

New nephropid and glypheid lobsters from the Mesozoic of Japan

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ABSTRACT

A new nephropid lobster, *Hoploparia kamimurai* new species is described from the Lower Cretaceous Ishido Formation (Barremian), Gunma Prefecture, central Japan. Two species of glypheid lobsters, *Glyphea yoshiakii* new species and *Glyphea* sp. were obtained from the Lower Cretaceous Arida Formation (Barremian), Wakayama Prefecture, southwest Japan and the uppermost Jurassic to lowermost Cretaceous Mitarai Formation (Tithonian–Berriasian), Gifu Prefecture, central Japan, respectively. These species are the first records of the fossil Glypheidae from Japan.

Key words: Crustacea, Decapoda, *Glyphea*, *Hoploparia*, Lower Cretaceous, Japan.

RESUMEN

Se describe una nueva langosta nefrópida, *Hoploparia kamimurai* especie nueva del Cretácico Inferior de la Formación Ishido (Barremiano), Prefectura de Gunma, Japón Central. Dos especies de langostas glyféidas, *Glyphea yoshiakii* especie nueva y *Glyphea* sp. fueron recolectadas en depósitos del Cretácico Inferior de la Formación Arida (Barremiano), Prefectura de Wakayama, Suroeste de Japón, y en depósitos del Jurásico más alto al Cretácico más inferior de la Formación Mitarai (Tithoniano–Berriasiano), Prefectura de Gifu, Japón Central, respectivamente. Estas especies constituyen los primeros registros fósiles de la Familia Glypheidae de Japón.

Palabras clave: Crustacea, Decapoda, *Glyphea*, *Hoploparia*, Cretácico Inferior, Japón.

INTRODUCTION

Although two new and one indeterminate species were described from the Upper Cretaceous of Japan during the last ten years (Karasawa, 1998; Karasawa and Hayakawa, 2000), occurrence of the genus *Hoploparia* from the Mesozoic of Japan is still rare. Recently, a nearly entire specimen of cephalothorax and abdomen attaching tail fan was discovered in the Lower Cretaceous (Barremian) Ishido Formation, Sanchu region, Gunma Prefecture by Mr. Hideo Kamimura. An additional specimen was obtained from the same area by Mr. Kiyohiko Ogai. On the basis of occurrences of such ammonites as *Pulchellia ishidoensis*, *Shasticrioceras* sp., aff. *S. patricki*, and *Barremites* (B.)

difficilis, the geologic age of the formation is considered to be the Barremian (Matsukawa, 1988; Toshimitsu and Hirano, 2000).

In contrast, the only known record of the Glypheoidea Zittel, 1885 in Japan has been "*Meyeria*" sp., reported from the Lower Cretaceous Ayukawa Formation (Valanginian), Ajishima Island, Miyagi Prefecture, northeast Japan (Koseki *et al.*, 1991). No detailed paper involving systematic description of the fossil has been published yet. The new species of *Glyphea yoshiakii* sp. nov. described herein was obtained from the muddy sandstone of the Arida Formation exposed at Suhara, Yuasa-cho, Wakayama Prefecture, by Mr. Kinichi Endo, where is the locality of "*Hoploparia*" sp. reported by Karasawa (2000). Occurrences of the

ammonites *Crioceratites (Paracrioceras) asiaticum* and *Shasticrioceras nipponicum* from this formation indicate a Barremian age (Matsukawa and Obata, 1993; Toshimitsu and Hirano, 2000).

A carapace of another species of the Glypheidae was obtained from the mudstone of the Mitarai Formation, exposed in Shokawa-cho, Takayama City, Gifu Prefecture, central Japan by Ms. Yukako Takahashi. Although the fossil preservation is not so good that the detailed characters are available, the specimen was identified as the genus *Glyphea* von Meyer, 1835. According to Sato *et al.* (2003), the geologic age of the Mitarai Formation is assignable to the Tithonian–Berriasian on the basis of the occurrence of the ammonite *Dellphinera* sp. cf. *D. obtusenodosa*.

The purpose of the present paper is to describe two new species of the genera *Hoploparia* and *Glyphea* from the Mesozoic of Japan. Type and examined specimens are stored in the Kanna Town Dinosaur Center (NDC: 51-2 Kagahara, Kanna-machi, Gunma 370-1602), Gunma Museum of Natural History (GMNH: 1674-1, Kamikuroiwa, Tomioka, Gunma 370-2345), Mizunami Fossil Museum (MFM: Gifu 509-6132) and the Shokawa Branch of Takayama Municipal Office (SACRA: 550 Arabuchi, Shokawa-cho, Takayama City, Gifu 501-5492).

SYSTEMATIC PALEONTOLOGY

Infraorder Astacidea Latreille, 1802
 Superfamily Nephropoidea Dana, 1852
 Family Nephropidae Dana, 1852
 Genus *Hoploparia* M'Coy, 1849

Hoploparia kamimurai new species

Figures 1.1, 1.5, 2

Diagnosis. Relatively small sized *Hoploparia* with less ornamented carapace; antero-ventrally extending postcervical groove, approaching cervical groove without remarkable ventral extension of branchiocardiac groove; antennal scale foliate, ovate.

Description. Carapace finely granulated; very weak median ridge behind rostral region. Rostrum moderately long, slender, approximately one-fourth length of carapace, deep median axial groove, laterally delimited by longitudinal carinae. Dentition of rostrum inconspicuous. Cephalic median carina short, weak. Longitudinally arranged supraorbital ridge strong, slightly projected anteriorly, slightly converging toward outer carina of rostrum.

Cervical groove relatively short, deep, slightly arcuate, extending forwardly and ventrally to join antennal groove. Antennal groove deep, clear. Hepatic groove relatively shallow, sinuous, extending posteriorly. Prominence omega demarcated by these grooves strongly swelling. Postcervical groove well defined, broad, deep, posteriorly arcuate, ex-

tending antero-ventrally, approaching to cervical groove without connection with hepatic groove. Urogastric groove recognizable. Very shallow branchiocardiac groove. Ventral extension of branchiocardiac groove absent.

Orbit rounded, demarcated inconspicuous rounded crest, deeply indented posteriorly. Antennal region with strong antennal ridge, truncated anteriorly. Antennal scale foliate, oval shape.

First abdominal somite the shortest. Second somite shorter than third to sixth. Tergum and pleuron of third abdominal somite the largest; pleuron anteriorly overlapped. Fourth to sixth somite slightly decreasing in size. Lateral margin of pleura rounded; pointed tip indiscernible. Telson broad, very weak median longitudinal ridge. Uneven surface in uropodal exopod.

Meri and carpi of unidentified pereopods slender, coarsely granulated.

Material examined. Holotype NDC P-0002 (carapace, abdomen, telson, uropod and pereopods), paratype GMNH-PI-1700 (carapace and abdomen).

Etymology. The trivial name is dedicated to Mr. Hideo Kamimura, who discovered and donated the holotype specimen together with other valuable fossil specimens from the formation.

Remarks. *Hoploparia kamimurai* new species resembles *H. collignoni* (van Straelen, 1949) from the Lower Cretaceous of Madagascar, *H. hemprichi* (Mertin, 1941) from the Upper Cretaceous of Germany, and *H. brittonensis* (Stenzel, 1945) from the Upper Cretaceous of Texas, in having the postcervical groove which approaches cervical groove obliquely without connection to the short hepatic groove via branchiocardiac groove, forming U-shape appearance. The present new species is similar to I and II in fig. 59 of Secretan (1964), in this respect. Tshudy and Sorhannus (2003) performed the cladistic analysis of the genus *Hoploparia* based mainly on the morphology of the carapace. *H. brittonensis* and *H. collignoni* are united by an unique character “ventral extension of branchiocardiac groove absent”. These two species, and *H. mesembria* Etheridge, 1917 from the Lower Cretaceous of Australia, show similar appearance in having short hepatic groove and branchiocardiac groove not connected to hepatic groove, were placed in a clade (Tshudy and Sorhannus, 2003). This same character appears in species of the genus *Homarus* Weber, 1795. Although not included in the analysis of Tshudy and Sorhannus (2003), *H. hemprichi* (Mertin, 1941) clearly shows same similitude. Despite resemblance in carapace grooves, *H. kamimurai* new species is clearly distinguished from the above cited species in having a less ornamented carapace, a relatively anteriorly projected antennal region, a proportionally shorter abdomen, and an oval-shaped antennal scale.

Two species described hitherto, *H. kamuy* Karasawa

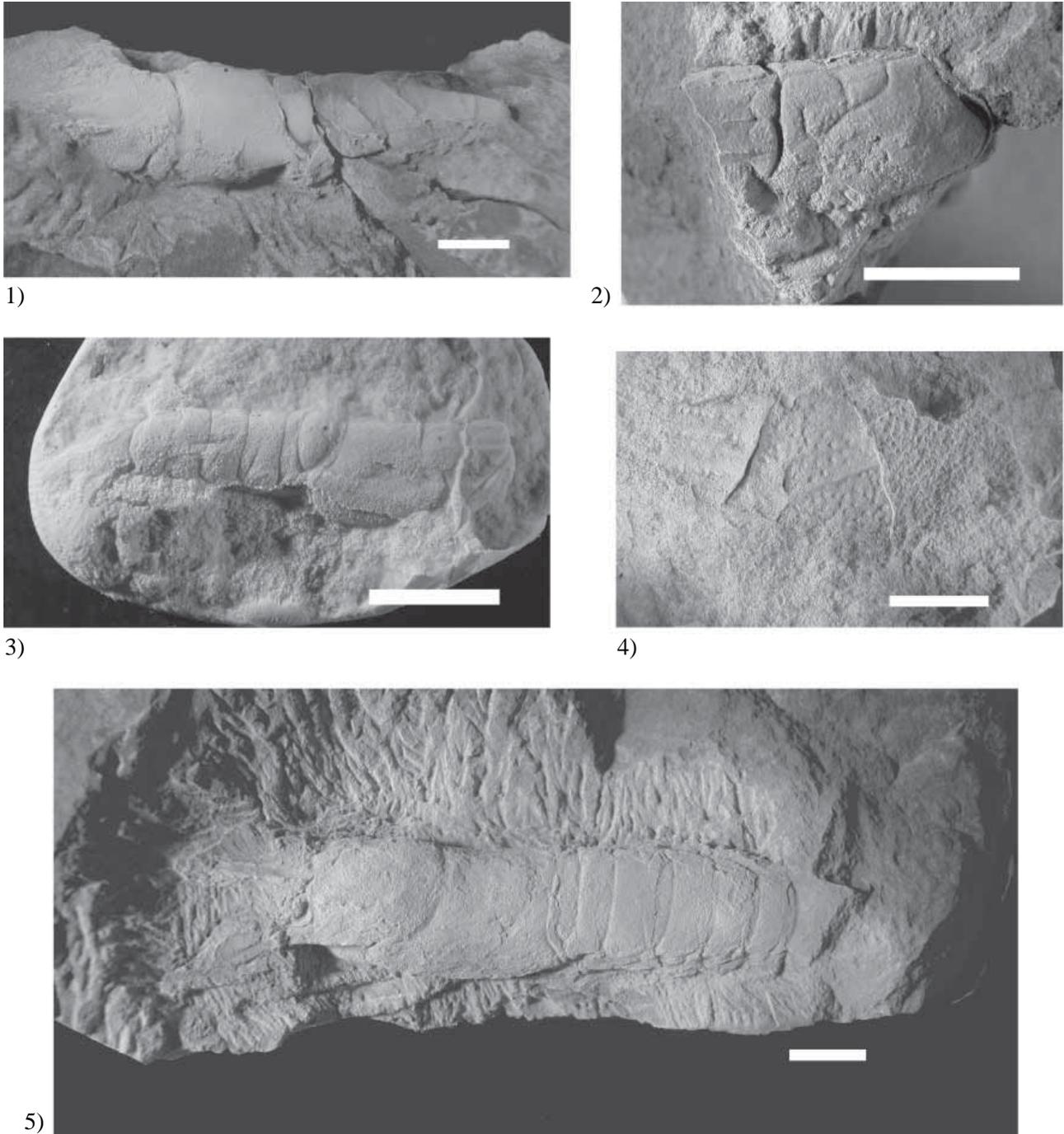


Figure 1. 1, 5: *Hoploparia kamimurai* new species; 1: Paratype, GMNH-PI-1700; 5: Holotype, NDC P-0002. 2, 3: *Glyphea yoshiakii* new species; 2: Holotype, MFM247019; 3: Paratype, MFM247111. 4: *Glyphea* sp. SACRApm-0011. Scale bars equals 5.0 mm.

and Hayakawa, 2000 from the Turonian of Hokkaido, northeast Japan and *H. miyamotoi* Karasawa, 1998 from the Maastrichtian of Awaji-shima, southwest Japan, less resemble the present new species than the above mentioned congeners.

Geologic age. Early Cretaceous (Barremian).

Occurrence. Road cut nearby Route 299, Sebayashi, Kannamachi, Tano-gun, Gunma Prefecture, Northeast Japan (Lat 36°4'20"N, Long 138°49'45"E). Sandy mudstone and fine grained sandstone of the Ishido Formation.

Measurements. (in mm) Holotype NDC P-0002, carapace length 43.7, abdomen length 25.2. Paratype GMNH-PI-

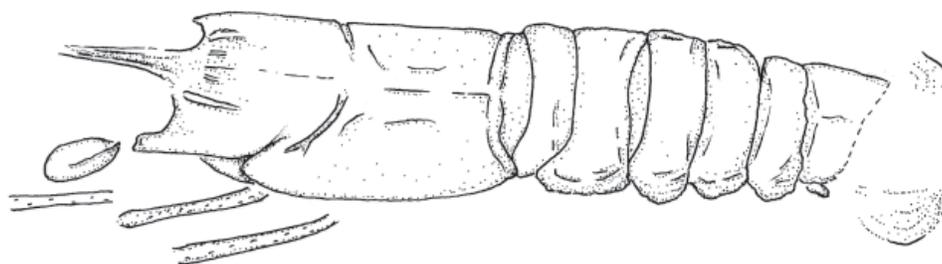


Figure 2. Line drawing of *Hoploparia kamimurai* new species.

1700, carapace length 24.2+, carapace width 10.7+, abdomen length 22.9+.

Infraorder Glypheidea Zittel, 1885
 Superfamily Glypheoidea Zittel, 1885
 Family Glypheidae Zittel, 1885
 Genus *Glyphea* Von Meyer, 1835

***Glyphea yoshiakii* new species**

Figures 1.2, 1.3; 3

Hoploparia sp., Karasawa, 2000, p. 235-236, figs. 1-1, 2.

Diagnosis. Small sized *Glyphea* with less ornamented carapace. Cervical groove steeply inclined. Postcervical groove extremely short.

Description. Carapace cylindrical. Cephalic region tapering anteriorly. Dorsal margin nearly straight; ventral thoracic margin gently convex with its greatest width at midlength. Tip of rostrum broken. Sculpture of cephalothorax partially unclear. Four longitudinal carinae arranged vertically in cephalic region; upper two carinae sharp, but poorly preserved; third one gently elevated; lowermost (antennal) beaded, strongest. Sinuous gastro-orbital groove short, extending vertically, branching posteriorly near posterior end of second carina. Cervical groove deep, steeply inclined from dorsal midline. Postcervical groove extremely short, becoming shallower posteriorly, join branchiocardiac groove. Branchiocardiac groove deep, clear; dorsally inclined steep angle, strongly curving forward at about posterior quarter of its length, extending anteriorly at low angle. Hepatic groove short, deepening posteriorly. Antennal and inferior grooves inconspicuous.

Region between cervical and branchiocardiac grooves broad. A deep and broad transverse groove from dorsal midline cross postcervical groove extending ventrally, join branchiocardiac groove. Region between this vertical groove, branchiocardiac groove and dorsal midline form small triangular area. Hepatic lobe swelling. Branchial region moderately broad, partially covered with coarse granules.

Abdominal somites 1–6 smooth. Somite 1 pleuron with posteroventally directed spine at posteroventral angle. Somite 2 pleuron subrectangular; ventral margin gently convex; anteroventral corner rounded; posteroventral corner with posteroventrally directed spine; posterior margin gently concave; surface with marginal furrows joining transverse furrow on anterior part of tergum. Pleura of somites 3 and 4 with sharp posteroventral corners; surface with shallow, broad marginal furrow along posterior margin. Pleuron of somite 6 reduced.

Material examined. Holotype: MFM247019 (carapace), paratype: MFM247111 (carapace and abdomen).

Etymology. The trivial name is dedicated to Mr. Yoshiaki Mizuno, who discovered the paratype specimen and has made large contribution to the paleontology of Mesozoic of Japan. His investigation has supported our research for long time.

Remarks. Most recently, Feldmann and Saint Laurent (2002) described a new species of *Glyphea* from the Cretaceous of Australia and enumerated 29 fossil species within the genus. In addition to its obvious small size, *Glyphea yoshiakii* new species is clearly distinguished from its congeners given in Feldmann and Saint Laurent (2002). The present new species most resembles the type species *G. regleyanus* Desmarest, 1822 and *G. munsteri* (Voltz, 1835) from the Upper Jurassic of Europe in the arrangement of carapace grooves. However, *Glyphea yoshiakii* is distinguished from these species in having a shorter carapace, more sinuous branchiocardiac groove, a steeply inclined cervical groove

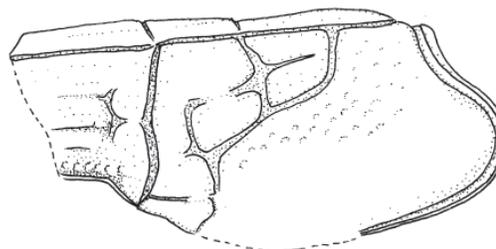


Figure 3. Line drawing of *Glyphea yoshiakii* new species.

and a narrower area between the gastro-orbital and cervical grooves. Although *Glyphea yoshiakii* also resembles *G. carteri* Bell, 1863 from the Lower Cretaceous of England in having a longitudinal groove across the postcervical groove, the new species is apparently distinguishable because the branchiocardiac groove of *G. carteri* is more sinuous and not smooth.

Based on a specimen which has a poorly preserved carapace and relatively well preserved abdomen, Karasawa (2000) described *Hoploparia* sp. from the same locality of the holotype specimen of the present new species. However, examination of an additional specimen and re-examination of Karasawa's (2000) specimen lead to the conclusion that *Hoploparia* sp. in Karasawa (2000) should be identified as *Glyphea yoshiakii*.

Geologic age. Early Cretaceous (Barremian).

Occurrence. Outcrop at Suhara, Yuasa-cho, Arida-gun, Wakayama Prefecture (Lat 34°2'23"N, Long 135°10'38"E). Arida Formation. Same as locality 2 of Komatsu (1999).

Measurements. (in mm) Holotype MFM247019, carapace length 22.0, carapace depth 9.8. Paratype MFM247111, carapace length 16.2+, carapace depth 8.7+, abdomen length 14.7+.

Glyphea sp.

Figure 1.4

Description. Carapace cylindrical. Cephalic region poorly preserved. Three longitudinal carinae with rows of coarse granules. Uppermost carina weaker than other two. Middle one with larger granules. Lowermost (antennal) carina most elevated. Cervical groove deep. Hepatic region beyond hepatic groove bilobate. Cardiac and branchial regions covered with coarse granules. Postcervical and branchiocardiac grooves long, weakly converging dorsally.

Material examined. SACRApm-0011 (carapace).

Remarks. *Glyphea* sp. most resembles *G. georgiensis* Taylor, 1979 from the Lower Cretaceous (Neocomian) of Antarctica in the shape of the hepatic groove and dorso-posterior linearly extended postcervical and branchiocardiac grooves. Some other species such as *G. oculata* Woods, 1957 from the Albian of Australia also resembles our specimen in having linearly elongated postcervical and branchiocardiac grooves. However, it should be noted that the present species has also similarities to species of *Trachysoma* Bell, 1858. Owing to its poor preservation, precise comparison should await for the discovery of additional material.

Geologic age. Latest Jurassic to Early Cretaceous (Tithonian–Berriasian).

Occurrence. Deserted quarry along Route 156, Mitarai, Shokawa-cho, Takayama City, Gifu Prefecture (Lat 36°1'30"N, Long 136°55'43"E). Mudstone of Mitarai Formation (Mitarashi Formation in original spelling), Tetori Group.

Measurements. (in mm) SACRApm-0011, carapace length 33.4+.

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