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Short Communication

Dendrophyllia in Greek waters, Mediterranean Sea, with the first record of *D. ramea* (Cnidaria, Scleractinia) from the area

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In the Mediterranean Sea the genus *Dendrophyllia* Blainville, 1830, is represented by two species known to form large branched colonies, *D. cornigera* (Lamarck, 1816) and *D. ramea* (Linnaeus, 1758). As is typical of Mediterranean Scleractinia, both species are also represented in the north-east Atlantic. They differ significantly in morphology (especially colony organization), geographical distribution, and ecology (ZIBROWIUS, 1980).

In *D. cornigera* branches and corallites are irregularly arranged and older polyps are often disconnected, the coenosarc being disrupted some distance below the calicular edge. *D. ramea* tends to form long branches with a larger terminal corallite, the smaller lateral corallites being arranged in two opposite lines along the main branches. In this species the polyps seated in the corallites typically remain interconnected, the coenosarc tending to cover the entire branches. In both the north-east Atlantic and the Mediterranean Sea *D. cornigera* extends further north than *D. ramea.* In the Atlantic its northern limit is Brittany and the Celtic Sea whereas *D. ramea* does not range further north than northern Portugal. In the Mediterranean Sea, *D. ramea* is absent from the northern part of the western basin, in contrast to *D. cornigera,* which ranges throughout the entire western basin. In the Atlantic both species are common in Morocco (ZIBROWIUS, 1981) and occur further south along the African coast.

In its respective areas *D. ramea* is commonly observed within SCUBA diving depths, as shallow as 30-40 m in the Mediterranean (OCAÑA *et al.,* 2000) and even shallower in the Atlantic (BOURY-ESNAULT *et al.,* 2005). In contrast *D. cornigera* typically occurs deeper, even to depths of several hundred meters where it may co-occur with *Madrepora oculata* (Linnaeus, 1758) and

Lophelia pertusa (Linnaeus, 1758). Ecologically opposing *D. cornigera* and *D. ramea* as shallower-living 'yellow corals' to *M. oculata* and *L. pertusa* as deeper-living 'white corals' is not justified. This long-lived misconception by PÉRÈS & PICARD (e.g., 1964), reiterated even nowadays, was based on a too imprecise knowledge of the *Dendrophyllia* species.

The occurrence of *D. cornigera* in the Mediterranean Sea has long been known in the entire western basin (including the northern part) before three live occurrences were reported from deep-water in the Aegean Sea and the outer side of the South-Aegean arc (ZIBROWIUS, 1979, 1980): near Antipsara (420 m), near Kyra Panayia (= Pelagos; 200-270 m), and south of Karpathos (600 m). VAFIDIS *et al.* (1997) mentioned it from northern Lesvos (170 m) without indicating if it was obtained live or dead. Cruise DANAOS 2007 on RV *Aegaeo* of HCMR found live *D. cornigera* southeast of Crete (520-620 m) (SMITH *et al.,* 2009) while cruise GECO on RV *Urania* of CNR in 2007 collected only long-dead specimens of *D. cornigera* from south of Crete, Karpathos and Rhodes (MS & HZ, observation on board). Live *D. cornigera* was mentioned by KONTIZA *et al.* (2006) in a biochemical paper as from 80 m at Serifos isl., Aegean Sea. Considering the ecological demands of this species, a depth of 80 m seems surprisingly shallow for *D. cornigera,* especially in the warm and transparent waters of the Cyclades islands and the wider Central Aegean Sea. However, no fragment of the coral in question is any longer available and the identification could not be verified. Moreover, the indicated depth is a rough estimation from local fishermen who originally collected the sample, and should be, thus, considered with caution (V. Roussis pers. com.). The live collections/observations indicate notable eastern occurrences in the general context of the Mediterranean scleractinian fauna 'thinning out' towards the eastern end of the basin, an impression now modified with increasing research effort, the present note contributing (Fig. 1).

As for *D. ramea,* it was considered to be limited to the southwestern part of the Mediterranean, with its easternmost outposts in the Strait of Sicily, Malta and the Pelagian Islands (ZIBROWIUS, 1980). Then the finding of a single large colony in the southern Croatian islands, Adriatic Sea (KRUŽIĆ *et al.,* 2002), unexpectedly extended its range far easternwards. Additional scleractinian discoveries reported in the same note indicated a 'more western look' to the southern Adriatic fauna that previously had been incompletely known.

This note provides a first record of *D. ramea* from Greek waters in the south-west Korinthiakos Gulf on the northern coast of Peloponnese, some 11 km east of the Rio-Antirio Straits which connect the inner Korinthiakos with the more western Patraikos Gulf - the latter itself connected to the open Ionian Sea (Fig. 1). The western part of Korinthiakos Gulf is characterized by temporary, wind-driven upwelling processes, which account for reduced surface and bottom temperatures (LASCARATOS *et al.,* 1989; RAMFOS *et al.,* 2005). Moreover, RAMFOS *et al.,* (2005) found here a mean depth of fluorescence maximum at 39m, which, in comparison with the open Aegean and Ionian Seas (83 m and 73 m respectively), indicates rather increased turbidity levels, as also confirmed by local divers and our personal experience (MS, YI, KM) after several years of diving in the area. In fact, turbidity in this area appears to show strong seasonal variations related to the discharge of sediment and nutrient loads from the many seasonal streams and small rivers

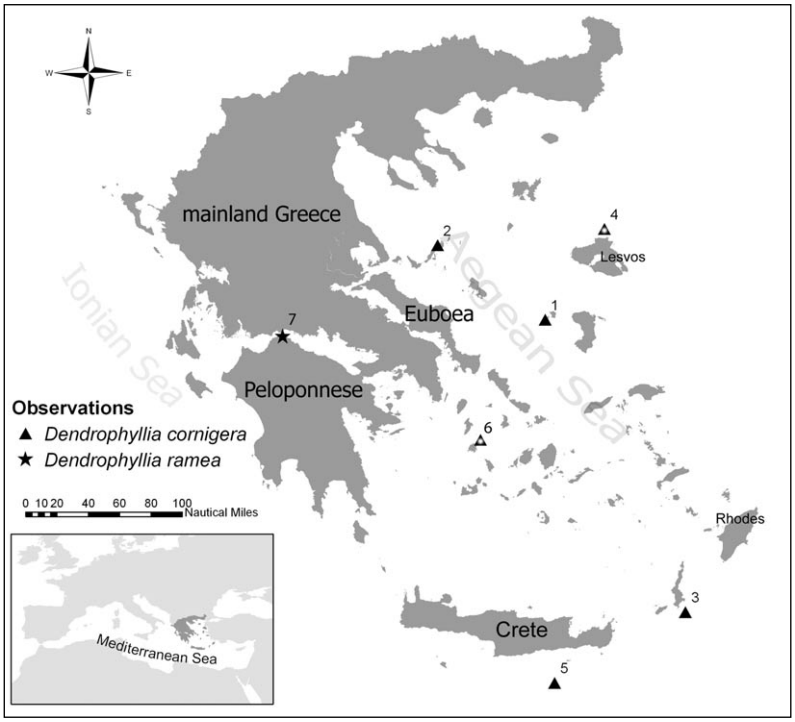

Fig. 1: Collections/Observations in Greece of *D. cornigera* (1, 2, 3: Zibrowius, 1979, 1980; 4: Vafidis *et al.,* 1997 -no indication whether dead or live specimens; 5: Smith *et al.,* 2009; 6: Kontiza *et al.,* 2006 -to be considered with caution, see text for details) and *D. ramea* (7: present note).

that drain along the N. Peloponnese coastline (POULOS *et al.,* 1996).

The precise location of the *D. ramea* colony was near Panagopoula village, a slope area that belongs to the southern faulted margin of the western Korinthiakos Gulf, experiencing exceptionally high seismicity and frequent submarine sliding phenomena (FERENTINOS *et al.,* 1988; LYKOUSSIS *et al.,* 1997). The basement rocks of the area consist of alpine Mesozoic limestones of the Pindos unit, covered by debris and talus cones (SAKELLARIOU *et al.,* 2001). Both geological structure and underwater topography is controlled by the southern fault zone, which is responsible for the creation of large submarine slopes locally exceeding 45˚ (SAKELLARIOU *et al.,* 2001).

In August 2009, one of the authors (KM) discovered at Panagopoula a single large colony of *Dendrophyllia ramea* alive at a depth of 39-40 m on a sedimentary bottom far away from any evident rock outcrop (Figs 2 & 3). The colony seems to lie on a soft bottom, but it is likely that it started its growth on a patch of hard substrate now hidden under the colony. The soft bottom at the site comprises silty sands, partially covered with coarse biogenic debris, especially large mollusc shells. There are also scattered limestone boulders, suggesting that the hard substrate that originally supported the colony may be of this type.

The colony is highly branched and meas-

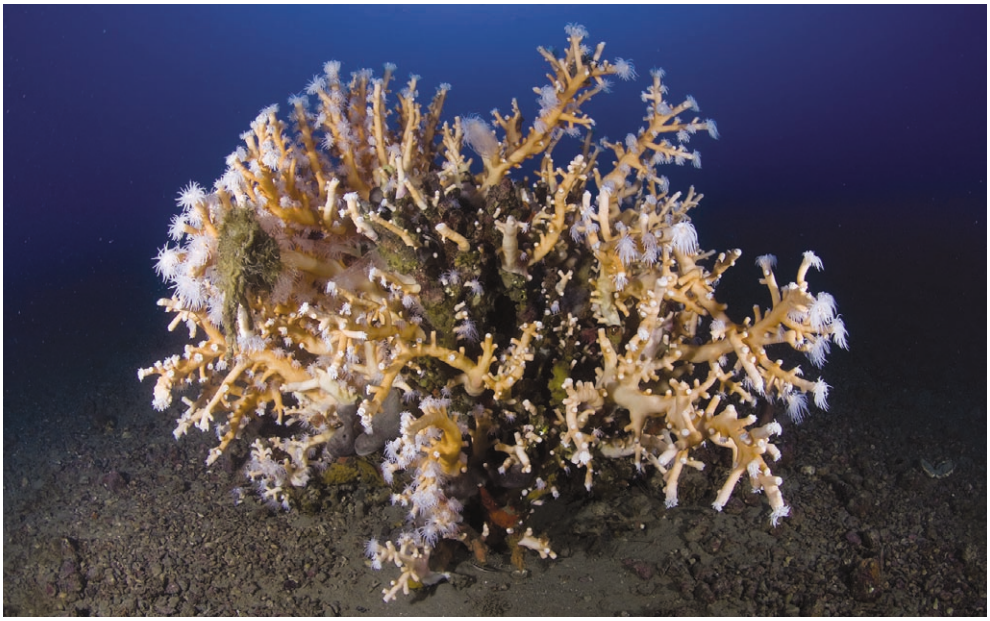

Fig. 2: General aspect of the *D. ramea* colony, found alive at Panagopoula coast, SW Korinthiakos Gulf (Photo by Yiannis Issaris).

Fig. 3: Detail of the expanded polyps of *D. ramea* (Photo by Yiannis Issaris).

ures 0.9 m in height, 1.3 m in width, and has main branches with a maximum diameter of about 6 cm at the base. Coenosarc and polyps (arranged on the branches in two opposite lines) are pale orange in colour with the fully expanded polyp tentacles being bright white. A central part of the colony is dead, the skeleton there being covered mainly with various species of sponges and ascidians. A small, already detached but still live fragment of the colony was collected for taxonomical purposes and deposited in the Goulandris Natural History Museum, Athens.

The adjacent area was surveyed for at least 100 m along the same depth zone, but no other *D. ramea* colonies were detected. Otherwise, the more spectacular macrofauna around the *Dendrophyllia* site comprises large sponges (*Axinella* spp.), many gorgonian colonies (*Leptogorgia sarmentosa*), crinoids (*Antedon mediterranea*), large ceriantharians and, on the boulders, various encrusting sponges and low colonial scleractinians (*Polycyathus*).

Other spectacular species that have been identified from steep rocky cliffs a few km easternwards include dispersed facies of the gorgonian *Eunicella cavolinii* (9-30 m), as well as several large colonies of the zoantharian *Savalia savaglia* (40-45 m) commonly considered as a rare species. Divers also mention the existence of the purple gorgonian *Paramuricea clavata* in this wider area, but no colonies have been found during the present study.

D. ramea in Greek waters is not considered as a recent easternwards colonization (e.g., in relation with climate modification) but as an occasional discovery of a probably rare species in an area previously little explored by divers. The age of that large colony can be expected to be several decades, at least. Contrary to earlier records of live *D. cornigera* in Greek waters, this presently still unique record of *D. ramea* is from the Ionian side, about equidistant from Malta and southern Croatia, the nearest confirmed occurrences outside the western basin. It will now be of interest to find out if *D. ramea* also occurs in the Aegean Sea or eastwards at least to Crete where the presently easternmost population of another dendrophylliid, *Balanophyllia regia* Gosse, 1860, has been recognized (ZIBROWIUS, 1979, 1980).

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