

A new species of raninoidan crab (Decapoda: Brachyura) from the Cretaceous Goshoura Group, Kyushu, Japan

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Abstract

Joeranina goshourajimensis, a new species in the crab family Palaeocorystidae (Decapoda: Brachyura: Raninoida) is described from the Upper Albian Enokuchi Formation of the Goshoura Group on Goshoura-jima Island, Kyushu, Japan. The occurrence of *Joeranina goshourajimensis* extends the known geologic range of genus *Joeranina* from Japan back to the late Albian.

Key words: Decapoda, Raninoida, Palaeocorystidae, Japan, Cretaceous, Goshoura Group

Introduction

Palaeocorystidae Lœrenthey and Beurlen, 1929, is an extinct raninoidan family known from the Aptian–Maastrichtian of the Tethys, North Atlantic, Arctic, Gulf of Mexico, and North Pacific regions (Collins, 1996; van Bakel et al., 2012; Laque et al., 2012). As of 2012, Palaeocorystidae contained 37 species in four genera (van Bakel et al., 2012; Laque et al., 2012). Three species of palaeocorystids representing three genera were previously known from the Northwest Pacific region: *Eucorystes intermedius* Nagao, 1931, from the Cenomanian–Santonian Yezo Supergroup on Hokkaido (Collins et al., 1993; Karasawa et al., 2006); *Joeranina japonica* (Jimbô, 1894) from the Cenomanian–Santonian Yezo Supergroup on Hokkaido and the Campanian Toyajo Formation in Wakayama Prefecture (Collins et al., 1993; Karasawa et al., 2006; Karasawa and Ohara, 2011); and *Notopocorystes* (s.l.) *xizangensis* Wang, 1981, from the upper Lower Cretaceous Tackna Formation in Xizang, China (Wang, 1981).

In this paper we describe a new species of a palaeocorystid crab collected from the mid-Cretaceous Goshoura Group, Kyushu, Japan. This is the fourth palaeocorystid species reported from the Northwest Pacific.

Geological setting

The mid-Cretaceous Goshoura Group consists of non-

marine and shallow marine siliciclastics outcrops on Goshoura-jima Island, in the eastern part of the Amakusa Islands, Kyushu, Japan (Fig. 1). Detailed stratigraphy and depositional facies were reported by Komatsu (1999b) and Komatsu and Maeda (2005). Komatsu and Maeda (2005) divided the Goshoura Group into the Eboshi, Enokuchi, and Karakizaki formations in ascending order (Fig. 2). The non-marine and shallow marine Enokuchi Formation, subdivided into the Upper Albian Hokahira and the Lower Cenomanian Gannohana members, yields abundant bivalves and ammonoids. The Eboshi and Karakizaki formations are composed of non-marine sediments containing freshwater and brackish-water bivalves and gastropods (Komatsu, 1999c; Komatsu et al., 2007). The depositional environments of the Eboshi Formation were interpreted as an estuary with a bay-head delta, stagnant lagoon, and sandy mouth. The Enokuchi Formation, consisting mainly of inner shelf, shoreface, and tidal-flat sediments, is overlain by the fluvial and tidal-flat sediments of the Karakizaki Formation. Komatsu and Maeda (2005) and Komatsu et al. (2008) discussed in detail the relationships between these depositional environments and bivalve assemblages and habitats. The Hokahira Member contains a Late Albian ammonoid assemblage consisting of *Mortoniceras* cf. *rostratum*, *Mortoniceras* sp., and *Desmoceras* sp. (Locs. 1511, 1521 in Komatsu and Maeda, 2005).

The Goshoura Group yields rich non-marine and shallow

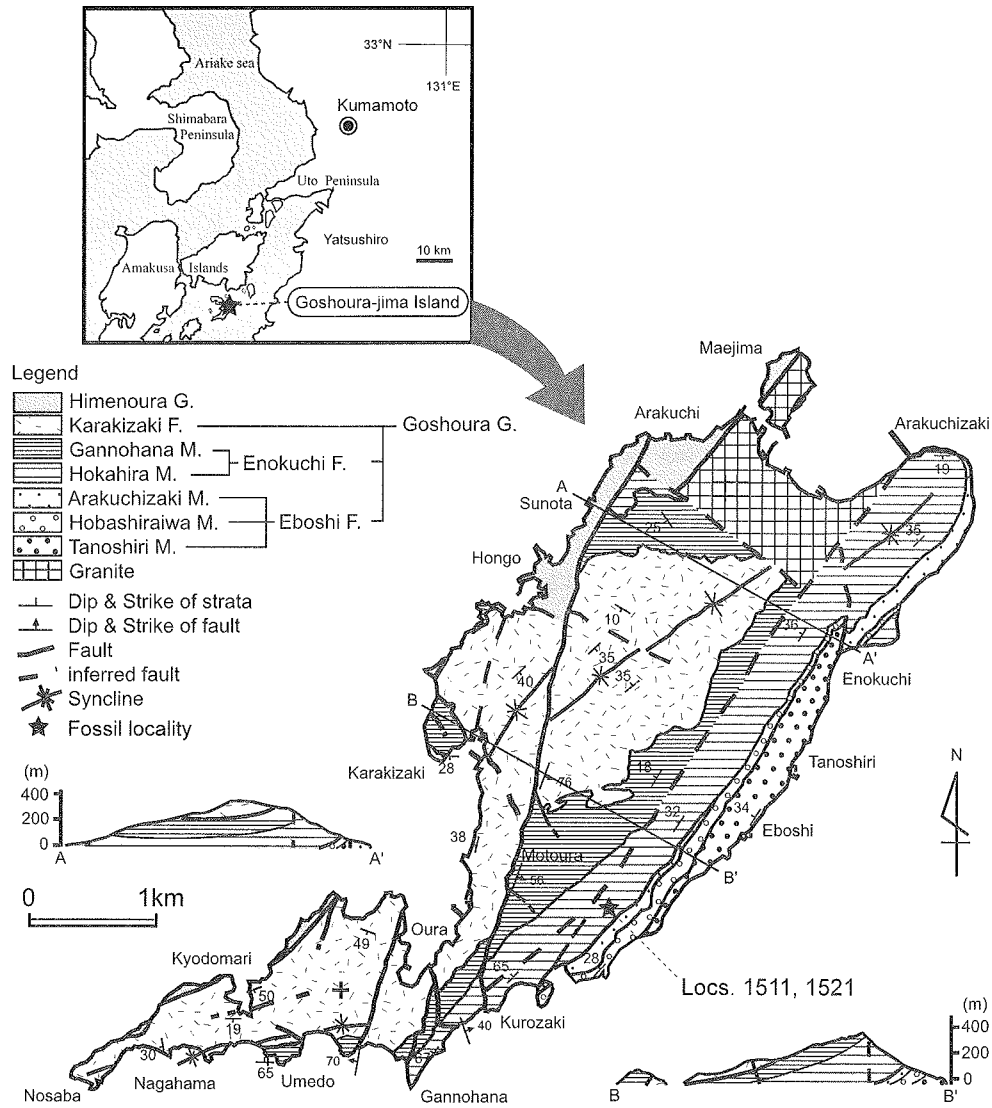


Fig. 1. Geological map of Goshoura Island showing fossil site (star).

marine fossils, including mollusks, brachiopods, bryozoans, reptiles, and others (i.e., Matsumoto, 1938; Matsumoto and Tashiro, 1975; Kikuchi et al., 2000; Komatsu and Maeda, 2005; Dick et al., 2013; Komatsu, 2013), but no decapod fossils had previously been recorded from the group. The specimen described herein was found in the Upper Albian Hokahira Member, Enokuchi Formation, in a block of inner-shelf muddy sandstone that came from Loc. 1511 to Loc. 1521 (Figs. 1, 2).

Systematic description

Superfamily Raninoidea de Haan, 1839, sensu Karasawa et al., 2011

Family Palaeocorystidae Lørenthey and Beurlen, 1929

Genus *Joeranina* Van Bakel, Guinot, Artal, Fraaije, and

Jagt, 2012

Joeranina goshourajimensis new species

Figs. 3, 4

Diagnosis. *Joeranina* with moderate-sized carapace. Carapace longitudinally ovate, width about 85% length. Carapace moderately vaulted transversely and longitudinally. Fronto-orbital margin wide, about 67% maximum width; upper orbital margin concave with two nearly closed fissures; inner orbital spine small, triangular; outer orbital tooth triangular. Anterolateral margins short, bearing two broad spines. Posterolateral margin smooth, gently convex. Posterior margin narrow, concave, about 45% maximum width. Dorsal surface generally smooth; anterior carapace regions weakly defined; mesogastric region with long anterior process, separated from protogastric regions by shallow, broad grooves; protogastric regions with small lateral protuberance; hepatic regions with small protuberance; cervical groove well defined, deep, sinuous; urogastic region separated from cardiac region by shallow, transverse groove; cardiac region bounded by relatively

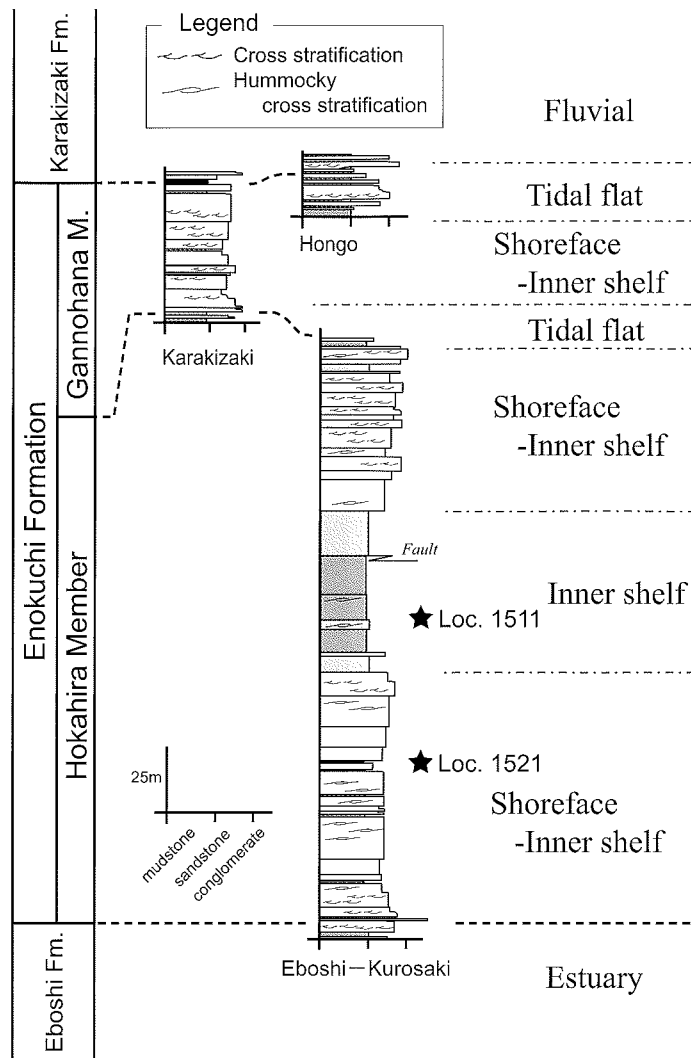


Fig. 2. Columnar stratigraphic sections showing depositional environments.

deep branchiocardiac groove; intestinal region not differentiated; branchial regions not well differentiated; epibranchial ridge weak, directed slightly posterolaterally from lateral side of urogastric region; remainder of region smooth.

Etymology. The trivial name notes the occurrence of the specimen in Goshoura-jima.

Description. Moderate-sized *Joeranina*. Carapace ovate, longer than wide, maximum width about 85% maximum length, maximum width as measured between 2nd anterolateral spines, about one-third the distance posteriorly on carapace. Carapace moderately vaulted transversely and longitudinally. Fronto-orbital margin wide, about 67% maximum width. Rostrum projected beyond orbits, but poorly preserved, details unknown. Upper orbital margin wide, width to maximum width equal to about 0.3, concave, with two nearly closed fissures; inner orbital spine small, triangular, directed

anterolaterally; outer orbital tooth triangular, directed anteriorly, longer than inner orbital spine. Anterolateral margins short with two broad spines; anterior spine directed slightly anterolaterally; posterior spine directed anterolaterally. Posterolateral margin long, smooth, rimmed, weakly convex. Posterior margin narrow, concave, about 45% maximum width. Dorsal surface generally smooth; anterior carapace regions weakly defined, trace of weak median ridge present; cuticle not preserved. Mesogastric region with long anterior process, widening and triangular posteriorly, separated from protogastric regions by shallow, broad grooves. Epigastric and protogastric regions confluent; protogastric regions with small lateral protuberance directed anteriorly. Hepatic regions with small protuberance directed anteriorly. Cervical groove well defined, deep, sinuous. Urogastric region separated from cardiac region by shallow, transverse groove. Cardiac



Fig. 3. *Joeranina goshourajimensis* new species.
Holotype (GCM-IVP3136), carapace, dorsal
view, scale bar=5 mm.



Fig. 4. *Joeranina goshourajimensis* new species.
Holotype (GCM-IVP3136), carapace, dorsal
view, scale bar=5 mm. Specimen coated with
ammonium chloride sublimate.
1, oblique frontal view; 2, dorsal view.

region bounded by relatively deep branchiocardiac groove. Intestinal region not differentiated. Branchial regions not well differentiated; Epibranchial ridge weak, directed slightly posterolaterally from lateral side of urogastric region; remainder of region smooth.

Discussion. Van Bakel et al. (2012) established the extinct genus *Joeranina* Van Bakel et al., 2012, within the family Palaeocorystidae and referred seven species from Albian–Campanian rocks of Europe, Greenland, North America, and Japan. Among these, the new species has resemblance to *Joeranina broderipii* (Mantell, 1844), a type species from the middle–upper Albian–?Cenomanian of Europe, *J. gaspari* Van Bakel et al., 2012, from the Albian of Spain, and *J. japonica* (Jimbô, 1894) from the Cenomanian–Campanian of Japan, and *J. platys* (Schweitzer and Feldmann, 2001) from the Albian of USA by the presence of two anterolateral spines. This species is easily distinguished from these four

species in that the anterolateral spines are short and broad, a well defined dorsal median carina is absent, and the anterior carapace regions are rather well defined. *Joeranina goshourajimensis* apparently differs from the other three species, *Joeranina harveyi* (Woodward, 1896), *J. paututensis* (Collins and Wienberg Rasmussen, 1992), and *Joeranina syriaca* (Withers, 1928) by the presence of only two spines on the anterolateral margin.

Joeranina japonica, a previously known Japanese species has been known from the Cenomanian–Santonian of Hokkaido (Collins et al., 1993) and the Campanian of Wakayama Prefecture (Karasawa and Ohara, 2011). Therefore, the discovery of this species represents the oldest record for the genus *Joeranina* from Japan.

Material examined. Holotype (GCM-IVP3136), deposited in the Goshoura Cretaceous Museum.

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