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Su20-045

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Funding Source: MARC/IMSD - NIH-funded Maximizing Access to Research Careers/ Initiative for Maximizing Student Diversity

Vibrational Communication in Juvenile Enchenopa Binota Treehoppers Recruits Nymphs to Initiate Group Foraging

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There are very few studies on how vibrational communication facilitates group foraging. Understanding the function of this communication in the *Enchenopa* treehopper would be very instrumental to further understanding their mechanisms of group living. There are many studies done on adult insect communication, but not many concerning juveniles. This project will address both of these understudied areas. Treehoppers feed on plant sap, and since plants have many defense mechanisms, it is important for treehoppers to find a good food source and take full advantage of it before the plant releases defensive chemicals. Juvenile treehoppers practice group living, and therefore communicate with each other often by using their bodies to generate vibrations that are sent through the host plant. There are multiple types of messages to be sent to group members, leaving room for development of different calls. *Calloconophora pinguis* is a treehopper species that uses vibrations to signal to other treehoppers where a good food source is, using a call and response method. The response could be the treehopper replicating the call and walking to the signaler, or just exclusively walking to the signaler; this suggests that the calls act as a form of recruitment. This study will focus on *Enchenopa binotata* on Viburnum plants. *Enchenopa* nymphs have previously been found to produce several different vibrations in various contexts, but the function of these signals has not been tested. I suspect that *Enchenopa* nymphs are also using this type of "call and response" communication system to locate and advertise feeding sites. This project will utilize the same procedure used in the study done by Reginald Cocroft in his 2005 paper studying vibrational communication in phloem-feeding insects. In this experiment, one nymph will be used for each playback for a total of 10 trials. There will be a playback of the potential recruitment signal, along with silence and wind vibrations as controls, each coming from one playback device. The location of the three playback treatments (signal, wind, silence) will be varied between trials. The responsiveness of the treehopper will be measured by their distance from the recruitment signal at the end of the playback, as they will be starting off at the base of a cut stem. Based on other studies done on *Tylopelta* treehoppers, as well as preliminary observations of the *E. binotata* nymphs, I expect the *Enchenopa* treehoppers to walk towards the source of the recruitment playback. This would show that the signals attract nymphs from the group to participate in group foraging. This experiment would allow us to look deeper into the role group size plays in decision making in juvenile treehoppers. Juvenile treehoppers are rarely alone, but since there are usually multiple groups on a plant, it would be helpful to understand how the treehoppers decide which group to follow.