



EFFECTS OF MARINE LITTER ON MEDITERRANEAN MARINE LIFE: A MONITORING PROTOCOL BASED ON BIOINDICATOR ORGANISMS

Data Analysis

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Task

- Index species based on occurrence of marine litter to select species as bioindicators
 - Literature review:
 - Taxa, species, geographical area, habitat, number of species sampled, number of species with marine litter



Data

- 42 studies of species impacted by marine litter
- 5 taxa groups:
 - Teleosts, reptiles, elasmobranchs, mammals, seabirds
- 22 Orders
- 91 species
- 6 habitats:
 - Neritic, pelagic, mesopelagic, demersal, benthopelagic, benthic

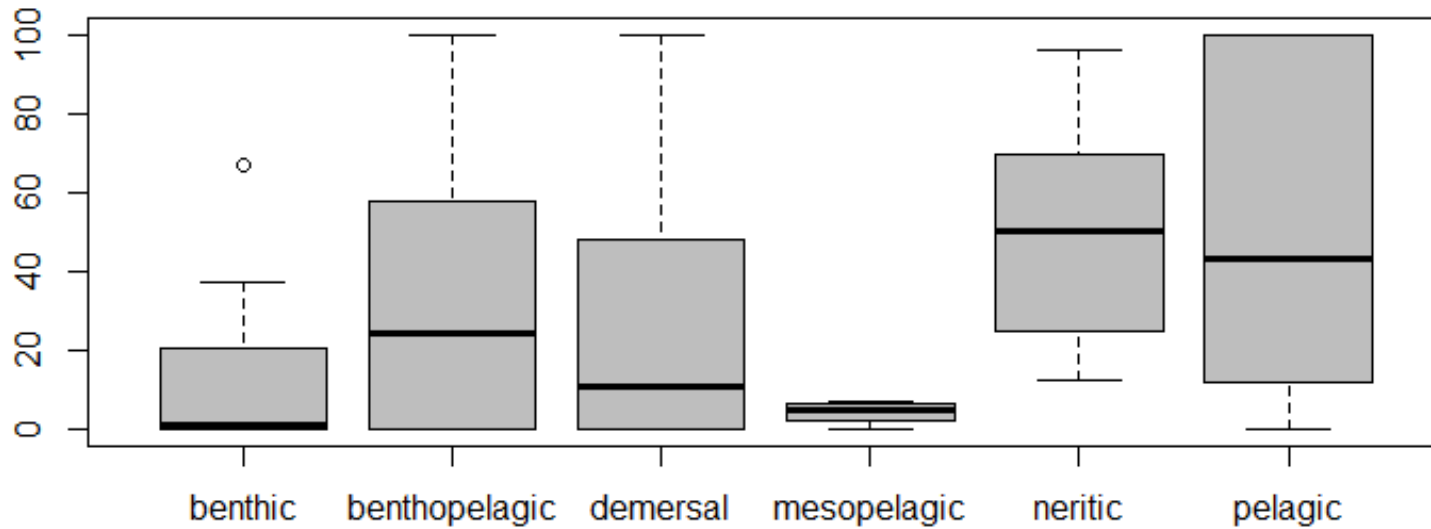


Analysis

- Marine Litter Impact Index
- Boxplot quartiles
 - Low: Minimum to first quartiles
 - Medium: First to third quartile (IQR)
 - High: Third quartile to maximum



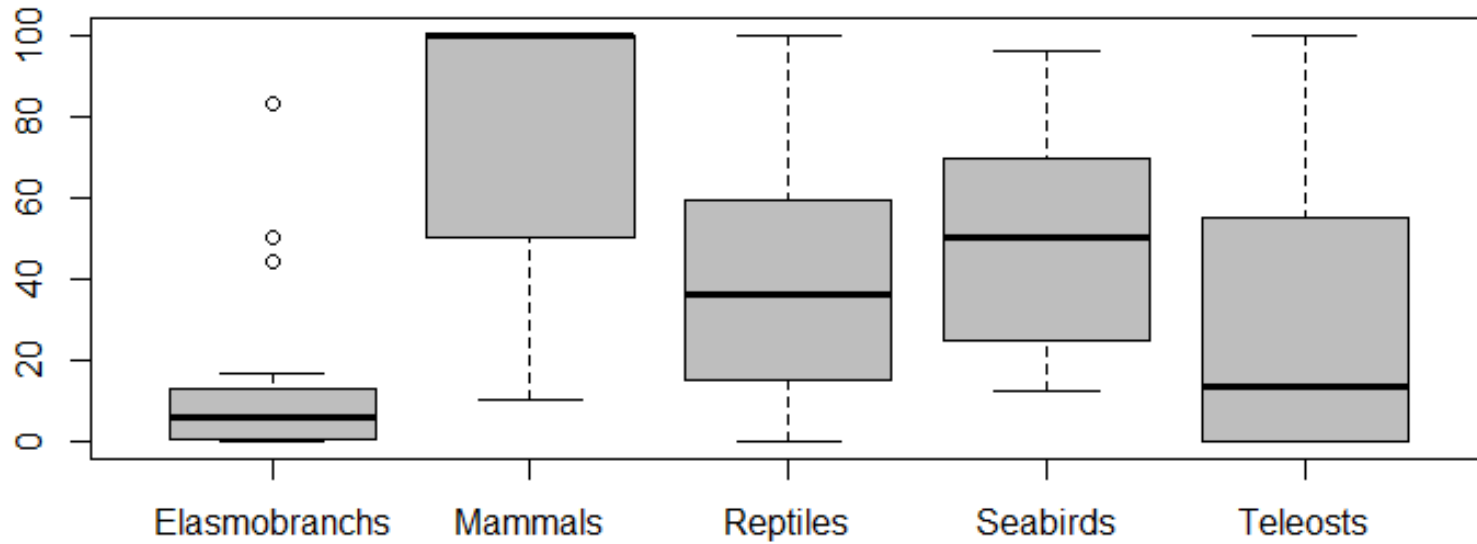
Habitat



Habitat: Bioindicator species

Habitat (number of species)	High Index	Species
Benthic (2)	> 20.75%	<i>Trigla lucerna, Chelidonichthys lucerna</i>
Benthopelagic (5)	> 57.71%	<i>Pagellus acarne, Caretta caretta, Dermochelys coriacea, Boops boops, Argyrosomus regius</i>
Demersal (12)	> 48.15%	<i>Saurida undosquamis, Diplodus annularis, Mullus barbatus, Mullus surmuletus, Nemipterus randalli, Pagellus erythrinus, Pagrus pagrus, Pelates quadrilineatus, Pomadasys incisus, Sciaena umbra, Serranus cabrilla, Siganus luridus</i>
Mesopelagic (1)	> 6.85%	<i>Hygophum benoiti</i>
Neritic (3)	> 69.57%	<i>Calonectris diomedea, Puffinus yelkouan, Puffinus mauretanicus</i>
Pelagic (7)	> 100%	<i>Physeter macrocephalus, Balaenoptera physalus, Tursiops truncatus, Grampus griseus, Stenella coerulealba, Engraulis encrasicolus, Caranx crysos</i>

Taxa



Taxa: Bioindicator species

Taxa (number of species)	High index	Species
Elasmobranchs (4)	> 13.16%	<i>Galeus melastomus</i> , <i>Squalus acanthias</i> , <i>Cetorhinus maximus</i> , <i>Pteroplatytrygon violacea</i>
Mammals (5)	> 100%	<i>Physeter macrocephalus</i> , <i>Balaenoptera physalus</i> , <i>Tursiops truncatus</i> , <i>Grampus griseus</i> , <i>Stenella coeruleoalba</i>
Reptiles (2)	> 59.54%	<i>Caretta caretta</i> , <i>Dermochelys coriacea</i>
Seabirds (3)	> 69.57%	<i>Calonectris diomedea</i> , <i>Puffinus yelkouan</i> , <i>Puffinus mauretanicus</i>
Teleosts (16)	> 54.81%	<i>Argyrosomus regius</i> , <i>Boops boops</i> , <i>Caranx crysos</i> , <i>Diplodus annularis</i> , <i>Mullus barbatus</i> , <i>Mullus surmuletus</i> , <i>Pagellus acarne</i> , <i>Pagrus pagrus</i> , <i>Pelates quadrilineatus</i> , <i>Sciaena umbra</i> , <i>Scomber japonicus</i> , <i>Serranus cabrilla</i> , <i>Siganus luridus</i> , <i>Trachurus mediterraneus</i> , <i>Chelidonichthys lucerna</i>



Proposed High Index Species

	Benthic	Benthopelagic	Demersal	Mesopelagic	Neritic	Pelagic
Elasmobranchs			Galeus melastromus Squalus acanthias			
Teleosts	Chelidonichthys lucerna	Argyrosomus regius Boops boops Pagellus acarne	Mullus barbatus Mullus surmuletus Saurida undosquamis Diplodus annularis Pagrus pagrus Pelates quadrilineatus Sciaena umbra Serranus cabrilla Siganus luridus	Hygophum benoiti		



Proposed High Index Species

	Benthic	Benthopelagic	Demersal	Mesopelagic	Neritic	Pelagic
Reptiles		<i>Caretta caretta</i> <i>Dermochelys coriacea</i>				
Mammals	-	-	-	-	-	<i>Physeter macrocephalus</i> <i>Balaenoptera physalus</i> <i>Tursiops truncatus</i> <i>Grampus griseus</i> <i>Stenella coerulealba</i>
Seabirds					<i>Calonectris diomedea</i> <i>Puffinus yelkouan</i> <i>Puffinus mauretanicus</i>	

