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SYMBOLS TO REPRESENT MEDITERRANEAN SEABED TYPOLOGIES AND FOCAL BENTHIC SPECIES

SIMBOLI PER RAPPRESENTARE LE TIPOLOGIE DI FONDALE E LE SPECIE BENTONICHE COSPICUE

Abstract - A set of effective symbols, suitable to represent 11 substrata typologies, 68 focal taxa and mucilage aggregates distribution, both on 2D/3D maps and along seabed profiles, was provided.

Key-words: methodology, map graphics, ocean floor, biocoenosis, Mediterranean Sea.

Introduction - Understanding diversity and ecological processes occurring in coastal marine habitats, as well conservation and management of marine biological resources and natural heritages, require proper representation of seabed typologies, biocoenosis, and benthic species distribution at a wide range of spatial scales. Most of the attention is generally paid on focal species, which include indicators, keystones, umbrellas, and flagships species (for definition see Zacharias and Roff, 2001). The distribution of these taxa can be obtained by scientific SCUBA divers along transects (Bianchi *et al.*, 2004) and reproduced as graphic profiles which describe, for examples, changes along gradients. Benthic cartography (including maps of the biocoenoses, emergencies, degradations and risks), requires standardised symbols (Meinesz *et al.*, 1983) and/or textual codes (Bianchi, 2007). The aim of the present study was to provide a set of effective symbols, suitable to represent Mediterranean substrata typologies and focal species distribution both on 2D/3D maps and along seabed profiles.

Materials and methods - Main substrata typologies and focal taxa list were obtained reviewing the literature on Mediterranean habitats classification (see RAC/SPA, 2006 and references therein), European Community directives and international conventions. Taxa list were reduced unifying species with similar shape, reproducible by the same symbol but different colours and/or size. For each selected typology and taxon the stylised shape was freehand drawn. All the freehand drawing were digitalised and converted in a custom font using dedicated software. The effectiveness of digitalised symbols was tested on thematic maps and transects profiles based on field data.

Results - 80 symbols, representing 11 bottom typologies, 68 taxa and mucilage aggregates, were drawn and stored in a custom font. These symbols were effectively used to represent focal species distribution within the “Secche di Tor Paterno” marine protected area.

Conclusions - Simple and easily distinguishable symbols are useful for both benthic cartography and graphic profile which could allow spatial and temporal analyses.

Mud		<i>Padina pavonica</i>		<i>Sarcotragus spinosulus</i>		<i>Erosaria spurca</i>	
Sand fine		<i>Dictyota</i> spp.		<i>Tethya</i> spp.		Cypraeidae	
Sand fine + ripple		<i>Sargassum</i> spp.		<i>Phorbas tenacior</i>		<i>Tonna galea</i>	
Sand coarse		<i>Laminaria</i> spp.		<i>Cliona</i> spp.		<i>Ranella olearia</i>	
Sand coarse + ripple		<i>Cystoseira</i> spp.		<i>Corallium rubrum</i>		<i>Charonia</i> spp.	
Detritus		<i>Codium bursa</i>		<i>Paramuricea clavata</i>		<i>Mitra zonata</i>	
Gravel		<i>Caulerpa taxifolia</i>		<i>Eunicella cavolinii</i>		<i>Lithophaga lithophaga</i>	
Stone		<i>Caulerpa prolifera</i>		<i>Eunicella singularis</i>		<i>Pinna nobilis</i>	
Rock coralligenous		<i>Caulerpa racemosa</i>		<i>Eunicella verrucosa</i>		<i>Pholas dactylus</i>	
Rock calcareous		Sea grasses		<i>Leptogorgia sarmentosa</i>		Sea urchin regular	
Rock granitic		<i>Petrobionta massiliana</i>		<i>Antipathes dichotoma</i>		<i>Sphaerechinus granularis</i>	
Rock metamorphic		<i>Axinella polypoides</i>		<i>Antipathes subpinnata</i>		Heart sea urchin	
Mucilage		<i>Axinella cannabina</i>		<i>Astroides calycularis</i>		Sea star	
<i>Peyssonella</i> spp.		<i>Spongia agaricina</i>		<i>Cladocora caespitosa</i>		Bryozoans erected	
<i>Lithophyllum</i> spp.		<i>Spongia officinalis</i> & <i>zimocca</i>		<i>Savalia savaglia</i>		Bryozoans encrusting	
<i>Corallina</i> / <i>Jania</i>		<i>Aplysina cavernicola</i>		<i>Errina aspera</i>		Ascidians solitary	
Maerl		<i>Aplysina aerophoba</i>		<i>Patella ferruginea</i>		Ascidians stolons	
<i>Laurencia</i> spp.		<i>Asbestopluma hypogea</i>		<i>Patella nigra</i>		<i>Aplidium conicum</i>	
<i>Sphaerococcus coronopifolius</i>		<i>Geodia cydonium</i>		<i>Gibbula nivosa</i>		<i>Polycitor adriaticus</i>	
<i>Schimmelmannia schousboei</i>		<i>Hippospongia communis</i>		<i>Dendropoma petraeum</i>		Ascidians colonial	

Fig. 1 - Proposed symbols for the most relevant seabed typologies and benthic taxa.

Simboli proposti per le tipologie di fondale e per i taxa bentonici più rilevanti.

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