

Author: Lyna Man

Mentors: Dr. Sarah Alaei and Dr. Alison Gardell

Higher Arsenic Bioaccumulation Observed in Gut Tissue of Male Chinese Mystery Snails from Lake Killarney in South King County, Washington

Chinese Mystery Snails (CMS) are an invasive species of viviparous mollusk present in both Arsenic-contaminated and non-contaminated lakes of areas in and surrounding Tacoma, Washington. This study aimed to determine if Arsenic (As) bioaccumulation is greater in male CMS gut tissue relative to head/foot, mantle, and visceral tissues from Lake Killarney (20 ppb As in H₂O) than in Lake Trout (control <1 ppb As in H₂O). Five snails from each lake were dissected and separated into four regions: head/foot, mantle, gut, and visceral tissue. The tissue samples were dried, ground into powder, processed through nitric acid digestion, and As content was quantified using ICP-MS. We observed significantly higher amounts of As in gut tissue samples from Lake Killarney than in Trout Lake. Additionally, CMS gut tissue from Lake Killarney had the highest accumulation of As for all tissue regions from both lakes. Our results demonstrate the physiological impact of As accumulation in different CMS tissue regions from both Lakes Trout and Killarney. The results of our research also raise questions about the involvement of gut microbiota as modulators of As bioaccumulation and toxicity in CMS. A next step in progressing our research would be to test for the presence of As biotransformation genes (ABGs) in the gut bacteria of CMS from both Lake Killarney and Lake Trout. The presence of ABGs in the gut bacteria of CMS should be further explored to uncover the unknown mechanisms behind higher accumulations of As in the gut of CMS. Studying the presence of known ABGs and their expression within the gut microbiota may lead to a further improved understanding of why As contamination is higher in the gut of CMS.