

Note

First record of the occurrence of an ellobiopsid *Thalassomyces marsupii* Kane on a new host of hyperiid amphipod in Japanese waters

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During our taxonomic and ecological survey on the parasites of zooplankton we found an ellobiopsid parasitic on an adult female of the hyperiid amphipod *Scina vosseleri* Tattersall (the body length measured from the anterior tip of the head to the posterior end of the telson: 9.0 mm) captured off Tanegashima Island (0–900 m depth, 30°13.05'N, 131°05.25'E~30°13.99'N, 131°05.7.30'E, oblique tow of an ORI net (mesh size 0.33 mm)) on May 29, 2002 (local time 10:28–12:10). The body length of the present specimen falls within that reported for adults (9–15 mm: Vinogradov 1999). The ellobiopsid was attached to the sternite of the fourth pereonite within the marsupium of the host, and penetrated into the mid-ventral nerve cord (Fig. 1A–C). It is provisionally identified as *Thalassomyces marsupii* Kane on the basis of the host-specificity (amphipod) and attachment site (nerve cord), and of the size (cluster ca. 0.92 mm×0.76 mm) and characteristic shape of a single gonome at the distal end of a short trophome (still immature). Since all of more than 60 gonomes were not fully developed to form spores (Fig. 1B), it was identified as immature. A perforation through which the parasite stalk emerged was about 0.14 mm in diameter (Fig. 1C). A simple root of the parasite was embedded in the mid-ventral nerve cord of the host which appeared to be heavily damaged by the infection (Fig. 1C). The host exhibited an undeveloped ovary and carried no eggs within the marsupium, although the brooding plates (=oostegites) were fully expanded.

In Japan and its adjacent waters the following species of the Ellobiopsidae have so far been recorded from planktonic crustaceans (Komaki 1970; Endo et al. 1985; Hanamura et al. 1989; Ohtsuka et al. 2000, 2003): *Ellobiopsis chattoni* Caullery (host: Copepoda, Calanidae); *Thalassomyces fagei*

(Boschma) (Euphausiacea, *Euphausia similis*); *Thalassomyces* sp. (Euphausiacea, *Thysanoessa inermis*, *Euphausia pacifica*); *Ellobiocystis* (?) sp. (Mysidacea, *Siriella japonica izuensis*). This is the first record of the occurrence of *T. marsupii* on a new host in Japanese waters.

Ellobiopsids are enigmatic organisms that have been regarded to be either dinoflagellates, sarcomastigophorans or fungi, with recent ultrastructural studies suggesting a strong affinity to achlorophyllous dinoflagellates (Whisler 1990). These parasites mainly infect a wide variety of planktonic and benthic crustaceans (Shields 1994). The Ellobiopsidae accommodates the following five heterogeneous genera, *Ellobiopsis* Caullery 1910, *Ellobiocystis* Coutière, 1911, *Parallobiopsis* Collins, 1913, *Thalassomyces* Niezabitowski, 1913, and *Rhizellobiopsis* Hovasse, 1926 (Kane 1964; Shields 1994). The genus *Thalassomyces* is the largest group of ellobiopsids, and consists of 13 known species to infect only crustaceans such as mysids, amphipods, euphausiids, and decapods (Shields 1994).

Thalassomyces marsupii has hitherto been known exclusively from 13 species of planktonic/benthic hyperiid and gammarid amphipods (Kane 1964; Vader & Kane 1968; Galt & Whisler 1970; Vader 1973; Wing 1975; Shield 1994; present study). The hyperiid hosts are: *Themisto gaudichaudii* Guérin-Meneville (as *Parathemisto gaudichaudii*) (the Benguela Current, the Southern Ocean), *T. abyssorum* (Boeck) (as *P. abyssorum*) (the North Atlantic, the Arctic Sea), *T. compressa* Goes (as *P. gracilipes* Norman) (North Sea); *T. pacifica* (Stebbing) (as *P. pacifica*) (Puget Sound, southeastern Alaska); *T. libellula* (Lichtenstein) (as *P. libellula*) (southeastern Alaska), *Cystisoma* sp. (North Pacific), and *Scina vosseleri* (Japan) (the nomenclature of the host amphipods based on Bowman et al. (1982) and Schneppenheim & Weigmann-Haass (1986)). The following gammarid hosts are epibenthic or planktonic: *Eusirus leptocarpus* Sars, *E. longipes* Boeck, *Rhachotropis ac-*

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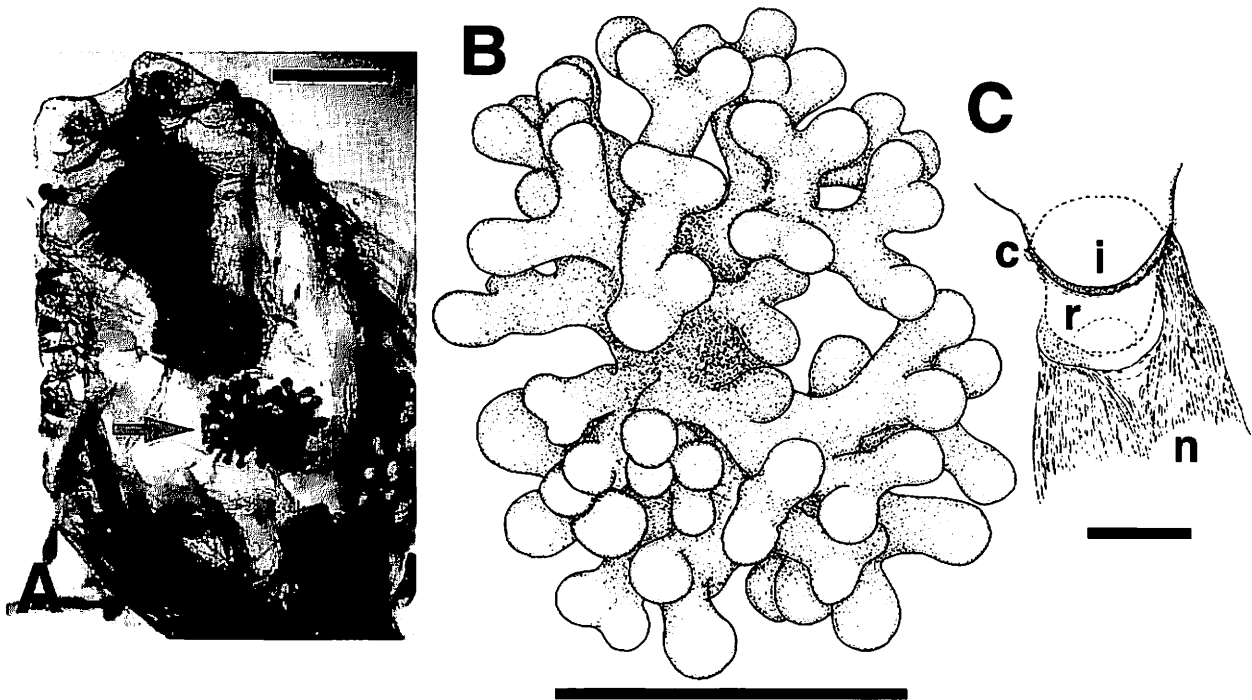


Fig. 1. *Thalassomyces marsupii*. A. Immature specimen (arrowed) attached to pereon of hyperiid amphipod *Scina vosseleri* (antennules and antennae of host broken off); B. Same as in A; C. Rooted (r) and insertion (i) portion of parasite, nerve cord (n) and thickened cuticle (c) of host. Scales = 1 mm (A); 0.5 mm (B); 0.1 mm (C).

uleata (Lepechin), *R. macropus* Sars, *R. helleri* Boeck (all from the North Atlantic), and *Cyphocaris challengerii* Stebbing (southeastern Alaska). In Alaskan waters Wing (1975) reported high prevalence (up to 15%) of *T. marsupii* on a pelagic gammarid *C. challengerii* and two species of the pelagic hyperiid *Themisto* (as *Parathemisto*) in August 1965 and September 1966.

Pathological influences of ellobiopsids on hosts have been examined through histological observations (Boschma 1949; Kane 1964). Some species of the mesoparasitic *Ellobiopsis* and *Thalassomyces* are supposed to castrate the host, while others do not (Shields 1994). These mesoparasites consist of two functionally different parts, an internal part for attachment and nutrient absorption and an external part for reproduction. Since *Thalassomyces* shows a strong affinity to the nerve systems of the hosts, it may cause behavioral changes leading efficient transmission of the parasites (Shields 1994). In this case, the damage in the nerve cord and underdevelopment of the ovary may allude to some kind of pathological influence on the host, although Kane (1964) pointed out only a localised reaction in the infected area.

Some ecto-, meso- and endo-parasites infecting marine zooplankton are known to have a great influence on the host populations, and more attention should be paid to these in order to understand marine ecosystems correctly (Ohtsuka et al. 2000; Gómez-Gutiérrez et al. 2003). The first step to achieve this is to accumulate descriptions of parasite-host relationships.

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