



POLYP EXPULSION OF THE CORAL *CLADOCORA CAESPITOSA* (ANTHOZOA, SCLERACTINIA) IN EXTREME SEA TEMPERATURE CONDITIONS

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During a laboratory experiment, polyp expulsion was observed for the first time in the coral *Cladocora caespitosa*. The living expelled polyps were observed attached on the side glass of the aquaria.

Key words: polyp expulsion, coral, *Cladocora caespitosa*

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Za vrijeme laboratorijskog istraživanja, po prvi put je promatrano odvajanje polipa koralja *Cladocora caespitosa*. Odvojeni polipi koralja bili su pričvršćeni za stakleni zid akvarija.

Ključne riječi: odvajanje polipa, koralj, *Cladocora caespitosa*.

The colonial coral *Cladocora caespitosa* (Linnaeus, 1767) is belonging to the family Faviidae and relatively common in the Mediterranean Sea (Fig. 1a). It occurs from shallow waters to depths of about 30 meters (where the amount of light still allows photosynthesis of the symbiotic zooxanthellae).

C. caespitosa represents the main bioconstructor of the Mediterranean basin, where it is spread in almost all biogeographic areas. A few studies (KRUŽIĆ, 2005; RODOLFO-METALPA *et al.*, 2005), concerning the ecology of this species, suggest that *C. caespitosa* could represent a valid indicator of climate change. *C. caespitosa* is physiologically and morphologically similar to the typical tropical reef-building corals in being zooxanthellate, colonial and capable of forming extensive formations (KRUŽIĆ &

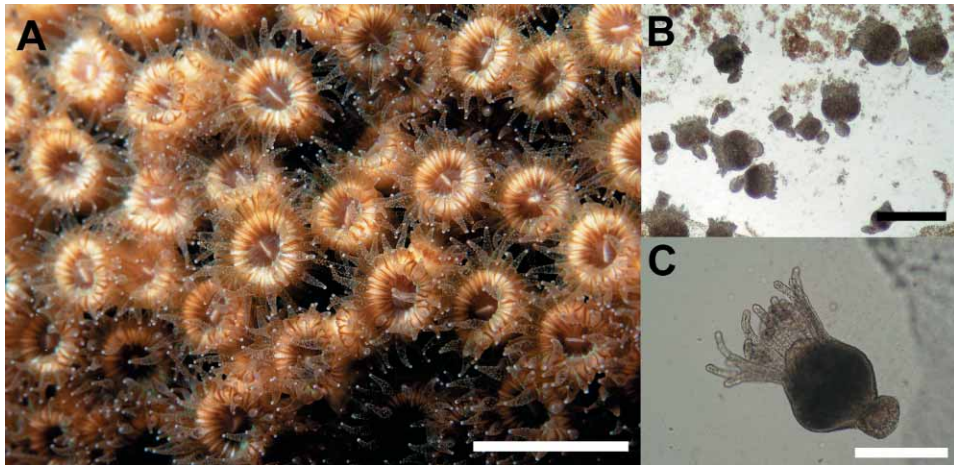


Fig. 1a. The *Cladocora caespitosa* calices with polyps (scale line = 10 mm). **B** Expelled polyps of *C. caespitosa* on the aquarium glass (scale line = 10 mm). **C** Expelled polyp (scale line = 5 mm).

POŽAR-DOMAC, 2003; KRUŽIĆ, 2005). Elevation in sea temperature could induce coral bleaching (starting as a decrease in zooxanthellae density per coral biomass), polyp necrosis and bacterial infection (KUSHMARO *et al.*, 1998; RODOLFO-METALPA *et al.*, 2005). Both aquaria and *in situ* results show that *C. caespitosa* is not able to withstand elevated or prolonged summer sea temperatures (KRUŽIĆ, 2005; RODOLFO-METALPA *et al.*, 2005). This suggests that this species will likely be under serious threat from the predicted seawater warming trend.

The positive anomalies of sea surface temperature were recorded in the last few summers and *C. caespitosa* underwent mass-mortality events, recalling those observed in the tropics (RODOLFO-METALPA *et al.*, 2000; GARRABOU *et al.*, 2002). Cases of mass mortality correlated with high temperatures were recorded also in other sessile epibenthic organisms, such as sponges and gorgonians (CERRANO *et al.*, 2000; PEREZ *et al.*, 2000; GARRABOU *et al.*, 2002; SARA *et al.*, 2003).

During a laboratory experiment examining the influence of high temperature on colonies of *C. caespitosa*, two colonies were held in separate glass 75 liter aquaria in filtered sea water at temperature of 30 °C. That is 4 °C higher than the normal maximum summer value.

On the 9th day of the experiment, the living polyps were observed attached on the side glass of the aquaria (Fig. 1b). The lengths of the polyps were 7–9 mm (Fig. 1c). The similar way of polyp expulsion was described *in situ* on coral *Oculina patagonica* from the Mediterranean coast of Israel (KRAMARSKY-WINTER *et al.*, 1997). The distinction between the original polyp expulsions is that the detaching polyp of *Oculina patagonica* included a corallite whereas in the case of *C. caespitosa*, there is only soft tissue detachment from the skeleton.

Due to elevated temperature, expelled polyps of *C. caespitosa* died after 3 days. The phenomenon of polyp expulsion could be the mode of asexual reproduction in a way of coral effort for survival in unfavorable environmental conditions like, in this way, elevated temperature. Unfortunately, it is not clear whether these polyps could actually regenerate new colonies. It is unclear however, what is the ecological significance of polyp expulsion in *C. caespitosa* and whether and how it occurs in nature. The origin colony died after 61 days of the experiment.

The cause of polyp expulsion needs more investigation to be fully understood in its physiological and ecological mechanisms.

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S A Ž E T A K

**Odvajanje polipa kod koralja *Cladocora caespitosa*
(Anthozoa, Scleractinia) u uvjetima povišene temperature mora**

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Vrsta *Cladocora caespitosa* (Linnaeus, 1767) relativno je česta vrsta u Sredozemnom moru na dubinama do 30 metara. Zbog simbiotskih alga zooxantela ovaj je koralj fiziološki sličan tropskim koraljima. Nagle promjene ekoloških čimbenika, prvenstveno temperature mora, glavni su razlog zašto je vrsta *C. caespitosa* u pojedinim područjima u Sredozemnom moru ozbiljno ugrožena. Prilikom laboratorijskih istraživanja utjecaja povišene temperature mora na kolonije ovog koralja, dvije kolonije držane su u akvariju na 30 °C. Devetog dana istraživanja zabilježeno je odvajanje polipa iz čaške koralja *C. caespitosa*. Odvojeni polipi koralja bili su pričvršćeni za stakleni zid akvarija. Do danas je ovakvo odvajanje polipa iz čaške koralja zabilježeno jedino kod tropske vrste *Oculina patagonica*. Ovakvo ponašanje polipa moglo bi predstavljati nespolno razmnožavanje koralja, iako je najvjerojatnije riječ o pokušaju preživljavanja polipa u nepovoljnim uvjetima okoliša, u ovom slučaju povišenoj temperaturi mora.