NACIONALNI INŠTITUT ZA BIOLOGIJO

Morje: smetišče ali zdravo življenjsko okolje?

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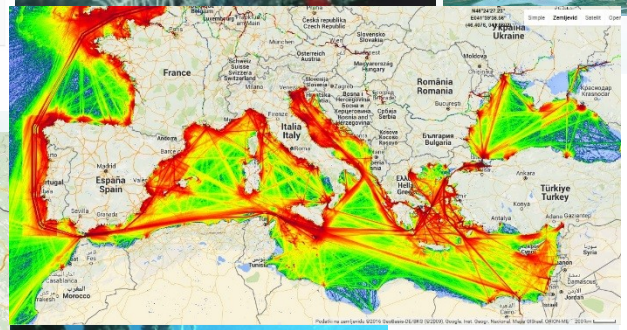
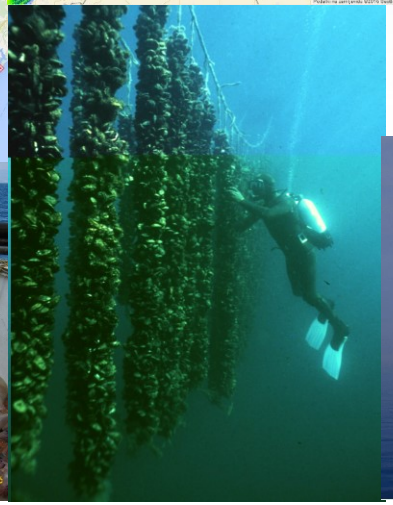
6330 Piran, Slovenija

Ekosistemske storitve iz morja

- ribištvo
- akvakultura
- transport
- turizem in rekreacija
- energija
- nove spojine





Onesnaževanje morja
(definicija po Barcelonski konvenciji)

- vnos (antropogeni ali naravni), odvzemanje materiala in energije, ki povzroči trajne spremembe v delovanju morskih ekosistemov in vpliva na izkoriščanje in rabo

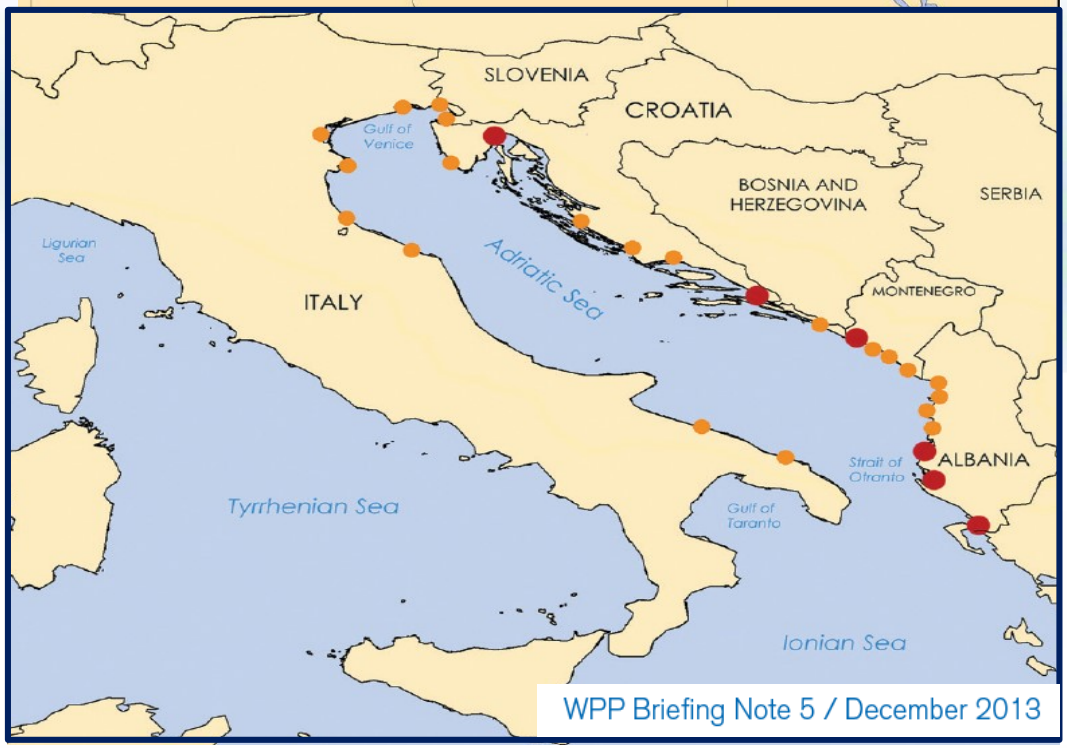
Cilji

- koncentracije škodljivih snovi morajo biti na ravni naravnih vrednosti
- zdrave populacije divjih živali in trajnostno izkoriščanje
- varna hrana

Sergio AQUINDO

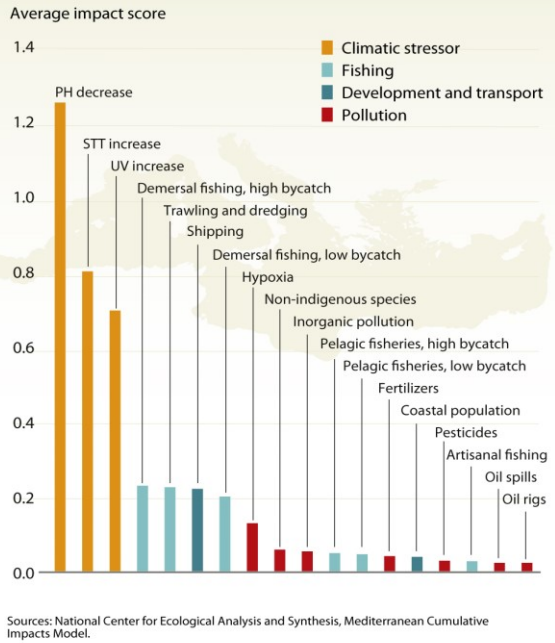
Viri onesnaževanja morja

- komunalne in ladijske odplake
- industrija
- kmetijstvo
- promet, pomorski in tudi cestni v obalnih območjih
- transport onesnaževal iz drugih območij z vodnimi masami (tokovi)
- vnos preko atmosfere



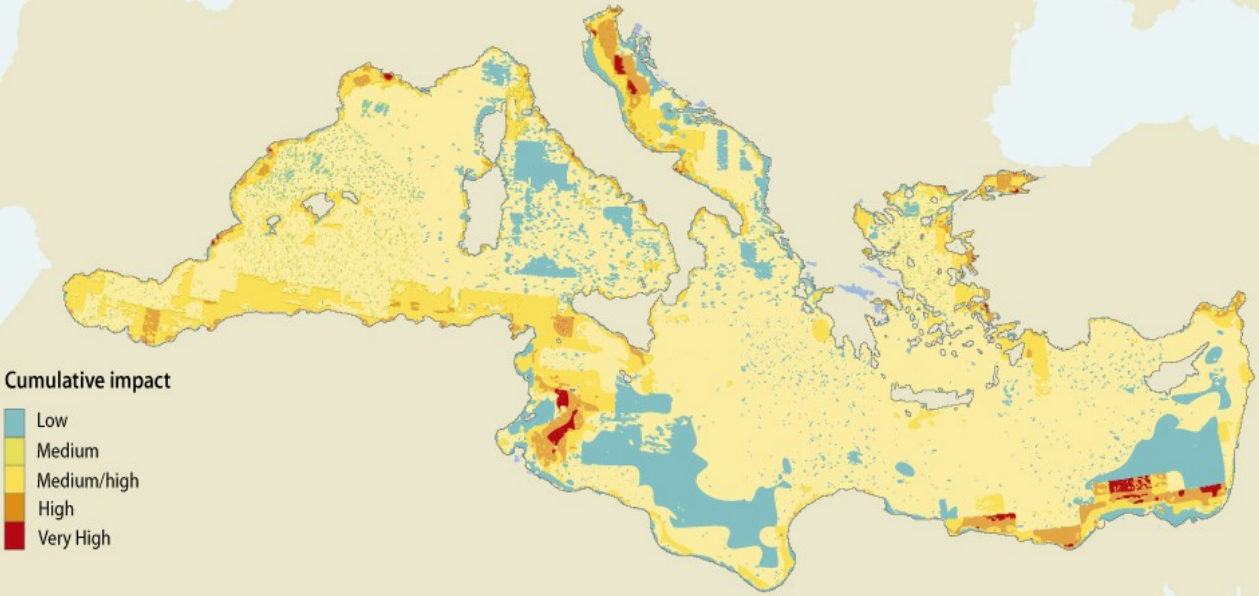
Onesnaževanje morja

Vplivi na okolje



Sources: National Center for Ecological Analysis and Synthesis, Mediterranean Cumulative Impacts Model.

Model združenih pritiskov



Sources: adapted from a map by National Center for Ecological Analysis and Synthesis, Mediterranean Cumulative Impacts Model, online database, accessed in December 2011.

Onesnaževanje morja

ENVIRONMENTAL BENEFITS OF THE ADRIATIC SEA

TOURISM

30 million visitors per year, half of whom visit the eastern Adriatic shoreline, generating €14 million in revenue.

MARITIME TRANSPORT

19 seaports each handling more than 1 million tons of cargo per year.

FISHERIES

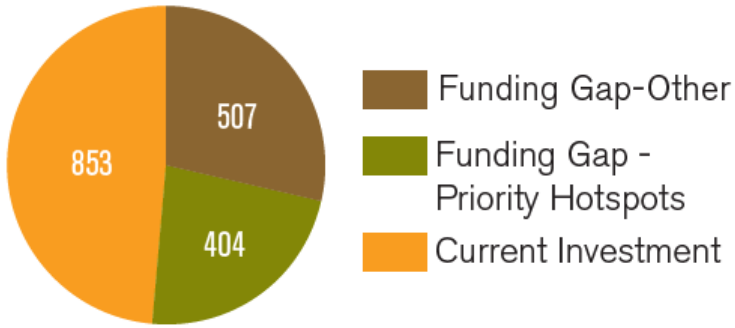
High socioeconomic value for coastal and island communities. Adriatic tuna and shellfish farming have the potential for significant development.

BIODIVERSITY

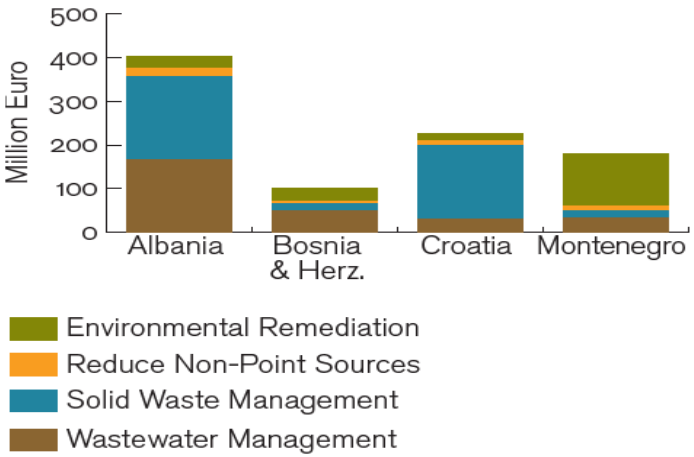
7,000 animal and plant species, many of which are endemic to the sea.

WPP Briefing Note 5 / December 2013

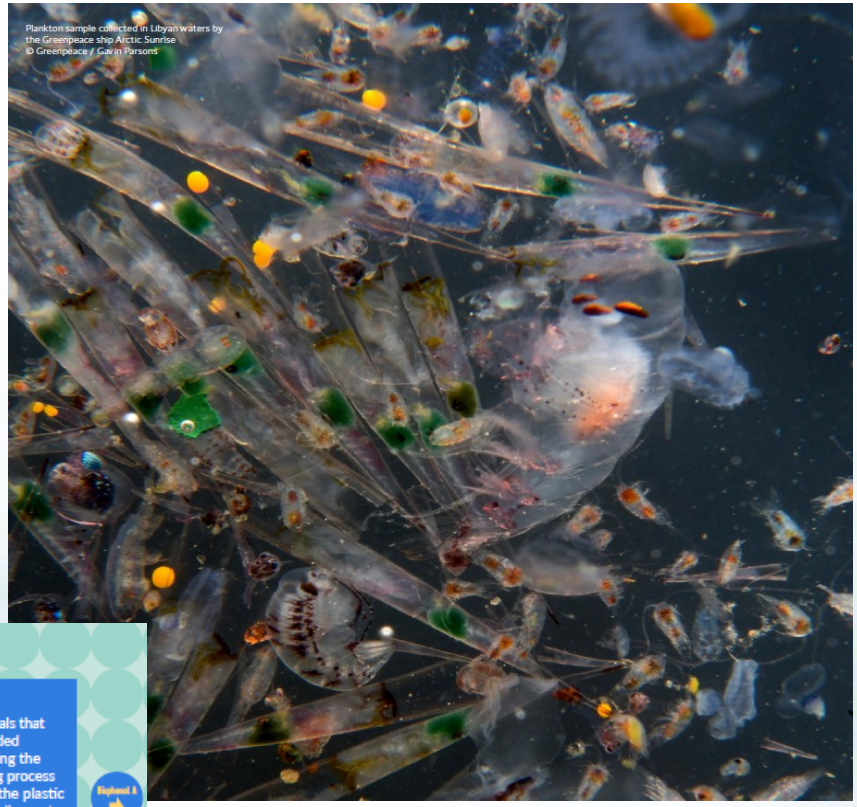
Vrednost investicij v okolje (mio.€)

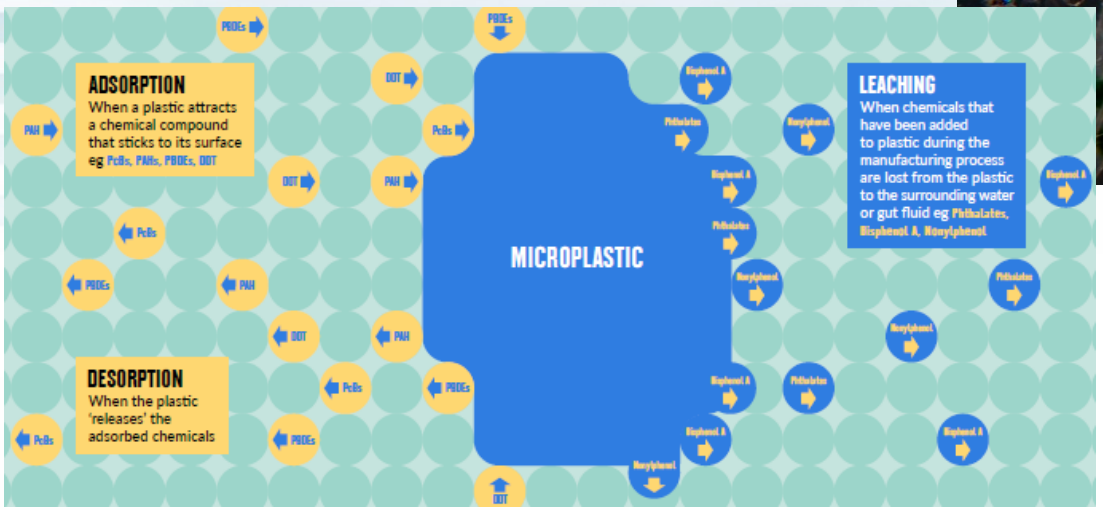


Potrebe po vlaganjih

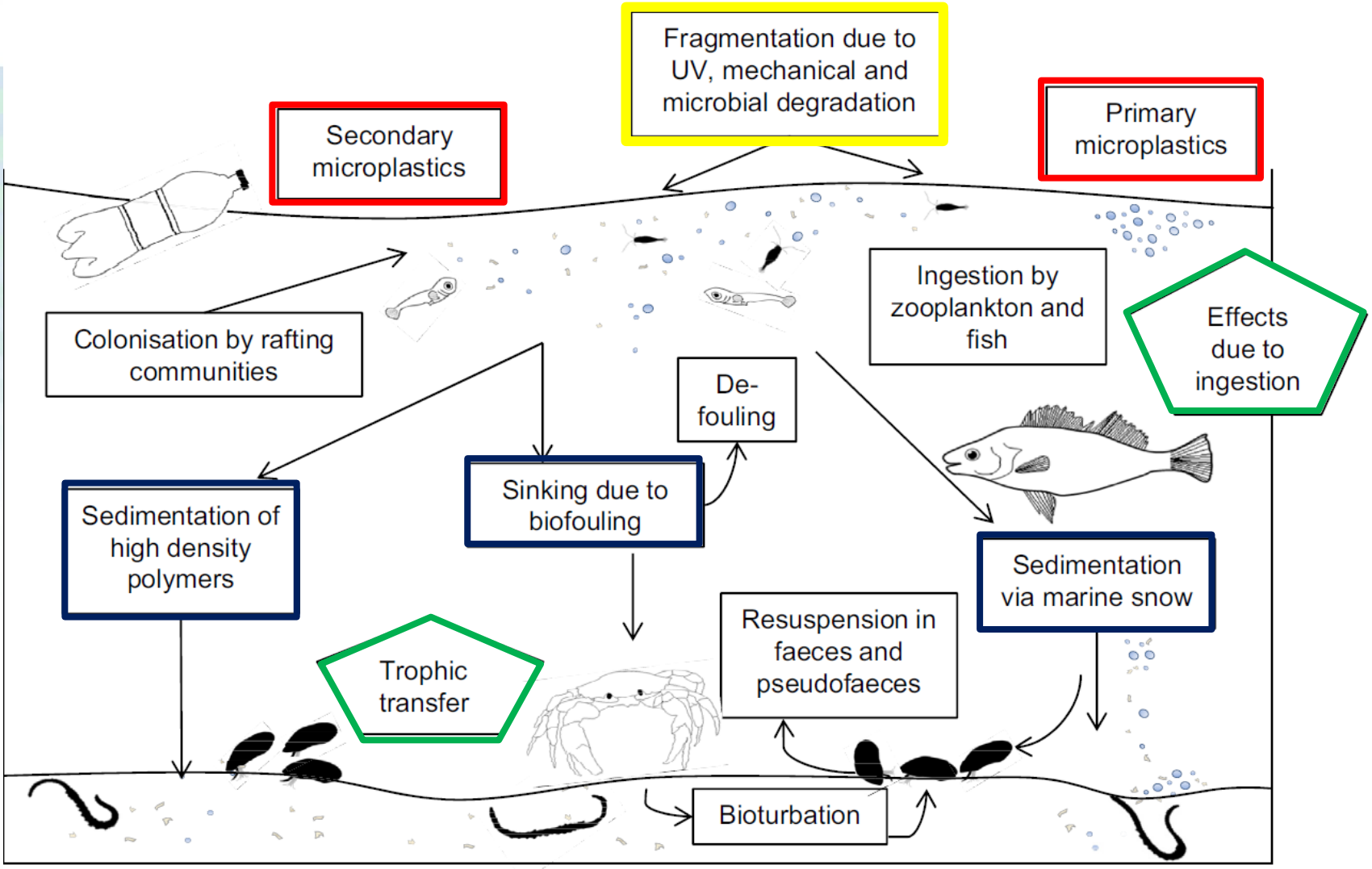


Makroplastika
>25 mm
Mezoplastika
<25 mm
Mikroplastika
<5mm (primarna in sekundarna)
Nanoplastika
<1um



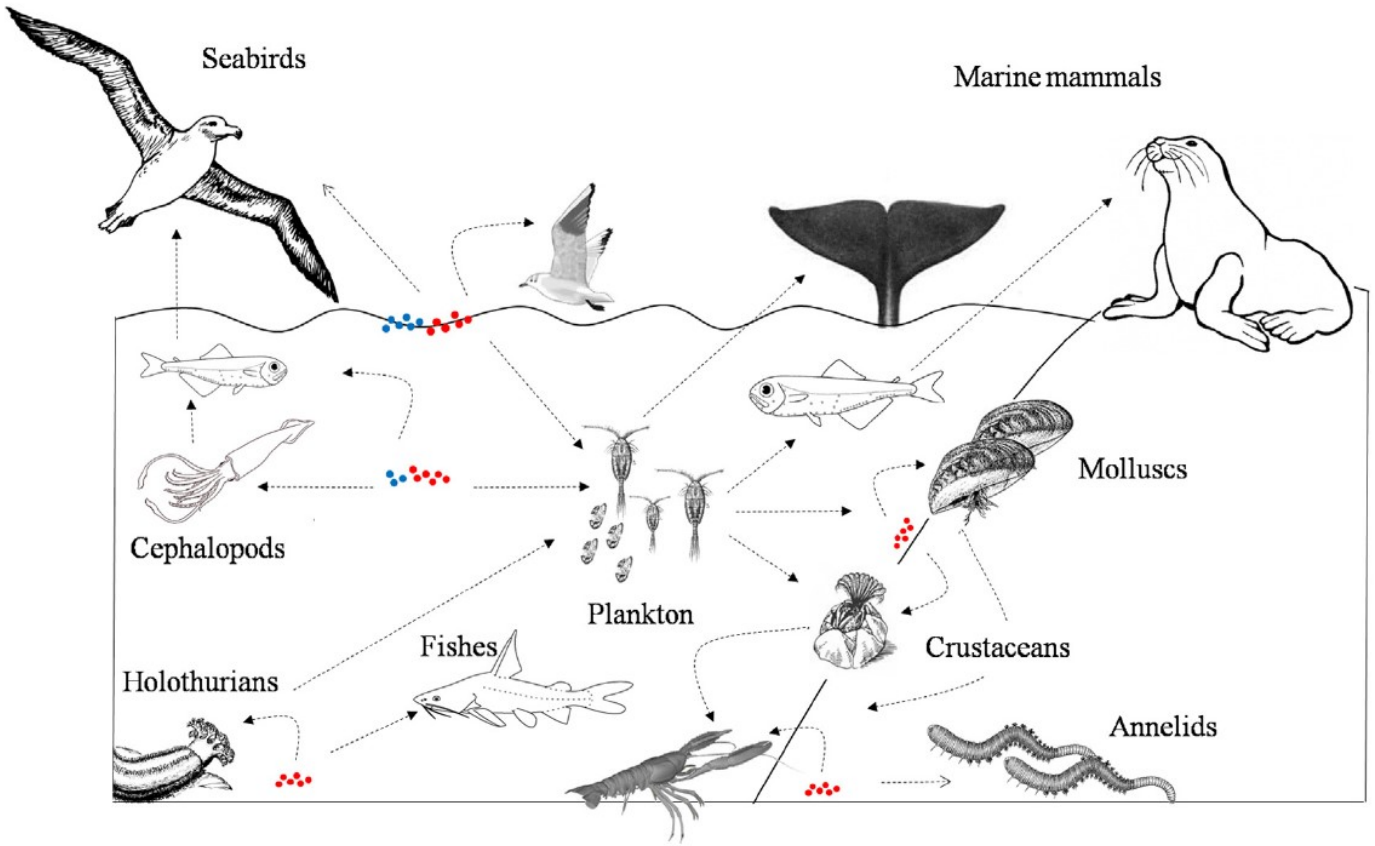


Greenpeace , 2016



Wright in sod., 2013

Prenos po prehranjevalni verigi



Cole M., 2013

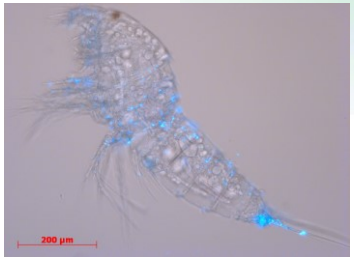


Foto: M.Grego, NIB

Avar do Sul in Costa, 2014

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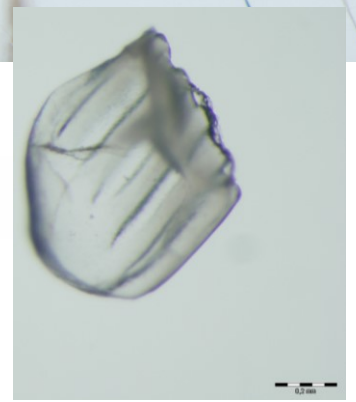
Plastika v ribjih želodcih







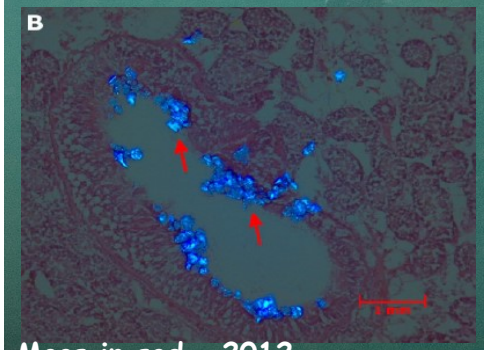



Fotografije plastike: M.Grego

NACIONALNI INŠTITUT ZA BIOLOGIJO

Plastika v školjkah

7 mikrodelcev v VSAKI školjki

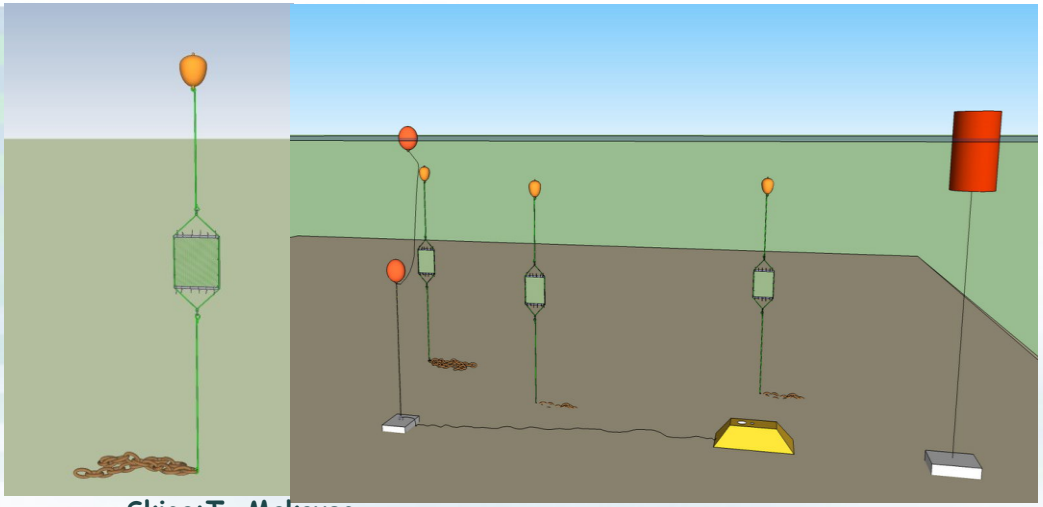


Moos in sod., 2012

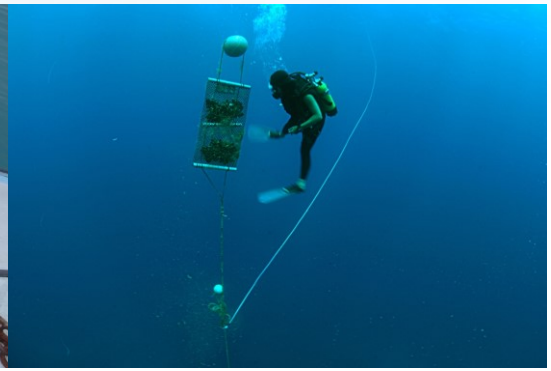
Foto: T. Makovec, NIB

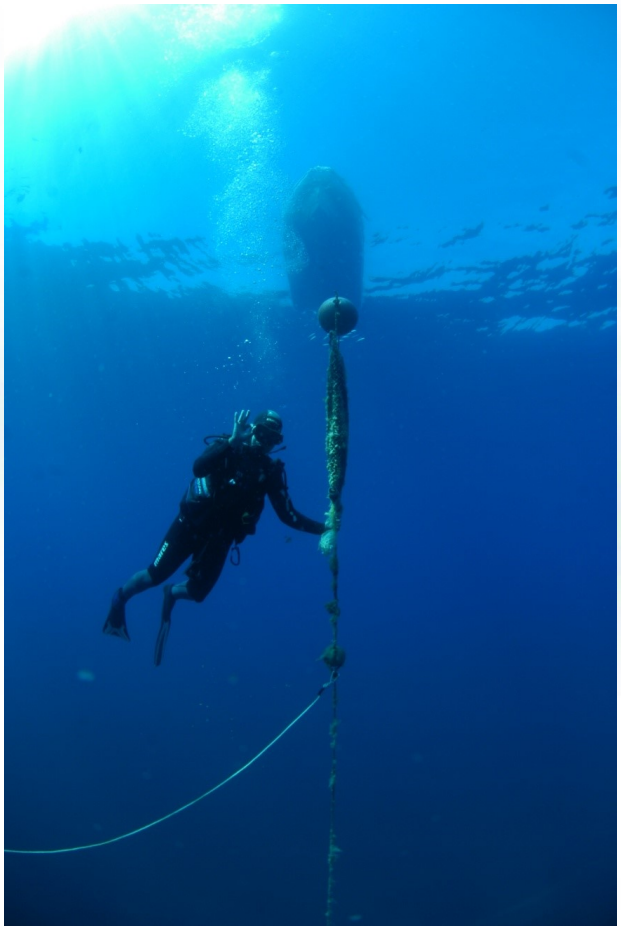
Biomonitoring

Postavitev kletk s klapavicami

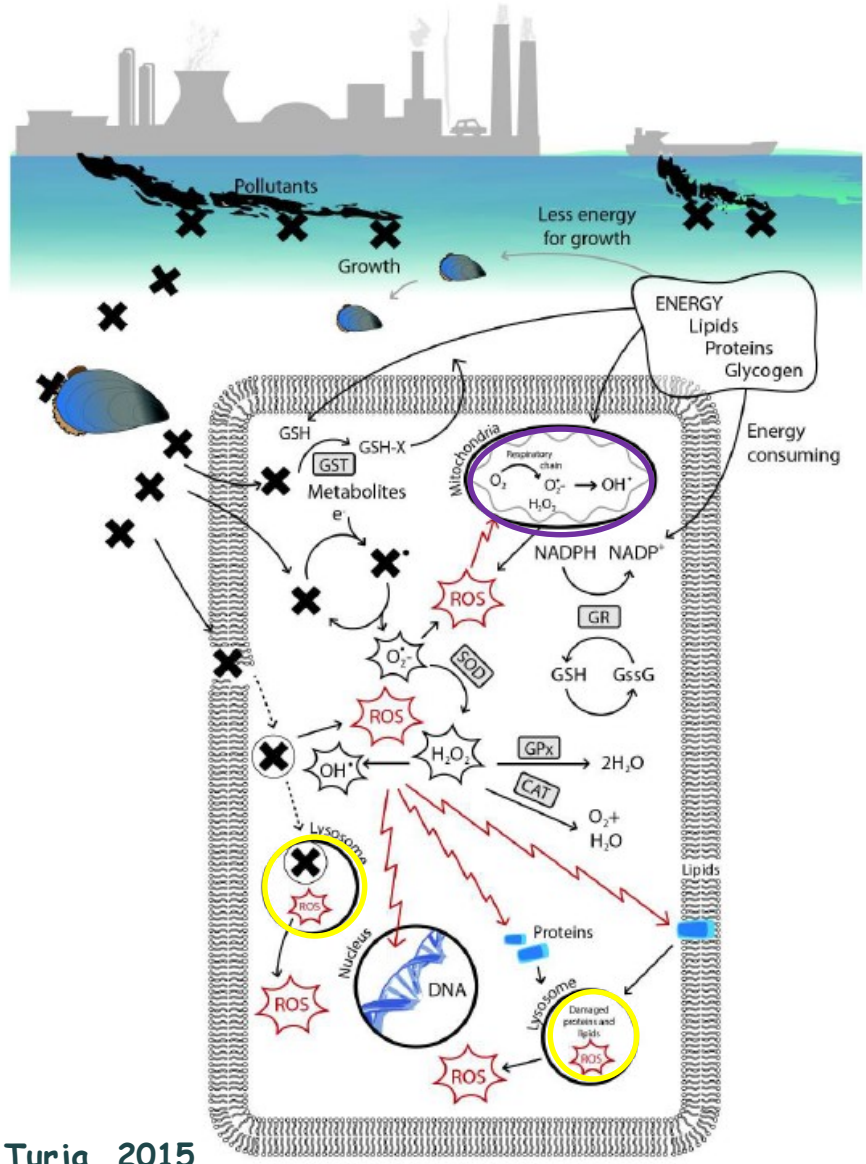


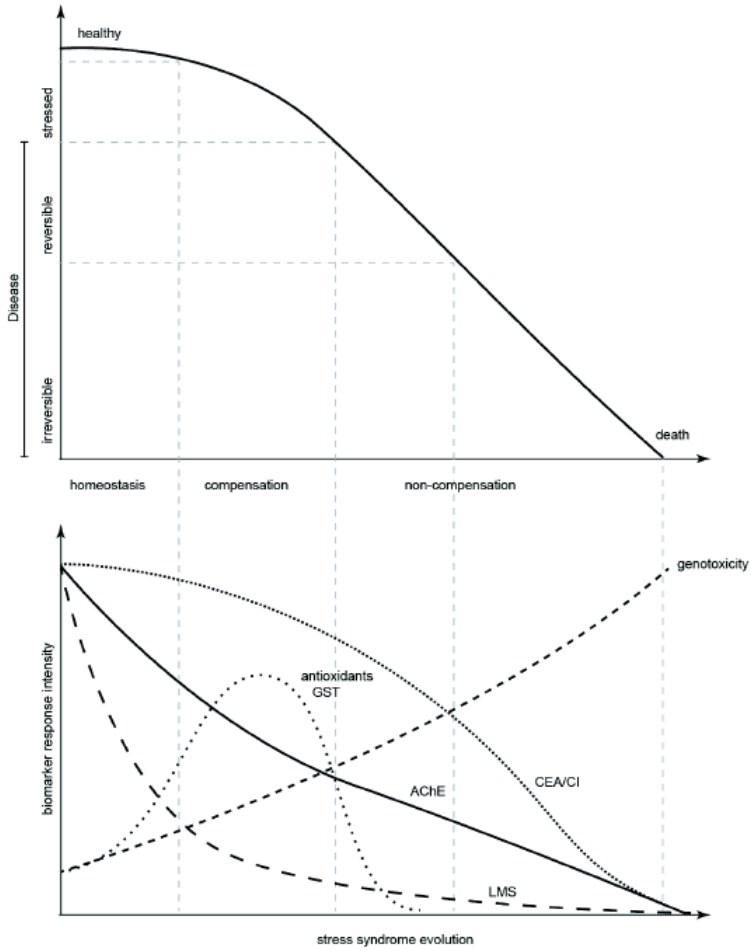
Skica: T. Makovec





Biološki učinki - stres





Prirejeno po Depledge, 1993, Dagnino in sod., 2007

Tarčne vrste

Mytilus galloprovincialis

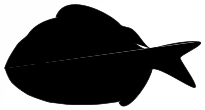
Brachidontes pharaonis

http://www.idscaro.net/sci/01_coll/plates/bival/pl_mytilidae_1.htm

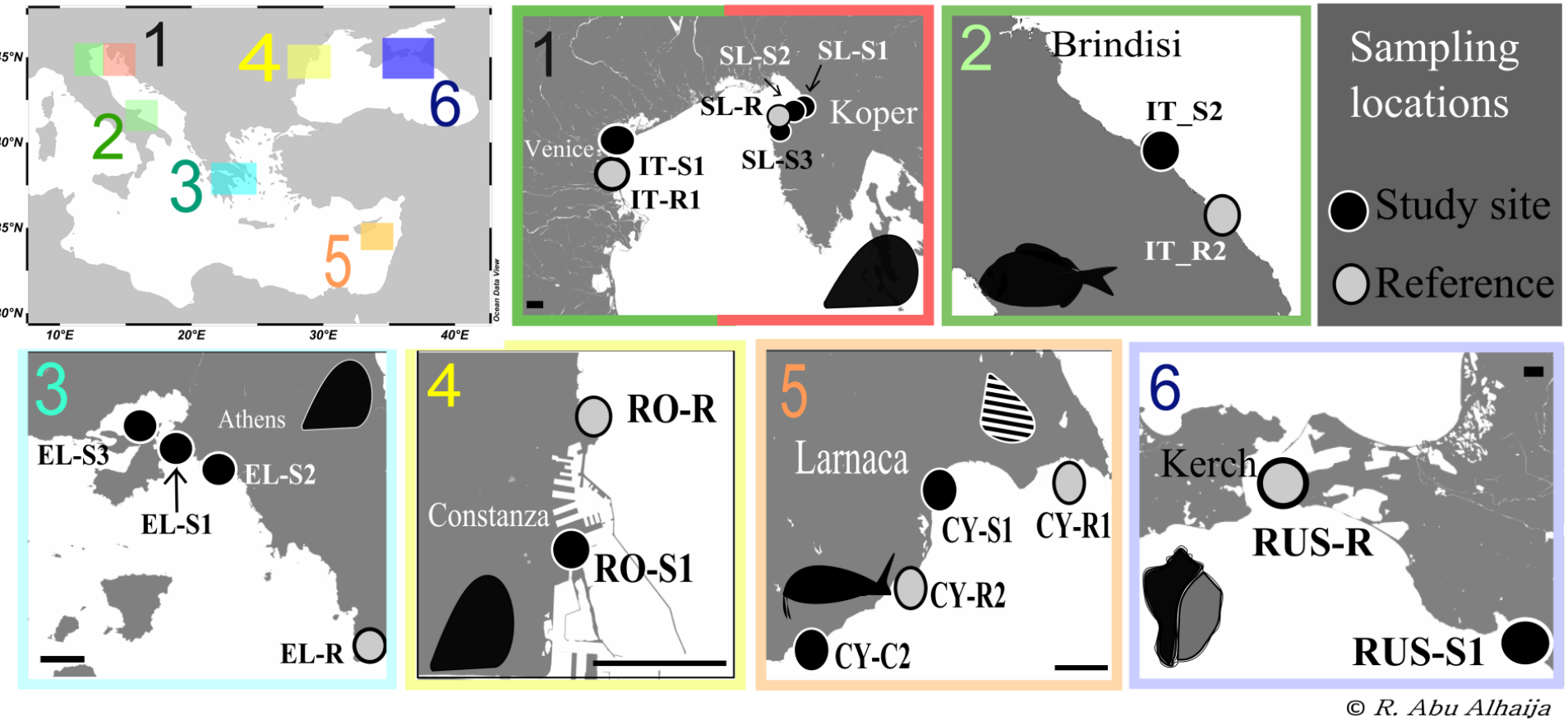
Rapana venosa

Mullus surmuletus

Diplodus sargus sargus

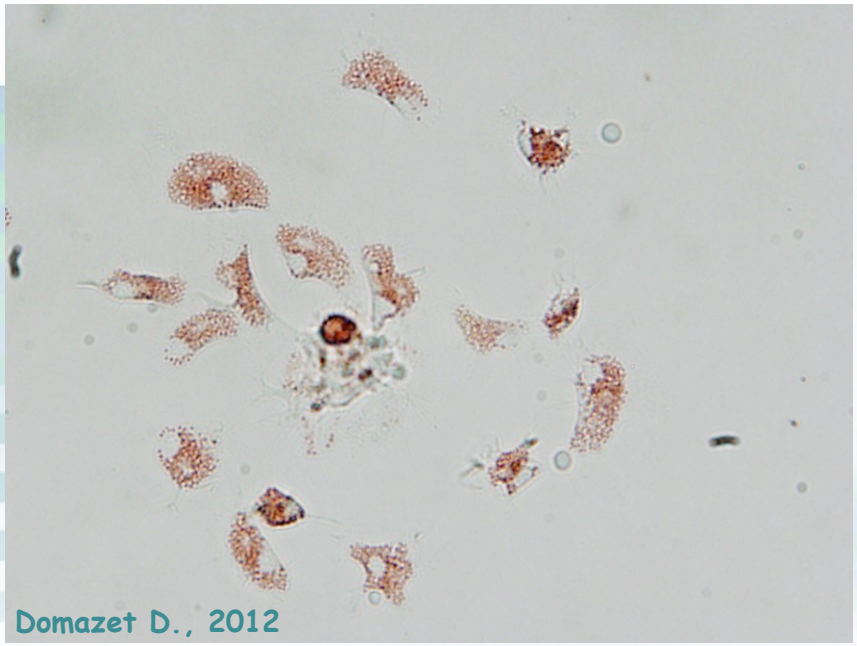


Geografska pokritost- meddržavno sodelovanje

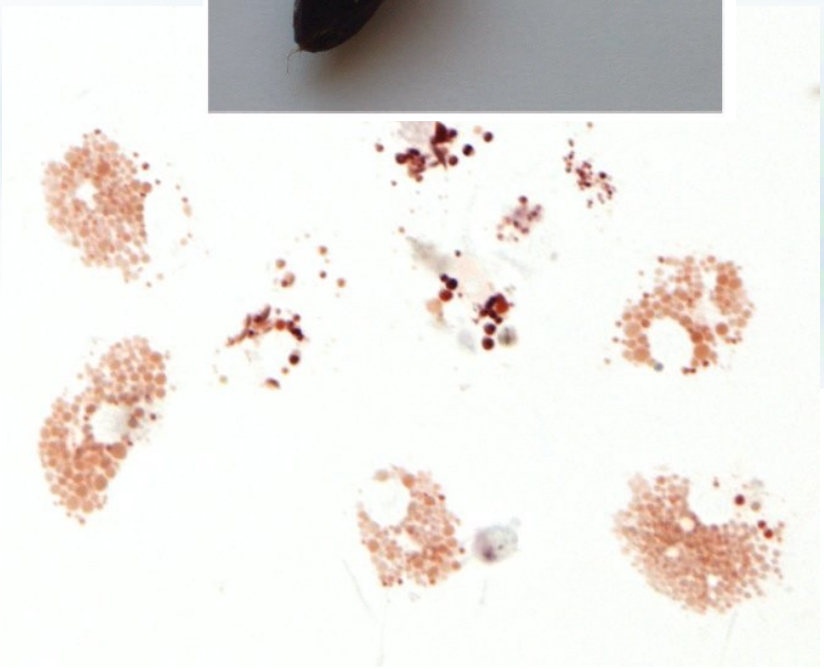


Scale bar: 5km

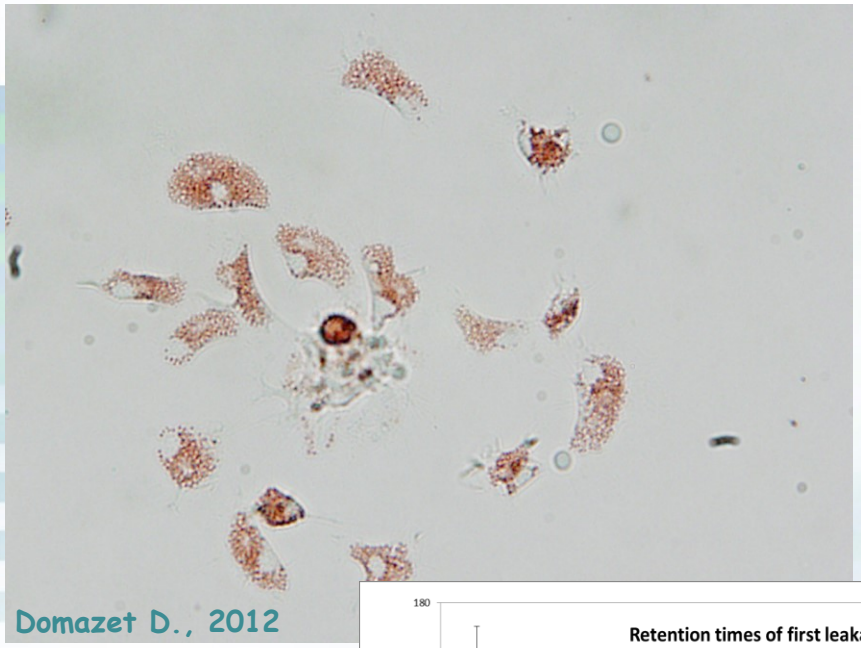
Splošni stres-stabilnost lizosomskih membran



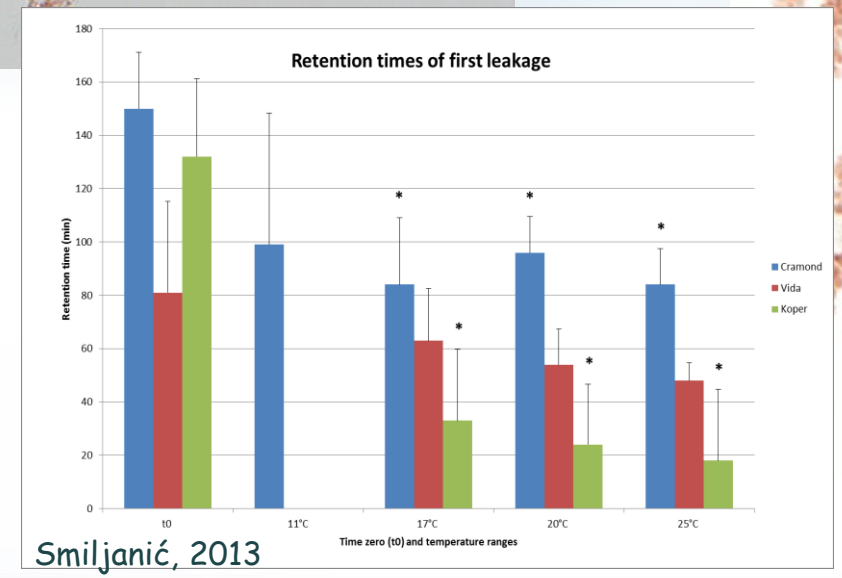
Domazet D., 2012



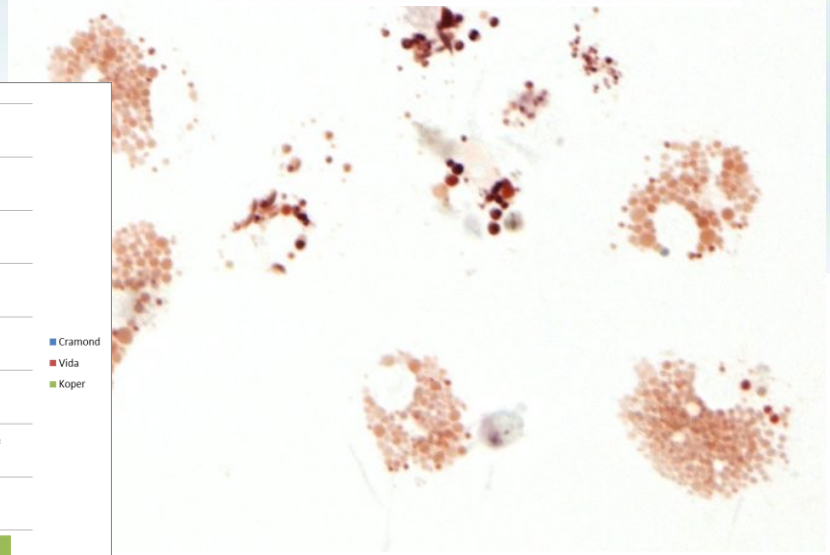
Splošni stres-stabilnost lizosomskih membran



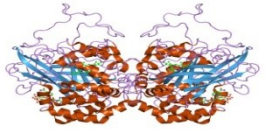
Domazet D., 2012



Smiljanić, 2013

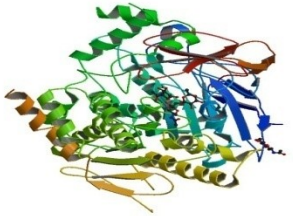


Biokemijski biomarkerji



Katalaza E.C. 1. 11.1.6 zaščita pred ROS

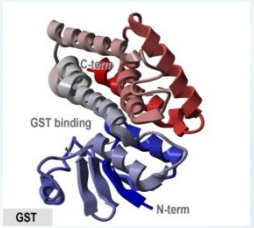
$2H_2O_2 \longrightarrow 2H_2O + O_2$



AChE E.C. 3.1.1.7 hidroliza nevrotransmiterja

GST E.C.2.5.1.18 biotransformacija

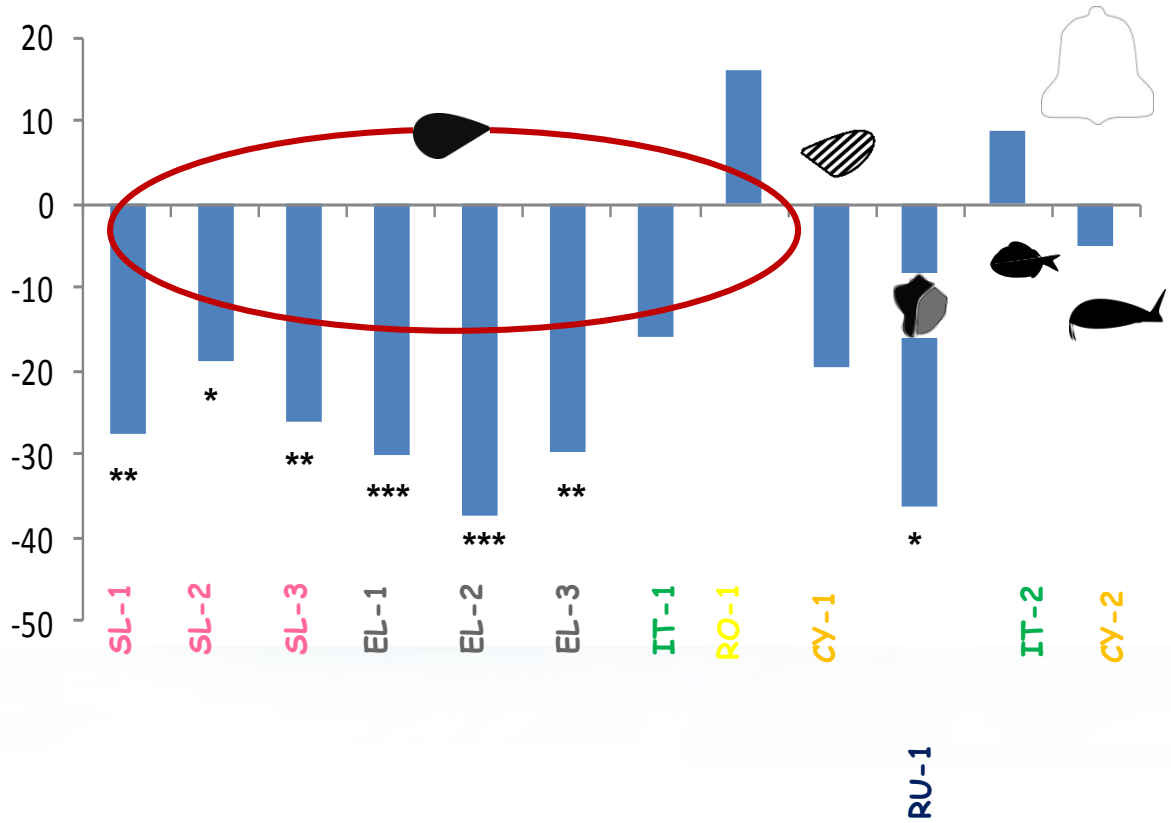
ksenobiotik +GSH ⟶ konjugat:ksenobiotik-GSH



Metalotioneini

Spremljajoči parametri
- kondicijski indeks školjke
- kondicijski faktor ribe
- kemična karakterizacija vzorčnega mesta

Katalaza



1.6 -5.0 U/mg proteinov

31 – 39 U/mg proteinov

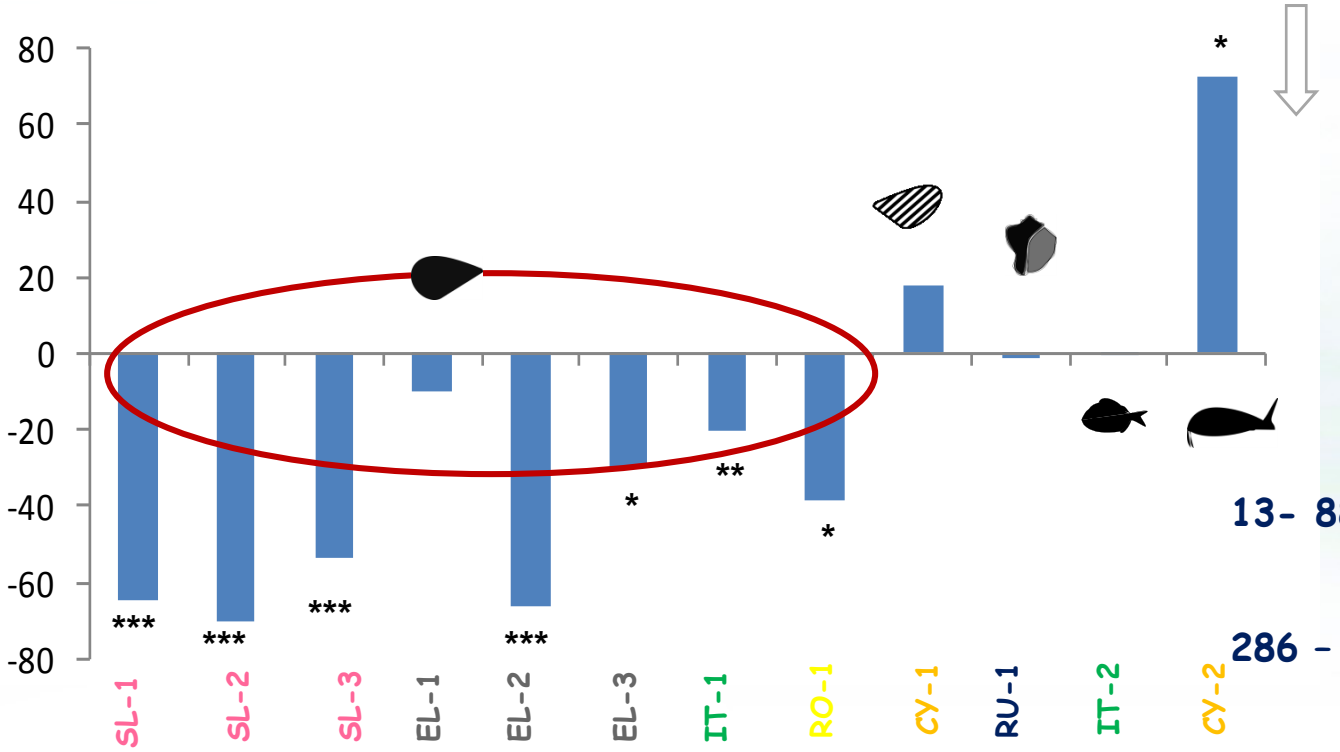
10 – 11 U/mg proteinov

Katalaza aktivnost glede na referenčno mesto

ANOVA: *p<0.05; **p<0.01; ***p<0.001.

% sprememb= 100*(referečno mesto - onesnaženo/refernčno mesto)

Acetilholinestraza



13- 88 nmol/min/mg prot

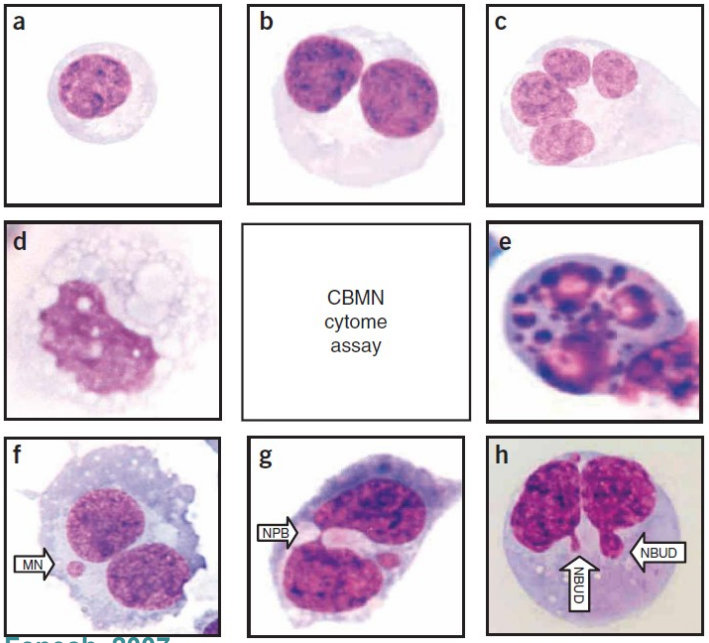
286 – 289 nmol/min/mg prot

171 – 295 nmol/min/mg prot

Acetilholinesteraza aktivnost glede na referenčno mesto

ANOVA: *p<0.05; **p<0.01; ***p<0.001.

Poškodbe dednine- mikronukleusni test



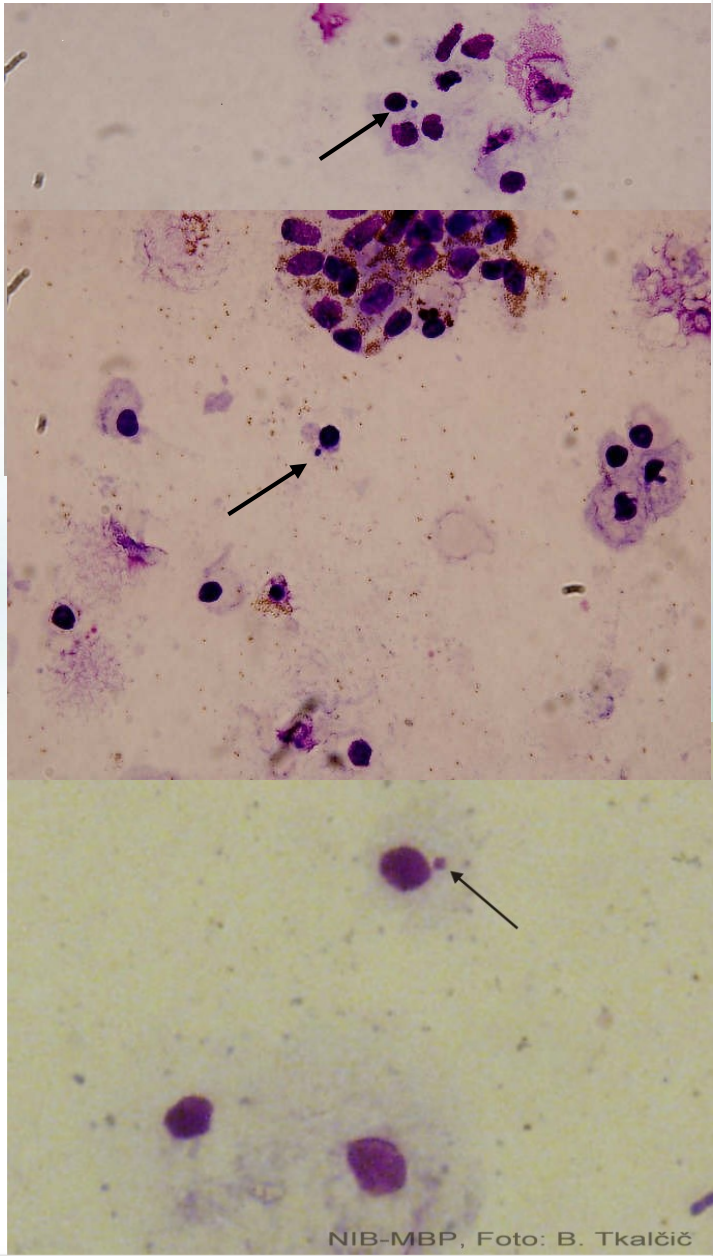
Fenech, 2007

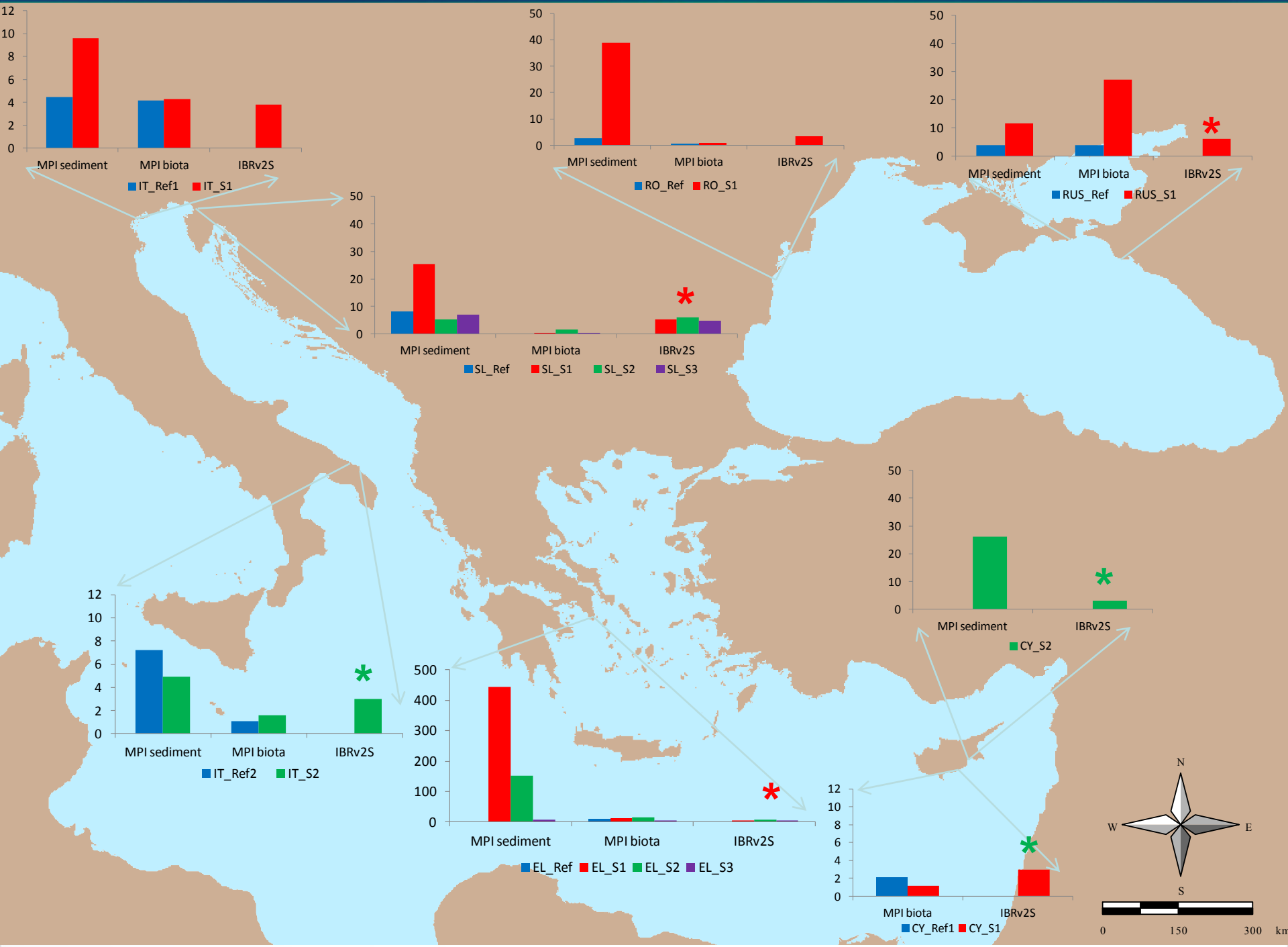
Vzorčno mesto: Koprski zaliv

Škrge klapavice (*Mytilus galloprovincialis*)

Obdobje 2 mesecev (october-december)

pojavljanje 2 do 5 MN/1000 celic




MPI sediment
MPI biota
IBRv2S
IT_Ref1
IT_S1
RO_Ref
RO_S1
RUS_Ref
RUS_S1
SL_Ref
SL_S1
SL_S2
SL_S3
IT_Ref2
IT_S2
CY_S2
EL_Ref
EL_S1
EL_S2
EL_S3
CY_Ref1
CY_S1
N
W
E
S
0
150
300
km

NACIONALNI INŠTITUT ZA BIOLOGIJO

Plastika: smet ali dragocenost?

Muzej za arhitekturo in oblikovanje
13. 3. 2017

Ljubljana

Raziskave obalnega morja P1-0237
PERSEUS FP7-OCEAN-2011