Online Proceedings

SESSION 2D

BIOLOGICAL RESPONSES TO ENVIRONMENTAL FACTORS

Session Moderator: Frieda B. Taub, Aquatic & Fishery Science

MGH 234

3:30 PM to 5:15 PM

* Note: Titles in order of presentation.

Measuring Microplastic Abundance in Pacific Sand Lance (*Ammodytes personatus*) Habitat on San Juan Island

Kaitlyn Conway, Senior, Envir Sustainability: Envir Comm (Tac)

Mary Gates Scholar

Mentor: Jan Newton, Applied Physics Laboratory, Schools of Oceanography and Marine Affairs

Mentor: Julie Masura, Environmental Science, Interdisciplinary Arts & Sciences, University of Washington Tacoma

Pacific sand lance (*Ammodytes personatus*) are important to the diets of sea birds, other predatory fish, as well as mammals. Microplastics (plastics $<$ 5 mm) have been found in spawning and deep-water habitats for these organisms. This project explored if microplastics are found on beaches near Friday Harbor Labs on San Juan Island, WA., and if so, to determine their concentration and distribution. Nine sediment samples were collected from two beaches (Jackson and South) and a wave field known to be Pacific sand lance habitat in this area. Samples were processed according to NOAA's Microplastics Methods Manual. Presence, abundance, type (fiber, fragment, film, pellets) and size class ($<$ 0.5 mm, 1-5mm, 6-10mm, $>$ 10mm) of microplastics were determined from sediment samples collected. Microplastics were found in all samples. Microfibers were the most abundant microplastic type (86%), and Jackson beach had the highest concentration of microplastics (17 microplastics/m2). On average the sizes were between 1-5 mm, and the number were 13 microplastics/m2 in the study area. Larger pieces (5-10 mm) were not present at the wave field located on the seafloor, although found at both beaches. This research helps connect microplastic presence to Pacific sand lance habitat. Considering the main prey type of Pacific sand lance and microplastics found in their environment overlap in size classes, it is highly likely that Pacific sand lance are consuming microplastics.

POSTER SESSION 3

Commons East, Easel 54

2:30 PM to 4:00 PM

Beach Plastic Analysis of Pacific Atoll

Amelia Jean Lingle, Senior, Environmental Science, UW Tacoma

Mentor: Julie Masura, Environmental Science, Interdisciplinary Arts & Sciences, University of Washington Tacoma

Plastic debris in large water bodies such as oceans and seas has become a prominent issue. Microplastics (polymers less than 5 mm) can be primary, manufactured (i.e. microbeads from facial exfoliants), entering water bodies through runoff / drainage systems, or secondary (i.e. clothing fibers or fragments) and overtime undergo weathering and breakdown. These microplastics are often small enough to pass through water treatment filters, thus ending up in watersheds. Aquatic organisms are known to ingest microplastics, and while the impacts are currently unknown, interest in the matter is growing. Contaminants in microplastics are also a concern and could have harmful effects on the environment and the organisms that ingest them as well. This study evaluated the concentration and distribution of microplastics collected from sandy beaches on islets (motus) of Tetiaroa, an atoll located in the Pacific Ocean. Thirty-six samples were collected from 8 of the islets. The analysis included density separation using a high-density fluid, filtration to .3-mm, examination under a microscope, and gravimetric analysis to determine concentration and type of microplastics in each sample. Sixty percent of the samples processed contained microplastics including fibers, netting, and a fragment. This preliminary study shows that microplastics continue to be ubiquitous in the natural environment, and continues to heighten the need for disposal management throughout the world.

POSTER SESSION 3

Balcony, Easel 117

2:30 PM to 4:00 PM

Recognizing Base J from Single Molecule Real Time (SMRT) Sequencing

Ivan S (Ivan) Montero, Junior, Computer Science, Applied & Computational Mathematical Sciences (Discrete Mathematics & Algorithms)
Mentor: Peter Myler, Global Health; Biomedical Informatics and Medical Education
Mentor: Aakash Sur, Biomedical and Health Informatics

Base J is a glycosylated nucleobase found in Trypanosomatids, a family of single celled parasites causing Sleeping Sickness, Chagas Disease, and Leishmaniasis. This modified base is thought to play an important role in transcriptional termination for these organisms. Current methods of analyzing Base J rely solely on chromatin immunoprecipitation experiments, which provide low resolution information pertaining to Base J positions. While previous studies have shown that SMRT-seq interpulse duration (IPD) is associated with the position of Base J, we still lack methods to use this information to produce a genome wide, nucleotide-level map of Base J. Here we explore analytical approaches such as dimensionality reduction, machine learning, and signal processing to determine patterns of IPD and DNA enrichment which correspond to Base J across the entire Leishmania tarentolae genome. We show that many simplified approaches such as peak calling, and dimensionality reduction do not contain enough information to accurately classify Base J. We also utilize signal decomposition with Fourier transforms, machine learning clustering and regression methods to provide a more complex treatment of the data. Our findings are an important step in producing an algorithmic approach to identifying precise locations of Base J and can yield insight into transcriptional regulation in Trypanosomatids.