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New species and new records of pinnotherid crabs (Crustacea: Decapoda: Brachyura) from the Yellow Sea

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Abstract

Five species belonging to two genera of pinnotherid crabs are reported from the Yellow Sea. Two are new to science, namely: *Sakaina glabra* sp. nov. and *Sakaina granulata* sp. nov.; while three species are recorded for the first time from China: *Pinnaxodes major* Ortmann, 1894, *Pinnaxodes mutuensis* Sakai, 1939, and *Sakaina japonica* Serène, 1964. *Sakaina glabra* can be easily distinguished from congeners by lacking a thick rim of pubescence along the anterolateral margin of the carapace. *Sakaina granulata* closely resembles *S. asiatica* (Sakai, 1933), but differs mainly in having a row of granule-like denticles along the anterolateral margin of its carapace.

Keywords: Crustacea; Brachyura; Pinnotheridae; *Sakaina*; *Pinnaxodes*; New species; New records; Yellow Sea

1. Introduction

Species of Pinnotheridae De Haan, 1833 (sensu Ng et al., 2008; Campos, 2009; Ng and Ngo, 2010) are rarely reported from China. Shen (1932) recognized nine pinnotherid species from northern China, while Dai et al. (1980) recorded eight species from Hainan. Dai et al. (1986) recognized a total of 17 species from Chinese waters. However, no additional material from northern China has been recorded since then. While examining pinnotherid specimens collected from the Yellow Sea, the authors found five interesting species, of which two species of *Sakaina* Serène, 1964, are new to science, with two species of *Pinnaxodes* Heller, 1865, and *Sakaina japonica* Serène, 1964, new records for Chinese waters. The two genera, *Pinnaxodes* and *Sakaina*, are also recorded for the first time from China.

This paper describes the two new species of *Sakaina* and presents taxonomic notes of the three new records. The following abbreviations are used: CL = carapace length, CW = carapace width, P2–P5 = first to fourth ambulatory legs, respectively; MXP3 = third maxilliped; G1 = male first gonopod; and G2 = male second gonopod. Measurements provided are expressed (in millimetres) as carapace length × carapace width. Specimens examined are deposited in the Marine Biological Museum, Chinese Academy of Sciences (MBMCAS) in Qingdao.

2. Systematics

Family Pinnotheridae De Haan, 1833
Subfamily Pinnotherinae De Haan, 1833

2.1. Genus *Pinnaxodes* Heller, 1865

Pinnaxodes major Ortmann, 1894 (Fig. 1)
Pinnaxodes major Ortmann, 1894: 697, pl. 23, fig. 10. – Tesch, 1918: 249 (list), 255 (key), 286 (list). – Balss, 1922: 140. – Yokoya, 1928: 778. – Sakai, 1935: 200, text-fig.

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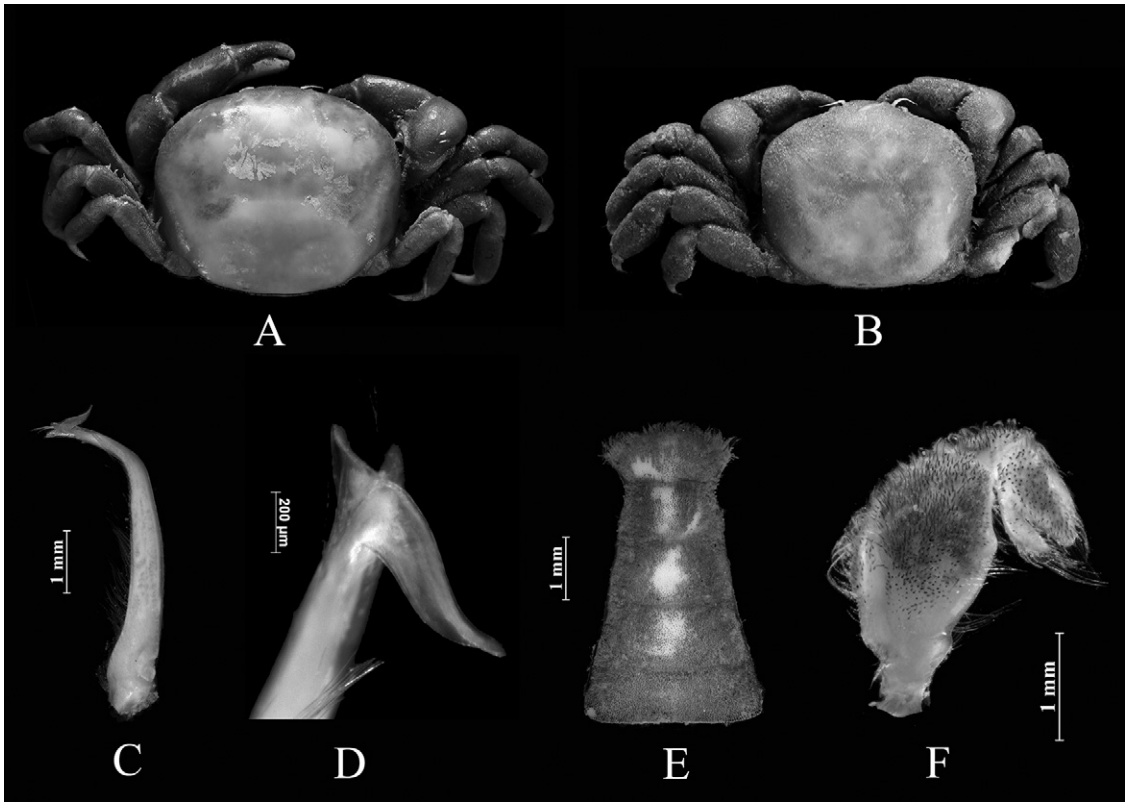

Fig. 1. *Pinnaxodes major* Ortmann, 1894 (MBM 119733): (A) overall view of female (13.4 mm × 16.0 mm); (B) overall view of male (9.0 mm × 10.8 mm); (C) G1; (D) tip of G1; (E) male abdomen; (F) MXP3 (male). Scale bar indicates 1 mm (C, E, F) or 0.2 mm (D).

104; 1939: 593, text-fig. 80; 1976: 578, fig. 317a, pl. 202, figs. 4–5. – Kobjakova, 1967: 244. – Schmitt et al., 1973: 35. – Takeda and Masahito, 2000: 99, figs. 3, 4. – Ng and Manning, 2003: 915, fig. 6. – Ng et al., 2008: 250 (listed).
Pinnotheres major – Sakai, 1933: 978, 980, 981, fig. 4a, b.

Material examined: 1 ♂ (9.0 mm × 10.8 mm), 1 ♀ (13.4 mm × 16.0 mm) (MBM 119733), Zhucha Island, Qingdao, coll. W. Jiang, 7.01.2005.

Remarks: *Pinnaxodes major* has been reported from Japan, Korea and the Far East of Russia. The present record extends its range further southward. The hosts of this species are variable, including the anal cavity of the sea cucumber *Holothuria* (*Mertensiothuria*) *hilla* Lesson, 1830 and mantle cavity of bivalves (*Atrina pectinata* (Linnaeus, 1767) and *Mytilus* sp.). Our material was found among a tray of fresh gastropod snails, *Rapana venosa* (Valenciennes, 1846), in a local fish market, but this may have contained other mollusks earlier, *Rapana* being an unlikely host. The original host is not known.

Takeda and Masahito (2000) compared the two West Pacific *Pinnaxodes* species, *P. major* and *P. mutuensis* with the type species, *P. chilensis* (H. Milne Edwards, 1837), which is South American. Their conclusion was that *P. major* and *P. chilensis* are congeneric, and *P. mutuensis* should be removed from this genus (see below). Ng and Manning (2003: 915–917, Figs. 6, 7) pointed out the difference of MXP3 structures between *P. major* and *P. chilensis*, but continued to treat *P. major* as a real *Pinnaxodes* (see also Ng et al., 2008). More data will be needed to resolve this.

Pinnaxodes mutuensis Sakai, 1939 (Fig. 2)
Pinnaxodes mutuensis Sakai, 1939: 595, fig. 81a–c. – Sakai 1956: 50. – Schmitt et al., 1973: 35. – Sakai, 1976: 579, fig. 317b. – Konishi, 1977: 607, fig. 2, 3A. – Takeda and Konishi, 1991: 33, fig. 1. – Ng and Manning, 2003: 915, fig. 6E–H.
Holothuriophilus mutuensis – Takeda and Masahito, 2000: 106, figs. 1B, 2G–H, 5. – Ng et al., 2008: 249 (listed).

Material examined: 2 ♂♂ (6.5 mm × 6.6 mm, 3.5 mm × 4.5 mm), 2 ♀♀ (8.1 mm × 8.6 mm, 3.2 mm × 3.4 mm) (MBMCAS 119734), Haiyang Island, Dalian, N. Yellow Sea, coll. C. J. Shen, 9.15.1956.

Remarks: *Pinnaxodes mutuensis* was reported from northern Japan by Sakai (1939, 1956, 1976) as well as Takeda and Konishi (1991) and Kornienko and Korn (2009) found the larvae in Peter the Great Bay, Russia. The present record is the first from the Yellow Sea, extending the southern limit of its distribution. The specimens were found in the mantle cavity of the bivalve *Modiolus modiolus* (Linnaeus).

Takeda and Masahito (2000) transferred this species to the genus *Holothuriophilus*. Ng and Manning (2003) discussed its taxonomic status, and argued that while it was not a good species of *Pinnaxodes*, referring it to *Holothuriophilus* was