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First record of the bivalve-inhabiting hydroid *Eugymnanthea inquilina* in the eastern Mediterranean Sea (Gulf of Thessaloniki, north Aegean Sea, Greece)

Abdalnasser Rayyan*, John Christidis and Chariton C. Chintiroglou

Department of Zoology, School of Biology, Box 134, Aristotle University of Thessaloniki, GR-540 06, Thessaloniki, Greece.
*Corresponding author, e-mail: educreian@yahoo.com

The first record of a bivalve-inhabiting hydrozoan *Eugymnanthea inquilina* was found in Thermaikos Gulf, north Aegean Sea, eastern Mediterranean Sea, associated with *Mytilus galloprovincialis*. Analyses of biometric data point the same biological differences between the Mediterranean and the Japanese *Eugymnanthea*, as reported by previous researchers.

INTRODUCTION

The genus *Eugymnanthea*, one of the bivalve-inhabiting hydroids is characterized by an abortive mature medusa without tentacles. This genus contains the two species *Eugymnanthea inquilina* Palombi, 1935 found in the Mediterranean Sea (Palombi, 1935; Cerruti, 1941; Crowell, 1957; Piraino et al., 1994), and *E. japonica* Kubota, 1979 found in Japanese waters (Kubota, 1979, 1985, 1991, 2000). The absence of a manubrium and the greater number of statoliths per statocysts in the medusa stage, always distinguish the Mediterranean *Eugymnanthea* from the Japanese one.

In recent studies carried out in Thermaikos Gulf, which were aimed at the evaluation of the low production of the local farmed mussel populations, a series of parasitic organisms were discovered, amongst them the hydrozoan *Eugymnanthea inquilina*, which was the most abundant. The recording and description of this species for the biogeographical region of the eastern Mediterranean was deemed necessary, in order to provide grounds for a more complete biological study on the effect of the hydrozoan on the mussel population (*Mytilus galloprovincialis*).

MATERIALS AND METHODS

During July 2001, *Mytilus galloprovincialis* individuals were collected from 'Long-line' mussel cultures in three localities in Thermaikos Gulf (north Aegean Sea). In total, 120 individuals were collected; 40 from each of the three stations (Makrygialos, Halastra and Nea Michaniona). Of these, 43 were found harbouring *Eugymnanthea* polyps (17 in Makrygialos, 10 in Halastra and 16 in Nea Michaniona; Figure 1). The polyps with well-developed medusa buds were removed from the hosts and were put in separate Petri dishes, filled with fresh seawater. The Petri dishes were kept at room temperature (22 °C), in an air-conditioned room. The next day, 35 medusae were obtained from the polyps of Makrygialos, 20 from the ones of Halastra and 46 from those from Nea Michaniona. At this stage, their morphology was examined under a microscope, fitted with a video and a photographic camera.

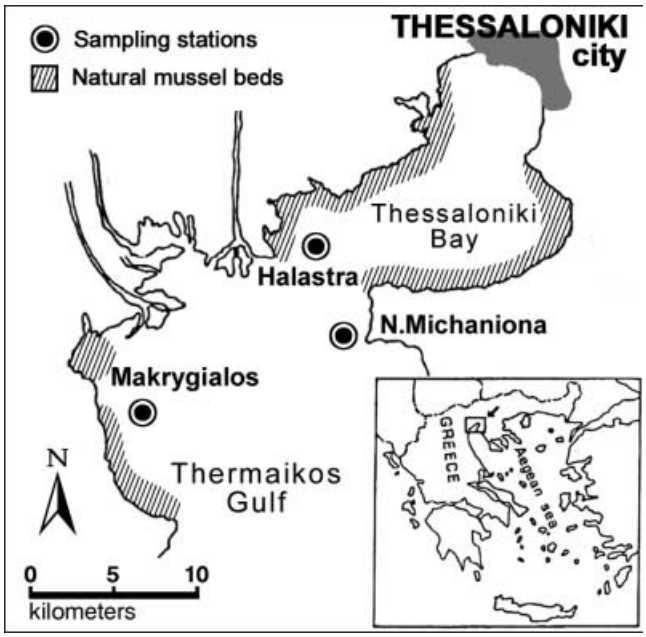

Figure 1. Map of Thermaikos Gulf (north Aegean Sea) showing the three sampling sites and the location and extent of the natural mussel beds in the Gulf.

At the same time, samples from naturally found populations were taken, from various areas of Thermaikos Gulf. In these mussels, parasitic organisms were usually totally absent (C.C. Chintiroglou, unpublished data).

RESULTS AND DISCUSSION

The polyp is solitary and its base forms a flattened pedal disk, which facilitates the attachment of the polyp to the soft body surfaces of the host (Figure 2A). No periderm is found on the entire body; only a thin membrane covers the medusa-bud (Figure 2B). The polyp is 0.70–2.10 mm long, with some specimens (particularly those of Nea Michaniona) reaching 3.5 mm in length and up to 0.29 mm in width. Seventeen to 30 tentacles are usually found. The

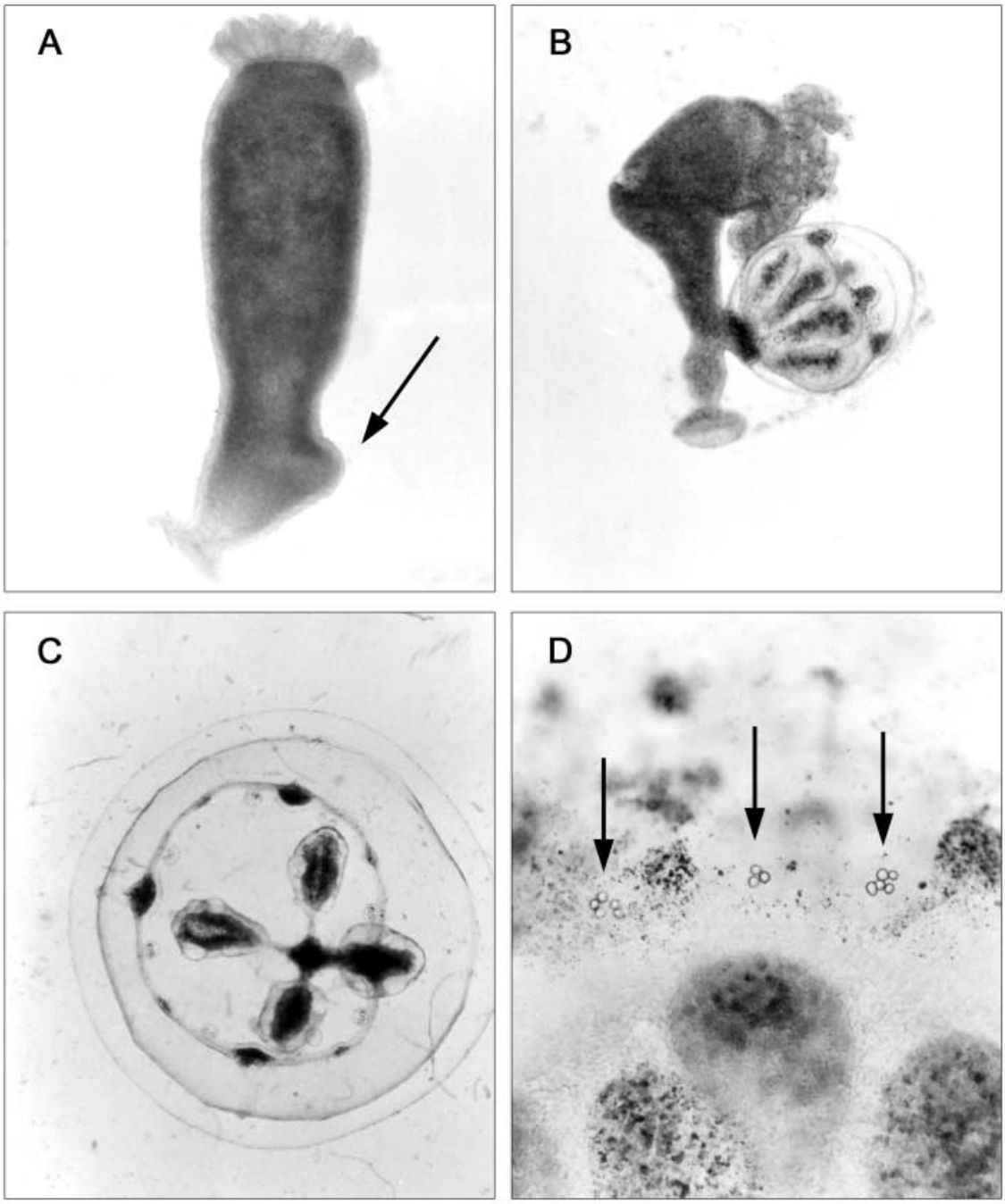

Figure 2. Morphology of *Eugymnanthea inquilina* polyp and medusa from north Aegean sea, Greece: (A) polyp showing a tiny undistinguished bud and a pedal disk, (B) polyp showing a developed medusa bud, (C) a mature one day old medusa (note: eight statocysts, eight marginal warts and no manubrium), (D) three statocysts, two containing five statoliths and one containing three.

Table 1. *Taxonomic characters of* Eugymnanthea *medusa from Greece*.

Locality	No. of medusae examined*	No. of statocysts examined	Frequency distribution of statocysts possessing the following number of statoliths per statocyst							
			0	1	2	3	4	5	6	7
Makrygialos	35	280	2	19	111	101	35	7		5
Halastra	20	160		11	41	63	24	20	1	
Nea Michaniona	46	368		31	125	137	40	22	6	7
Totals	101	808	2	61	277	301	99	49	7	12

*All examined medusae had eight statocysts, eight marginal warts, and no manubrium.

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colour of the polyp is variable, appearing from white, to yellow, orange and sometimes even red (for those polyps found in well organized aggregations on the mantle). In all instances, except those of red polyps, it is similar to that described by Palombi, 1935; Cerruti, 1941; and Crowell, 1957.

The one day old mature medusae are 0.55–0.90 mm in width at the umbrella. All 101 (100%) examined medusae had eight statocysts, eight marginal warts and no manubrium (Figure 2C). Most of the examined statocysts contained more than two statoliths, the variation range of the statoliths being 0–7 per statocyst. Of the 808 statocysts examined, 71.5% contained two or three statoliths, 8.3% contained one or no statoliths and the rest contained four or more (Figure 2D and Table 1). These results are in compliance with the observations made by Cerruti (1941) on *Eugymnanthea inquilina* and Kubota (1979, 1985, 1987, 1989, 1991, 2000) on *E. japonica* confirming that the absence of a manubrium and the greater number of statoliths per statocyst distinguish the Mediterranean *Eugymnanthea* from the Japanese one.

During the dissections, no polyps were found on the gills of the host. Most were attached to the mantle and the visceral mass. These observations coincide with those of Cerruti (1941) who reported that no polyps of *Eugymnanthea* were found attached on the gills of *Mytilus galloprovincialis* off Taranto. Crowell (1957) also reported that polyps of *E. inquilina* were never found on the gills of *M. galloprovincialis* from Naples, and Piraino et al. (1994) noticed that *E. inquilina* rarely attached to the gills of *M. galloprovincialis*. In contrast, the Japanese polyps are usually attached to the gills, as well as to its mantle, visceral mass and to every other soft body portion (Kubota, 1991, 2000). This is another marked difference, which distinguishes the Mediterranean *Eugymnanthea* from the Japanese one.

This is the first record and description of *Eugymnanthea inquilina* for the eastern Mediterranean. The high presence of *E. inquilina* in cultured mussels, especially in conjunction to its absence from the natural populations, indicates a direct connection between the level of presence of the hydrozoan and the density of the mussel population.

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