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Notes and News

Biological notes on *Zeuxo ezoensis* Okamoto et al., 2020 (Crustacea: Peracarida: Tanaidacea)

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Abstract

We report microhabitats used by the tanaidid tanaidacean *Zeuxo ezoensis* Okamoto et al., 2020 on the marine alga *Sargassum confusum* C. Agardh, as well as its molting behavior, based on observation of captive individuals. *Zeuxo ezoensis* constructed its tube-shaped nests on *S. confusum* (1) at the bases of lateral branches, (2) on main branches in the apical region, (3) in cracked air bladders, and (4) in clumps of a filamentous alga (Chordariaceae sp.) epiphytic on *S. confusum*. The behavioral sequence of a single molt observed for a male *Z. ezoensis* was as follows. (1) A break occurred along the ventrolateral and posterodorsal edges of the carapace, creating a dorsal opening in the old exoskeleton; (2) the animal began to extricate itself from the old exoskeleton through this opening; (3) the cephalothorax and its appendages shed the old exoskeleton; and (4) the animal completed extrication from the old exoskeleton. The entire molt took about five minutes.

Key words: benthos, epibiont, Tanaidoidea, Tanaidomorpha, tube dweller

Our current knowledge of the biological aspects of tanaidacean crustaceans is fragmentary. This is true even for the family Tanaididae, representatives of which are commonly found in shallow waters, and to which perhaps most relevant attention has been given. Tanaididae contains about 90 shallow-water species (cf. Anderson 2020), but biological information is available for only a few of them and is limited to a few genera (e.g., Johnson and Attramadal 1982a, b; Matsumasa 1994; Nakaoka 2002; Morales-Vela et al. 2008; Chim et al. 2016; Tanabe et al. 2017).

Zeuxo ezoensis Okamoto et al., 2020 is a shallow-water tanaidid reported from Hokkaido, Japan (Okamoto et al. 2020), from among algae such as the brown *Sargassum* spp. and red *Neorhodomela aculeata* (Perestenko) Masuda (Kakui et al. 2017). Using silk, it constructs tube-shaped nests (Kakui et al. 2021), that may function to provide shelter from predators such as gobiid fish (Kakui 2015), staurozoan jellyfish (Kakui 2022), and anthuroid isopods (Shiraki and Kakui 2022). In this study, based on YH's observations of captive animals in 1980, we report (1) microhabitats on *Sargassum confusum* C. Agardh used by *Z. ezoensis* and (2) the behavioral sequence of its molt.

Microhabitats on *Sargassum confusum*

Several dishes (50 or 80 mm in diameter; kept at about 15°C under ambient light), each containing one female and one male *Z. ezoensis*, a branch of *S. confusum*, and seawater, were prepared and observed more than once a day. Tanaidids constructed their tubes (1) on the bases of lateral branches, (2) on main branches in the apical region,

(3) in cracked air bladders, and (4) among a filamentous brown alga Elachistaceae sp. [= Chordariaceae sp. in the recent classification] epiphytic on *S. confusum* (Fig. 1). We note that in the wild, *S. confusum* thalli with many clumps of epiphytic algae attached tended to harbor more *Z. ezoensis* than those with only a few.

Molting behavior

Molting typically occurred within nest, making observation impossible. Only one molt by a male outside a nest was observed; it involved the following behavioral sequence (Fig. 2). (1) A dorsal transverse break occurred in the old exoskeleton between the carapace and pereonite 1. This break extended anteriorly to the base of the eye lobe and along the ventrolateral edges of the carapace, creating a dorsal opening in the old exoskeleton. While this was occurring, the animal occasionally shook the posterior body dorsally and ventrally, actively moved its pereopods, and frequently touched its antennules with its chelipeds (Fig. 2A). (2) The animal began to extricate itself from the old exoskeleton through the dorsal opening, as its posterior body moved peristaltically (Fig. 2B). (3) The cephalothorax and its appendages soon shed the old exoskeleton, with the posterior part of the body remaining in the old exoskeleton. The animal continuously shook the posterior end of the body in the dorso-ventral plane

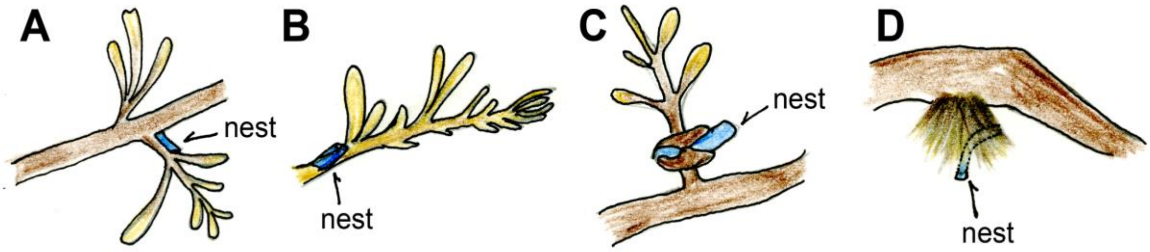

Fig. 1. Microhabitats on *Sargassum confusum* used by *Zeuxo ezoensis* Okamoto et al., 2020. A–D, tube-shaped nests (shown in blue) constructed by *Z. ezoensis* at the base of a lateral branch (A), on a main branch in the apical region (B), in a cracked air bladder (C), and among algae epiphytic on *S. confusum* (D). Drawing by Yoshinobu Hayakawa.

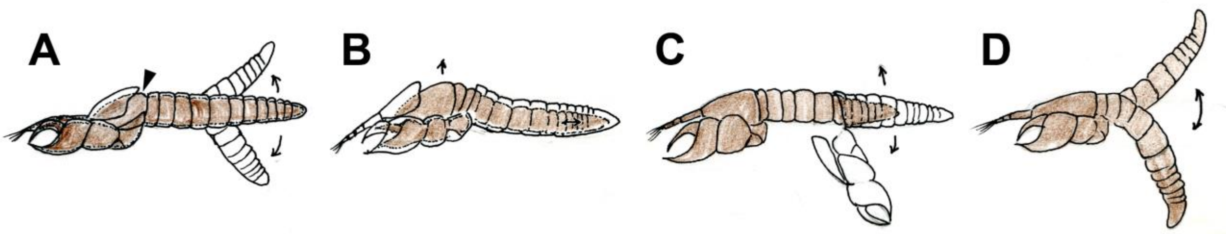

Fig. 2. Behavioral sequence of molting in *Zeuxo ezoensis* Okamoto et al., 2020. A, a dorsal opening (arrowhead) appears in the old exoskeleton. B, the animal begins extrication from the old exoskeleton. C, the cephalothorax and its appendages shed the old exoskeleton. D, the animal completes extrication from the old exoskeleton. Arrows indicate movements of parts of the body. Details of the sequence are provided in the main text. Drawing by Yoshinobu Hayakawa.

(Fig. 2C). (4) The animal completed extrication from the old exoskeleton, continuously shaking the posterior part of the body dorsoventrally, possibly to help extend the new exoskeleton (Fig. 2D). The molt was completed in about five minutes. To our knowledge, this is the second study describing the behavioral sequence of molting in Tanaidacea. The sequence reported here resembles another example observed by Bückle Ramírez (1965) in the leptocheliid *Heterotanais oerstedii* (Krøyer, 1842).

The natural history of tanaidaceans remains largely unknown. Recent observations of living tanaidaceans under both wild and captive conditions have brought new discoveries, such as a tanaidid species dwelling in barnacle tests (Chim et al. 2016; see also Chim and Tong 2019), mucoid tube construction in a parapseudid species (Kakui and Hiruta 2017), and the second example of sex change in a nototanaid species (Kakui and Hiruta 2022). Future observations will undoubtedly make further discoveries.

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