INGESTED LITTER BY FISH IN THE DEEP WATERS OF THE EASTERN IONIAN SEA (E. MEDITERRANEAN)

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Introduction

Marine litter has been recognised as a complex, multi-faceted and serious global environmental problem.

Marine litter impacts:

- ✓Aesthetics
- ✓Health
- ✓Environment
- ✓Economy
- ✓Ecology
- Indirectly: changes to habitat
- Directly: i) Entanglement ii)Ingestion

Litter in marine environment originates from a variety of different sources, but its negative impacts (e.g. ingestion, entanglement) on marine organisms worldwide have been recognized only the last decades.

Materials and Methods

- CoralFISH project (FP7 Nº 213144 and Greek Ministry
- Eastern Ionian Sea (off Cefalonia Isl.) E. Mediterranean (Fig.1)
- Experimental long line fishing
- Depths: 300 - 850m depth.
- 26 deep-water species studied.
- Litter was weighted and identified

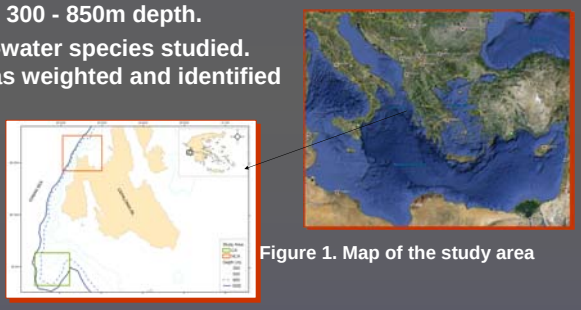

Figure 1. Map of the study area

Results

From the 26 deep-water fish species examined (1504 individuals), litter was present only in the gut of 4 Elasmobranch (the pelagic stingray *Pteroplatytrygon violacea* (Fig.2), the blackmouth catshark *Galeus melastomus* (Fig.3), the longnose spurdog *Squalus blainville* (Fig.4), the velvet belly *Etmopterus spinax* (Fig.5) and one Teleost species (the blackspot red seabream *Pagellus bogaraveo*) (Fig.6).

Figure 2. *Pteroplatytrigon violacea*

Figure 3. *Galeus melastomus*

Figure 4. *Sqalus blainville*

Figure 5. *Etmopterus spinax*

Figure 6. *Pagellus bogaraveo*

36 litter items identified from the guts of 28 individuals. The number of individuals and the litter frequency of occurrence is presented in Table 1.

Table 1. Occurrence of ingested litter in the guts of deep-water species caught in the E. Ionian Sea during the study period (2010)

Species	N.	% Occur.
Etmopterus spinax	16	6.25
Galeus melastomus	741	3.24
Squalus blainville	75	1.30
Pteroplatytrygon violacea	2	50.00
Pagellus bogaraveo	60	1.67

Ingested litter were classified into three categories: (i) plastics, (ii) metals and (iii) wood. Bird bones and feathers (Others) were also found but as their origin was uncertain, they were not considered as litter. The number and the percentage of litter categories are shown in Figure 7. The number of litter items per fish was ranged from 1-6 with highest value observed for *P. violacea*. Plastics were the most common litter category. Plastic composition is shown in Figure 8.

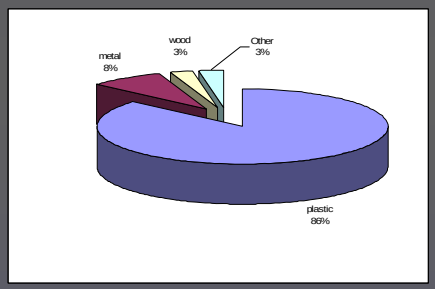

Figure 7. Ingested litter categories.

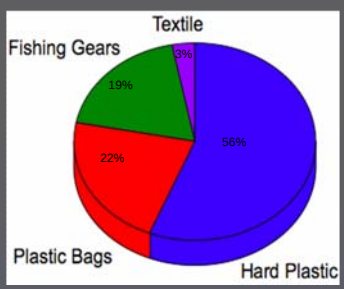

Figure 8. Ingested plastic composition.

Plastic particles were mainly of blue (bags), brown (hard plastic), black (bags) and transparent green colors (fishing gears). Their size ranged from 5-60 mm.

Discussion

- Litter was entering the food chain and reported in the guts of fish and other living organisms.
- Elasmobranchs seem to swallow more frequent litter than bony fish.
- Plastics were the most common ingested litter category and this could be explained by the fact that they disperse easily widely at various depths and their degradation occurs slower in the sea due to cool waters.
- The occurrence of litter materials was relatively infrequent for most species, indicating an accidental consumption.
- More attention should be given on future works focusing on the ingested litter and its impact on marine organisms.

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