Online Proceedings

POSTER SESSION 2

MGH 206, Easel 175

1:00 PM to 2:30 PM

Analysis of Microplastics in Zooplankton in the Puget Sound Region

Brison Grey, Sophomore, Oceanography, Seattle Central College
Lindsay O'Neal

Mentor: Marina Halverson, Biology, Seattle Central College
Mentor: Ann Murkowski, Biology, North Seattle College

Zooplankton live throughout the water column and what they ingest gets passed to marine life in the higher trophic levels and can ultimately be consumed by humans. Microplastics, 5 mm in diameter or smaller, can contain and absorb high concentrations of toxins and have been consumed by zooplankton in laboratory studies. This research examines whether zooplankton are eating microplastics in Puget Sound. Zooplankton samples were collected from two locations on the east side of Whidbey Island, at an approximate depth of 180-200 meters, and preserved in formalin to prevent further ingestion or regurgitation of microplastics. Samples were then processed according to the National Oceanic and Atmospheric Administration's methods for the analysis of microplastics in the marine environment. The zooplankton and other organic materials were dissolved and the remaining inorganic components were weighed and examined using light microscopy. The most abundant plankton collected were various species of amphipods, chaetognaths, copepods, and shrimp. Microplastic fibers were observed after completion of the chemical digestion. These results suggest that zooplankton are consuming microplastics in situ and provide evidence of the introduction of microplastics into the marine water column.

POSTER SESSION 2

Commons West, Easel 9

1:00 PM to 2:30 PM

Effects of Elevated Levels of Zinc on the Uptake of Calcium in the Pacific Oyster, *Crassostrea gigas*

Andrew Ness, Sophomore, Mechanical Engineering, North Seattle College
Leroy Miller, Sophomore, Oceanography, North Seattle College
Mentor: Ann Murkowski, Biology, North Seattle College
Mentor: Marina Halverson, Biology, Seattle Central College

Zinc is essential for the regulation of many biological processes in all known species. However aquatic species, especially invertebrates, are relatively sensitive to zinc toxicity compared to most terrestrial organisms. As oceans warm due to climate change, zinc previously trapped in ocean sediment will be released into the water column, exposing sensitive benthic and coastal species to elevated, potentially harmful zinc levels. Our study focuses on the impacts of elevated zinc on the calcium uptake of the pacific oyster. Previous research has shown that zinc can mimic other ions, disrupting calcium uptake in the gills. This is thought to be due to their similar size and charge, and could be especially harmful to shellfish and other organisms which use calcium to form their calcium carbonate ($CaCO_3$) shell. In our study, sixty-four oysters were randomly distributed into four tanks of varying elevated zinc concentrations. Following a 72 hour exposure period, the oysters were dissected and the gills were analyzed using Flame Atomic Absorbance Spectroscopy (FAAS) for calcium concentrations. The uptake of calcium through the gills of the oyster is expected to decrease as the concentration of zinc exposure increases. These results contribute to the growing body of knowledge concerning the interplay between zinc and calcium ions in aquatic organisms. Additional research is needed to characterize this effect on a wider variety of marine organisms, especially those in areas with significant run-off from urban or industrial localities.

POSTER SESSION 2

Commons West, Easel 7

1:00 PM to 2:30 PM

Ocean Acidification and pH Changes in the Eelgrass Beds of Padilla Bay

Jacqueline Dodd, Sophomore, Mathematics, Seattle Central College
Kaetlen Slocum, Sophomore, Environmental Science, Biology, Seattle Central College
Mary Amstrup, Sophomore, Environmental Science, North Seattle College
Mentor: Ann Murkowski, Biology, North Seattle College
Mentor: Marina Halverson, Biology, Seattle Central College

Increasing atmospheric CO2 has lead to increased uptake of CO2 by oceans causing ocean acidification. Ocean acidification is the long-term reduction of pH that can have negative effects on marine organisms, especially young calcifying organisms. In Puget Sound, ocean acidification has already caused large-scale oyster larval mortality, negatively affecting a significant contributor to the Pacific Northwest economy. The native eelgrass in Puget Sound, *Zostera marina*, may be a local mitigation strategy for ocean acidification. Marine plants take up CO2 through photosynthesis to create biomass increasing the pH of the water. In this study, water samples were collected from several depths within the water column above eelgrass beds and surrounding mudflats in Padilla Bay. Water samples were analyzed for pH, total alkalinity, dissolved oxygen, dissolved inorganic carbon, and chlorophyll A. Eelgrass shoots and density were measured for leaf area index and the Padilla Bay National Estuary Research Reserve weather stations were used to calculate solar irradiance to estimate the photosynthetic activity of the eelgrass beds. Results suggest that eelgrass beds, in addition to providing critical habitat, may also help locally mitigate ocean acidification beyond the area of the eelgrass beds. Future research analyzing the input and output of carbon in eelgrass beds will be critical to developing large-scale carbon and pH models in marine environments.

POSTER SESSION 2

Commons West, Easel 8

1:00 PM to 2:30 PM

Persistent Organic Pollutants in Possession Sound

Jordan Lindgren, Sophomore, Pre-Med, Biotechnology, Everett Community College
Mentor: Ann Murkowski, Biology, North Seattle College
Mentor: Marina Halverson, Biology, Seattle Central College

Persistent organic pollutants (POPs) such as polychlorinated biphenyls (PCBs), dichlorodiphenyl trichloreothane (DDTs), polybrominated diphenyl ethers (PBDEs) and hexabromocyclododecanes (HBCDs) are toxic nonpolar molecules that can cause damage to the reproductive, developmental, behavioral, and endocrine systems. These pollutants accumulate within the fatty tissues of important species in Puget Sound, including orca whales, salmon, herring, and plankton. This study measured the concentrations of two banned POPs, PCBs and PBDEs, and one currently used POP, HBCD, in plankton communities in Possession Sound. POP concentration in the water was measured in situ using a Chemcatcher deployment device to passively sample water at five locations across Possession Sound. Gas chromatography-mass spectrometry (GC-MS) was used to identify and quantify the POPs collected on the Chemcatcher filters and in the plankton samples. This two-pronged approach to sample both the water and plankton communities helps better define the relationship between POP concentrations in the water and those in the plankton community. This relationship is critical as plankton serve as the primary entry point for POPs into marine food webs. Additional research is needed to help determine the pathways that these pollutants travel between organisms.