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Three new gnathiid species with larvae ectoparasitic on coastal sharks from southwestern Japan (Crustacea: Isopoda)

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Abstract

Gnathiid larvae were collected from the gill chambers of coastal sharks in southwestern Japan. Some were reared in a laboratory aquarium and successfully metamorphosed into adults. Morphological observations of the adult males identified three undescribed species, which are designated *Gnathia albipalpebrata* n. sp., *G. parvirostrata* n. sp., and *G. dejimagi* n. sp. on the basis of their larval morphologies and pigmentation patterns.

Key words: Gnathiids, Cymothoidea, ectoparasite, shark, larval morphology, new species

Introduction

The Isopoda family Gnathiidae includes about 200 species belonging to 12 genera (Schotte *et al.* 2008 onwards). Male and female adult gnathiids are highly dimorphic; males have highly developed mandibles and females lack mandibles and possess a swollen thorax to brood their eggs. Their larvae have needle-like mouthparts for sucking body fluids from fish. Gnathiid larvae with swollen thoraxes containing fish body fluid are traditionally called praniza larvae and those with segmented thoraxes before feeding are traditionally called zuphea larvae (Smit & Davies 2004).

Gnathiid taxonomy is generally based on the morphology of the male but larval descriptions have recently increased because ecological studies have identified larvae as ectoparasites on fish (Ferreira *et al.* 2009; Farquharson *et al.* 2012). On the other hand, the gnathiid fauna is poorly understood in most areas, and many species have not been reported (Kensley *et al.* 2009; Svavarsson & Bruce 2012).

Many species have recently been reported from Japanese waters, including 35 gnathiid species from six genera (Ota 2013). Among the gnathiid fauna collected from coastal elasmobranch hosts in southwestern Japan, five species have been described (Ota & Hirose 2009a, 2009b; Ota 2011). The present study reports three new species collected from coastal shark as hosts on the basis of male adults, female adults, and their larval morphologies.

Material and methods

Between June 2008 and September 2010, host elasmobranchs were collected from fisheries in Nakagusuku Bay (26°12'N, 127°49'E) and off Ishigaki-jima Island (24°28'N, 124°18'E). The elasmobranchs were caught using a gill net (Nakagusuku Bay) or a line (Ishigaki-jima Island). All specimens were kindly donated by the fishermen. The elasmobranchs were identified according to Froese and Pauly (2012). Gnathiid larvae were collected by dissecting the mouths and gill chambers of the elasmobranchs.

The pigmentation patterns of live gnathiid larvae were photographed. Some gnathiid larvae were fixed in 70% ethanol for description. A previous study showed that gnathiid larvae ectoparasitic on elasmobranchs were all third-stage larvae that metamorphosed into the adult stage; larvae ectoparasitic on other hosts were all first- and second-stage larvae (Ota *et al.* 2012). Thus, all gnathiid larvae examined in this study were third-stage larvae. Third-stage praniza larvae from host fishes were kept until they molt into adults in 0.5 mm mesh containers within

of *G. dejimagi* n. sp. (4.1–5.5 mm vs. 9.0 mm) (Ota & Hirose 2009a). Female adult of *G. nubila* is easily distinguish from *G. dejimagi* n. sp. by 2 spots on frontal border (Ota & Hirose 2009b).

A live specimen of the third-stage pranzia larva had a cloud-like white pattern on its swollen thorax. This pattern is visible on *G. nubila* and *G. grandilaris* but *G. nubila* has a distinct white line on the ventral thorax (Ota & Hirose 2009b) while *G. grandilaris* has white spots on the dorsal thorax (Coetzee *et al.* 2008). *Gnathia dejimagi* n. sp. had relatively large eyes and the inner margins of the eyes reached the base of the antenna while the distal margins were close to the base of the antenna. In most other species, the inner margins of the eyes do not reach the base of the antenna and the base of the antenna and the distal margin of the eyes are separated by a space (Smit & Davies 2002; Coetzee *et al.* 2009; Ota & Hirose 2009a; Ota, 2011). *Gnathia grandilaris* also has relatively large eyes but its pleotelson is narrower than that of the present species (Coetzee *et al.* 2008).

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