

“The Dubbing World for the Ocean”: An Ocean Literacy initiative at Santa Marinella (RM)- Central Tyrrhenian Sea

Final report of activities (by Martina Gaglioti)

Introduction

The Ocean Literacy is among the main objectives of the United Nations and is essential in order to fulfill the objectives resumed by the Sustainable Development Goals 14. The design thinking behind this definition is making more understandable as possible the reasons behind the need of advance our knowledge and support the scientific research to enhance our effort toward a sustainable use of marine resources and a more spread comprehension of the importance of this “blue knowledge”. In order to support this kind of advocacy these reasons have been resumed in 7 reference principles in order to translate even the most complex concepts behind the marine ecosystems functioning into more easily understandable statements even for a not-expert audience (Santoro et al., 2017; Borja et al., 2020). The herein described initiative has been conceived exactly on this perspective, in the framework of the Ocean Literacy Activities promoted by the Intergovernmental Oceanographic Commission of UNESCO.

Study area

The investigated site (Fig.1 a, b) is located in the nearby of the Santa Marinella harbor (42° 2' 2.49"N; 11°52' 7.53"E) along the Latium coast (Central Tyrrhenian Sea). The study area is a sandy beach characterized by the presence of mixed sediments, both sand and gravel materials.



Figure 1 (a, b) Sampling site- Santa Marinella (RM) Promontory of the Odescalchi Castle (Latium coast- Central Tyrrhenian Sea)

Material and methods

During the fieldwork session we introduced the dynamic system of the sandy beaches and the main issues affecting the sandy shores and the coastal environments in general. The main topics addressed during this event have been focused on the origin of sandy beaches and the dynamic processes affecting their evolution over time, determining the microscopic and macroscopic dynamics retrievable also at a seascape and landscape level. The theoretical part was thought by presenting at first the main principles of Ocean Literacy and then developed walking through an ideal pathway into the relationship between biodiversity and ecosystem functioning of the sandy beaches' environments.

This journey has been supported by a storytelling on the aforementioned topics using some explanatory cards (Fig. 2) focused on the main characteristics of the most relevant abiotic and biotic components of the investigated site and the main representatives of the biodiversity associated to the sandy beaches and the bioturbation processes they are involved in. Moreover, a special focus has been given also on the relevant component of the Mediterranean seagrass meadows for their crucial role among the most efficient drivers of blue carbon storage in coastal environments. Indeed, beside considering the abiotic factors and physio-chemical driving forces associated to the sandy beaches, we focused also on the biotic component acting as “natural defenses” of the ocean toward the most debated issues of coastal erosion, sea-level rise and climate-change related effects concerning the marine ecosystems both onshore, for instance in the transitional environments as the sandy beaches, and offshore from the shallow waters to the deepest



Figure 2 The first card of our journey: the seven principles of Ocean Literacy

environments. On this perspective a brief insight was given on the ecological role of seagrass meadows and on the debated issue of alien species, explaining the consequences of their presence on the overall functioning of the marine ecosystems.

Finally, in order to provide an effective hands-on experience to the participants we concluded our fieldwork session with some sample observations trying to attribute them the proper taxonomical group using a field guide (Fig. 3a-g) and we applied a real scientific protocol in order to wear the scientist' glasses for a while and assess the health status of the investigated beach. To achieve this goal, we applied the MAC-e Monitoring Protocol developed by Reef Check with specific adaptations for the Mediterranean basin and currently accepted from the scientific community as a useful tool in order to conduct monitoring sessions with an expeditious approach.



Figure 3(a-g) Some insights on the field activities of the day

Monitoring session results

During the practical session we monitored an overall linear space of 100 m collecting data on our sampling area. Additionally, the youngest participants learned how to correctly use an analog compass to discover the seaward orientation of the investigated area, they acquired the GPS position of the sampling sites in order to map properly the explored area and after a theoretical introduction on the sedimentary environment they acquired some information also on the granulometric characteristics of the sediments. An overall of 6 sampling sites for a total of 30 replicates (5 for each sites) have been considered along an overall stretch of 100 m using some sampling quadrats (25 cm x 25 cm). The size was readapted just according to practical needs and considering the prevailing target of the volunteers involved (Fig.4).



Figure 4 Wearing the same uniform for a day with a common life-long objective hopefully

As a result of the monitoring session, we highlighted a quite poor level of anthropic disturbance considering its proximity to a highly urbanized area, even though some evidences of anthropic disturbance have been observed. Indeed, the human-derived component of the beached material was dominated by glass fragments (bottles), cigarette butts, polystyrene and building materials. The biological component examined by the young volunteers and their supervisors was dominated by vegetal remains (*Posidonia oceanica*, algal thalli or fragments and wood remains), whereas the macrobenthic component

was the less represented, even though some beached remains of decapoda or sessile crustaceans (*Brachiuria* crabs; *Balanidae*) and mollusks have been observed (i.e., *Arca noae*, *Sepia officinalis*, *Ensis minor*, *Spondilus gaederopus*). In the east facing side of the explored beach a tiny “banquette” derived from the deposit of *Posidonia* leaves was found, with a medium thickness of 30 cm in the areas of more consistent accumulation. In addition, on some substrates we observed some bioerosion traces acted by porifera and some examples of hard-substrate colonization from serpulid polychaeta (Fig. 5).



Fig. 5 Some pictures telling us some of the most interesting “life histories” of the investigated place

An overall number of 100 volunteers have been engaged in the initiative (around 80 adults and 20 children), all the activities have been finalized according to the COVID-19 protocol measures in force. After a proper work of elaboration the acquired data will be desirably shared with the scientific community and loaded on the online reference database for similar monitoring data storage: <https://www.reefcheckmed.org/italiano/reef-check-med/spiagge/>. Moreover, the beach, located in the nearby of the Odescalchi Castle Promontory of Santa Marinella, has already been added as a new sampling site (Beach reference ID: 95) to the extant Reef Check database, since according to the open access available information it has never been investigated before through this kind of approach.

This initiative gave us the opportunity to fill a knowledge gap on this coastline stretch from a more scientific perspective. Hopefully, the data acquired on this occasion could be used as a baseline for future observations to improve upcoming monitoring sessions and management initiatives, to be repeated over time in order to monitor the health status of this coastal zone in a diachronic perspective and detect significant changes that might occur over time. Otherwise, it has been a pleasant capacity-building session and outreach occasion as well.

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