

Option C Ecology and Conservation C.3- Impacts of Humans on Ecosystems

ZEBRA MUSSEL
QUAGGA MUSSEL

microplastics

Essential idea:

- Human activities impact on ecosystem function.

Nature of science:

- Assessing risks and benefits associated with scientific research
 - the use of biological control has associated risk and requires verification by tightly controlled experiments before it is approved. (4.8)
 - Taxifolia (ornamental aquatic plant, toxic)
 - Violet Sea Slug is immune to its toxins
 - Could it be used to control Taxifolia?

Applications and skills:

- Application: Study of the introduction of cane toads in Australia and one other local example of the introduction of an alien species. (pg 627)
 - Cane toad introduced in Australia (1935)
 - Native to Central and South America
 - Predator of Cane Beetle
 - Toxic to predators
 - Also a problem in US (Florida, 1936)

Applications and skills:

- Application: Study of the introduction of cane toads in Australia and one **other local example** of the introduction of an alien species. (pg 627)
 - Zebra/Quagga Mussel
 - Native to Black and Caspian Sea
 - Invaded Great Lakes
 - Spread to Lake Mead

International-mindedness:

- Over 100 countries across the globe have agreed to ban the production of CFCs to reduce the depletion of the ozone layer.

Sources of Chlorofluorocarbons (CFCs)

The COMET Program

Understandings

- Introduced alien species can escape into local ecosystems and become invasive.
 - Limiting factors are absent.
 - Kudzu (southeast US)
 - Snakehead
 - Exotic snakes



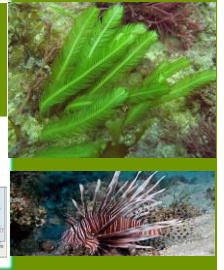
Understandings

- Competitive exclusion and the absence of predators can lead to reduction in the numbers of endemic species when alien species become invasive.

Understanding 17

Understandings

- Two species cannot survive indefinitely in the same habitat if their niches are identical.
 - Georgi Frantschik Gause (Russian, 1932) wrong scientist in text
 - Competitive Exclusion Principle
 - Two species of Paramecium grown with yeast (only one can survive)



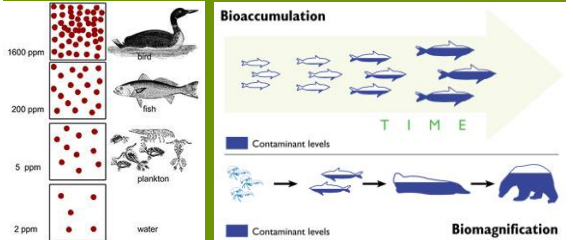
Applications and skills:

- Skill: Evaluation of eradication programs and biological control as measures to reduce the impact of alien species. (DBQ 628 and 629)
 - Mango mealy bug in Ghana (1982) and parasitic wasp.
 - Purple loosestrife (invasive plant) in North America and introduced beetle



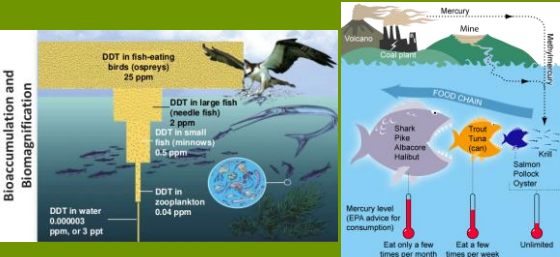
Understandings

- Pollutants become concentrated in the tissues of organisms at higher trophic levels by biomagnification.
 - Fat-soluble toxins
 - Toxins concentrate at each trophic level.
 - Sometimes absorbed from environment (technically Bioaccumulation)



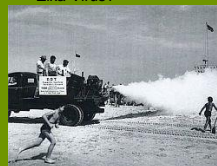
Understandings

- Pollutants become concentrated in the tissues of organisms at higher trophic levels by biomagnification.
 - Ex: Mercury (methyl), PCBs (Polychlorinated biphenyls), DDT
 - First studied with DDT in Raptors(1950's)



Applications and skills:

- Application: Discussion of the trade-off between the control of the malarial parasite and DDT pollution. (read 632-633)
 - Dichlorodiphenyltrichloroethane
 - Insecticide used after WWII
 - Rachel Carson, Silent Spring (1962)
 - Thinning egg shells of raptors
 - Due to biomagnification
 - World Health Org (WHO) condones malaria control as last resort
 - Zika Virus?



Applications and skills:

- Skill: Analysis of data illustrating the causes and consequences of biomagnification. (DBQ 631-632)
 - Radioactive cesium 137
 - Atomic testing in 1961 in Anaktuvuk Pass, Alaska
 - Analyze data for lichens, caribou, and Inuit

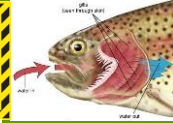
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Cs
Cesium
132.905



Applications and skills:

- Skill: Analysis of data illustrating the causes and consequences of biomagnification. (DBQ 631-632)
 - Some chemicals can be eliminated through gills but not lungs.
 - Compare PCB-153 (Polychlorinated biphenyls) and β HCH (β -hexachlorocyclohexane) in marine fish, terrestrial organisms, and marine mammals.



Understandings

- Macroplastic and microplastic debris has accumulated in marine environments.
 - Ocean currents concentrate in 5 worldwide gyres.
 - Degradation releases organic chemicals.
 - Plastics absorb other organic chemicals, concentrating toxins.
 - Animals eat or become tangled.



Applications and skills:

- Application: Case study of the impact of marine plastic debris on Laysan albatrosses and one other named species. (Do DBQ 635)
 - Nest on Midway atoll.
 - North American Gyre deposits macroplastics.
 - Parents feed chicks plastic.



End

