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GEOGRAPHICAL ANALYSIS OF MARINE SPECIES DISTRIBUTION DATA PROVIDED BY DIVER VOLUNTEERS

ANALISI GEOGRAFICA DEI DATI DI DISTRIBUZIONE DI SPECIE MARINE FORNITI DA VOLONTARI SUBACQUEI

Abstract - *Data collected by diver volunteers are stored in an online database. Data are periodically checked for consistency in geographical location, sea bottoms features and reliability by a set of crosschecks. The integrated use of the Google web-GIS platform and adequate procedures resulted in 39 distribution maps freely available on the project web sites.*

Key-words: *benthos, interaction, species diversity,* Eunicella cavolinii*,* Paramuricea clavata.

Introduction - SCUBA diver volunteers have already made significant contributions to scientific knowledge through their participation in a range of studies (e.g.: Darwall and Dulvy, 1996; Foster-Smith and Evans, 2003; Bell, 2007). The potential of this workforce is well illustrated in the tropical programme 'Reef Check' (Hodgson, 2001). Recreational divers surveyed over 300 reefs in 31 countries in a global survey that was certainly beyond the resources of conventional scientific projects. In northern Europe, NELOS (www.biologie.nelos.be) in Belgium and The Netherlands, and SEASEARCH (www.seasearch.org.uk) in the UK, are well-established projects with observation protocols appropriate for their target areas and objectives. The aim of the present study was to analyse the distribution data of selected species provided by diver volunteers.

Materials and methods - The network coordinated by Reef Check Italia onlus consists on the active participation of recreational divers, who have the task to promote the project and to coordinate the activity at local level, involving others volunteers. Everybody, with experience and passion can give their own contribution. Volunteers conduct surveys on their own or during organized field surveys using the Coastal Environmental Monitoring (CEM) protocol. During CEM surveys, divers swim freely throughout a dive site and record information on 39 easily identifiable target species. At the conclusion of each survey, divers give information also on survey time, depth, temperature, and other environmental data later transferred to the online database thought the project web site (www.reefcheckitalia.it). Data are periodically checked for consistency in geographical locations, sea bottom features and reliability by a set of crosschecks. Visually estimated abundances were normalised on the observation time. Stored data can be represented and analysed by a range of Geographical Information Systems (GIS) and related tools. In the present study, an approach based on the Google Hearth and Google Map web-GIS were applied in order to make the data free available through Internet.

Results - Since 2006, Reef Check Italia onlus involves more than 600 trained recreational divers that conduct around 2,000 surveys. When possible, dataset was integrated with data from recent literature. After the appropriate checks, all the data are periodically represented on Google maps, through a semi-automatic procedure. This procedure resulted in 39 distribution maps freely available on the project web sites. Further analyses, including readout information on each single observation,

are possible downloading the georeferenced dataset and importing it on the Google Earth platform (Fig. 1) or in any other GIS.

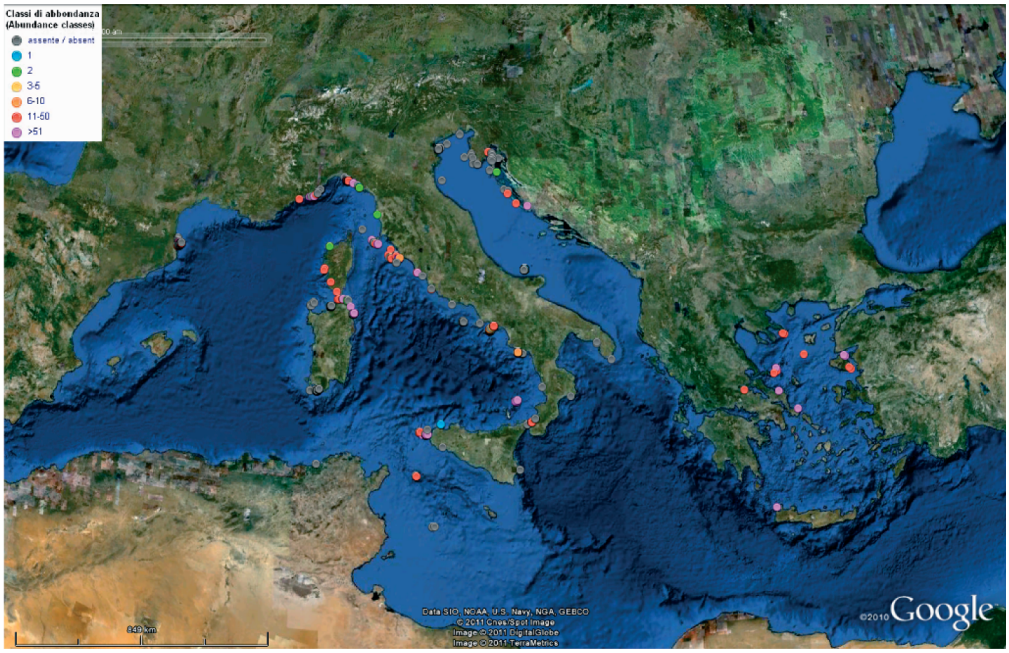

Fig. 1 - Distribution data of the gorgonian *Paramuricea clavata* provided by diver volunteers integrated with data from recent literature.

Dati di distribuzione della gorgonia Paramuricea clavata *forniti da subacquei volontari integrati con dati provenienti da letteratura recente.*

Conclusions - The analysis of the distribution of species at a biogeographic scale is fundamental to answer some basic ecological questions. The only instrument to permit a right planning of interventions on protection is to know the most suitable environment for a species and its geographical distribution. Reef Check Italia standardised census method and database management system have resulted in a successful citizen science monitoring program. Citizen science allows all those who are interested in the resource to contribute to its understanding. Beyond providing valuable data, the increased stewardship that comes from participation in the surveys is vital to the protection of coastal marine resources.

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