An Investigation to Improve Captive Rearing Programs and General Native Hawaiian Land Snail, or Kahuli, Dietary Knowledge

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Captive rearing programs for endangered Native Hawaiian snails, or kahuli, face challenges due to limited research surrounding wild kahuli conditions and diet. They are essential in native ecosystems and culture, but are threatened due to factors such as invasive species. To inform captive rearing programs, this project examines the temporal changes in the microbiome of Succinea unicolor, a proxy species of the native Catinella rotundata, from the wild into captivity. Stool samples were taken at various time points across the first week into captivity, which were later sequenced and analyzed. Our results show the microbiome shifts over time for all replicates, but notably captive communities that exhibited a shift towards increased Cyanobacterial dominance were also linked with lower survival rates. These results suggest that Cyanobacteria dominance may indicate waste accumulation contributing to snail deaths, though it may also be relevant to their diet, as it is found in both wild and captive environments. Therefore, to further understand snail diet and improve captive rearing practices, we decided to grow new culturable food sources that could replace current options within captivity and provide insight into kahuli diet. We were able to successfully isolate and identify different bacterial isolates, including Cyanobacteria, from wild leaves that kahuli are found on. To begin to better understand these microbial isolates, food preference trials were conducted on Succinea unicolor that show a possible preference for Cyanobacteria that are found in the culturable food sources mentioned above. Therefore, we are hopeful for the continuation of these trials on native species with various Cyanobacteria to help implement this culturable food source into captive rearing.

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