

# EXTRACTION AND CHARACTERIZATION OF MICROPLASTICS IN MARINE ORGANISMS SAMPLED AT GIGLIO ISLAND AFTER THE REMOVAL OF THE COSTA CONCORDIA WRECK

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# Plastics and organisms

Direct ingestion of microplastics occurs at several trophic levels and for several species

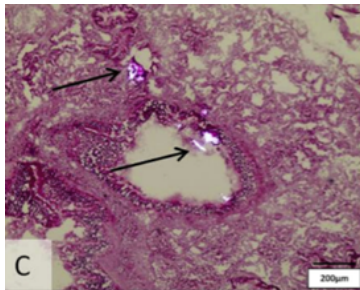
Microplastics can also be transferred throughout the food-web

Negative effects at different levels of organization

Zooplankton



Mussels



Fish



Fulmar & Harbor seal



Whales

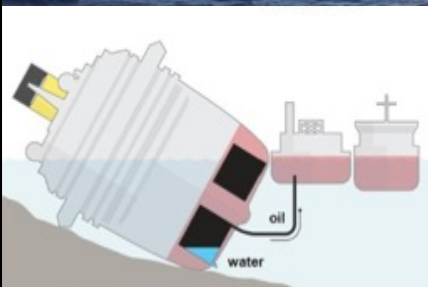


# BESIDE BASAL LEVELS, CAN WE MONITOR THE POSSIBLE INCREASE OF MPs IN THE MARINE ENVIRONMENT?



## Le operazioni di soccorso

Centinaia di uomini e decine di mezzi di soccorso si trovano all'Isola del Giglio attorno alla Costa Concordia dalla notte tra venerdì e sabato scorso, quando la nave ha impattato contro un gruppo di scogli per adagiarsi poi vicino al porto



### Le ispezioni

I soccorsi (Vigili del fuoco e speleologi) ispezionano i ponti fuori o parzialmente sott'acqua alla ricerca di dispersi e vittime. Sono dotati soprattutto di barelle (anche verticali) dove far adagiare eventuali sopravvissuti



### I cani

Dodici cani del nucleo cinofilo dei Vigili del fuoco usati per cercare i dispersi cabina per cabina grazie anche alle mappe della nave messe a disposizione dalla compagnia



### Gli elicotteri

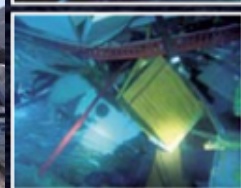
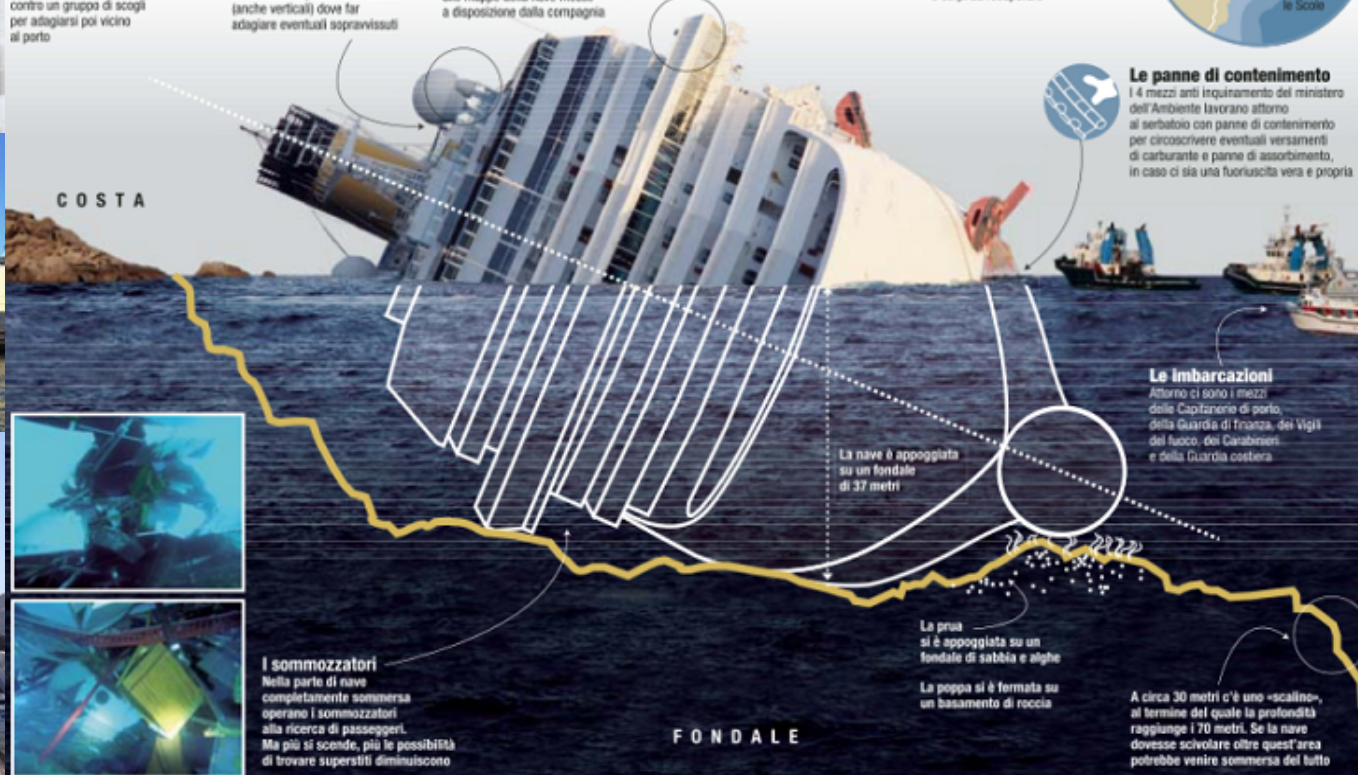
I velivoli della Marina e della Guardia di finanza sorvolano la zona intorno alla nave per cercare eventuali sopravvissuti o corpi da recuperare



### Le panne di contenimento

I 4 mezzi anti inquinamento del ministero dell'Ambiente lavorano attorno al serbatoio con panne di contenimento per circoscrivere eventuali versamenti di carburante e panne di assorbimento, in caso ci sia una fuoriuscita vera e propria

COSTA

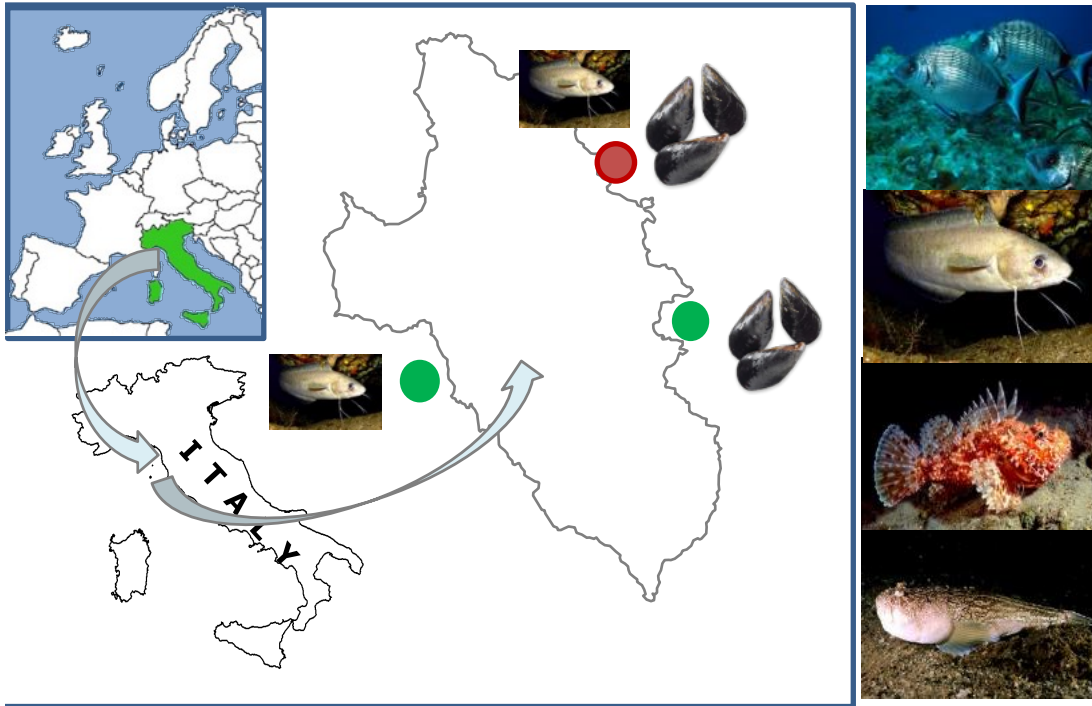


### I sommozzatori

Nella parte di nave completamente sommersa operano i sommozzatori alla ricerca di passeggeri. Ma più si scende, più le possibilità di trovare superstiti diminuiscono



# Experimental design



## FISH:

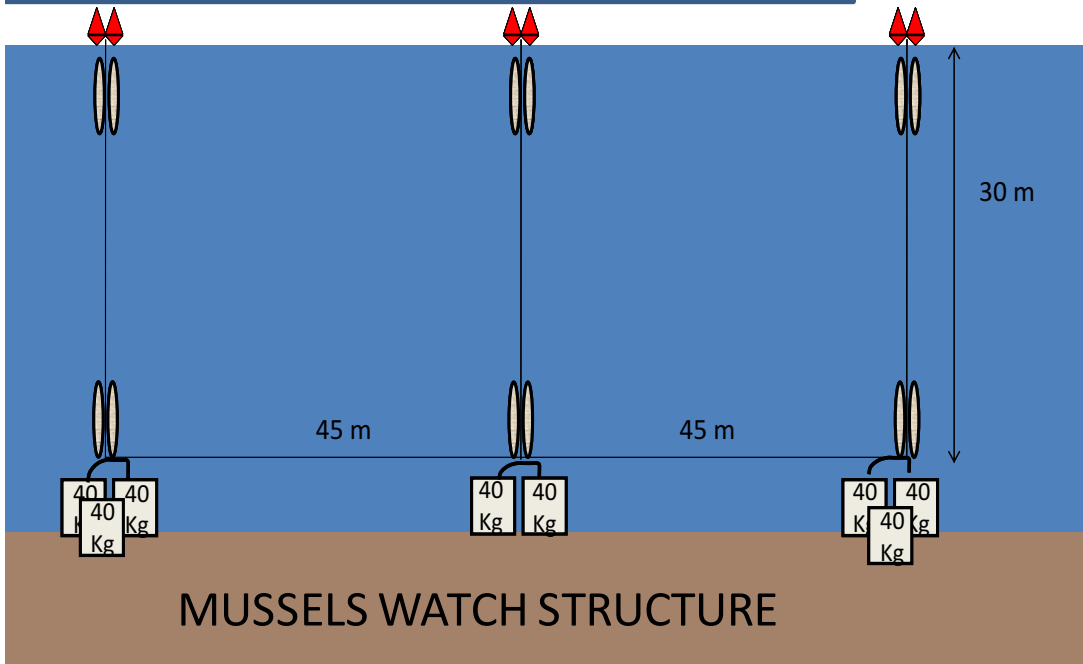
20 Fish x Site were sampled in Summer 2014.



Site	Species	N of analyzed organisms
CTRL	<i>Sparidae</i>	3
	<i>U. scaber</i>	4
	<i>P. phycys</i>	7
	<i>Scorpaena sp.</i>	8
WRECK	<i>Sparidae</i>	2
	<i>U. scaber</i>	3
	<i>P. phycys</i>	2
	<i>Scorpaena sp.</i>	11

## MUSSELS:

3 Seasons: Winter '13, Spring, Summer '14  
 2 Sites = Caldane (CTRL) and WRECK.  
 2 Depths = -1,5m and -30m



# EXTRACTION PROTOCOL

A RECENTLY TESTED AND VALIDATED PROTOCOL WAS USED IN ORDER TO QUANTIFY AND CHARACTERIZE MPs FROM NATIVE FISH AND TRANSPLANTED MUSSELS

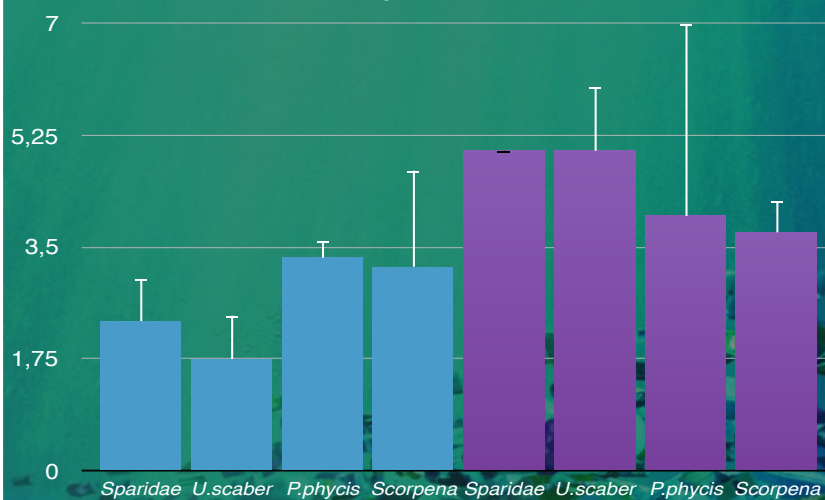
Experimental development of a new protocol for extraction and characterization of microplastics in fish tissues: First observations in commercial species from Adriatic Sea

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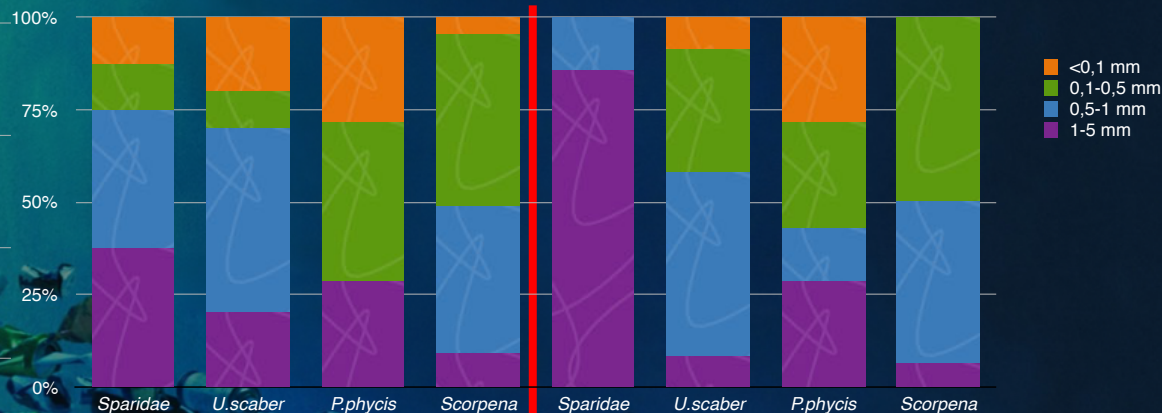


# CTRL species vs WRECK species

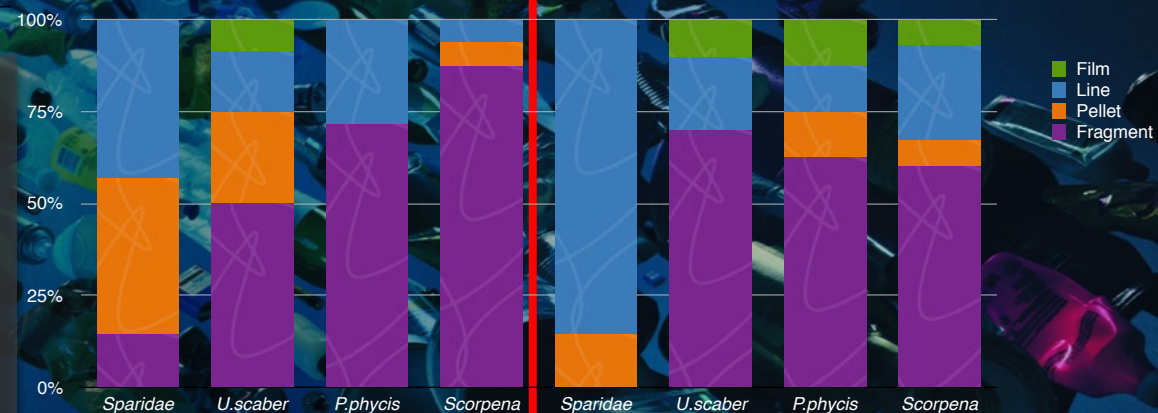
## Microplastics in fish



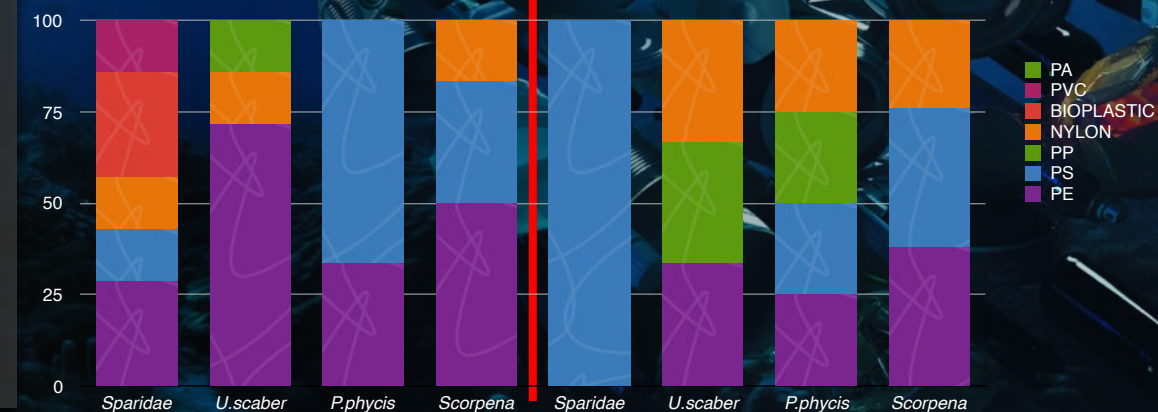
## Size distribution in different species (%)



## Shape distribution in different species (%)



## Typology distribution in different species (%)



**On 40 analyzed organisms 36 had MPs in stomach (94%).**

**CTRL species had lower number of ingested items in respect to the WRECK organisms.**

**No clear pattern for shape, size and typology between species from two investigated sites.**

**Overall, size, shape and typologies of ingested items are in line with Adriatic species (See poster n°101916.) except for nylon that occur with higher frequency.**

# MICROPLASTICS IN FISH COLLECTED FROM TWO SITES OF GIGLIO ISLAND

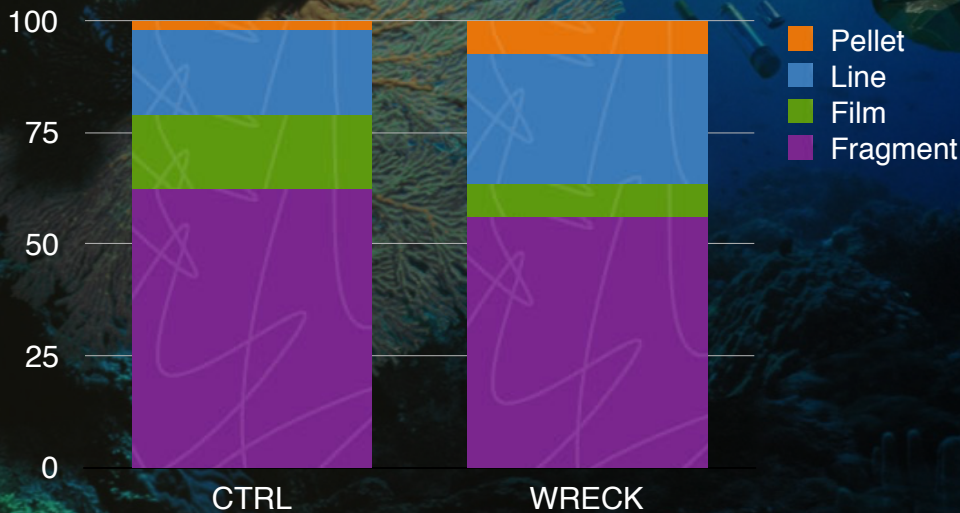
Microplastics in gastrointestinal tract



Size frequency (%)



Shape frequency (%)



Typology frequency (%)

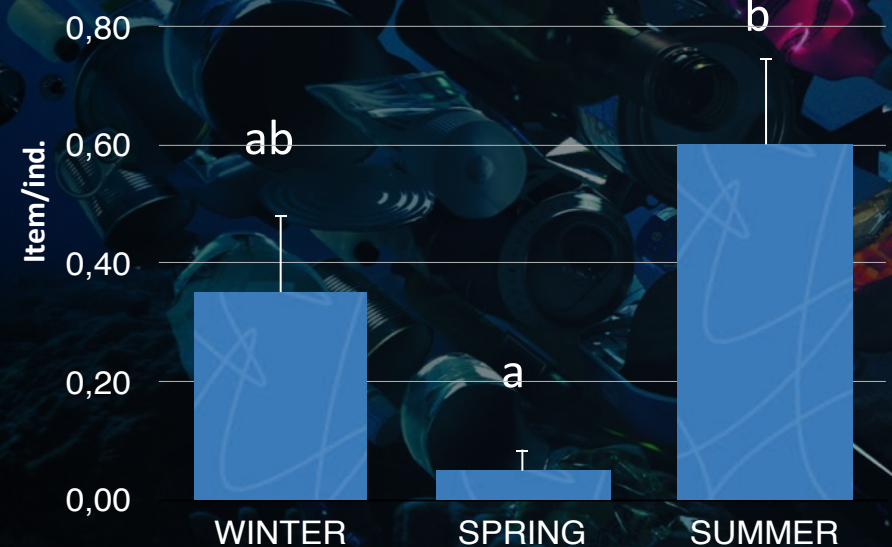
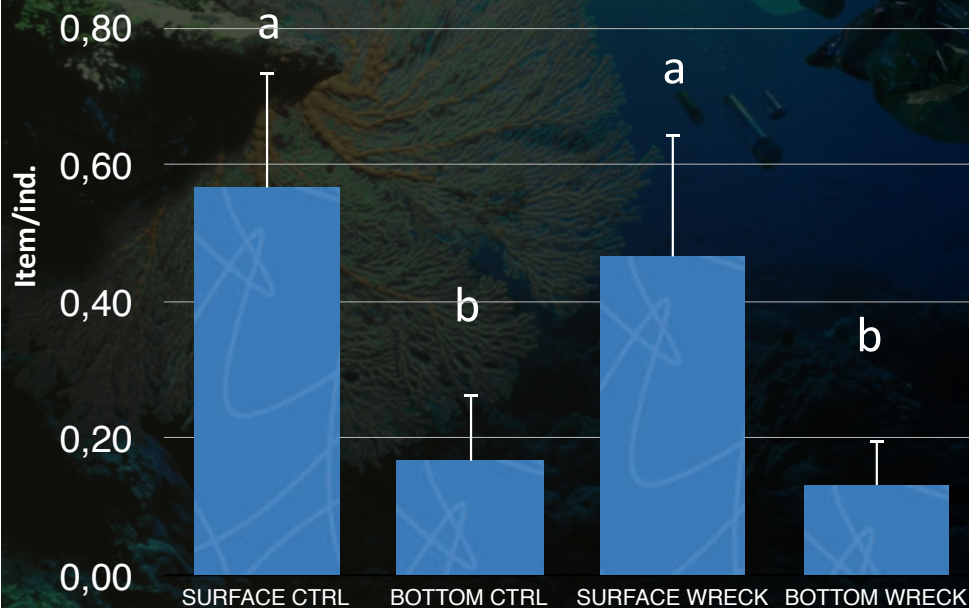
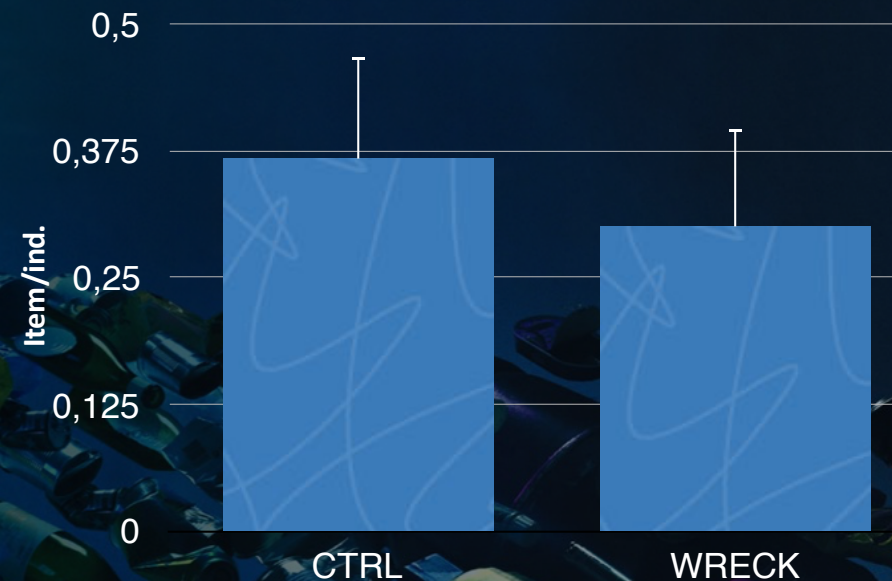
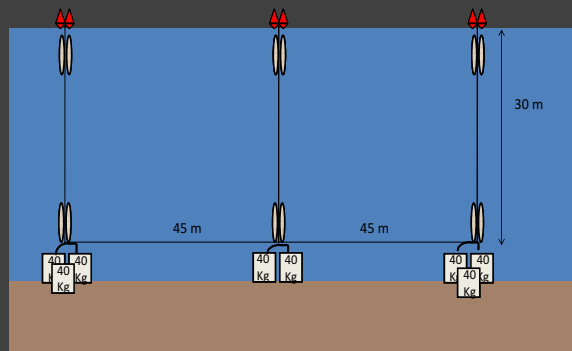




# MICROPLASTIC IN MUSSELS

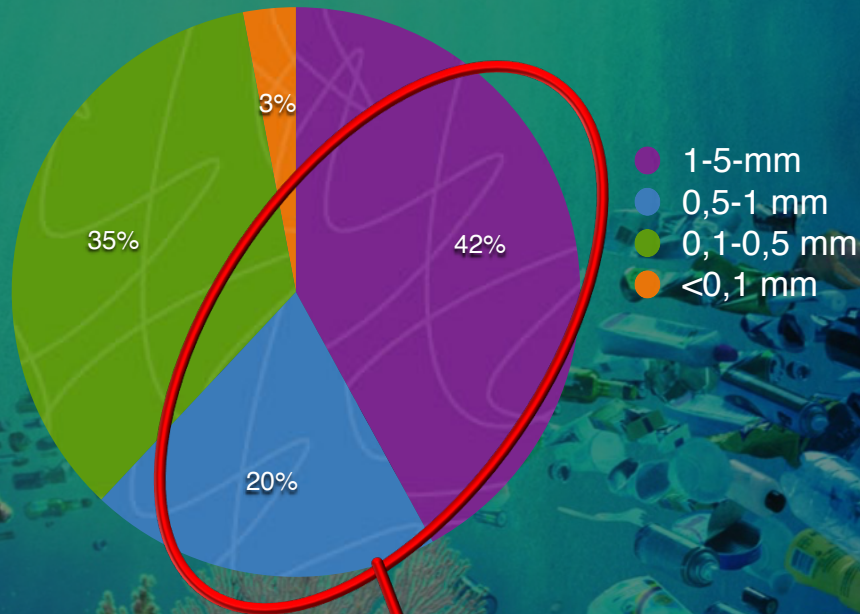
## TRASLOCATED AT THE GIGLIO ISLAND

No significant differences were observed in microplastic accumulation between mussels transplanted close to the wreck or in control site in different translocation experiments

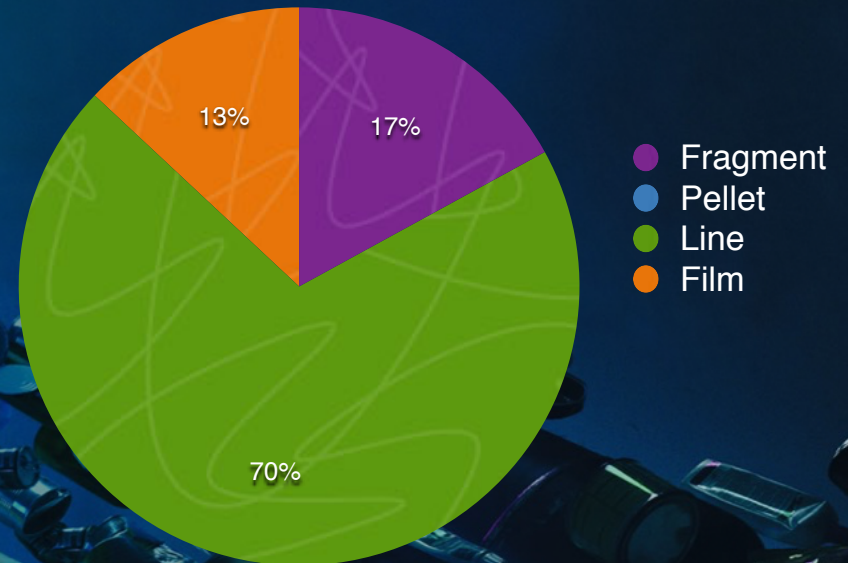


# SIZE AND SHAPE OF MICROPLASTIC IN MUSSELS

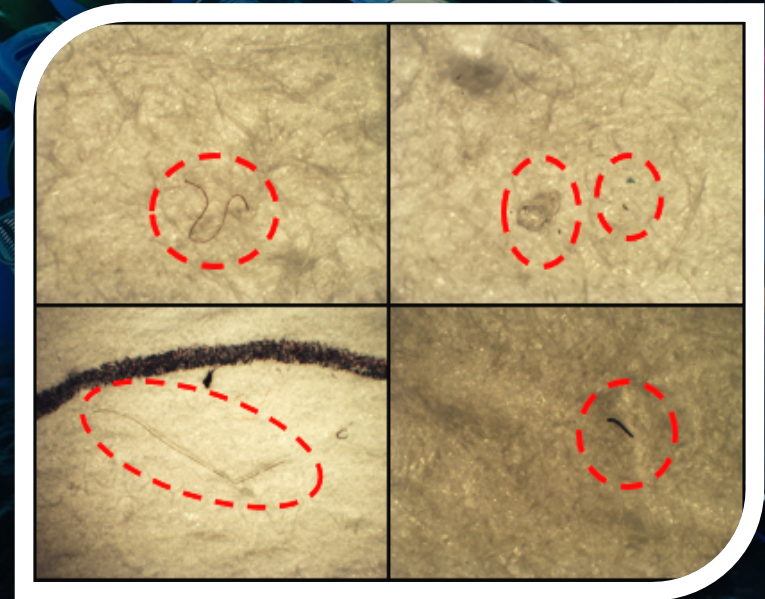
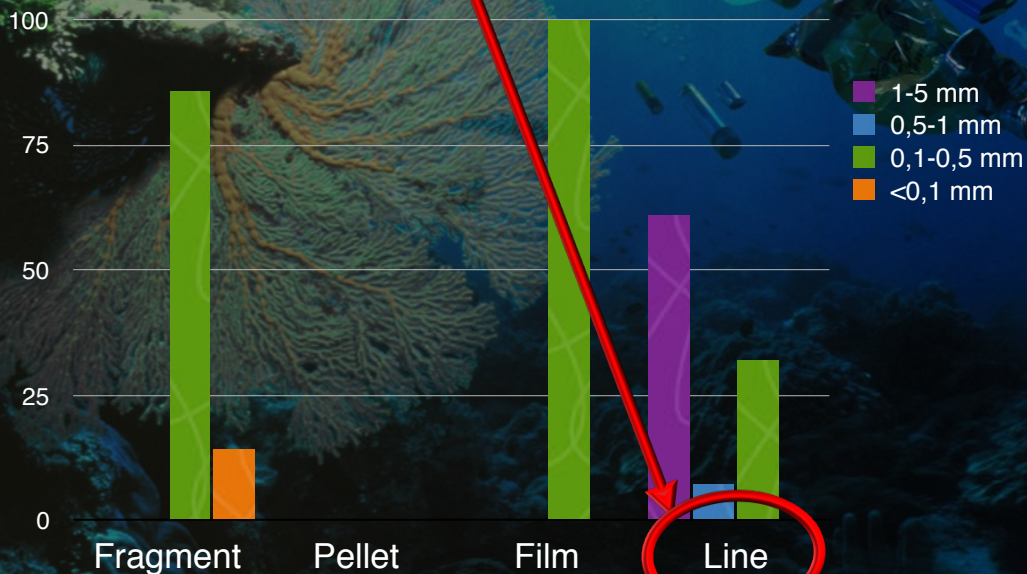
Size frequency (%)



Shape frequency (%)



Distribution of shape in respect to the size



# CONCLUSIONS

- Fish were highly susceptible to MPs ingestion and revealed site specific differences both in terms of number and polymer typology, suggesting a possible relationship with human activities related to the wreck removal.
- Extracted MPs were mostly represented by fragments followed by lines and film, polyethylene and polyamide.
- Transplanted invertebrates typically exhibited a lower frequency of MPs in soft tissues and did not allow to highlight significant differences between sites at different distance from the wreck.
- The release of microplastics in the marine environment can be efficiently monitored in areas impacted by anthropogenic activities (i.e. incidents), using appropriate sentinel species.

Acknowledgements:

Special thanks to all the Ecotox-Team of Di.S.V.A.

Poster n° . 101916

Presence, distribution and characterization of microplastics in commercial organisms from Adriatic Sea.



**Thanks for your attention!!!**