VERRUCAE ON SEA-FANS: UNEXPECTED ABUNDANCE OF THE BARNACLE C*ONOPEA CALCEOLA* (ELLIS) ON THE GORGONIAN *EUNICELLA SINGULARIS* (ESPER) IN THE MEDITERRANEAN SEA

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Abstract
Colonies of the symbiotic Mediterrean gorgonian *Eunicella singularis* were found to host the warm-tropical barnacle C*onopea calceola* on rocky bottoms in the Sicily Channel. Barnacle' presence and abundance (some tens individuals per colony) is probably due to increasing seawater temperatures, this 'co-habitation' supposedly representing a strategy for *C. calceola* species' survival and a further threat for *E. singularis* in an increasingly warming Mediterranean Sea.

Keywords: Crustacea, Sicily Channel, Cnidaria, Global change, Alien species

Introduction
The barnacle *Conopea calceola* (Ellis), living on gorgonians, has been reported present, yet rare in Southern Italian coasts ([1], [2]). Records are given here on monospecific, dense stands of candelabra-like *Eunicella singularis* (Esper) hosting the barnacle, found in the Sicily Channel.

Material and methods
A biodiversity survey was carried out in May 2012 at Favignana Island (Marine Protected Area of Egadi Islands, Sicily Channel, Italy). In 13 localities, rocky bottom communities were video-surveyed along transects spanning on the whole a 0 to 60 m depth range. Video sampling (30 min per transect) was performed with a full-HD camera equipped with a wide-angle lens recording nearly 0.75 m^2 at a distance of approximately 50 cm.

Results and Discussion
A total of 570 *E. singularis* colonies were surveyed, of which 24.6 % were seen to host *C. calceola* (Tab. 1). The majority of *E. singularis* colonies living on bottoms between 15 and 30 m were characterized by tens of 'verrucae' barnacle housings (Fig. 1).

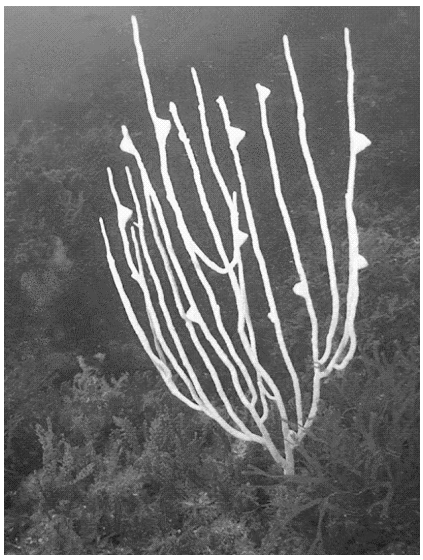

Fig. 1. Colony of *Eunicella singularis* on a flat rocky bottom at Favignana, Egadi Island, Sicily Channel (South Western Mediterranean) colonized by more than 12 individuals of the barnacle *Conopea calceola* that form visible verrucae.

By sampling a few *E. singularis* colonies, gorgonian tissue was observed to wrap *C. calceola* shell with the exception of a small opening which ensure barnacle feeding. The presence of alive individual within the shell suggested that the white gorgonian is a suitable substrate for the barnacle. Warm-tropical *C. calceola* has a wide distribution extending from the eastern Atlantic coast to the Indian Ocean, and further to the seas bordering S.E. Asia ([3]). Present occurrence and abundance of this barnacle may be compared with those of other warm-water species such as *Solidobalanus fallax* (Broch), which is found inhabiting the British sea-fan *Eunicella verrucosa* ([4]). As for *S. fallax, C. calceola* ubiquitous presence observed in the last few years is probably due to increasing seawater temperatures, favoring species widespread and making it more detectable. In light of serious threats affecting the Mediterranean white gorgonian *E. singularis* such as the extensive mortalities that occurred in the past decade ([5]), the increase in *C. calceola* abundance could signify a further problem for *E. singularis*. This 'co-habitation' may represent a strategy for *C. calceola* survival in the changing Mediterranean Sea.

Tab. 1. Localities, depth range, number of *E. singularis* colonies and number of colonies (%) with *C. calceola.*

Localities	Depth (m)	colonies (n)	n. colonies with *C. calceola* (%)
Secca Fondale	15-31	136	1.5
Secca del Toro	7-33	132	12.9
Punta Longa	19-32	63	65.1
Manuzza	19-34	42	61.9
Nonna Venus	19-32	18	66.7
Galeotta	3-30	40	35
Palo Spirografi	15-32	37	13.5
Scoglio Corrente	5-30	52	3.8
Grotta Cala Rotonda	0-8	0	0
Costiera di Ponente	0-10	0	0
Punta Sottile	12-30	44	47.7
Faraglioni	8-20	1	0
Atlantide	30-60	5	0

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