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MICROPALAEONTOLOGY NOTEBOOK

Occurrence of a rare puncioid ostracod, *Promanawa konishii* (Nohara, 1976), in Recent sediments of the East China Sea

HOKUTO IWATANI[1*], TOSHIAKI IRIZUKI[2] & MORIAKI YASHUHARA[1]
[1]Department of Earth Sciences, School of Biological Sciences, Swire Institute of Marine Science, The University of Hong Kong, Kadoorie Biological Sciences Building, Pokfulam Road, Hong Kong SAR, China
[2]Department of Geoscience, Interdisciplinary Graduate School of Science and Engineering, Shimane University, 1060 Nishikawatsu, Matsue 690-8504, Japan
*Corresponding author (e-mail address: hokuto.iwatani@gmail.com)

A left valve of *Promanawa konishii* (Nohara, 1976) was found in the modern surface sediment of the East China Sea, off the western Iheya-Izena Islands, SW Japan (Fig. 1). The specimen was collected from St 447 (26.98°N, 127.72°E, 512 m water depth) during the GH09 cruise by the Geological Survey of Japan, Agency of Industrial Science and Technology (AIST). *Promanawa konishii* has a laterally compressed semi-elliptical carapace with a wide frill around the entire ventral margin and a long straight hinge, uniquely characteristic of the superfamily Puncioidea which includes the extant genera *Manawa, Promanawa* and *Puncia* (Hornibrook, 1949; McKenzie & Neil, 1983), considered by some to represent a surviving lineage of the order Palaeocopida, all others of which have been extinct since the end of the Palaeozoic (Hornibrook, 1949; Swanson, 1991). Living specimens of *Manawa* were described from a water depth of 17 m off Goat Island, New Zealand, by Swanson (1989, 1991). According to this study, the nauplius larvae of *Manawa* have a dome-shaped single carapace that is later divided into two valves jointed by hingement during the growth stages; however, ostracods usually have two such valves throughout their lifetime. Tabuki & Hanai (1996) suggested that this ontogenetic change may reflect the phylogeny of ostracods as a group.

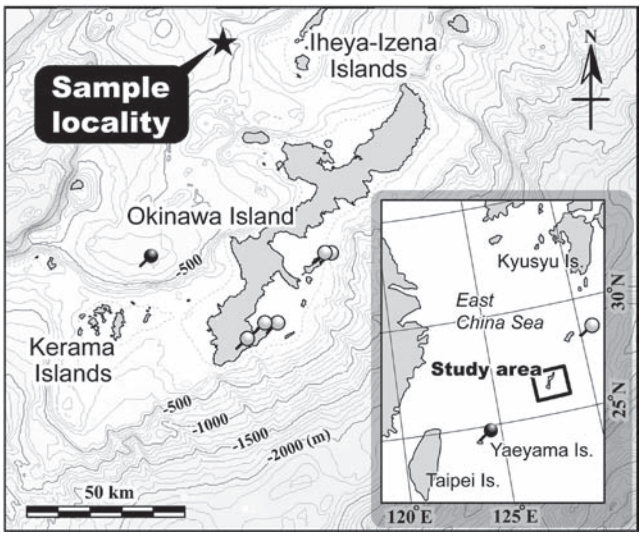

Fig. 1. Map of study area and sample locality (solid star). Black and white head pins indicate modern and fossil records of *Promanawa konishii*, respectively (modified after Nohara, 1987).

Promanawa konishii was first discovered in the Pliocene Shinzato Formation on Okinawa Island (Ishizaki, 1973). It was formally described as a new species, *Manawa konishii*, from the Pleistocene Chinen Formation on the same island by Nohara (1976), and was then reassigned to the genus *Promanawa* by McKenzie & Neil (1983). Modern occurrences of this species were also reported in the sea adjacent to the Okinawa Islands, such as Yaeyama Islands and Kerama Islands (Fig. 1). According to Tabuki & Hanai (1996), specimens collected from the coral reef lagoon of the Yaeyama Islands were considered to be autochthonous because of the presence of preserved setae on their valves. A geographical feature (i.e. an enclosed lagoon) of their study area also suggests that it is unlikely that ostracod valves are affected by postmortem transportation. For these reasons, they suggested that *P. konishii* inhabits extremely shallow-water environments, similar to *Manawa* (Swanson, 1989).

In the present study, *P. konishii* occurred at a water depth of approximately 500 m. Nevertheless, it coexisted with intertidal and phytal taxa, such as *Neonesidea*, *Paradoxostoma* and *Xestoleberis* (Fig. 2), which generally live in seaweeds and in nearshore environments with sandy bottoms (Hanai *et al.*, 1977; Sato & Kamiya, 2007; Tsurumi & Kamiya, 2007). For example, *Xestoleberis hanaii* (a characteristic species of *Xestoleberis* spp. in the present study) is a typical phytal species broadly distributed in intertidal zones in Japan (Sato & Kamiya, 2007). The specimens of these co-occurring taxa are all empty shells without soft parts, as the *Promanawa* specimen. The above observations indicate that the *Promanawa* specimen of this study is allochthonous, and was probably transported from a shallow-water area together with these intertidal and phytal taxa. *Promanawa konishii* may well live in a similar environment to the habitat of these co-occurring taxa.

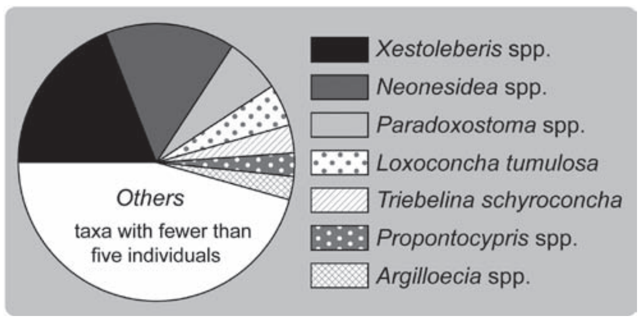

Fig. 2. Relative abundance of major ostracod taxa in sample St 447.

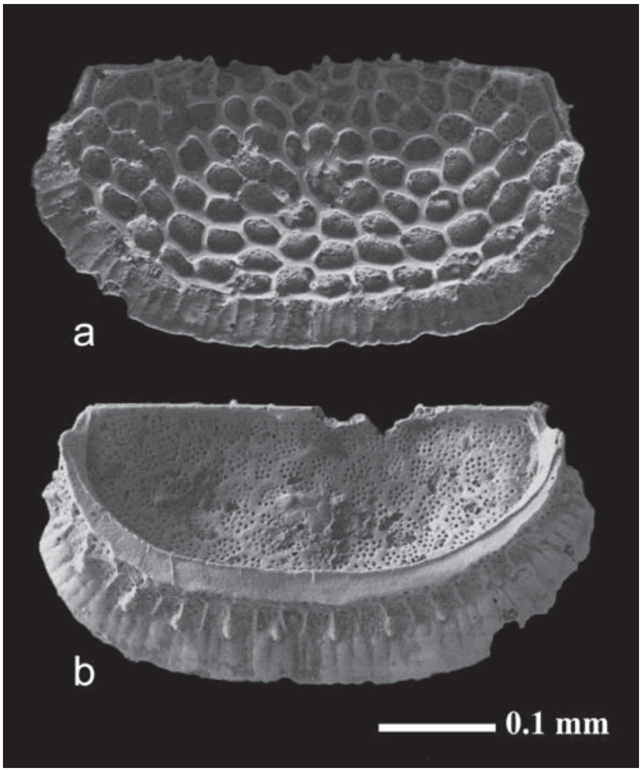

Fig. 3. SEM images of *Promanawa konishii* (Nohara, 1976): (**a**) lateral and (**b**) internal views of the same specimen, left valve, adult, male, sample no. St 447.

There are few reports of modern Puncioidea because of their low population density (Hornibrook, 1949; Swanson, 1991). This study is one of the few reports concerning the occurrence of modern Puncioidea, 'a living fossil'.

SYSTEMATIC PALAEONTOLOGY

The higher classification above superfamily level follows Horne *et al.* (2002). This specimen is stored in the Department of Geoscience, Interdisciplinary Faculty of Science and Engineering, Shimane University (DGSU).

Superfamily **Puncioidea** Hornibrook, 1949
Family **Punciidae** Hornibrook, 1949
Genus *Promanawa* McKenzie & Neil, 1983
Promanawa konishii (Nohara, 1976)
(Fig. 3)

1973 *Manawa* sp. Ishizaki: 404–405, pl. 47, 48, fig. 1.
1976 *Manawa konishii* Nohara: 75–78, pl. 1, fig. 1.
1982 *Manawa konishii* Nohara; Nohara & Nakasone: figs 1–4.
1987 *Manawa konishii* Nohara; Nohara: 30–35, pl. 6, figs 34, 37.
1995 *Promanawa konishii* (Nohara); Hanai & Tabuki: 260–265, text-fig. 1; pl. 1, figs 1–3; pl. 2, figs 1–5; pl. 3, figs 1–4.
1996 *Promanawa konishii* (Nohara); Tabuki & Hanai: fig. 1.
2010 *Promanawa konishii* (Nohara); Iwatani & Irizuki: fig. 2.

Specimen. Male left valve, DGSU no. CO0290.

Locality. East China Sea, off the western Iheya-Izena Islands, SW Japan, 26.98°N, 127.72°E, 512 m water depth, St 447 (GH09).

Dimensions (mm). Length = 0.477; height = 0.249.

Remarks. The specimen of the present study is larger and more strongly calcified than the modern specimen shown in Hanai & Tabuki (1995). The specimen of Hanai & Tabuki (1995, pl. II) has sharp polygonal reticulation with thin muri. The characteristic roundish polygonal reticulation with thick muri of our specimen is similar to that of fossil individuals (Ishizaki, 1973; Nohara, 1976). As little is reported about the modern specimens of *P. konishii*, our understanding of their morphological variation leaves room for various interpretations. One possibility may be that the modern specimen of Hanai & Tabuki (1995) is not an adult but a juvenile. Another possibility is that *P. konishii* has two morphological forms, namely a large valve with strongly calcified form and a small valve with weakly calcified form.

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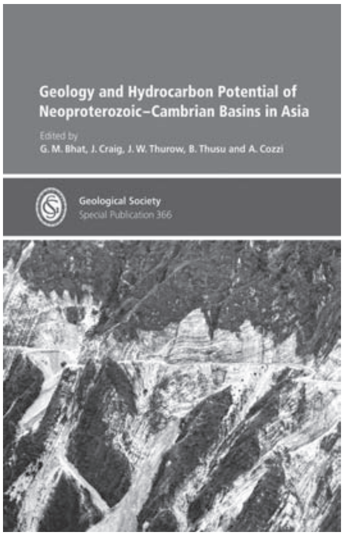

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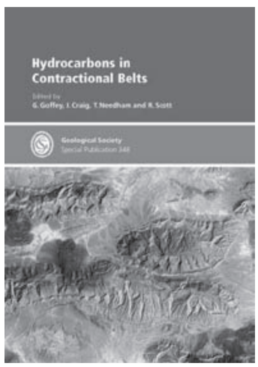

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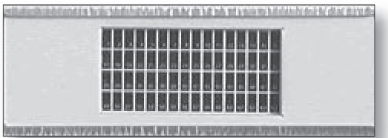

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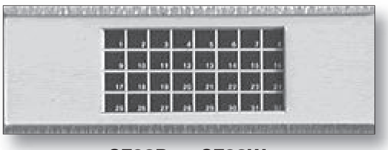

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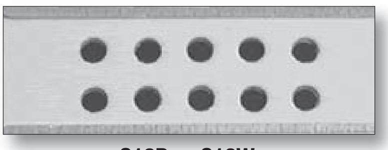

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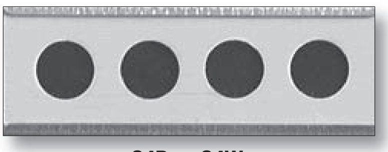

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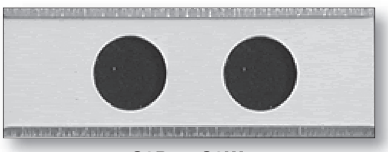

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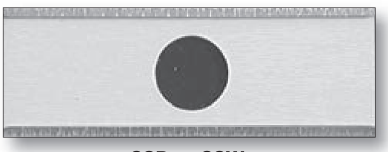

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