

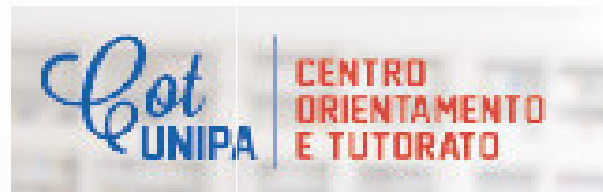


Progetto:
Scienze Naturali e Ambientali

Dipartimento di scienze della terra e del mare



UNIVERSITÀ
DEGLI STUDI
DI PALERMO



Laboratorio BIOINDICATORI

M. Giovanna Parisi

M. Cammarata

Dove lavorare????????????

Nei **parchi nazionali** ,
nelle **riserve naturali** ,
nei **giardini alpini** e nei
musei scientifici come
addetto alla **gestione**
ed alla **didattica**



Nel settore della programmazione e
controllo territoriale svolti dagli Enti
pubblici (ARPA, Province, ASL, Regioni)

Nel settore della **tutela** e
del **recupero** dei beni
ambientali

Nella
ricerca
naturalistica



Nel settore
dell'**insegnamento**
nella scuola
secondaria

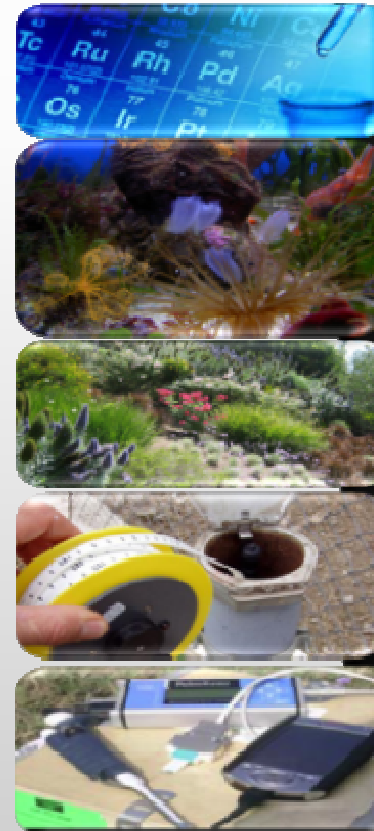


Profilo professionale

- Esperto della gestione e del monitoraggio dei sistemi ambientali
- Tecnico per la Protezione del Suolo
- Tecnico per il Monitoraggio Ambientale
- Esperto della sicurezza e della protezione ambientale

*Libero
professionista:
Biologo (sez. A) -
Geologo (sez. A)*

*Dottorato di
Ricerca in "Scienze
della Terra e del
Mare"*



Fonti di esposizione outdoor ed indoor



OSSERVAZIONE DELL'AMBIENTE

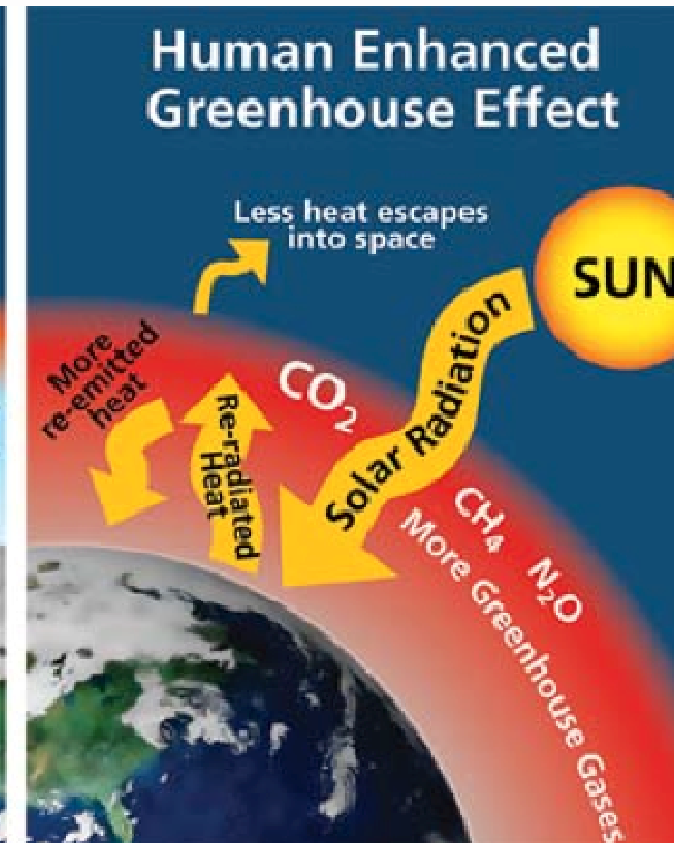
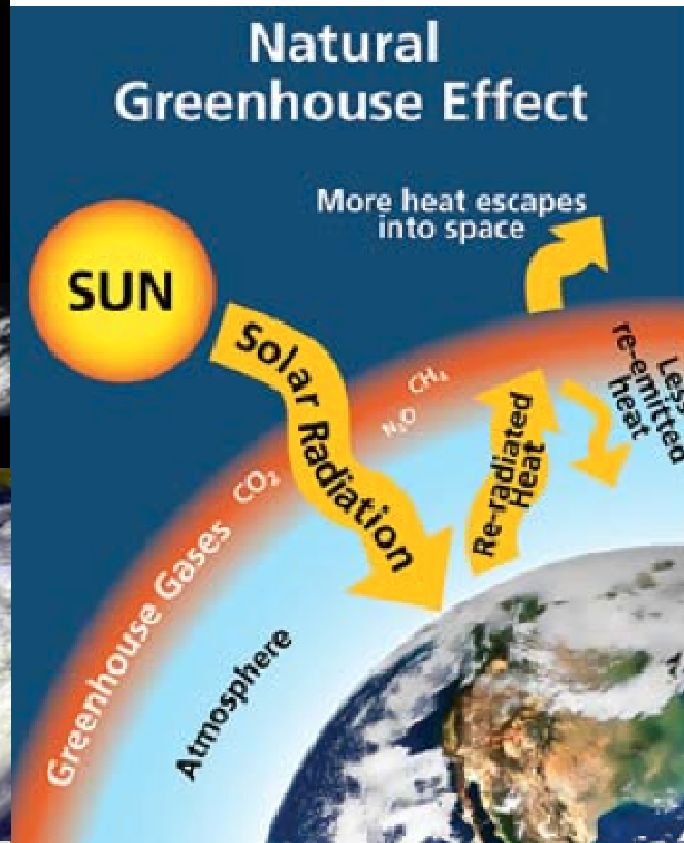


Agenti biologici
che provocano
infezioni, allergie e
intossicazioni.



Si cercano Indicatori Ambientali, qualitativi o quantitativi capaci di rappresentare una situazione ambientale complessa costituita da componenti naturali biotiche o abiotiche

Climate global change





ALTERAZIONE DELL'ECOSISTEMA MARI



Nel mondo ogni anno 150 milioni di persone vengono a contatto con meduse urticanti



BBC NEWS Watch One-Minute World News

News Front Page Last Updated: Thursday, 20 July 2006, 10:13 GMT 11:13 UK

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Nuclear plant struck by jellyfish

A nuclear power plant in Japan was forced to lower the output of its reactors after jellyfish blocked a filter in a seawater cooling system.



Power from two reactors at Chubu Electric Power Co's plant in Hamaoka had to be reduced after the water intake system shut down automatically.

A mass of jellyfish clogged a pipe in a seawater cooling system

CNN.com /asia

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Japanese fishermen brace for giant jellyfish

updated 5:08 p.m. EDT, Sun July 19, 2009

home » news » news archive » 2006 » fish news

Jellyfish invade Mediterranean



Pictures: Doru Lupeanu.

Thousands of tourists holidaying in the Mediterranean have been stung by jellyfish after vast swarms of the creatures invaded the coasts during the hot summer.

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Invasion of the jellyfish: Mediterranean hundreds suffer from stings

By Matthew Kay in Paris, Elizabeth Nash in Madrid and Peter Pop

Thursday, 24 July 2008

SHARE PRINT



BBC NEWS Watch One-Minute World News

News Front Page Last Updated: Wednesday, 21 November 2007, 20:57 GMT

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Jellyfish attack destroys salmon

A jellyfish invasion has wiped out Northern Ireland's only salmon farm, killing more than 100,000 fish.



A Northern Salmon spokesman said last week's attack could cost more than £1m.

Billions of small jellyfish, known as Mauve Stingers, flooded into the cages about a mile into the Irish Sea, off Glenarm Bay and Cushendun.

The density of jellyfish stopped workers from reaching cages

Open Enlarge Image

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The New York Times Healthscience

WORLD U.S. N.Y. / REGION BUSINESS TECHNOLOGY SCIENCE HEALTH SPORTS OPINION

Oceans' alarm: Jellyfish swarms

By Elisabeth Rosenthal

BARCELONA — Blue patrol boats crisscross the swimming areas of beaches here with their huge nets skimming the water's surface. The yellow flags that urge caution and the red flags that prohibit swimming because of risky currents are sometimes topped now with blue ones warning of a new danger: swarms of jellyfish.

In a period of hours during a day a couple of weeks ago, 300 people

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BBC NEWS Watch One-Minute World News

News Front Page Last Updated: Tuesday, 5 June 2007, 17:53 GMT 18:53 UK

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Fishing 'destabilises Black Sea'

Excessive fishing in the Black Sea has triggered major changes in the marine ecosystem, scientists suggest.

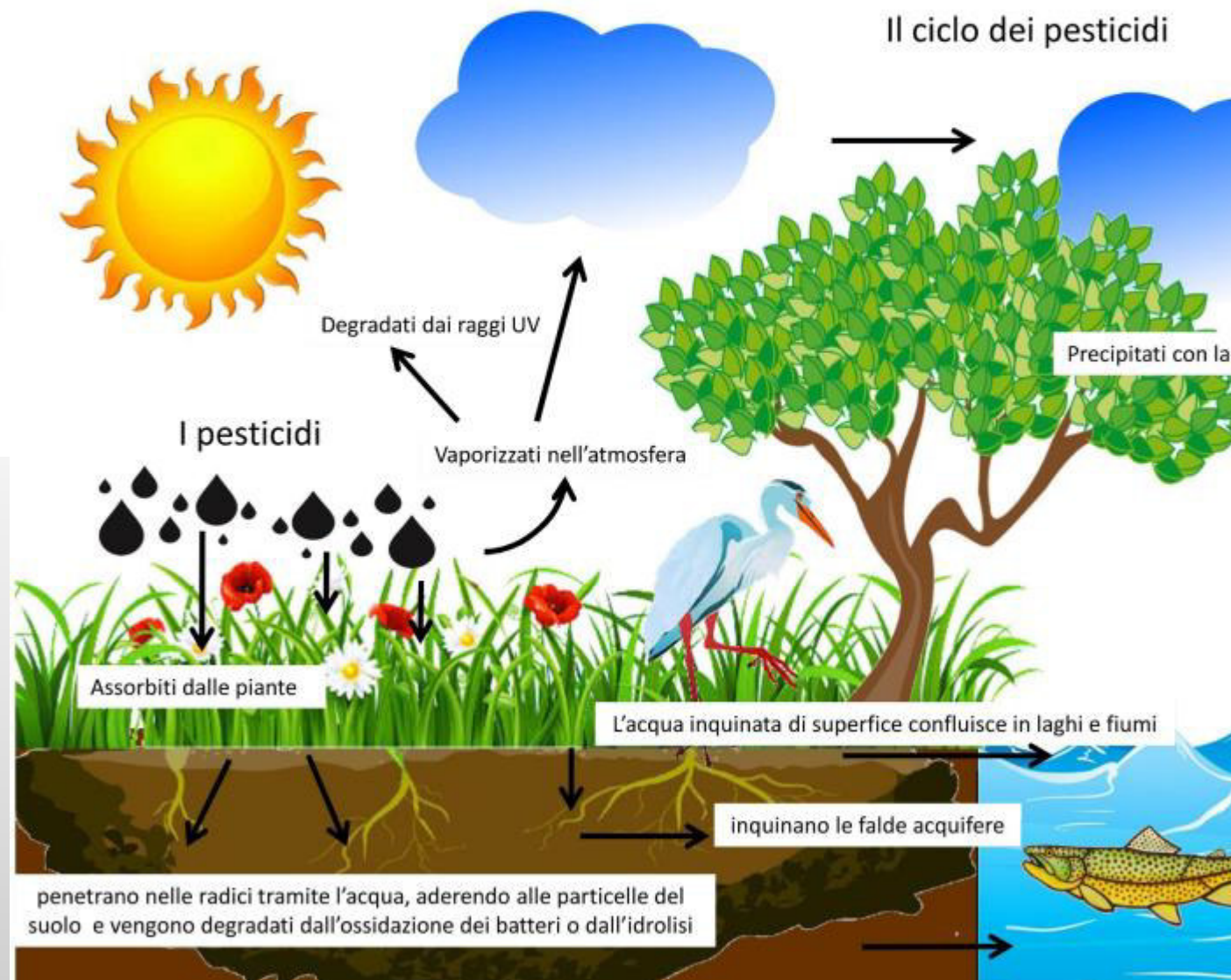


L.KLISSUROV

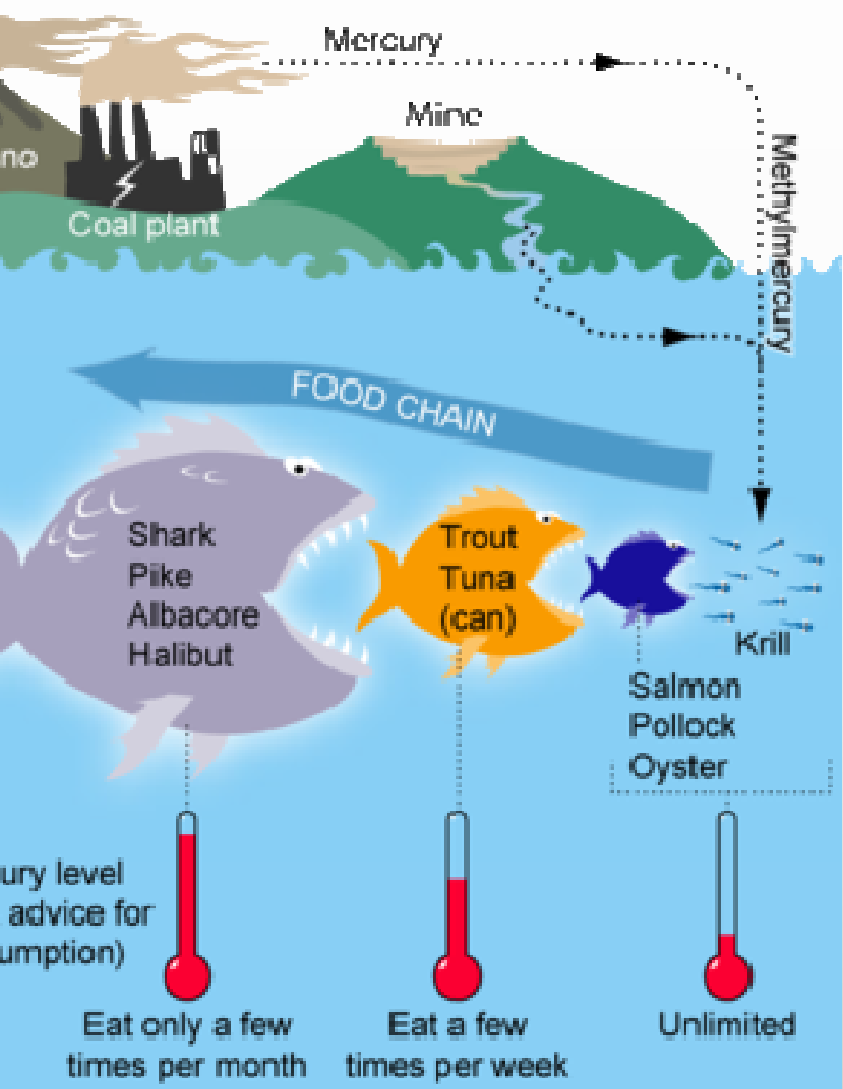
miopsis jellyfish thrived in fish-scarce waters



Pesticidi e insetticidi



Metalli e organometalli



Limiti di emissione in acque superficiali D.Lgs 152/06.

Componenti	Concentrazioni	Unità di misura
Alluminio (Al)	≤ 1	mg/L
Arsenico (As)	≤ 0,5	mg/L
Bario (Ba)	≤ 20	mg/L
Boro (B)	≤ 2	mg/L
Cadmio (Cd)	≤ 0,02	mg/L
Cromo totale (Cr)	≤ 2	mg/L
Ferro (Fe)	≤ 2	mg/L
Manganese (Mn)	≤ 2	mg/L
Mercurio (Hg)	≤ 0,005	mg/L
Nichel (Ni)	≤ 2	mg/L
Piombo (Pb)	≤ 0,2	mg/L
Rame (Cu)	≤ 0,1	mg/L
Selenio (Se)	≤ 0,03	mg/L
Zinco (Zn)	≤ 0,5	mg/L



nitrate di mercurio
 $\text{Hg}(\text{NO}_3)_2$.



Plastiche

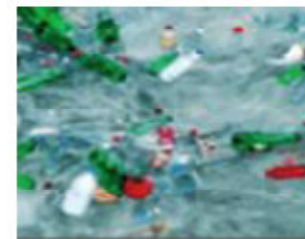


Microplastiche

1.



LA PLASTICA VIENE
SCARICATA NEL MARE E
NEI FIUMI

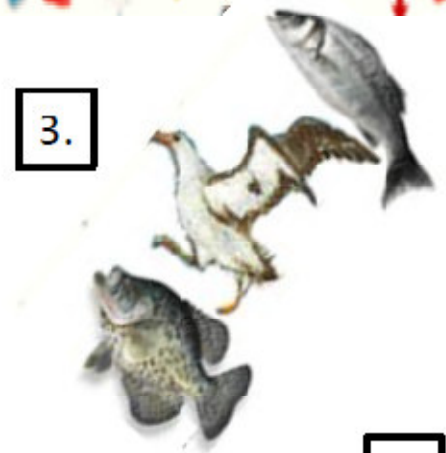


2.



IN ACQUA SI SGRETOLA IN
PICCOLISSIMI PEZZETTI, A VOLTE
INVISIBILI E SU QUESTI SI ATTACCANO
SOSTANZE VELENOSE

3.



GLI ANIMALI COME PESCI, UCCELLI,
GAMBERI MANGIANO LA PLASTICA
PIENA DI SOSTANZE DANNOSE...

4.



....CHE ARRIVANO
NEL PIATTO A
TAVOLA

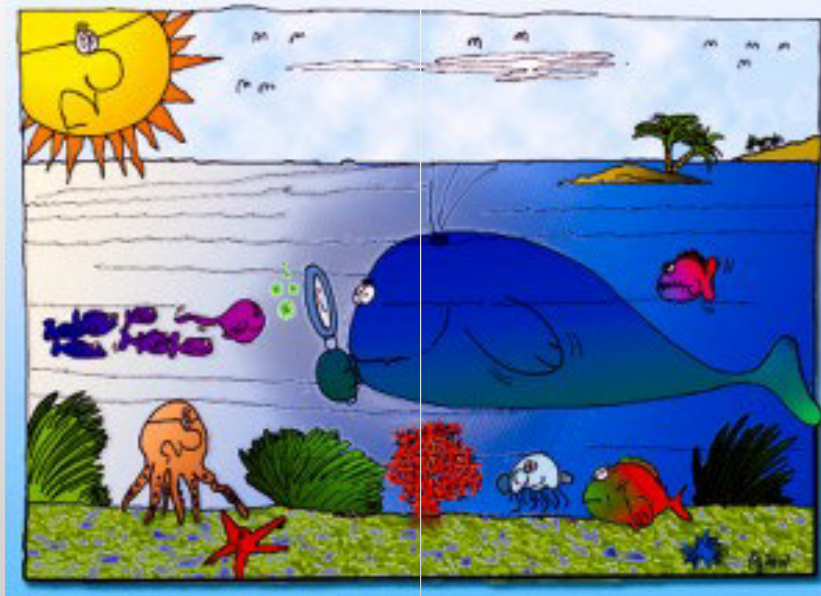


MONITORAGGIO

Misurazione, valutazione e determinazione dei parametri ambientali dei livelli di **Inquinamento**, allo scopo di prevenire gli effetti negativi e dannosi verso l'ambiente.

Previsione di possibili **cambiamenti** nell'ecosistema e/o nella biosfera nel complesso.

Pervenire alla valutazione sullo Stato di Qualità dell'ambiente



A cosa serve il monitoraggio ambientale?

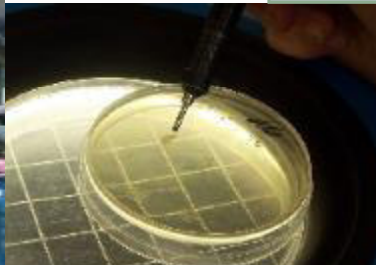


Analisi chimico-fisiche



Analisi biologiche

CONTROLLO DELL' AMBIENTE

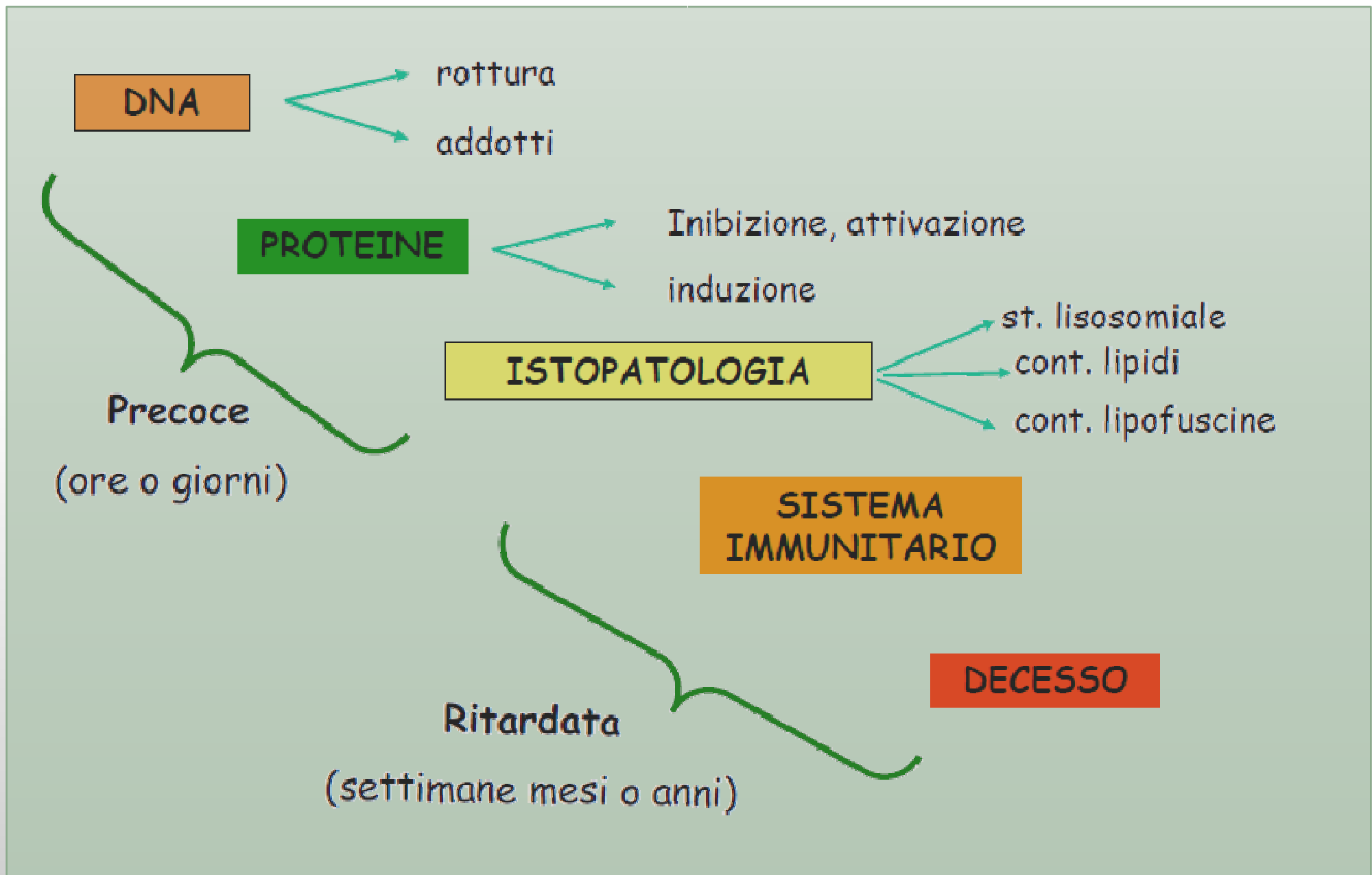


L'INDIVIDUAZIONE DI ORGANISMI CON SPECIFICHE
CARATTERISTICHE CHE LI RENDANO IDONEI AD ESSERE UTILIZZATI
EFFICACEMENTE NELLE CAMPAGNE DI BIOMONITORAGGIO

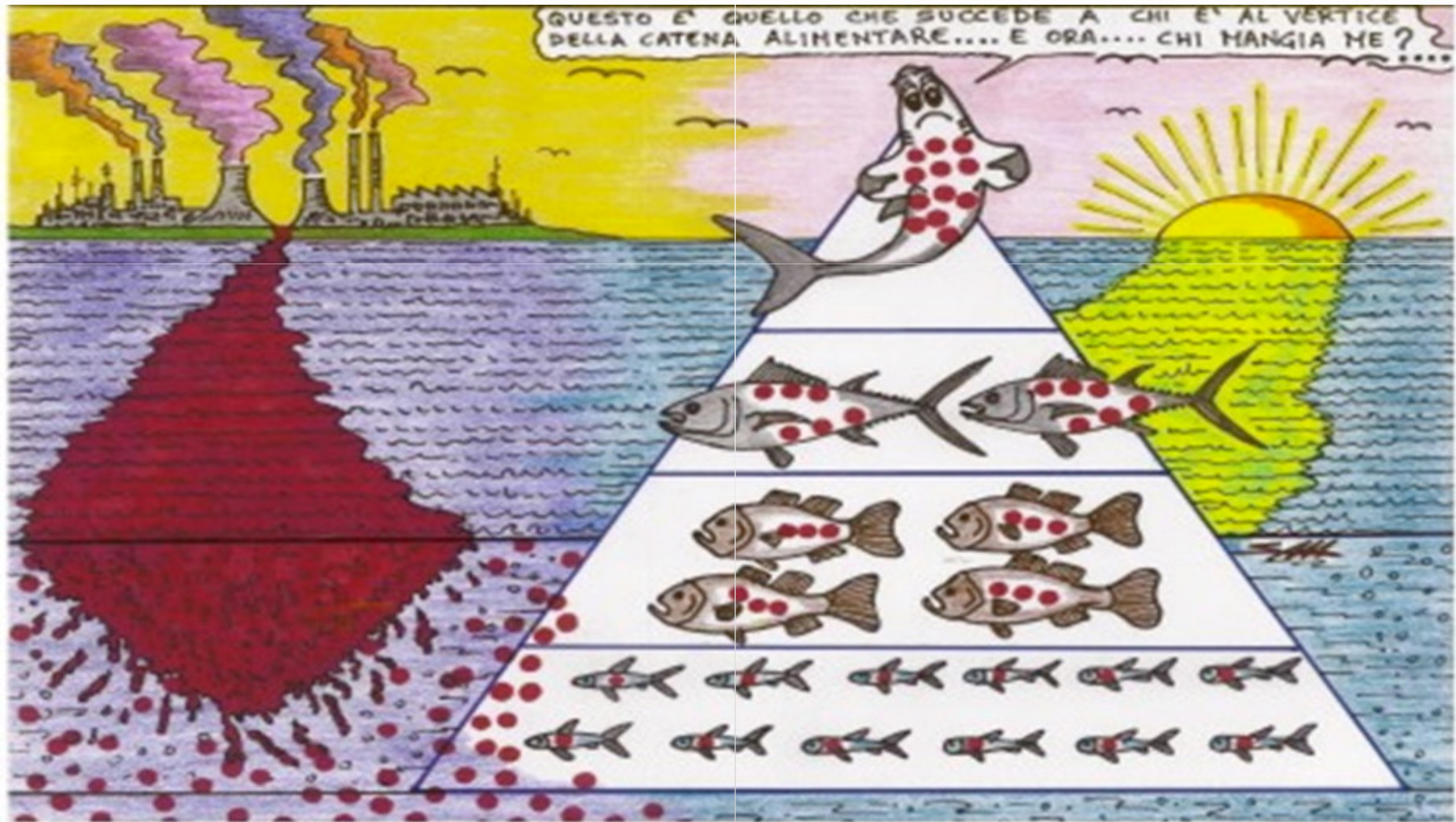
BIOINDICATORI



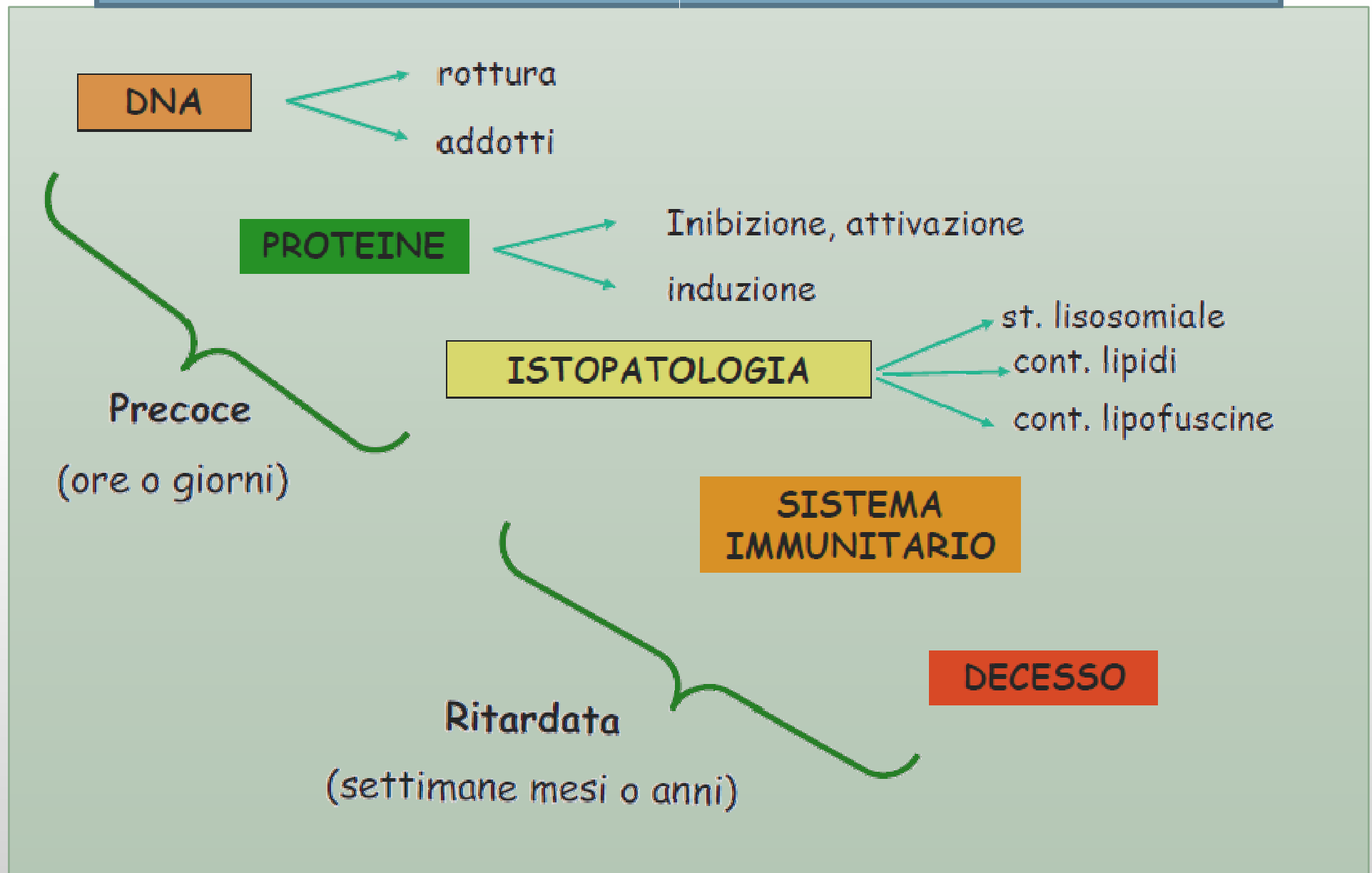
RISPOSTE DEGLI ORGANISMI



Nel passaggio da un livello ad un altro nella RETE TROFICA gli inquinanti si concentrano sempre di più raggiungendo livelli preoccupanti soprattutto in quegli organismi sfruttati dall'uomo per fini alimentari.



Dai biondicatori ai biomarkes

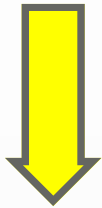
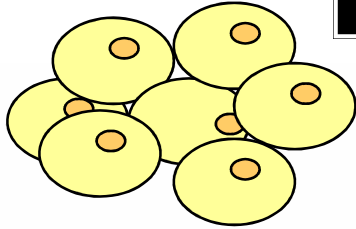


Biondicatori....un esempio

- © Individui di *Styela plicata* raccolti dal porto di Palermo e conservati in acqua di mare filtrata e areata ad una temperatura di 15°C



Cellule di tunicati



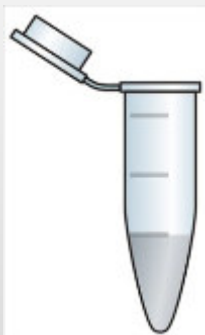
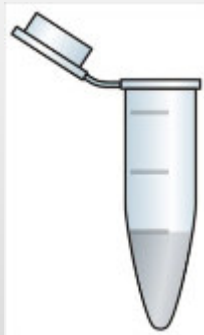
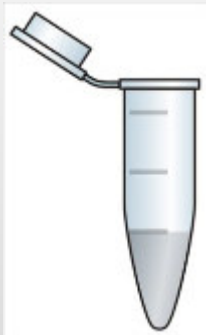
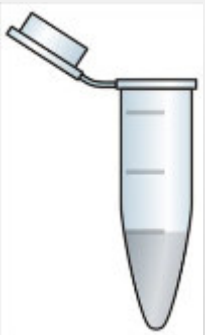
Incubazione con CH_3HgCl

MS

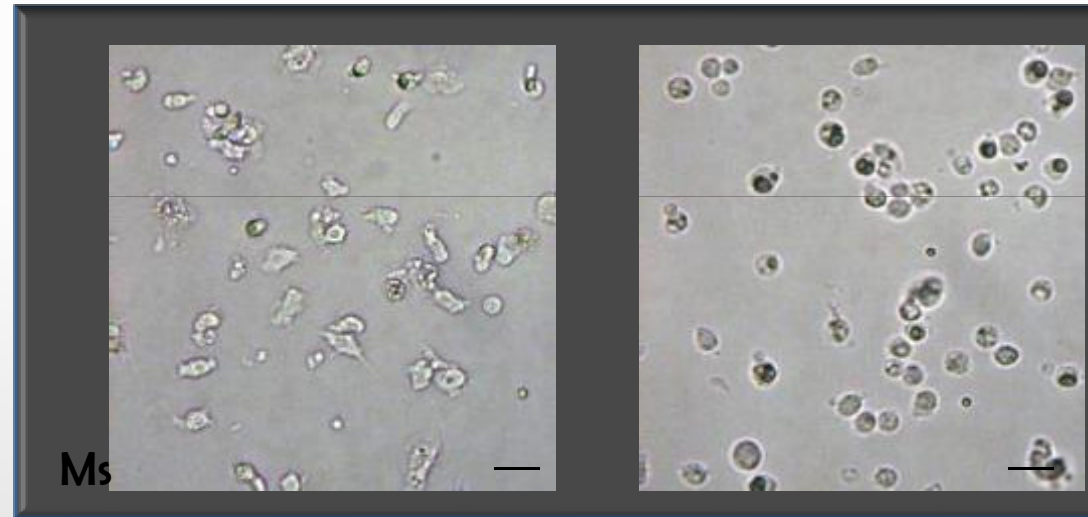
10^{-4} M

10^{-5} M

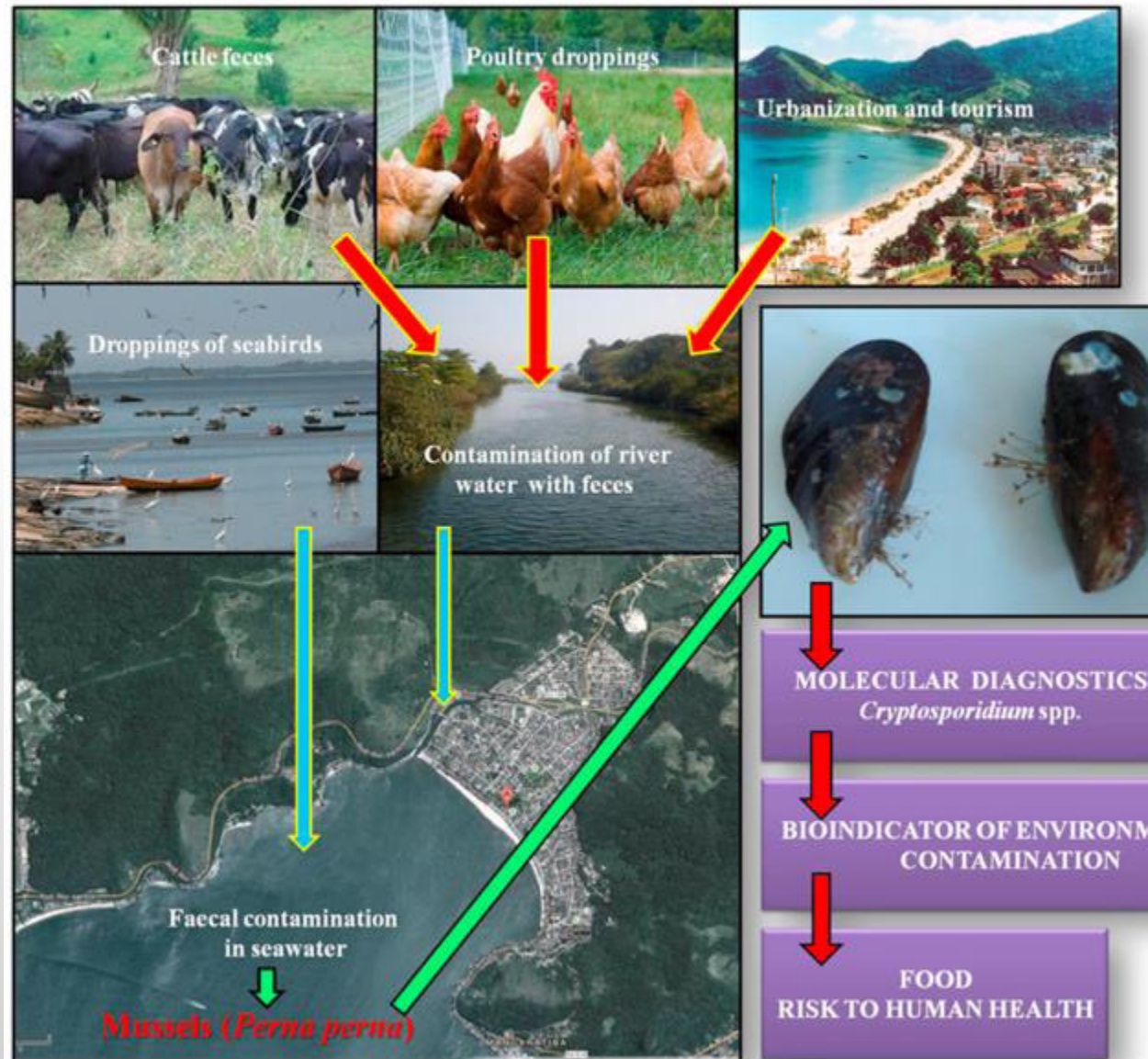
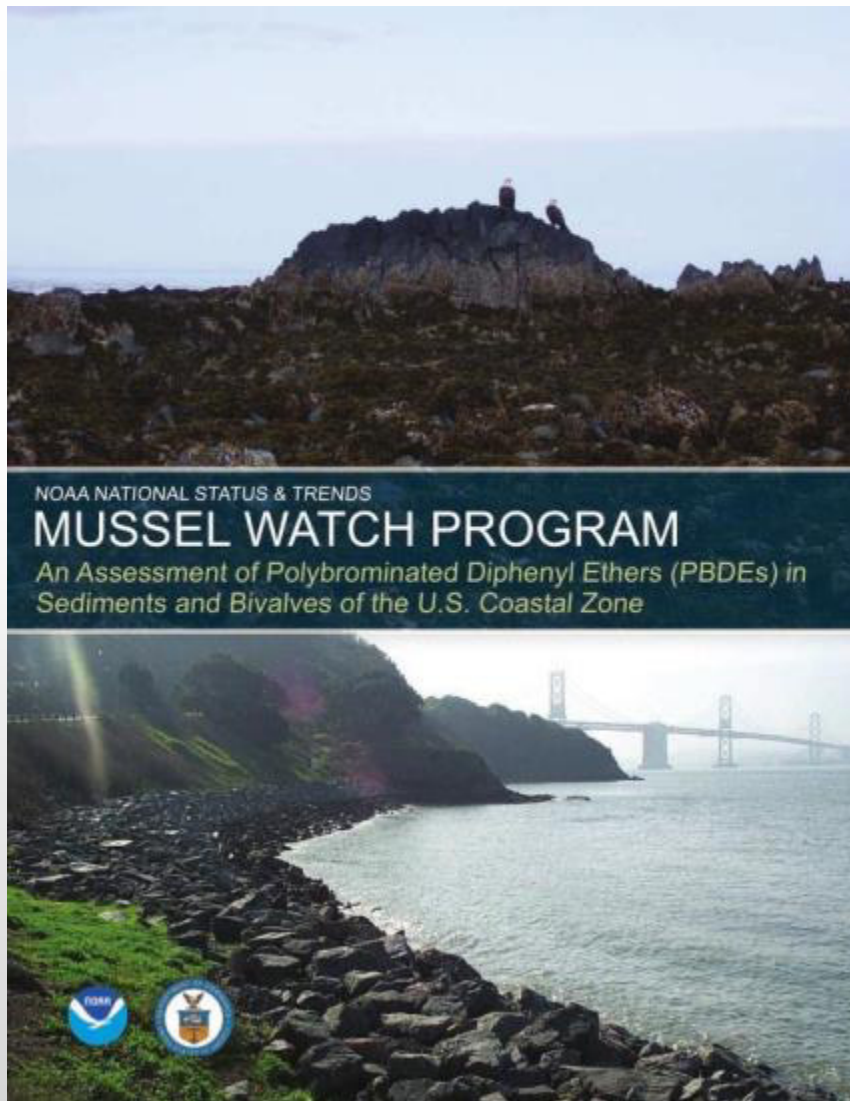
10^{-6} M

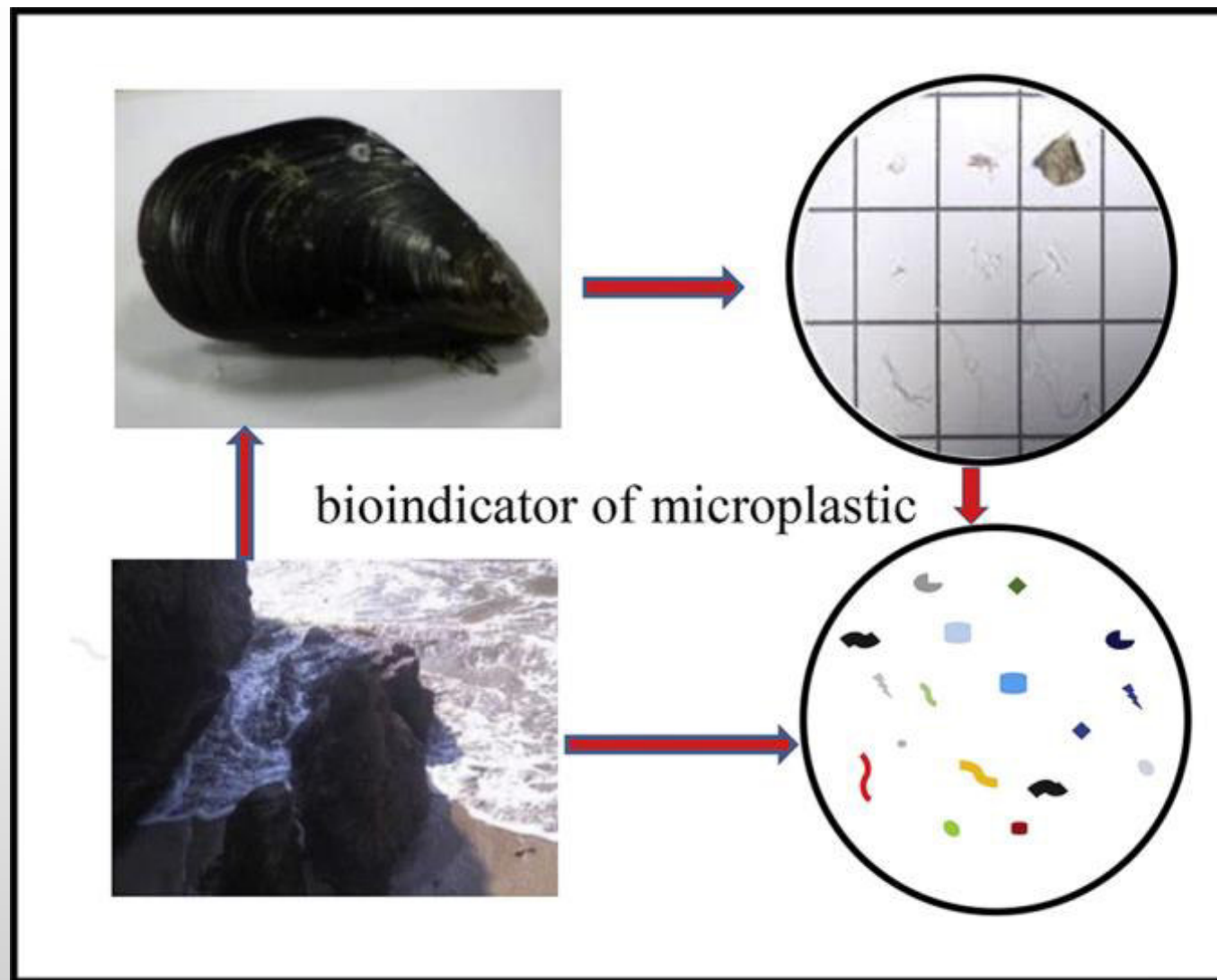
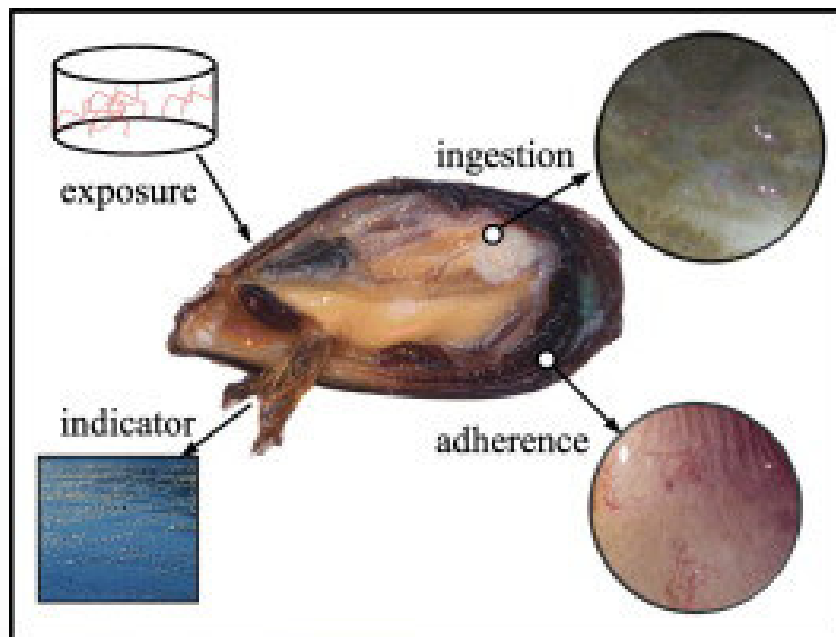


ALTERAZIONE
SPREADING



Molluschi bivalvi

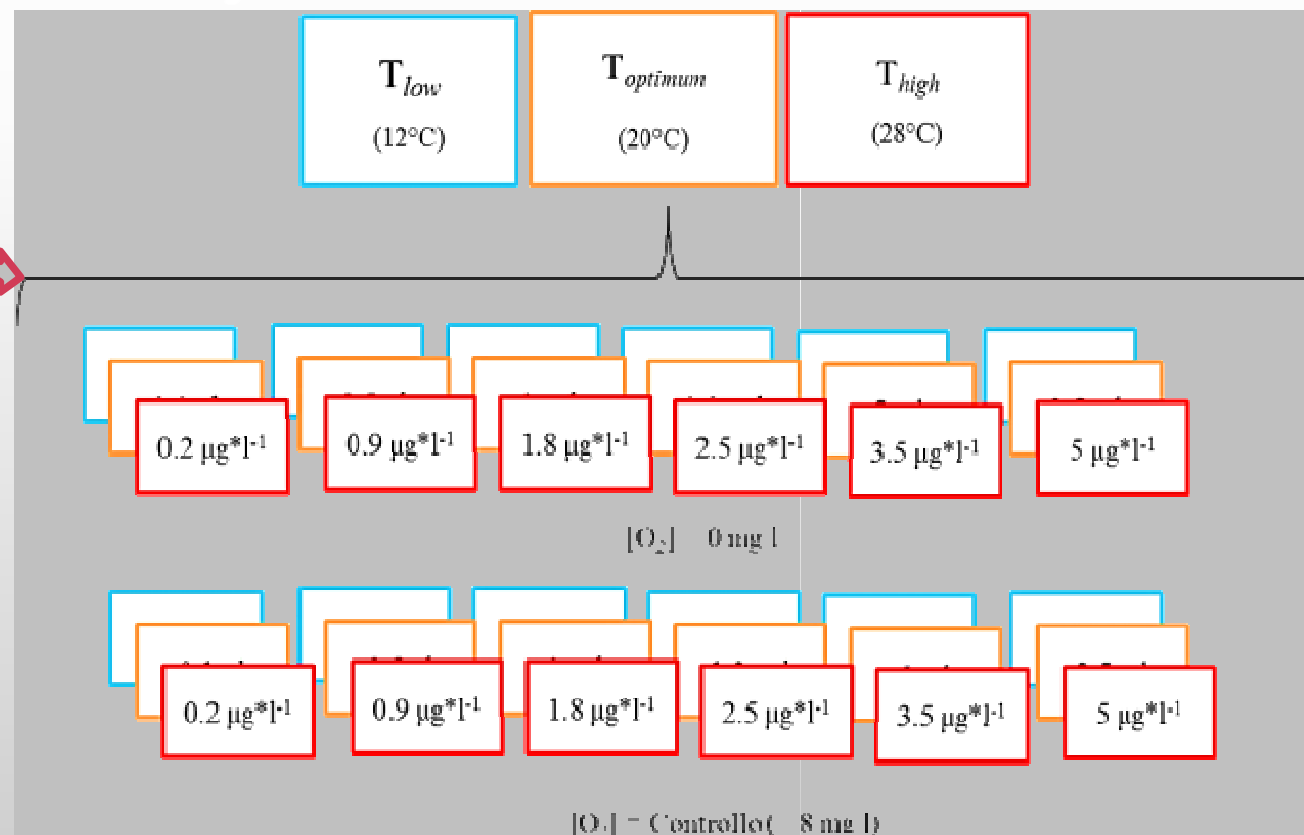




FATTORI AMBIENTALI SU MITILO

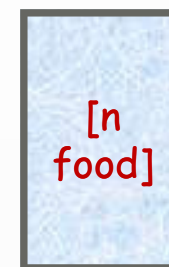


Both glass-resin used for acclimatization



Norm

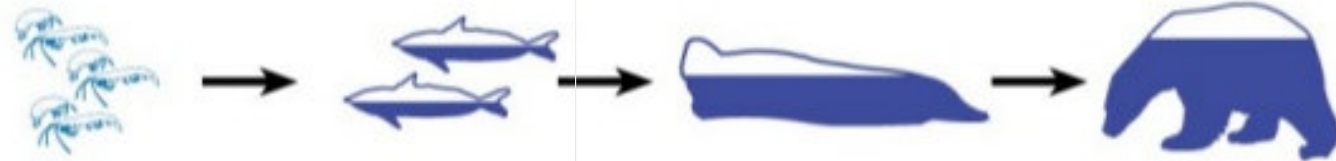
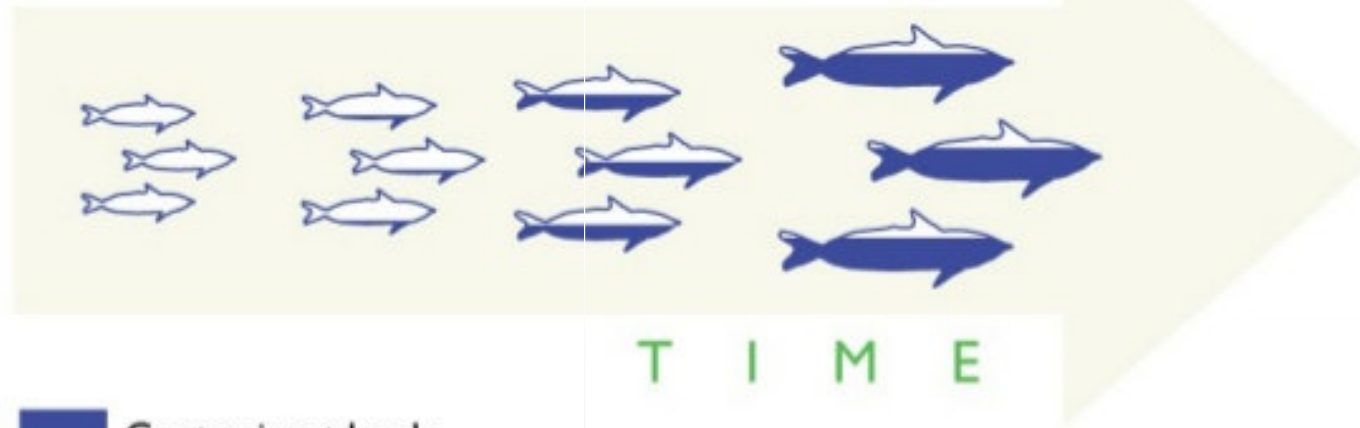
Anox



22 mussels

Pesci

Bioaccumulation



Biomagnification

BIOSENSORS

