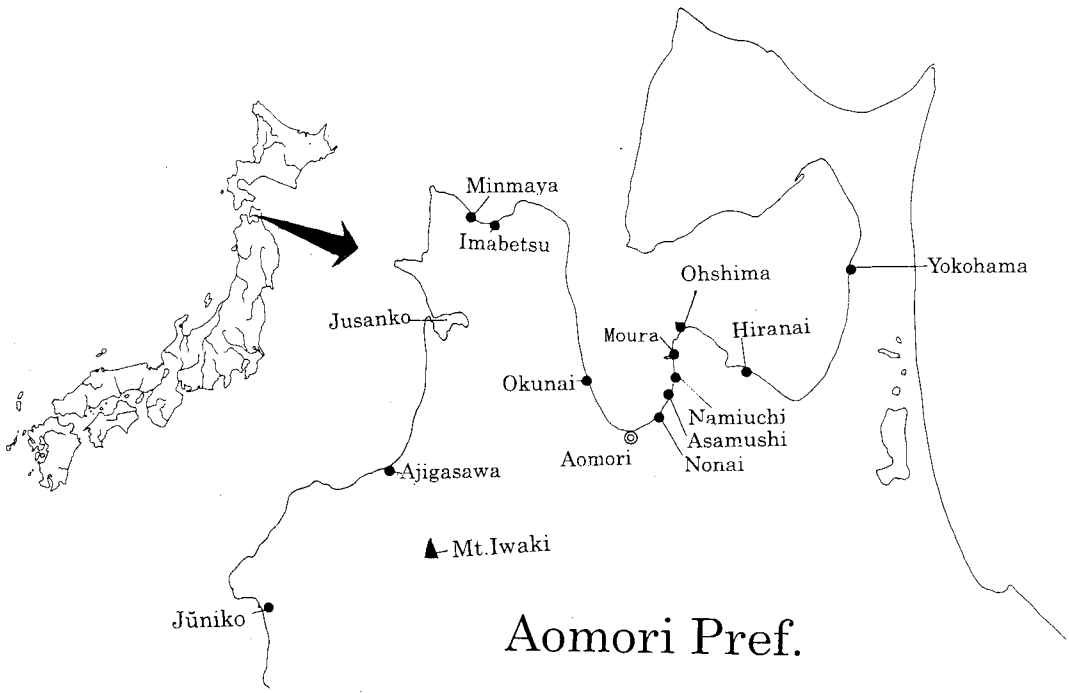

Fig. 1. Map showing the main colleting sites.

Description: Body rather slender, 3.3 times as long as wide. Body color white in alcohol. Cephalon 0.8 times as long as wide, with a small projection at atnero-meidal part and sharp protruded projection at antero-lateral angle. Eyes relatively big, each eye with about 37 ommatidia. Pleotelson triangular with 2 setae at apical margin.

Antennule (Fig. 2B): Peduncle 3-segmented; first and second segments rectangular; third segment a little longer than the second, with 6-7 setae on distal margin. Flagellum 4-segmented and slender, segment 3 with an aesthetasc and terminal segment with 3 aesthetascs.

Antenna (Fig. 2C) approximately 1.4 times longer than antennule. Peduncle 4-segmented; segment 1 with a protuberance at distal angle; last peduncular segment long and wide with 10 long setae. Flagellum 7-segmented and slender, with 7-8 relatively long setae.

Mandible (Fig. 2D) stout and triangular; armed carina and mandibular setae lacking: armed carina lacking; mandibular blade with 5-6 teeth; mandibular incisura lacking; dorsal sulcus small; supra denticles lacking; mediofrontal process small; spraocular lobes small.

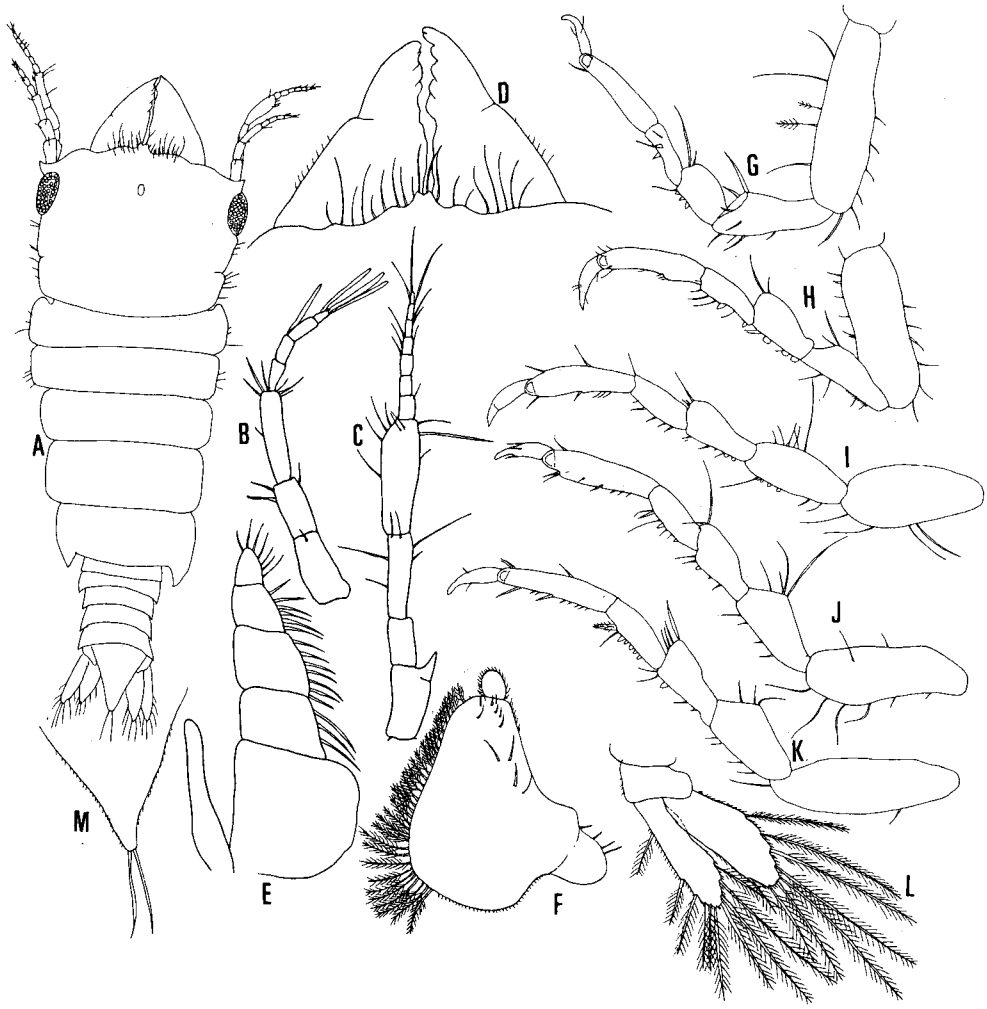

Fig. 2. *Gnathia mutsuensis* n. sp. Holotype. A, Dorsal view; B, Antennula;, C, Antenna; D, Mandible; E, Maxilliped; F, Pylopod; G-K, Pereopods 1-5; L, Uropods.

Maxilliped (Fig. 2E) 5-segmented; segment 1 wide and lacking setae; segment 2 square, with 3 setae; segment 3 square, with 7 setae; segment 4 square, 3/4 as long as segment 3, with 6 setae; terminal segment slender, with 7 setae around the margin.

Pylopod (Fig. 2F) 2-segmented; segment 1 wide and triangular, with more than 35 setae on margin; segment 2 small and round.

Pereopod 1 (Fig. 2G): basis rectangular, with 2 plumose setae and 3 simple setae on outer margin and 6 setae on inner margin; ischium slender and shorter than basis, with 8 setae; merus short with 3 protuberences and 2 longer ones at the posterior margin; carpus

slender and 2stout a d 2 simple setae; propodus long, with a seta at inner distal margin; dactylus relatively long.

Pereopod 2 (Fig. 2H) a little shorter than pereopod 1: basis rectangular, with 6 setae on both margins; ischium 3/5 as long as basis, with 4 setae on inner margin and 2 setae on outer margin; merus with 3 peg-like protuberances on inner margin; carpus a little shorter than merus, with 4-5 setae and a stout seta on inner margin; propodus 1.7 times longer than merus, with several setae; dactylus long.

Pereopod 3 (Fig. 2I) as long as pereopod 2; basis with 4 long setae on inner margin; ischium with 4 peg-like protuberances and 3-4 setae on inner margin and 5-6 setae on outer margin; merus 2 peg-like protuberances and 3-4 relatively short setae on inner margin and 3-4 setae at outer distal angle carpus 4 setae on inner margin and a seta at outer distal angle; propodus with 5-6 setae on inner margin and 2 relatively long setae on outer margin.

Pereopod 4 (Fig. 2J) as long as pereopod 3: basis with 6-7 setae on inner martin and 2 setae on outer margin; ischium, with 4 setae on inner margin and 3 setae on outer margin; merus with 2 peg-like protuberances and 3 short setae on inner margin and 2 setae at outer distal angle; carpus 1.4 times longer than merus, with 4-5 setae on inner margin at distal angle; propodus with 6-7 setae on outer margin.

Pereopod 5 (Fig. 2K) a little longer than pereopod 4: basis rectangular, ischium with 4-5setea on inner margin and 3 setae on outer margin; merus with a peg-like seta and 4 short setae on inner margin and 4 setae at outer distal angle; carpus 6 setae on inner margin, a stout seta at inner distal angle; propodus with 8-10 setae on inner margin

Uropod (Fig. 2L) basis; endopod with 8 long plumose setae around the margin; exopod as long as endopod, with 9 long plumose setae around the margin.

Etymology: The species is named after the old name of Aomori Prefecture.

Remarks: The present species is most closely allied to *Gnathia sanrikuensis* Nunomura from the sea off Iwate Prefecture, but the former is separated from the latter in the following features: (1) shape of cephalon, (2) larger eyes, (3) acuter supraocular lobe of cephalon, (4) bifurcated medio-frontal process of cephalon, (5) absence of mandibular setae, and (6) numerous plumose setae on both uropodal rami.

The present new species is closely allied to *Gnathia hirayamai* Nunomura reported from Amakusa, but the former is separated from the latter in the following features: (1) presence of small but remarkable mediofrontal process in the anterior part of cephalon, (2) lacking of mandibular incisura, (3) presence of small but remarkable supraocular lobe at the antero-lateral part of cephalon, (4) presence of mandibular blade, (5) presence of peg-like protuberances on pereopods, (6) bigger eyes with more ommatidia, and (7) less numerous segmentation of antenna.

Suborder Asellota

Family Janiridae

***Ianiropisis longiantenata* Thielemann, 1910**

(Japanese name: Umi-mizumushi)

Material examined: 7 exs., Asamushi, Aomori-shi, June 13, 1983, coll. Noboru Nunomura.

Family Janiridae

***Jaeropsis lobata* Richardson, 1899**

(Japanese name: Hirata-umimizumushi)

Material examined: 1 ex., Asamushi, Aomori-shi, date unknown, coll. Makoto Tsuchiya.

Suborder Anthuridea

Family Anthuridae

***Cyathura* sp. (aff. *muromiensis* Nunomura, 1976)**

Material examined: 10 ♀♀, Lake Jûsan-ko, Shiura-mura, Aug. 8, 1975, coll. Shigeru Nakao.

Family Paranthuridae

***Paranthura japonica* Richardson, 1909**

(Japanese name: Yamato-uminanafushi)

Material examined: 4 exs., coastal and rocky shore and *Zostera* zone, June 15, 1983, coll. Noboru Nunomura; 1 ex., Sep. 29, 1984, coll. Noboru Nunomura; 2 exs., Yokohama, June 15, 1979, coll. Makoto Tsuchiya; 3 exs., Asamushi, Aomori, date unknown, coll. Makoto Tsuchiya.

***Colanthura nigra* Nunomura, 1975**

(Japanese name: Kuro-ashitarazu-uminanafushi)

Material examined: 1 ex., sea 10m off Asamushi, Aomori-shi, and Aomori-shi June 6, 1979, coll. Makoto Tsuchiya.

Suborder Valvifera

Family Idoteidae

***Idotea ochotensis* Brandt, 1851**

(Japanese name: Ohotsku- heramushi)

Material examined: 7 exs., Asamushi, Aomori-shi, June 13, 1983, coll. Noboru Nunomura; 1 ex, Asamushi, Aomori-shi, June 15, 1983, coll. Noboru Nunomura; 1 ex. Asamushi, Aomori-shi, June 16, 1983, coll. Noboru Nunomura; 7 exs., Ohura near Asamushi, Aomori-shi, July 7, 1997, coll. Makoto Tsuchiya; 8 exs., Yokohama, June 15, 1979, coll. Makoto Tsuchiya; 1 ex., Asamushi, Aomori-shi, June 13, 1983, coll. Katsutoshi Itoo.

***Cleantiella isopus* (Grube, 1883)**

(Japanese name: Iso-heramushi)

Material examined: 1 ex., Asamushi, Aomori-shi, July 15, 1983, coll. Noboru

Nunomura; 2 exs; Asamushi, Aomori-shi, Aomori-shi, June 16, 1983, coll. Noboru Nunomura; 1 ex., Urata, Aomori-shi, June 14, 1979, coll. Makoto Tsuchiya; 3 exs., Hiranai-machi, coll. Makoto Tsuchiya; 2 exs., Asamushi, Aomori-shi, June 13, 1983, coll. Katsutoshi Ito.

Family Chaetilidae

***Symmius caudatus* Richardson, 1904**

(Japanese name: Yaribo-heramushi)

Material examined: 1 ex., off Asamushi (8m in depth), Sep. 12, 1978, coll. Makoto Tsuchiya.

Suborder Flabellifera

Family Cirolanidae

***Natatolana japonensis* (Richardson, 1904)**

(Japanese name: Yamato-sunahorimushi)

Material examined: 1 ex., off Asamushi, Aomori-shi, June 15, 1983, coll. Noboru Nunomura; 16 exs., off Asamushi, Sep 12, 1978, coll. Makoto Tsuchiya; 27 exs., off Asamushi, Aomori-shi (6-30 m in depth), Sep. 21, 1978, coll. Makoto Tsuchiya; 1 ex., Asamushi, Aomori-shi, June 15, 1983, coll. Noboru Nunomura; 3 exs., Asamushi, Aomori-shi, Aug. 15, 1983, coll. Makoto Tsuchiya.

***Excirolana chiltoni* (Richardson, 1905)**

(Japanese name: Hime-sunahorimushi)

Material examined: 2 exs., Nonai, Aomori-shi, Sep. 10, 1980, coll. Noboru Nunomura; 10 exs., Kanita, Kanita-machi, July 23, 1980, coll. Noboru Nunomura; 12 exs., Kanayazawa, Mutsu-shi, Sep. 30, 1984.

Family Aegidae

***Aega antillensis* Schioedte & Meinert, 1879**

(Japanese name: Menaga-gusokumushi)

Material examined: 1♀, Mutsu Bay. data unknown, coll. Makoto Tsuchiya.

Family Sphaeromatidae

***Cymodoce japonica* Richardson, 1907**

(Japanese name: Nihon-kotsubumushimi)

Material examined: 2♂♂5♀♀, Yokohama-machi, Sep. 30, 1984, coll. Noboru Nunomura; 3 exs., intertidal zone, Asamushi, Aomori-shi, June 15, 1983, coll. Noboru Nunomura; 1 ex., Asamushi, Aomori-shi, Aug. 15, 1983, coll. Makoto Tsuchiya.

***Gnorimosphaeroma rayi* Hoestlandt, 1969**

(Japanese name: Iso-kotsubumushi)

Material amined: 5 exs., intertidal zone, Hadakajima, Asamushi, Aomori-shi, June 16,

1983; coll. Noboru Nunomura; 6 exs., Karibazawa, June 15, 1979, coll. Makoto Tsuchiya; 8 exs., Yokohama, June 15, 1979, coll. Makoto Tsuchiya; 1 ex., Moura, June 14, 1983, coll. Noboru Nunomura; 3 exs., Namiuchi, June 13, 1979, coll. Makoto Tsuchiya; 7 exs., Shirasuna, June 14. 1979, coll. Makoto Tsuchiya; 6 exs. Urata, Hiranai-machi, June 14. 1979, coll. Makoto Tsuchiya; 31 exs., Kanita, Kanita-machi, July 23, 1987, coll. Noboru Nunomura; 30 exs, Yasaku, Aomori-shi, July 23, 1984 coll. Noboru Nunomura; 13 exs., Nonai, Aomori-shi, July 23, 1984, coll. Noboru Nunomura; 3 exs., Arihata, Yokohama-machi. Sep. 30, 1984, coll. Noboru Nunomura.

***Gnorimosphaeroma ovatum* (Richardson, 1933)**

(Japanese name: Maru-kotsubumushi)

Material examined: 18 exs., Amidagawa, Yomogida-mura, July 23, 1984, coll. Noboru Nunomoura. 2 exs., Ohura, Aomori-shi, June 7, 1977, coll. Makoto Tsuchiya.

***Gnorimosphaeroma naktongense* Kwon & Kim, 1987**

(Japanese name: Chosen-kotubumushi)

Material examined: 3 exs., Minmaya, June 19, 1983, coll. Noboru Nunomura; many, Koshiguchi-no-ike, Juniko, Iwasaki-mura, July 1, 1996, coll. Noboru Nunomura.

***Dynoides dentisinus* Shen, 1929**

(Japanese name: Shiriken-umisemi)

Material examined: 6♂♂9♀♀, Asamushi, Aomori-shi, July 7, 1983, coll. Makoto Tsuchiya; 9 exs., Asamushi, Aomori-shi, Mar. 1989, coll. Makoto Tsuchiya.

***Leptosphaeroma gottcshei* Hilgendorf, 1885**

(Japanese name: Hirata-umisemi)

Material examined: 10 exs., intertidal zone, Asamushi, Aomori-shi, June 16, 1983, coll. Noboru Nunomura; 30 exs., intertidal zone, Hadakajima, Asamushi, Aomori-shi, 1 ex., off Asamushi, Aomori-shi, June 15, 1983, coll. Noboru Nunomura; Aomori-shi, June 16, 1983, coll. Noboru Nunomura; 1 ex., Asamushi, Aomori-shi, June 6, 1979.

Family Ligiidae

***Ligia exotica* Roux, 1828**

(Japanese name: Funamushi)

Material examined: 5 exs., Asamushi, Aomori-shi, Jun. 15, 1983, coll. Noboru Nunomura; 1♀, Aburakawa, July 23, 1984, coll. Noboru Nunomura; 18 exs., Jûsan-ko, Shiura-mura, July 30, 1976, coll. Shigeru Nakao, 2 exs., Asamushi, Aomori-shi, Sep. 29, 1984, coll. Noboru Nunomura; 1 ex. Kanita, Kanita-machi, June 14, 1983, coll. Noboru Nunomura.

***Ligia cinerascens* Budde-Lund, 1828**

(Japanese name: Kita-funamushi)

Material examined: 1 ex., Arihata, Yokohama-machi, coll. Noboru Nunomura; 4 exs., Asamushi, Aomori-shi, June 13, 1983, coll. Noboru Nunomura; 1♀, Nonai, Aomori-shi, July 23, 1984, coll. Noboru Nunomura; 1♂3♀♀, Asamushi, Aomori-shi, June 14, 1983, coll. Noboru Nunomura.

***Ligidium japonicum* Verhoeff, 1918**

(Japanese name: Hime-funamushi)

Material examined: 2♂♂9♀♀, Kanagi-machi, 260–280 m above sea level; 3♀♀, Mt. Iwaki, Sep. 24, 1977. Coll. Yoshiaki, Nishikawa; 2♂♂9♀♀ Mt. Iwaki, 1300–1350 m a. s. l., Sep. 24, 1977, coll. Yoshiaki Nishikawa.

Family Trichoniscidae

***Haplophthalmus danicus* Budde-Lund, 1879**

(Japanese name: Naga-warajimiushi)

Material examined: 4 exs., Asamushi, Aomori-shi, June 16, 1983, coll. Noboru Nunomura.

Family Scyphacidae

***Armadilloniscus japonicus* Nunomura, 1984**

(Japanese name: Nihon-hama-warajimiushi)

Material examined: 5 exs., Asamushi, Aomori-shi, June 13, 1983, coll. Noboru Nunomura; 14 exs., Asamushi, Aomori-shi, July 27, 1984, coll. Noboru Nunomura; 1 ex., Hiranai, July 23, 1984, coll. Noboru Nunomura; 9 exs., coll. Noboru Nunomura

***Detonella japonica* Nunomura, 1984**

(Japanese name: Hamabe-warajimushi)

Material examined: 2 exs., Asamushi, Aomori-shi, June 16, 1983, coll. Noboru Nunomura.

Family Phylosciidae

***Littorophiloscia nipponensis* Nunomura, 1986**

(Japanese name: Nihon-hiiro-warajimushi)

Material examined: 6 exs. Asamushi, Aomori-shi, June 14, 1983, coll. Noboru Nunomura.

Family Porcellionidae

***Porcellio scaber* Latreille, 1804**

(Japanese name: Warajimushi)

Material examined: 1♂9♀♀, Asamushi, Aomori-shi, June 15, 1983, coll. Noboru Nunomura; 5♂♂1♀, Asamushi, Aomori-shi, June 13, 1983, coll. Noboru Nunomura; 5♂♂4♀♀, Asamushi, Aomori-shi, June 14, 1983, coll. Noboru Nunomura; 6♂♂6♀♀, Okunai, Aomori-shi, June 19, 1983, coll. Noboru Nunomura; 2♂♂2♀♀, Minmaya, Minmaya-mura, June 19, 1983, coll. Noboru Nunomura; 4♂♂3♀♀, Futatsu-ishi,

Imabetsu-machi, June 19, 1983, coll. Noboru Nunomura; 7♀♀, Moura, Hiranai-machi, June 14, 1983, coll. Noboru Nunomura; 3♂♂ Kanayazawa, Mutsu-shi, Sep. 30, 1974, coll. Noboru Nunomura; 1♂5♀♀, Okunai, Aomori-shi, June 19, 1983, coll. Noboru Nunomura. 1♂2♀♀, Amidagawa. Yomogida-mura, July 23, 1984, coll. Noboru Nunomura; 2♂♂, Kanita, Kanita-machi, July 23, 1984, coll. Noboru Nunomura; 3♂♂, Nonai, Aomori-shi, July 23, 1984, coll. Noboru Nunomura; 2♀♀, Arito, Noheji-machi, Sep. 30, coll. Noboru Nunomura; 2♂♂28♀♀, Asamushi, Aomori-shi, June 11, 1982, coll. Hiroshi Morino.

Family Armadillidae

***Armadilldium vulgare* (Latreille, 1804)**

(Japanese name: Oka-dangomushi)

Material examined: 1♂, Moura, Hiranai-machi, June 14, 1983, coll. Noboru Nunomura; 3♂♂2♀♀, Okunai, Aomori-shi, June 19, 1983, coll. Noboru Nunomura; 1♂ Asamushi, Aomori-shi, June 15, 1983, coll. Noboru Nunomura.

Family Tylidae

***Tylos granuriferus* Budde-Lund, 1885**

(Japanese name: Hama-dangomushi)

Material examined: 1 ex., Ajigasawa, date unknown, coll. Makoto Tsuchiya.

Discussion

A total of 28 species of isopod crustaceans, including 17 marine, 1 freshwater and 10 terrestrial species, were recorded from the coastal and terrestrial habitats of Aomori Prefecture, Northern Japan. The biogeographical aspects of isopod fauna of these areas studied are as follows.

1. The most dominant species in the intertidal marine isopod crustaceans collected from Aomori Prefecture are *Idotea ochotensis, Leptosphaeroma gottcshei* and *Gnorimosphareoma rayi*, the most dominant subtidal species is *Natatolana japonensis*.

2. *Idotea ochotensis* is considered to be colder elements but more typical cold water elements such as the genus *Tecticipes* is lacking. Other intertidal species are considered to be warmer elements.

3. As to the terrestrial species, both northern elements and southern elements are found. *Detonella japonica* and *Ligidium japonicum* are considered to be colder elements. But others are warmer elements and cosmopolitan foreign elements.

4. As to the number of individuals, *Porcellio scaber* is the most dominant in urban and agricultural areas. Whereas, *Ligidium japonicum* is the most dominant in natural forests. The both species are considered to be Northern elements, though the former is considered to be cosmopolitan.

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