

Marine pollution and environmental awareness: An efficient way to approach high school students towards marine sciences

Giovacchini Alice¹, Mascha Stroobant², Silvia Merlino³, Marina Locritani⁴ and Marinella Abbate⁵

¹ Università di Pisa, Dipartimento di Biologia Marina, Via Volta 4/b, 56126 Pisa, Italy
E-mail: giovacchiniali@gmail.com

² DLTM – Distretto Ligure delle Tecnologie Marine, La Spezia, Italy

³ Istituto di Scienze Marine, CNR, sede di La Spezia-Pozzuolo di Lerici, Italy

⁴ INGV – Istituto Nazionale di Geofisica e Vulcanologia, Roma, Italy

⁵ ENEA-UTMAR –Centro Ricerche Ambiente Marino –Pozzuolo di Lerici, La Spezia, Italy

All the seas are filling up with micro/macro plastic, with degradation rates up to 1000 years. Often they accumulate in specific areas (the famous “Pacific plastic island”) and Mediterranean sea is not an exception (Suaria&Aliani, 2014).

On one hand, damages suffered by animals after contact with macro/micro plastic objects has led to an increase of studies especially on the effects of these pollutants in the food chain (Galgani *et al.* 2014). On the other hand we still lack knowledge concerning marine litter fluxes in our seas (coming from harbors, river mouths, illegal landfills and sewers) and accumulation on European beaches (Andrady, 2011).

ISMAR Institute has undertaken, since 2013, the SEACleaner project, with the goal to gather as much data as possible on the presence, type and amount of marine litter in the coastal area around the “Pelagos Sanctuary “ (Notarbartolo di Sciara *et al.*, 2008) a special area that encompasses over 87.500 km² of the north-western Mediterranean Sea, between south-eastern France, Monaco, north-western Italy and northern Sardinia, surrounding Corsica and the Tuscan Archipelago.

SEACleaner project involves 4 marine protected areas/marine parks of Liguria and Tuscany, 4 research institutes (such as ISMAR, DLTM, ENEA-UTMAR and DLTM) and one University (University of Pisa). The project has been conducted by involving high schools of the neighbouring areas of La Spezia and Parma through work-related internships (regulated by Legislative Decree n.77 of 15.04.2005 and Law n. 107 of 13.07.2015). Students recollect a large amount of data (citizenscience). This approach has proven to be valid also from an educational point of view (Merlino *et al.* 2015), since it brings students close to social and environmental issues, while improving knowledge of scientific methodology. Students (at now 450 in three years) participate also to data analysis and give their contribution in different tasks, depending on their school curricula (graphical design, computer science, bio-technology etc.).

The project has had an European Union grant for shoot a documentary (translated in French and subtitled in English), screened at the “tenth anniversary of the researcher night” (September 2015) and selected for several environment film festival, as the Torino Environmental Festival, the LEGAMBIENTE-CLOROFILLA Festival and the International LIFE AFTER OIL Festival [MARINE RUBBISH. A challenge to share. 2015. English subtitled version is now available on ISMAR Youtube channel and on LIFE AFTER OIL International Film festival website].

References

- Andrady, A. L. 2011. Microplastics in the marine environment. *Marine Pollution Bulletin*, 62, 1596–1605.
- Galgani, F., Claro, F., Depledge, M., & Fossi, C. 2014. Monitoring the impact of litter in large vertebrates in the Mediterranean Sea within the European Marine Strategy Framework Directive (MSFD): Constraints, specificities and recommendations. *Marine Environmental Research*, 100: 1–7.
- Italian Law: Legge 13 luglio 2015, n. 107 “Riforma del sistema nazionale di istruzione e formazione e delega per il riordino delle disposizioni legislative vigenti” (GU Serie Generale n.162 del 15 luglio 2015).
- Italian Law: Decreto Legislativo 15 aprile 2005, n. 77 “Definizione delle norme generali relative all'alternanza scuola-lavoro, a norma dell'articolo 4 della legge 28 marzo 2003, n. 53” (GU n. 103 del 5 maggio 2005).
- Merlino S., Locritani M., Stroobant M., Mioni E., Tosi D. 2015. SeaCleaner - Focusing citizen-science and environment education on unravelling the marine litter problem. In: *Blue Future: education the next generation. Special issues of MTS Journal July/August 2015*, V 49.

- Notarbartolo di Sciara, G., Agardy, T., Hyrenbach, D., Scovazzi, T., Van Klaveren, P. 2008. The Pelagos Sanctuary for Mediterranean marine mammals. *Aquatic Conservation: Marine and Fresh water Ecosystems*, 18: 367-391.
- Suaria, G. and Aliani, S. 2014. Floating debris in the Mediterranean Sea. *Marine Pollution Bulletin*, 86 (1-2): 494-504.