A new member of the Family Prosopidae (Crustacea: Decapoda: Brachyura) from the Lower Cretaceous of Japan

Hiroaki Karasawa[1, *], Hisayoshi Kato[2], and Kazunobu Terabe[3]

[1] *Mizunami Fossil Museum, Yamanouchi, Akeyo, Mizunami, Gifu 509-6132, Japan.*
[2] *Natural History Museum and Institute, Chiba, Aoba, Chiba 260-8682, Japan.*
[3] *Department of Geology, Faculty of Science, Niigata University, Niigata 950-2181, Japan.*
** GHA06103@nifty.com*

ABSTRACT

A new genus and species (Decapoda: Brachyura: Prosopidae) is described from the lower Cretaceous Sebayashi Formation of Gunma Prefecture, Japan. It represents the second and oldest record of the Family Prosopidae from the North Pacific realm. A checklist of all known species of the Mesozoic Decapoda from Japan is included.

Key words: Crustacea, Decapoda, Brachyura, Prosopidae, Cretaceous, Japan.

RESUMEN

Un nuevo género y nueva especie (Decapoda: Brachyura: Prosopidae) es descrito del Cretácico Inferior de la Formación Sebayashi, Perfectura de Gunma, Japón. Representa el segundo y más antiguo registro de la Familia Prosopidae en el dominio del Pacífico Norte. Se incluye una lista de las especies conocidas de Decapoda mesozoicos de Japón.

Palabras clave: Crustacea, Decapoda, Brachyura, Prosopidae, Cretácico, Japón.

INTRODUCTION

The Prosopidae von Meyer, 1860, an extinct family within the Superfamily Homolodromioidea Alcock, 1899, comprises three subfamilies, Prosopinae von Meyer, 1860, Pithonotinae Glaessner, 1933, and Glaessneropsinae Patrulius, 1960. Besides the Danian occurrence of *Plagiophthalmus* Bell, 1863 (Segerberg, 1900), all genera are known from the Jurassic to Cretaceous (Müller *et al.*, 2000). Previously known members of the Prosopidae are mainly recorded from the Tethys realm (Müller *et al.*, 2000). The purpose of the present paper is to describe a new genus and new species of a prosopid from the Lower Cretaceous of Japan. In addition, a checklist of all known species of the Mesozoic Decapoda from Japan is presented (see Table 1).

The specimens were collected from the sandstone portion of alternating sandstone and mudstone within the "Upper Member" of the Sebayashi Formation (Matsukawa, 1983) exposed at Sebayashi, Kanna-cho (Lat 36°4′1″N, Long 138°50′20″E), Gunma Prefecture. Matsukawa (1983) indicated, based upon mollusks, that the geologic age of the Sebayashi Formation is upper Barremian–Aptian. The Decapoda-bearing sandstone yields an ammonite fauna containing *Barremites* sp. and *Pseudohaploceras* sp., which is similar to the Barremian fauna reported by Matsukawa (1983).

The specimens are housed in the Gunma Museum of Natural History (GMNH), Tomioka, Gunma 370-2345, Japan, and the Mizunami Fossil Museum (MFM).

SYSTEMATIC PALEONTOLOGY

Family Prosopidae von Meyer, 1860
Subfamily Prosopinae von Meyer, 1860
Genus *Nipponopon* new genus

Diagnosis. As for the species.

Etymology. A contraction of Nippon and *Prosopon*.

Geologic range. Early Cretaceous (Barremian).

Discussion. The present new genus may be most similar to *Rathbunopon* Stenzel, 1945, among the known prosopine genera, but differs in that the carapace is slightly wider than long and triangular in outline, the protogastric region bears three pointed tubercles, the cervical groove is complete and deep, and the urogastric region is weakly bilobed and is not ornamented with two transverse ridges. Members of the Pithonotinae have usually smooth dorsal carapace and complete lateral margins; therefore, *Nipponopon* is readily distinguished from them. *Nipponopon* also differs from *Glaessneropsis* Patrulius, 1960, a sole included genus of the Glaessneropsinae by lacking a wide, crown-shaped rostrum and strong orbital spines, both of which are diagnostic characters of the Glaessneropsinae.

The Prosopidae has been well known from the Jurassic and Cretaceous of the Tethys realm (Müller *et al.,* 2000). Prosopids occurring outside the Tethys realm have been *Ekalakia lamberti* Bishop, 1976, *Plagiophthalmus bjorki* Bishop and Williams, 2000, and *Rugafarius fredrichi* Bishop, 1985, from the Campanian of the Western Interior, USA, *Oonoton woodi* Glaessner, 1980, from the Albian of Australia, *Pithonoton inflatum* Collins and Karasawa, 1993, from the Upper Cretaceous of Hokkaido, *Plagiophthalmus collinsi* Feldmann, Tshudy and Thomson, 1993, from the Campanian of Antarctica, and *Rathbunopon polyakron* Stenzel, 1945, from the Cenomanian of the Western Interior, USA. Thus, *Nipponopon* is the second record of the Prosopidae from the North Pacific realm and recognition of the genus extends the geologic range for the family known from the North Pacific rim back to the early Cretaceous.

Nipponopon hasegawai new species

Figures 1a-c, 2a- c

Diagnosis. Moderated-sized prosopid. Carapace slightly wider than long, widest at posterior fifth, strongly vaulted. Rostrum short, triangular, steeply downturned, with deep median sulcus. Upper orbital margin with two weak fissures; inner orbital margin projecting beyond upper orbital margin. Lateral margin strongly divergent posteriorly with short epibranchial spine. Dorsal regions well defined. Epigastric tubercles present. Mesogastric region inflated with three tubercles. Protogastric region with three pointed tubercles. Cervical and branchiocardiac grooves deep, broad. Urogastric region divided into two by shallow median depression. Cardiac region pentagonal, strongly ridged. Mesobranchial and metabranchial regions confluent, strongly tumid.

Description. Moderated-sized prosopid. Carapace slightly wider than long, widest at posterior fifth, strongly vaulted transversely and longitudinally. Frontorbital margin about two-thirds of carapace width. Frontal margin steeply downturned; rostrum short, triangular in outline. Orbits transversely oval, directed anterolaterally; upper margin with two weak orbital notches; inner margin projecting beyond upper margin. Lateral margin strongly divergent posteriorly, not defined as sharp edges, with reentrants at cervical and branchiocardiac grooves; epibranchial spine present, short, directed laterally; posterolateral corners smoothly rounded. Posterior margin short, gently convex.

Dorsal regions well defined. Frontal region with deep median sulcus. Epigastric tubercles well defined, directed anteriorly. Mesogastric region inflated, triangular, bearing three tubercles in an inverted triangle. Protogastric region surmounted by three pointed tubercles situated at anterodistal, proximomedial, and posterodistal areas. Cervical

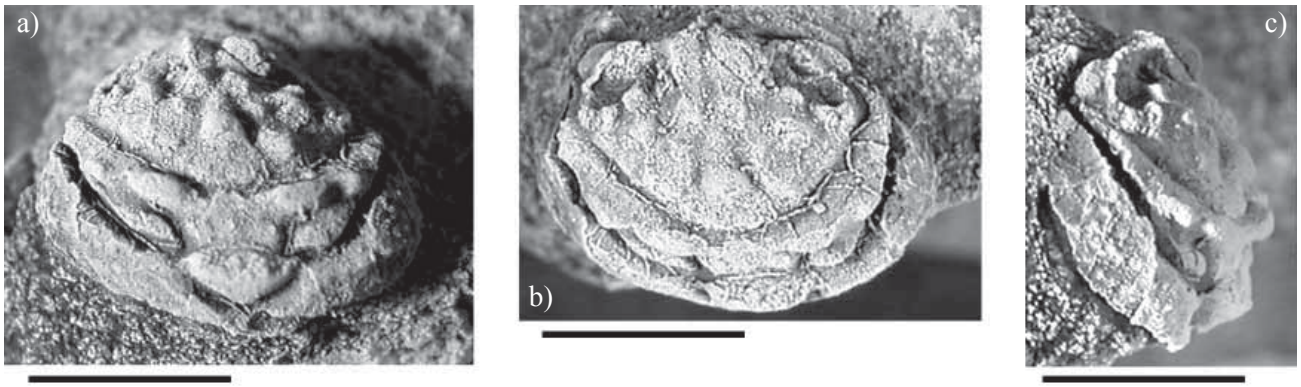

Figure 1. *Nipponopon hasegawai* new genus, new species. Holotype GMNH-PI-1701. a: dorsal view; b: frontal view; c: lateral view. Scale bars: 5 mm.

Table 1. Checklist of species of Decapoda known from the Mesozoic deposits of Japan, with the geologic range and original generic status. A total of 26 species is known from the Mesozoic deposits of Japan.

Infraorder	Section	Subsection	Superfamily	Family	Genus	Species [Age]
Polychelida Wood-Mason, 1874			Eryonoidea de Haan, 1941	Coleiidae Van Straelen, 1924	*Coleia* Broderip, 1835	*Coleia uzume* Karasawa, Takahashi, Doi, and Ishida, 2003 [Carnian, Late Triassic]
Achelata Scholtz and Richter, 1995			Palinuroidea Latreille, 1802	Palinuridae Latreille, 1802	*Linuparus* White, 1847	*Linuparus japonicus* Nagao, 1931 [Turonian-Maastrichtian, Late Cretaceous]
Glypheidea Zittel, 1885			Glypheoidea Zittel, 1885	Glypheidae Zittel, 1885	*Glyphea* von Meyer, 1835	*Glyphea yoshiakii* Kato and Karasawa, 2006, as *Hoploparia* sp. (Karasawa, 2000) [Barremian, Early Cretaceous] *Glyphea* sp., Kato and Karasawa, 2006 [Tithonian - Berriasian, Late Jurassic - Early Cretaceous]
				Mecochiridae Van Straelen, 1924	*Meyeria* M'Coy, 1849	"*Meyeria*" sp., Koseki *et al.*, 1991 [Valanginian, early Cretaceous]
Astacidea Latreille, 1802			Uncinoidea Beurlen, 1928	Uncinidae Beurlen, 1928	*Uncina* Quenstedt, 1851	*Uncina pacifica* Schweigert, Garassino, Hall, Hauff, and Karasawa, 2003 [Thoarcian, Early Jurassic]
			Nephropoidea Dana, 1852	Chilenonephroberidae Tshudy and Babcock, 1997	*Tillocheles* Woods, 1957	*Tillocheles kaoriae* Yokoi and Karasawa, 2000 [Cenomanian-Turonian, Late Cretaceous]
				Nephropidae Dana, 1852	*Hoploparia* M'Coy, 1849	*Hoploparia kamuy* Karasawa and Hayakawa, 2000 [Turonian-Santonian, Late Cretaceous] *Hoploparia kamimurai* Kato and Karasawa, 2006 [Barremian, Early Cretaceous] *Hoploparia miyamotoi* Karasawa, 1998 [Maastrichtian, Late Cretaceous]
Thalassinidea Latreille, 1831			Axioidea Huxley, 1879	Micheleidae Sakai, 1992	*Paki* Karasawa and Hayakawa, 2000	*Paki rurkonsimpu* Karasawa and Hayakawa, 2000 [Campanian, Late Cretaceous]
			Callianassoidea Dana, 1852	Callianassidae Dana, 1852	*Callianassa* Leach, 1814	*Callianassa ezoensis* Nagao, 1932 [Campanian-Maastrichtian, Late Cretaceous] "*Callianassa*" (s.l.) *masanorii* Karasawa, 1998 [Maastrichtian, Late Cretaceous] *Callianassa* (s. l.) *sakakuraorum* Karasawa, 2000 [Barremian, Early Cretaceous]
Anomala Boas, 1880			Galatheoidea Samouelle, 1819	Galatheidae Samouelle, 1819	*Eomunidopsis* Via Boada, 1981	*Eomunidopsis kojimai* Karasawa and Hayakawa, 2000 [Santonian, Late Cretaceous]
					Luisogalathea Karasawa and Hayakawa, 2000	*Luisogalathea tomitai* Karasawa and Hayakawa, 2000 [Santonian, Late Cretaceous]
					Paragalathea Patrulius, 1960	*Paragalathea miyakoensis* Takeda and Fujiyama, 1983 [Late Aptian, Early Cretaceous]

Table 1. (Continued)

Infraorder	Section	Subsection	Superfamily	Family	Genus	Species [Age]
Brachyura Latreille, 1802	Podotremata Guinot, 1977	Dromiacea de Haan, 1833	Homolodromioidea Alcock, 1899	Prosopidae von Meyer, 1860	*Nipponopon* new genus	*Nipponopon hasegawai* new species [Barremian, Early Cretaceous]
					Pithonoton von Meyer, 1842	*Pithonoton inflatum* Collins and Karasawa, 1993 [Turonian-Campanian, Late Cretaceous]
			Dromioidea de Haan, 1833	Dynomenidae Ortmann, 1892	*Diaulax* Bell, 1863	*Diaulax yokoii* Collins, Kanie, and Karasawa, 1993 [Santonian, Late Cretaceous]
		Homolidea de Haan, 1839	Homolidea de Haan, 1839	Homolidae de Haan, 1839	*Homolopsis* Bell, 1863	*Homolopsis hachiyai* Takeda and Fujiyama, 1983 [Late Aptian, Early Cretaceous]
					Hoplitocarcinus Beurlen, 1928	*Hoplitocarcinus brevis* (Collins, Kanie, and Karasawa, 1993) as *Metahomola* Collins and Rasmussen, 1992 [Turonian-Santonian, Late Cretaceous]
		Archaeobrachyura Guinot, 1977	Raninoidea de Haan, 1841	Raninidae de Haan, 1841	*Eucorystes* Bell, 1863	*Eucorystes intermedius* Nagao, 1931 as *Notopocorystes* (*Eucorystes*) Bell, 1863 [Cenomanian-Turonian, Late Cretaceous]
					Notopocorystes Bell, 1863	*Notopocorystes japonicus* (Jimbô, 1894) as *Eucorystes* [Turonian-Coniacian, Late Cretaceous]
			incertae sedis	Necrocarcinidae Förster, 1968	*Necrocarcinus* Bell, 1863	*Necrocarcinus undecimtuberculatus* Takeda and Fujiyama, 1983 [Late Aptian, Early Cretaceous]
	Heterotremata Guinot, 1977		Dorippoidea MacLeay, 1838	Dorippidae MacLeay, 1838	*Eodorippe* Glaessner, 1980	*Eodorippe binodosa* Collins, Kanie, and Karasawa, 1993 [Cenomanian, Late Cretaceous]
			Retroplumoidea Gill, 1894	Retroplumidae Gill, 1894	*Archaeopus* Rathbun, 1908	*Archaeopus ezoensis* (Nagao, 1941) as *Plagiolophus* Bell, 1858 [Campanian-Maastrichtian, Late Cretaceous]

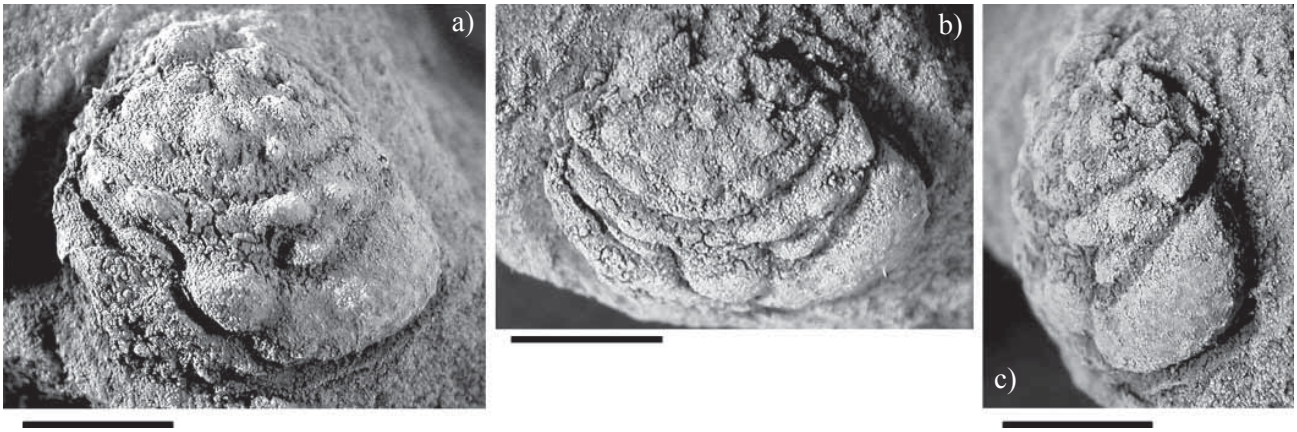

Figure 2. *Nipponopon hasegawai* new genus, new species. Paratype MFM247019. a: dorsal view; b: frontal view; c: lateral view. Scale bars: 5 mm.

groove well defined, deep, broad, concave. Urogastric region divided by shallow median depression into two inflated lobes, separated from epibranchial regions by deep grooves. Cardiac region pentagonal, strongly convex. Branchiocardiac groove deep, broad, joining cervical groove near ventral margin. Mesobranchial and metabranchial regions confluent, strongly tumid, finely granulated.

Material examined. Holotype GMNH-PI-1701 and paratype MFM247019 collected by K. Terabe.

Etymology. The specific name honors Y. Hasegawa, the Director of the Gunma Museum of Natural History, who has added so much to the understanding of fossil vertebrates in Japan.

Occurrence. "Upper Member" of the Sebayashi Formation (Barremian; Lower Cretaceous); Sebayashi, Kanna-cho (Lat 36°4′1″N, Long 138°50′20″E), Gunma Prefecture, Japan.

Discussion. see genus.

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