



MONITORING OF MEDITERRANEAN COASTAL AREAS: PROBLEMS AND MEASUREMENT TECHNIQUES

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Marine litter ingested by loggerhead sea turtle *Caretta caretta* (Linnaeus, 1758) in Tuscany waters (North-Western Mediterranean Sea)

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Introduction

Sea turtles bump into a great number of anthropogenic debris that can accumulate both on surface in convergence zones and at sea floor at any depth, representing an increasing threat for the marine environment. Sea turtles interact with anthropogenic debris through entanglement and ingestion, with an increasing number of documented cases and studies. Marine debris may be accidentally ingested if mixed with natural food, actively selected because similar to a natural prey, like jellyfish. The percentage of the turtles ingesting artificial debris varied among the study area and this inter-regional variation might be caused by the difference of feeding habits in each region. Therefore, it is important to study debris ingestion as a component of diet in a variety of areas. Debris can obstruct, damage or cause inflammation of the digestive tract, causing a reduced digestive capability and even death. When not-lethal, ingested debris might cause other problems like floating syndrome or reduced swimming capability, making the turtle more vulnerable to bycatch or collision with boats. Moreover, anthropogenic debris ingestion can transfer toxic compounds on marine wildlife.

Materials and methods

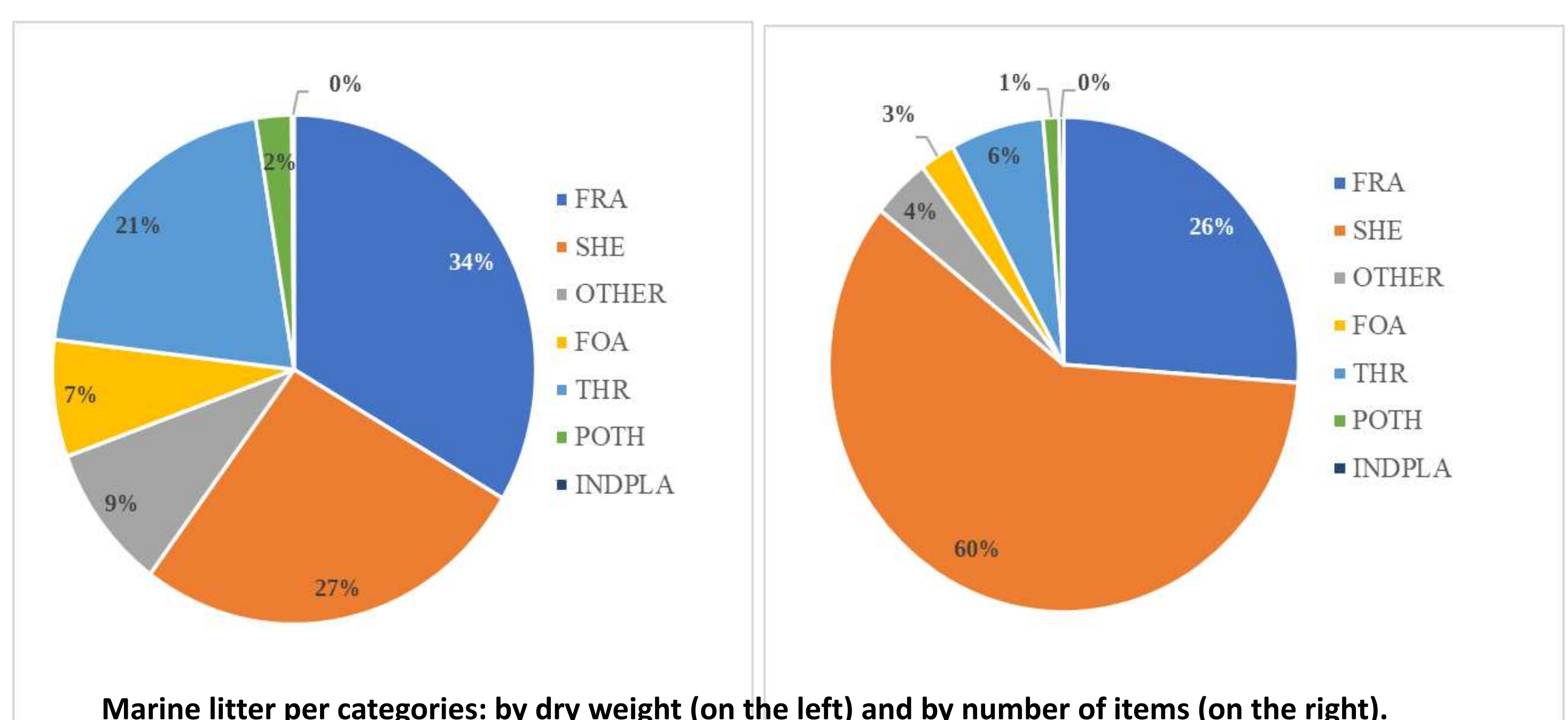
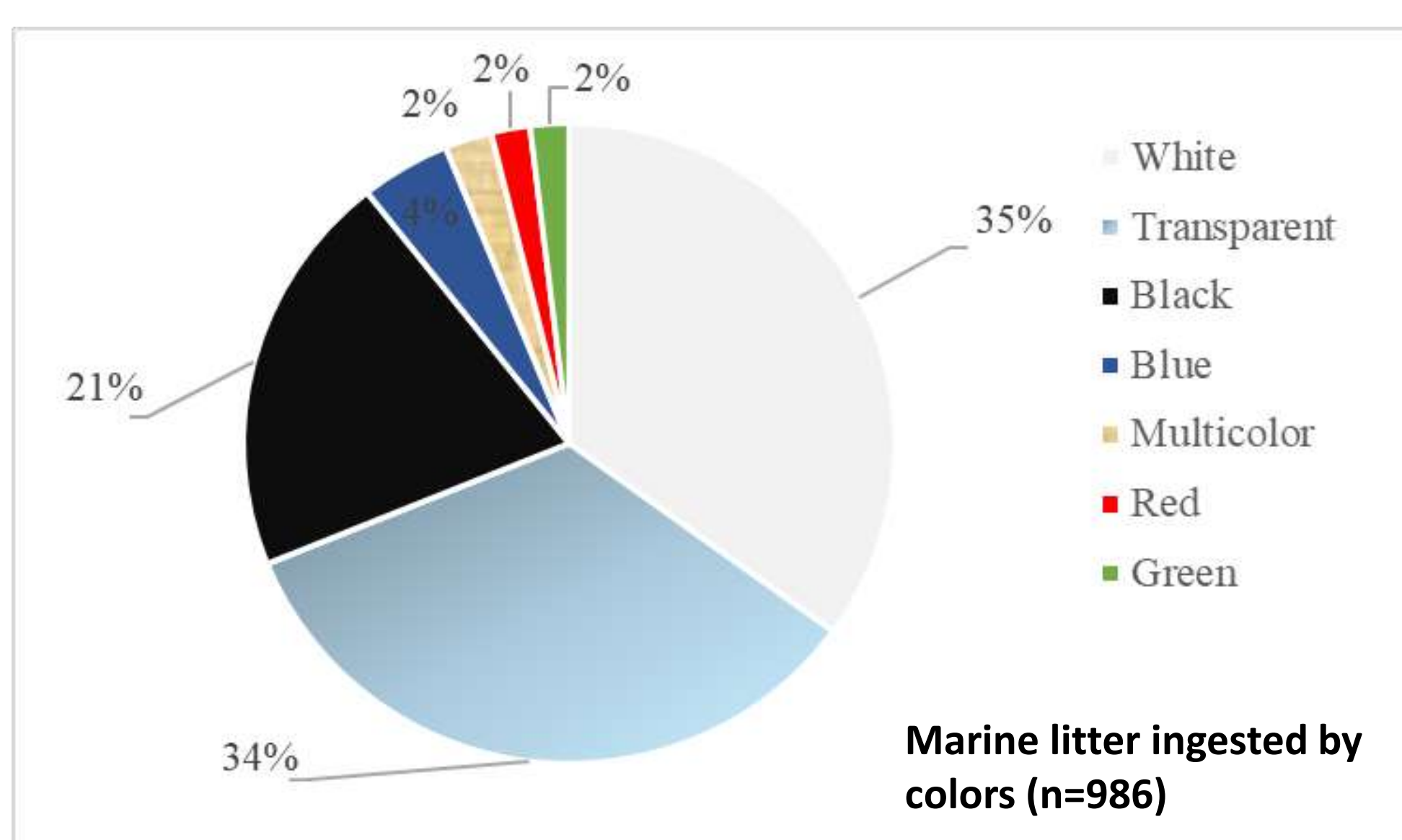
The foraging ecology of the loggerhead sea turtle in a neritic foraging habitat in the Tuscan seas (North-Western Mediterranean Sea) was studied by gastrointestinal tracts (GI) of 152 specimens recovered along the Tuscany littoral between 2006 and 2024. The recovered specimens, late-juveniles, sub-adults and adults, were all dead animals stranded or accidentally caught by different gears. All the animals were measured, weighted, sex-identified when possible and the oesophagus, stomach and intestines were removed. Preys were identified to the lowest taxonomic level and marine debris ingested were characterized using the standardized protocol.



Different type of plastic categories: fragment (FRA), threadlike (THR), sheet like (SHE), foamed (FOA), other plastic like (POTH), industrial plastic pellets (INDPLA), other non plastic litter (OTHER)

GI tract	DW g	N	% DW	% N
Intestin	239,3	1299	84,6	83,5
Stomach	40,8	220	14,4	14,1
Oesophagus	1,9	25	0,7	1,6
Feces	0,87	11	0,3	0,7
Total	282,87	1555	100	100

Marine litter for each GI tract (n=152 turtles; DW= dry weight, g; N=Numbers of items)



Conclusion

The evidence of marine debris was observed on several specimens, and this confirms their high impact also in the Mediterranean Sea and stresses the importance of the loggerhead turtle as species to evaluate the effects of toxic chemicals found mainly in plastics, as required by the Marine Strategy Framework Directive (MSFD) of the European Union for evaluation of Good Environmental Status (GES).

Correlating the ingestion of preys to that of marine debris could be important to evaluate in which way turtles respond to the ingestion of debris and if the latter influence their diet. If marine debris influence feeding capacity of loggerhead sea turtles, we should observe, with the increasing of number and weight of the latter, a lesser ability of turtles to feed, and as a result, a lesser weight of organisms inside the gastrointestinal tract of those animals. But this evidence does not emerge from our study.