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News: Sea Butterflies

- The population of the sea butterflies in the Southern Ocean is shrinking due to climate change, making them extremely vulnerable.

Sea Butterflies

- Sea Butterflies scientific name Thecosomata, are a suborder of sea snails known as shelled pteropods.
- They have muscular feet that allow them to swim in water instead of gliding on solid surfaces.
- Sea butterflies are holoplanktonic (organisms that pass their whole life floating, drifting, or swimming weakly in the water) and spend their entire life cycle in the water column.
- They are found in all oceans but are more diverse and abundant in colder waters.
- Sea butterflies have bilateral symmetry and a coiled or uncoiled shell of various shapes and sizes.
- Their shell is mostly transparent and very fragile and can be easily dissolved by ocean acidification.

- They have a pair of wing-like lobes or parapodia for propulsion and a head with eyes, tentacles, and a mouth with a long proboscis to capture prey.
- They have a reduced or absent gill and rely on their body surface for gas exchange.

Importance

- They are a major food source for many fish, seabirds, whales, and other marine animals.
- They also play a key role in transporting carbon from the surface to the deep ocean through their shells and fecal pellets.

Impact of Climate change in the population of Sea Butterflies

Ocean Acidification

- Increased carbon dioxide absorption by the ocean leads to higher acidity.
- Reduced availability of carbonate ions necessary for shell formation and maintenance.
- The ocean is the most acidic in winter because cooler water absorbs more CO_2. This means, the winter months are the most dangerous for the shelled sea butterflies.
- Sea butterflies' shells can dissolve, weaken, or deform.

- Increased vulnerability to predators, infections, and stress.
- Affects metabolism, growth, reproduction, and survival.

Ocean Warming

- Rising ocean temperatures due to climate change.
- Changes in distribution and abundance of sea butterflies.
- Seek optimal thermal conditions for development and survival.
- Alters food availability and quality.
- Impacts ocean currents and mixing affecting sea butterfly transport.

Ocean Deoxygenation

- Warmer and stratified ocean leads to decreased oxygen levels.
- Affects sea butterflies' respiration and energy balance.
- Alters vertical migration patterns.
- Exacerbates effects of ocean acidification by increasing dissolved carbon dioxide concentrations.

Impact of Reduced Sea Butterfly population on Antarctic Ocean

Reducing the Food Availability for Higher Trophic Levels

- Sea butterflies serve as a major food source for fish, seabirds, whales, and other marine animals.
- Population decline of sea butterflies can lead to starvation, malnutrition, or reduced reproduction in their predators and prey.

Disrupting the Balance of the Marine Food Web

- Sea butterflies play a crucial role in linking primary producers (phytoplankton) with secondary consumers (zooplankton) and higher trophic levels.
- Decline in sea butterfly population can alter the structure and function of the marine food web.
- Biodiversity and productivity of the Antarctic marine ecosystem may be affected.

Decreasing the Carbon Sequestration Capacity of the Ocean

- Sea butterflies contribute to the "biological pump," transporting carbon from the surface to the deep ocean through their shells and fecal pellets.
- Population decline reduces the amount of carbon sequestered (process of capturing and storing atmospheric carbon dioxide) in the ocean.

- This results in increased carbon dioxide in the atmosphere and further ocean acidification.