

Importance of body size on ^{137}Cs uptake in marine animals

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Poster #30

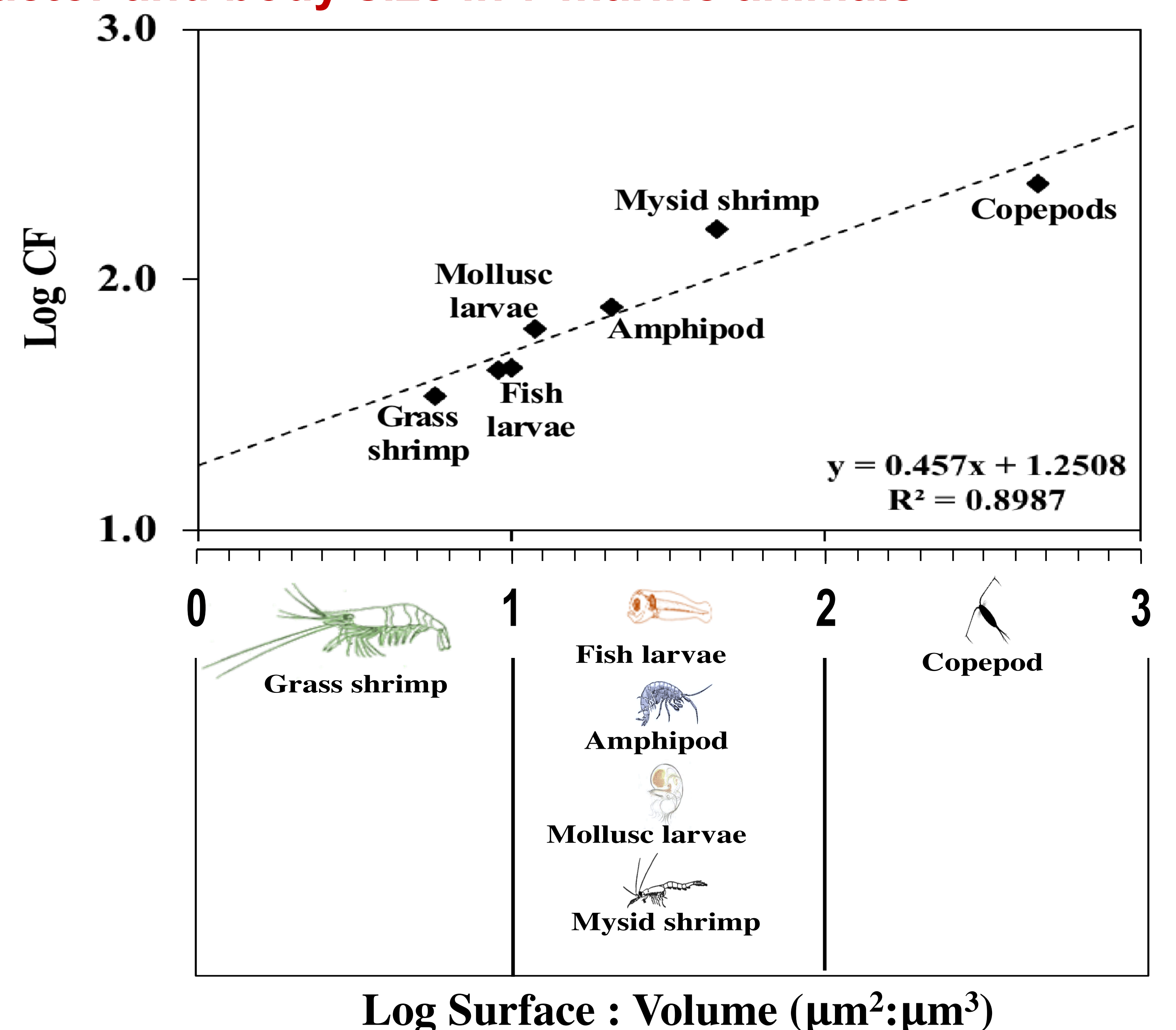
Introduction

Why Cesium?

- ❖ The Fukushima nuclear accident (2011), released the largest accidental release of radioactive materials such as ^{131}I , $^{134,137}\text{Cs}$, ^{132}Te into the atmosphere and to the Pacific ocean
- ❖ Radiocesium ^{134}Cs and ^{137}Cs have relatively long half-lives (30 years) and greater residence times in the water
- ❖ The field data collected from coastal waters off Fukushima revealed great variations of ^{137}Cs concentrations in different marine species, and these varied with animal size and ecological habitat
- ❖ The uptake of dissolved Cs is thought to be an important route of ^{137}Cs bioconcentration among small diverse marine invertebrates such as zooplankton, shrimp, and some molluscs as well as fish larvae
- ❖ ^{137}Cs uptake by marine organisms based on their body size is limited

Results

Fig 1. Relationship between the ^{137}Cs concentration factor and body size in 7 marine animals

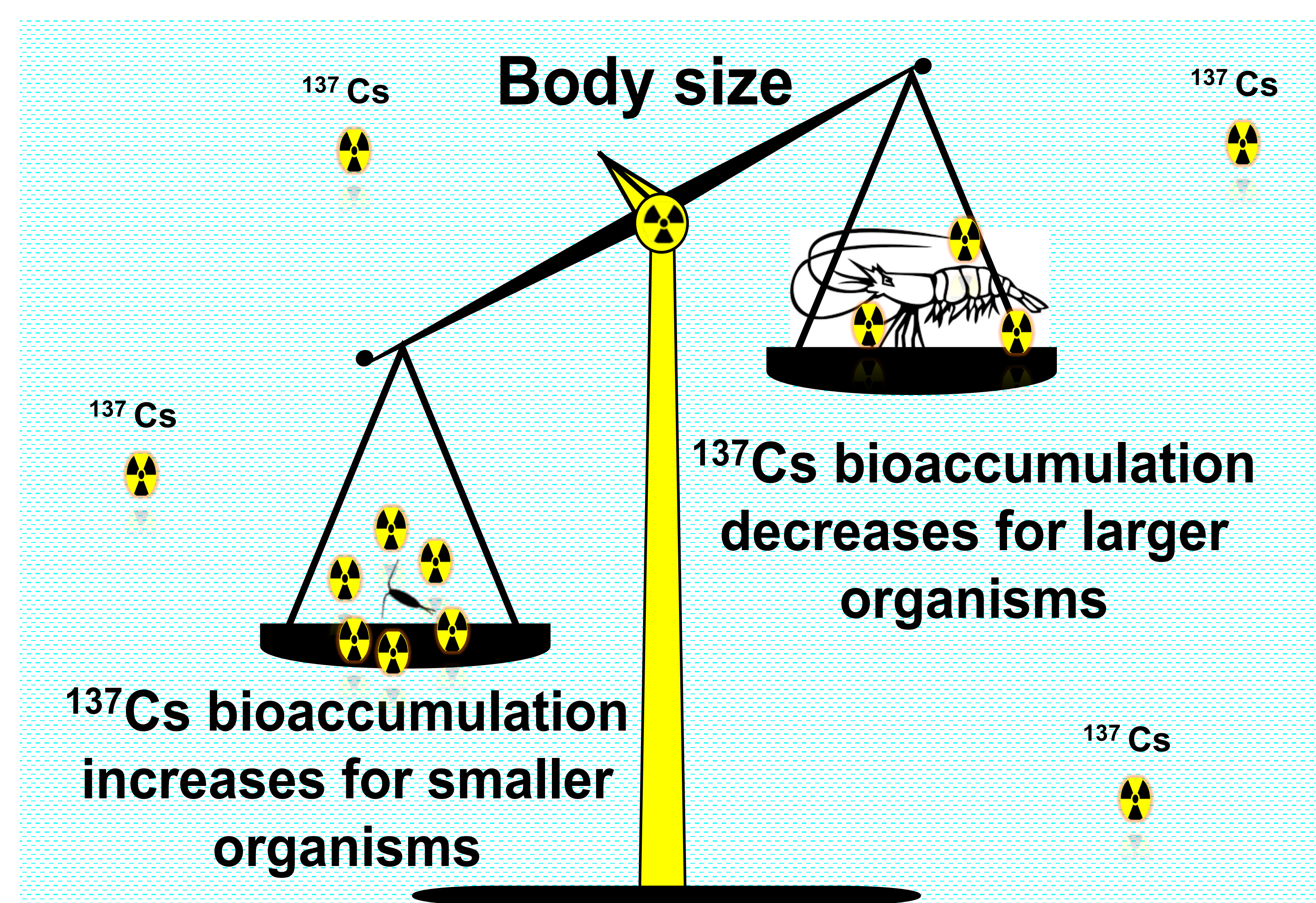


Results

Table.1. Uptake and depuration rate constants of ^{137}Cs in the marine prey species

Taxa	Common Name	Scientific Name	Uptake rate constant (k_u) ($\text{L g}^{-1} \text{d}^{-1}$)	Loss rate constant (k_{ew}) (d^{-1})
Crustacea	Copepod	<i>Acartia tonsa</i>	0.1	0.4
	Mysid shrimp	<i>Americamysis bahia</i>	0.07	0.3
	Amphipod	<i>Leptocheirus plumulosus</i>	0.04	0.1
	Grass shrimp	<i>Palaemonetes vulgaris</i>	0.01	0.2
Molluscs	Slipper limpet	<i>Crepudila fornicate</i> larvae	0.002	0.300
Chordata	Killifish	<i>Fundulus heteroclitus</i> larvae	0.02	0.1
	Sheep head minnow	<i>Cyprinodon variegatus</i> larvae	0.01	0.05

Take Away Message



The ^{137}Cs concentration factors in the 7 marine species were inversely related to animal size and positively related to the surface: volume ratios of the animal bodies.

Acknowledgments

Science and Engineering Research Board and Indo-US Science and Technology Forum, (Government of India) (No. SERB Indo-US Postdoctoral Fellowship 2016/ 147-Derin Mary Thomas)