

## Three Decapod Crustaceans from the Lower Cretaceous Miyako Group, Northern Japan

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### Introduction

Several small decapod fossils were found from the Lower Cretaceous Miyako Group by Mr. Kiichiro HACHIYA. They represent three new species as described below, and this is the first record of Early Cretaceous fossil decapods in Japan. The authors express the cordial thanks to the collector, Mr. HACHIYA, who offered these fossil materials to the authors for study, and to Dr. Ikuwo OBATA of our museum who gave us useful information on the biostratigraphy of the Miyako Group.

### Occurrence and Geological Setting

All of the present specimens were found in a fine-grained calcareous sandstone cobble at Tokuzo, northern shore of the small cape southeast of Hiraiga, Tanohatamura, Iwate Prefecture. Judging from the occurrence, its lithological appearance and associated fossils, it obviously belongs to the lower part of the Hiraiga Formation of the Miyako Group.

The Miyako Group, a representative of Lower Cretaceous sediments in Japan, is scatteringly distributed along the coast of Sanriku District, northern Japan, and bears rich marine fossils such as ammonites, molluscs, corals, echinoids, and foraminifers.

The biostratigraphical and paleontological studies have been carried on by HANAI, OBATA and HAYAMI (1968) and others, though the detailed geological map of this area has not yet been published.

The Hiraiga Formation, containing crustacean fossils, lies at the upper part of the Miyako Group. The present crustacean fossils were associated with ammonites such as *Hypacanthoplites subcornuerianus* and molluscs such as *Anthonya subcantiana*. The former ammonite species represents the lower half of the Hiraiga Formation and is assigned to the upper Upper Aptian in age. The latter bivalve has been recorded from

the same locality by HAYAMI (1966).

### Description

Family Galatheidae

Genus *Paragalathea* PATRULIUS, 1960

*Paragalathea miyakoensis* sp. nov.

(Fig. 1; Pl. 1, fig. 3)

*Material examined.* One specimen (holotype, kept at the National Science Museum, Tokyo, NSM-PA12225), found in a fine grey calcareous sandstone block of the lower part of the Hiraiga Formation, the Miyako Group, at Tokuzo, Hiraiga, Tanohata-mura, Iwate Prefecture. Upper part of Upper Aptian, Lower Cretaceous. Breadth of carapace ca. 5.5 mm; length of carapace ca. 6 mm. Rostral part is broken off, and a large part of right branchial region is embedded in hard matrix.

*Description of holotype.* Contour of carapace oblong, slightly widening posteriorly; carapace strongly convex from side to side, especially so on gastric region, with a strong linear cervical groove; surfaces in front of and behind cardiac region flattened or rather depressed; entire surface covered with many transverse striae which are short, shallow and make the scaly appearance; gastric region with stronger, more or less granulated striae; epibranchial region distinctly separated from main part of branchial region by a transverse furrow developed as a lateral branch of cervical groove; lateral margin of branchial region with strong oblique striae.

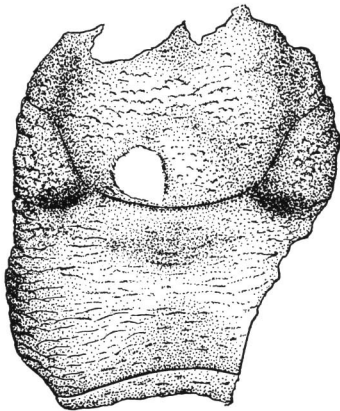


Fig. 1. *Paragalathea miyakoensis* sp. nov., holotype, NSM-PA12225.  $\times 9$

*Remarks.* Very unfortunately the holotype is quite imperfect in having no rostral part, and thus the inclusion to *Paragalathea* is rather tentative. According to the recent contribution on the Galatheidae by VIA BOADA (1982), however, there seems to be almost no doubt about the generic status of the Japanese species because of the close similarity to *P. ruizi* (VAN STRAELEN) in the general shape of the carapace and its dorsal ornamentation. The new species is distinguished from the Spanish species from the

Cenomanian limestones of the Orobe Mountain by the feeble and short striae on the dorsal surface and the distinctly trapezoid gastric region, the posterior margin of which is almost transverse.

The genus *Paragalathea* ranges from Tithonian (uppermost Jurassic) to Cenomanian (lowermost of Upper Cretaceous), according to VIA BOADA (1982). The discovery of *Paragalathea* from Japan extends its geographic distribution from Europe to East Asia.

Family Homolidae  
Genus *Homolopsis* BELL, 1863  
*Homolopsis hachiyai* sp. nov.

(Fig. 2; Pl. 1, fig. 4; Pl. 2, figs. 5–8)

*Material examined.* Six specimens embedded in the same sandstone block as the previous species found at Tokuzo, Tanohata-mura, Iwate Prefecture. Upper part of the Hiraiga Formation of the Miyako Group, referred to the upper Upper Aptian. The holotype (NSM-PA12226) and three paratypes (Paratypes C (NSM-PA12227), D (PA12224a) and E (PA12224b)) are deposited in the National Science Museum, Tokyo. Of them two paratypes (D and E) are embedded in the same piece as the holotype of *Necrocarcinus undecimtuberculatus* sp. nov. which is described in the following lines of this paper. Remaining two paratypes (A and B) are kept in the HACHIYA's Fossil Collection. All the specimens are represented only by the dorsal surface of the carapace without the lateral part outside the *linea homolica*. The length and breadth of the carapace are about 7 and 5 mm, respectively, in the holotype, and all the other specimens are almost same size as the holotype.

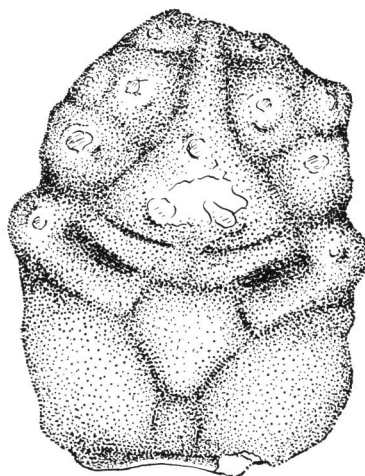


Fig. 2. *Homolopsis hachiyai* sp. nov., holotype, NSM-PA12226.  $\times 9$

*General description.* Carapace longitudinally subquadrate in its contour, with convex sides; dorsal surface well divided into convex areolae by very deep and wide

furrows; epigastric region rather large, with a tubercle at its posterior end; protogastric and hepatic regions convex together, with an oblique furrow much shallower than other interregional furrows, having each a strong tubercle; mesogastric region very large, with its main part distinctly triangular; forward projection of mesogastric region forms a narrow ridge and extending almost to anterior end of epigastric region; main part of mesogastric region tripartite and has a prominent tubercle on each part; urogastric region short, wide and more or less ridged, without distinct tubercle; cardiac region convex and rather pentagonal, rapidly narrowing posteriorly; intestinal region weakly demarcated; epibranchial region prominently convex, having a strong tubercle; mesobranchial region also armed with a strong tubercle, its posterior part being extended inward obliquely toward anterolateral part of cardiac region; metabranchial region evenly convex and covered with minute, more or less scaly granules.

*Notes on holotype.* The dorsal surface is exposed for its most part, and the areolae well traceable. The tubercles on the areolae are, however, broken off and almost worn out except for those on the epibranchial and mesobranchial regions, which are truncated, but rather sharp.

*Notes on paratypes.* In the paratype A the mesogastric region and the posterior half of the carapace are exposed. The carapace is rather flattened as a whole, with worn out mesogastric tubercles, though the interregional furrows are deep. The paratype B may be supplementary to the holotype. The dorsal surface is exposed for its most part, and the posterior two tubercles on the mesogastric region are well preserved. The areolae are strongly convex, but the tubercles are mostly indicated by the vestiges. The paratype C is embedded in the small piece of rock. The dorsal surface is exposed for its most part, but the frontal and protogastric region are imperfect; the posterior two tubercles of the mesogastric region and epibranchial tubercle are sharp. In the paratype D the main part of the carapace is exposed; tubercles are also broken off except for the posterior right one of three mesogastric tubercles; the cardiac region is strongly convex. The paratype E is rather imperfect, with the right half exposed; branchial region is covered with small, obtuse granules, some of which are united to form a transverse short rows and make a more or less scaly appearance.

*Remarks.* The new species is very close to *Homolopsis brightoni* WRIGHT et COLLINS from the English Cretaceous, the Cenomanian to the Lower Albian, but distinguished from it by the more strongly convex areolae which are separated from each other by the wider and deeper furrows, the presence of one tubercle each on the protogastric and hepatic regions, and the inner extension of the mesobranchial region with its anterior part deeply excavated. In all the specimens examined three mesogastric tubercles are always distinct and probably conical with a sharp tip as seen in some specimens.

WRIGHT and COLLINS (1972) attributed ten fossil species from Europe, U.S.A. and Australia to the genus *Homolopsis*, ranging from Hauterivian (lower Lower Cretaceous) to Danian (lowermost of Paleocene).

## Family Calappidae

Genus *Necrocarcinus* BELL, 1863*Necrocarcinus undecimtuberculatus* sp. nov.

(Fig. 3; Pl. 1, figs. 1, 2)

*Material examined.* One specimen (holotype, kept at the National Science Museum, Tokyo, NSM-PA12223) found in the same sandstone block as the previous two species, the counterpart is stored in the HACHIYA's Fossil Collection.

Breadth of carapace ca. 13 mm; length of carapace ca. 11 mm. Carapace is somewhat distorted toward right side, and anterolateral margins of both sides and frontorbital margin are entirely embedded in hard matrix.

*Description of holotype.* Contour of exposed surface of carapace pentagonal; dorsal surface separated into regions by deep and wide furrows, being provided with eleven tubercles which are truncated in various degree; each protogastric region with two tubercles side by side, each branchial region with three in a longitudinal line, and cardiac region with one; a minute subsidiary tubercle present on posterior slope of cardiac region; a tubercle at junction of antero- and posterolateral margins of carapace; posterolateral margin long and gently curved throughout; posterior margin narrow and deeply concave.

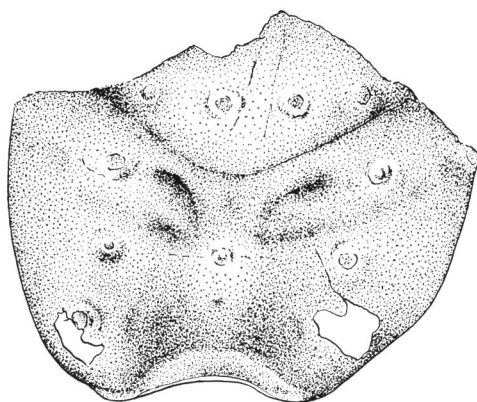


Fig. 3. *Necrocarcinus undecimtuberculatus* sp. nov., holotype, NSM-PA12223  $\times 4.7$

*Remarks.* Due to the excellent papers on the subfamily Necrocarcininae of the Calappidae by FÖRSTER (1968), and WRIGHT and COLLINS (1972), the Japanese species is apparently referred to *Necrocarcinus* or *Paranecrocarcinus*. Although some important characters are not exposed, the strong dorsal tubercles indicate the generic position in *Necrocarcinus* rather than *Paranecrocarcinus*.

The new species is distinguished from the known species of both genera, especially from *N. labeschii* (DESLONGSCHAMPS) from the Lower Cenomanian to the top of the Lower Albian of many localities in England and from the Cenomanian of Calvados and Seine-Inférieure in France, by having no tubercles on the mesogastric and urogastric regions.

The genus *Necrocarcinus* ranges from Upper Aptian to Eocene in age, according to WRIGHT and COLLINS (1972). The Japanese species of *Necrocarcinus* occurs from the *Hypacanthoplites subcornuerianus* Zone, and similarly in England *Necrocarcinus tricarinatus* BELL is found from the *Hypacanthoplites jacobii* Zone.

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### Explanation of Plates

#### Plate 1

- Fig. 1. *Necrocarcinus undecimtuberculatus* sp. nov. Counterpart of holotype, stored in HACHIYA'S Fossil Collection. × 5.
- Fig. 2. Ditto. Holotype, NSM-PA12223. × 5.
- Fig. 3. *Paragalathea miyakoensis* sp. nov. Holotype, NSM-PA12225. × 10.
- Fig. 4. *Homolopsis hachiyai* sp. nov. Paratype C, NSM-PA12227. × 10.

#### Plate 2

- Fig. 5. *Homolopsis hachiyai* sp. nov. Holotype, NSM-PA12226. × 10.
- Fig. 6. Ditto. Paratype A. In HACHIYA'S Fossil Collection. × 10.
- Fig. 7. Ditto. Paratype B. In HACHIYA'S Fossil Collection. × 10.
- Fig. 8. Ditto. Paratype D. NSM-PA12224a. × 10.

