The status of red coral (*Corallium rubrum*) resource in the Northern and Western coasts of Sardinia.

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ABSTRACT

A picture of the spatial distribution of the deep red coral resource in the Northern and Western coasts of Sardinia is illustrated. Three zones with different demography were identified. Some specific issues on the growth of the deeper colonies in these zones are also presented. It will be also emphasized the utility of these data in the management of the resource.

INTRODUCTION

In Sardinia (Central Western Mediterranean) the coral harvesting was practiced by French fishermen mainly since 1300 dC (Doneddu and Fiori, 2003). In the last 30 years Sardinian Administration has established some management actions to improve sustainable exploitation, conservation and protection of red coral banks in its waters (Follesa *et al*., FAO-CFGM 2010). Taking into account that these regulations could have affected the state of the resource, a picture of the present spatial distribution of the deep red coral in the Northern and Western coasts of Sardinia are illustrated.

MATERIAL AND METHODS

The study is located on the Northern and Western coasts of Sardinia at depth below 80 m. Extensive ROV survey was carried out between 2007 and 2008 by professional divers to identify locations of *C. rubrum* colonies in the Sardinian Sea and to identify the size structure of colonies (Tab. 1). In each colony the height was measured, using a rod of 2 cm as the reference size, from a point two centimeters from the base of the stem to the furthest tips of the longest branches (Tsounis et al. 2006), with the image analysis program, tpsdDig 2 (Rohlf, 2005). Finally all colonies were grouped in six classes according to height with five centimeters of difference between one group and the next (I, 0-5 cm ; II, 5-10 cm; III, 10-15 cm; IV, 15-20 cm; V, 20-25 cm; VI, > 25 cm)

Tab.1 – Number of transects performed and colonies examined in each coast of Sardinia

Investigated area	Depth range	n° transects	n° examined colonies
Nothern coast	84-93	9	11795
CentralWestern coast	80-121	13	2920
South Western coast	85-107	11	4593
Total	**80-121**	**33**	**19308**

The data have been also integrated by biometric measures (height, cm) of the commercial colonies collected, from 2007 to 2010, by professional divers following the main regulations enacted by Autonomous Region of Sardinia (basal diameter lower than 10 mm with a tolerance of 20%; capture only depth below 80 m).

RESULTS

Three zones (Northern, Central western and South western coast) characterized by diverse size and age structure, and spatial distribution pattern are identified. On the Northern coast, populations appear characterized by a near absolute dominance of small colonies, 90 per cent of which fall into the smallest of the two height classes defined by ROV images (I and II). An average height near to 8 cm is calculated for the commercial colonies collected by professional divers.

In contrast, *C. rubrum* resource on the central western coast highlights an healthier state in respects to the northern coast. From the 13 ROV transects the highest values are observed for the medium-size colonies comprised in the two classes of from 10 to 15 cm and 15 to 20 cm in height, with percentages of over 30 %. Only 5 % of registered colonies pertain to smaller-height categories. Similar results are shown by biometric parameters of commercial colonies. An average height near or higher than 15 cm is identified in the main areas investigated on the central western coast.

All colonies collected in the two previous coasts (Northern and Central western coasts), even if present a very different main height, registered more or less the same age (organic staining matrix method on the base of the basal diameter) about 34 years.

Finally, an intermediate structure between that of the Northern and Central western coasts has been found on the South Western coast. The 11 ROV transects show that the colonies prevalently found here do not exceed 10 cm in height. The same results get reinforced by biometric analysis.

The population structures of *Corallium rubrum* appeared statistically different (Kolmogorov-Smirnov test $P<0.005$) among all three investigated areas.

CONCLUSIONS

In general *C. rubrum* resources present a “Good ecological condition” in the Sardinian Sea. In Central Western coast the colonies show a mean height higher than 6 cm, dimension able to ensure the reproductive potential needed for the survival of the populations (Tsounis et al., 2006). The actual regional law, which is based on three main measures—time of harvesting (May-October), number of licenses (max. 30) and a harvest per dive/day of 2,5 kg — could ensure sustainable management although the harvesting pressure has not been increased in the Sardinian Sea. However, its strict respect should be binding to ensure an optimal balance between capacity of recovery and harvesting.

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