



Figure 5. 1, 3, *Portunites kattachiensis* sp. nov. 1, carapace, $\times 2.0$, dorsal view, Noda collection (5927). 3, carapace, holotype (KMNH IVP 300,016), $\times 2.8$, dorsal view. 2, 4-6. *Branchioplax pentagonalis* (Yokoyama, 1911) comb. nov. 2, carapace and left cheliped, Noda collection (5927), $\times 1.2$, dorsal view. 4, carapace and left cheliped, KMNH IVP 300,018, $\times 1.5$, dorsal view. 5, left and right chelipeds, thoracic sterna and abdomen (plaster cast), KMNH IVP 300,019, $\times 1.5$, ventral view, 6, carapace, ESN 80005, $\times 2.0$, dorsal view.

intestinal lobe is small. Gently raised hepatic regions are well differentiated. The epibranchial lobes are gently swollen and arched anteriorly. The meso- and metabranchial lobes are also gently swollen. The orbitofrontal margin occupies 0.6–0.7 of the carapace width. The frontal margin is straight, divided medially by a V-shaped notch, and finely granulated, and a shallow sinus separates it from an obscure inner orbital angle. The upper orbital margin is wide and pierced by two shallow notches laterally. Gently arched anterolateral margins are 0.4 of the width; there are five teeth including the postorbital tooth; the 1st tooth is small and triangular in outline; the 2nd is the largest and broadly triangular in outline; the 3rd–5th are forwardly directed and acutely triangular in outline, and the 5th is smallest. Gently convex posterolateral margins are 1.2 times as long as the anterolateral margins and the posterior angle is broadly rounded into a slightly convex posterior margin.

Abdomen of male: The 7th somite is triangular in outline. The 6th, longest, is wider than long, with straight, parallel lateral margins. The 5th and 4th somites are also wider than long and their lateral margins taper anteriorly. The 3rd somite is narrow. The 2nd and 1st somites are not preserved.

Sternites 1 to 3 are missing and the 4th is broken; sternites 5 and 6 are wider than long; the 7th is narrower than the preceding two and the 8th is reduced in size.

The finely granulated chelipeds are strongly heterochelate, the major being rather more than half as long as the minor cheliped. The slender dactylus is gently curved ventrally and there seem to be four teeth diminishing in size distally on the occludent margin. The fixed finger is as long as the dactylus and possesses a longitudinal shallow groove on the ventrolateral surface. The palm is longer than the dactylus.

The pereopods are ovate in cross section.

Discussion.—Yokoyama (1911) originally

described this species on the basis of a single broken specimen obtained from a depth of 484 feet of a shaft at the Miike Coalfield. At that time, he considered the species to be most closely allied to *Xanthilites bowerbankii* Bell, 1858 from the Eocene of the Isle of Sheppey, England. Examination of a recently obtained well-preserved carapace, remaining associated chelipeds, thoracic sterna and a fragmentary abdomen indicate that this species should be transferred from *Xanthilites* Bell, 1858 to *Branchioplax* Rathbun, 1916. *B. pentagonalis* closely resembles *B. washingtoniana* Rathbun, 1916 from the Eocene of Alaska (Rathbun, 1926; Tucker and Feldmann, 1989), but differs in having a longer carapace and a finely granulated frontal margin which is separated from an obscure inner orbital angle by a shallow sinus. A longer carapace and five anterolateral teeth readily distinguish *B. pentagonalis* from *B. concinna* Quayle and Collins, 1981 from the Eocene Barton Clay of England. *B. pentagonalis* differs from *B. sulcata* Müller and Collins, 1991 from the Late Eocene Szépvölgy Formation of Hungary by having well defined dorsal regions of the carapace.

Repository.—KMNH IVP 300, 017–300, 019; ESN80005; Noda collection (5927).

Discussion

The Middle Eocene decapod fauna from the Manda Group is represented by five species; four species, *Callianassa muratai* Nagao, 1932, *C. elongatodigitata* Nagao, 1941, *Ranidina teshimai* Fujiyama and Takeda, 1980, and *Portunites hexagonalis* Nagao, 1941 have been described from the Late Eocene Poronai Formation of Hokkaido. Except for *Portunites*, decapods of the Manda Group have nothing in common with those of the Poronai Formation. In addition, the raninids are represented by different genera.

Both *Eucalliax* and *Raninoides* have living species, while *Prohomola*, *Portunites* and

Branchioplax are restricted to the Palaeogene. Whereas the fossil species of *Eucalliax* and *Prohomola* are endemic, those of *Raninoides*, *Portunites* and *Branchioplax* are recorded from the Palaeogene of North America, Central America, Senegal, England and Hungary (Rathbun, 1926; van Straelen, 1933; Remy and Tessier, 1954; Quayle and Collins, 1981; Müller and Collins, 1991). Accordingly, the occurrences of *Raninoides*, *Portunites* and *Branchioplax* show that the decapod fauna from the Middle Eocene Manda Group is related to the western and central Tethyan realms.

References cited

- Bell, T., 1858: *A monograph of the fossil malacostracous Crustacea of Great Britain. Part I, Crustacea of the London Clay.* 44 p., 11 pls. Palaeontographical Society, London.
- , 1863: *A monograph of the fossil malacostracous Crustacea of Great Britain. Part II, Crustacea of the Gault and Greensand.* 40 p., 11 pls. Palaeontographical Society, London.
- Biffar, T.A., 1970: Three new species of callianassid shrimp (Decapoda, Thalassinidea) from the western Atlantic. *Proc. Biol. Soc. Washington*, vol. 83, no. 3, p. 35–49.
- Bishop, G.A., 1983: Two new species of crabs, *Notopocorystes (Eucorystes) eichhorni* and *Zygastocarcinus griesi* (Decapoda: Brachyura) from the Bearpaw Shale (Campanian) of North-Central America. *Jour. Paleont.*, vol. 57, no. 5, p. 900–911.
- , and Brannen, N.A., 1992: *Homolopsis pikeae*, new species (Decapoda), a crab from the Cretaceous of Texas. *Jour. Crustacean Biol.*, vol. 12, no. 2, p. 317–323.
- Fujiyama, I. and Takeda, M., 1980: A fossil raninid crab from the Poronai Formation, Hokkaido, Japan. *Professor Saburo Kanno Memorial Volume*, p. 339–342, pls. 39, 40. Tsukuba.
- Guinot, D. and Forges, B.R. de, (in press): Crustacea decapoda: La famille des Homolidae de Haan, 1839. In, A. Crosnier, ed., *Résultats des Campagnes MUSORSTOM, Mém. Mus. natn. Hist. nat., Paris*.
- Haan, W. de., 1833–1850: Crustacea. In, von Siebold, P.F., *Fauna Japonica sive Descriptio Animalium, quae in Itinere per Japoniam, Jussu et Auspiciis Superiorum, qui Summum in India Batava Imperium Tenent, Suscepto, Annis 1823–1830 Collegit, Notis, Observationibus et Adumbrationibus Illustravit.* i–xvii, i–xxxii, ix–xvi + 243 p., pls A–J, L–Q, 1–55. Lugduni-Batavorum, Leiden.
- Jenkins, R.J.F., 1977: A new fossil homolid crab (Decapoda, Brachyura), Middle Tertiary, south-eastern Australia. *Trans. Roy. Soc. South Australia*, vol. 101, p. 1–10.
- Latreille, P.A., 1825: Entomologie, ou histoire naturelle des crustacés, des arachnides et des insectes. *Genre de Crustacés Encyclopédie Méthodique, Histoire Naturelle*, vol. 10, 832 p. Paris.
- Manning, R.B. and Felder, D.L., 1991: Revision of the American Callianassidae (Crustacea: Decapoda: Thalassinidea). *Proc. Biol. Soc. Washington*, vol. 104, no. 4, p. 764–792.
- Matsumura, H., 1949: A summary of the Palaeogene stratigraphy of northern Kyushu. *Mem. Fac. Sci. Kyushu Univ.*, ser. D, vol. 2, p. 91–107.
- Milne Edwards, H., 1837: *Histoire naturelle des Crustacés, comprenant l'anatomie, la physiologie et la classification de ces animaux.* vol. 2, 532 p. Paris.
- , 1852: De la famille des ocypodides (Ocypodidae). Second Memoire. Observations sur les affinités zoologiques et la classification naturelle des Crustacés. *Ann. Sci. Nat.*, ser. 3 (Zool.), vol. 18, p. 128–166, pls. 3, 4. Paris.
- Mizuno, A., 1962: Paleogene and Lower Neogene biochronology of West Japan. Part II. *Jour. Geol. Soc. Japan*, vol. 68, p. 687–693. (in Japanese with English abstract)
- , 1963: Paleogene and Lower Neogene biochronology of West Japan. Part III. *Jour. Geol. Soc. Japan*, vol. 69, p. 38–50. (in Japanese with English abstract).
- , 1964: Paleogene and Early Neogene molluscan faunas in West Japan. *Rep. Geol. Surv. Japan*, no. 204, p. 72 p.
- , 1992: Reexamination of the biostratigraphic divisions, Mizuno, 1962–'63, for the Paleogene in western Kyushu, based on current age determination data. *Geol. Soc. Japan, Abstracts with Programs, 99th Ann. Meet.*, p. 179. (in Japanese)
- Müller, P. and Collins, J.S.H., 1991: Late Eocene coral associated decapods (Crustacea) from Hungary. *Contr. Tert. Quatern. Geol.*, vol. 28, nos. 2, 3, 47–92, 8 pls.
- Nagao, T., 1926: Palaeogene stratigraphy of Kyushu, Japan. Part 6. *Japan. Jour. Geol. Geogr.*, no. 452, p. 596–601. (in Japanese)
- , 1928: Palaeogene fossils of the Island of Kyushu, Japan. I. *Sci. Rep., Tohoku Imp. Univ.*, ser. 2, vol. 9, no. 3, p. 97–128, pls. 17–22.
- , 1932: Two Tertiary and one Cretaceous Crustacea from Hokkaido, Japan. *Jour. Fac. Sci.*

- Hokkaido Univ.*, ser. 4, vol. 2, no. 1, p. 15-22, pl. 4.
- , 1941: On some fossil Crustacea from Japan. *Jour. Fac. Sci., Hokkaido Univ.*, ser. 4, vol. 6, nos. 1, 2, p. 86-100, pl. 26.
- Ozaki, M. and Hamasaki, S., 1991: Fission track ages of the Paleogene strata in the northern part of Fukuoka Prefecture, Southwest Japan. *Jour. Geol. Soc. Japan*, vol. 97, no. 3, p. 251-254. (in Japanese)
- Parisi, B., 1915: I Decapodi giapponesi del Museo di Milano. II. Dromiacea. *Atti Soc. ital. Sci. nat.*, vol. 54, p. 102-116, pls. 2, 3.
- Quayle, W.J. and Collins, J.S.H., 1981: New Eocene crabs from the Hampshire basin. *Palaeontology*, vol. 24, no. 4, p. 733-758, pls. 104, 105.
- Remy, J.M. and Tessier, F., 1954: Décapodes nouveaux de la partie ouest du Sénégal. *Bull. Soc. géol. France*, ser. 6, vol. 4, p. 185-191, pl. 11.
- Rathbun, M.J., 1916: Description of a new genus and species of fossil crab from Port Townsend, Washington. *Amer. Jour. Sci.*, vol. 41, p. 344-346.
- Rathbun, M.J., 1926: The fossil stalk-eyed Crustacea of the Pacific slope of North America. *U. S. Nat. Mus., Bull.*, no. 138, 155 p, 39 pls.
- Straelen, V. van, 1933: Sur des crustacés décapodes cénozoïques du Venezuela. *Bull. Musée royal d'Hist. nat. Belgique*. vol. 9, no. 10, p. 1-14.
- Tomita, S., Ishibashi, T. and Hara, M., 1992: A brief note on the Paleogene of the Miike Coalfield in the Omuta district, Middle Kyushu, Japan. *Sci. Rep., Dep. Earth Planet. Sci., Kyushu Univ.*, vol. 17, no. 2, p. 25-43, pls 2-18. (in Japanese with English abstract)
- Tucker, A.B. and Feldmann, R.M., 1990: Fossil decapod crustaceans from the Lower Tertiary of the Prince William Sound region, Gulf of Alaska. *Jour. Paleont.*, vol. 63, no. 3, p. 409-427.
- Wood-Mason, J. and Alcock, A., 1891: Note on the results of the last season's deep-sea dredging: natural history notes from H.M. Indian Marine Survey Steamer 'Investigator,' Commander R.F. Hoskyn, R. N., Commanding, no. 21. *Ann. Mag. Nat. Hist.*, ser. 6, vol. 7, p. 258-272.
- Yabumoto, Y. 1989. A new Eocene lamnoid shark, *Carcharodon nodai*, from Omuta in Northern Kyushu, Japan. *Bull. Kitakyushu Mus. Nat. Hist.*, no. 9, p. 111-116, pl. 1.
- Yokoyama, M. 1911. Some Tertiary fossils from the Miike coalfield. *Jour. Coll. Sci., Imp. Univ. Tokyo*, vol. 27, p. 1-16, 3 pls.

万田層群産中期始新世十脚甲殻類：福岡県大牟田市勝立に分布する中部始新統（沖ノ島階）万田層群勝立層より産した3新種を含む5種の十脚甲殻類化石を記載する。それらは、*Eucalliax yoshihiro* sp. nov. (スナモグリ科), *Prohomola japonica* (Yokoyama) gen. nov. (ホモラ科), *Raninoides nodai* sp. nov. (アサヒガニ科), *Portunites kattachiensis* sp. nov. (ガザミ科), *Branchioplax pentagonalis* (Yokoyama) comb. nov. (エンコウガニ科) である。*Raninoides*, *Portunites*, *Branchioplax* 属の存在は、万田層群の十脚甲殻類ファウナが、古生物地理上、始新世における西部・中部テーチス地域の十脚甲殻類ファウナと関連があったことを示す。

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