Elucidating the Influence of Habitat Fragmentation, Urbanization, and Environmental Factors on the Inhibitory Ability of Antifungal Cutaneous Bacteria Found on the Eastern Redback Population

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Amphibian populations are currently experiencing a global decline, with 43% of all species listed as a threatened species.. Increased habitat fragmentation has been shown to increase the development of the chytrid fungus Batrachochytrium dendrobatidis (Bd) causing the disease chytridiomycosis. The eastern redback salamander (Plethodon cinereus), possess antifungal cutaneous bacteria, which mitigate the growth of Bd. It was previously undetermined how habitat conditions associated with urbanization affect salamander abundance and number of bacterial isolates on their skin. In order to investigate the effects of these factors, eastern redback salamanders located in high upland, mid-upland, and stream locations at urban, suburban, and rural sites were swabbed for cutaneous bacteria, and soil samples were taken from each site. Soil chemistry, water content, and pH were analyzed alongside bacterial isolate data. It was expected that urbanization would have a negative effect on the number of bacterial isolates, however, our research discovered that urbanization has an approaching significantly positive effect on the bacterial isolates ($0.07>p>0.05$). Also, there was no statistical significance between pH, soil water content, and the number of salamanders and bacterial isolates found, compared to habitat type ($p> 0.05$). There was a statistically significant difference between phosphorus and potassium levels in comparison to number of salamanders and bacterial isolates ($p<0.05$), finding low levels of phosphorus and high levels of potassium is optimal for a greater number of salamanders and bacterial isolates. Thus, this study has begun to elucidate the effects of habitat conditions on disease protection in amphibians and will contribute to alleviating amphibian declines.

Awards Won:
Third Award of $1,000