Vibrational Communication in Juvenile Enchenopa Binotata Treehoppers and Nymph Recruitment to Initiate Group Foraging

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Background

- Group-living organisms need a form of communication to survive
- Treehoppers are sap-feeding insects that communicate through vibrations sent through the host plant
- Juvenile treehoppers practice group-foraging
- *Calloconophora pinguis* treehoppers practice call-and-response signaling to advertise a food source
- *Enchenopa binota* adult signals have been studied, but not their juvenile signals
- **Hypothesis:** *Enchenopa binota* nymphs use signals to recruit other juveniles for group foraging

Figure 1: *E.binota* nymphs on *Juglans nigra*

Methods

- 1 nymph will be placed at the base of a 3-stemmed *Viburnum* clipping
- Each stem will have a different playback device attached, each playing a different sound (placement will be rotated between trials) (Fig.2)
  - Silence
  - Potential recruitment signal
  - Atmospheric Noise (rain, rustling leaves, etc.)
- Nymph responsiveness assessed by measuring distance from recruitment signal at the end of the playback
- Ten trials, each with different nymphs

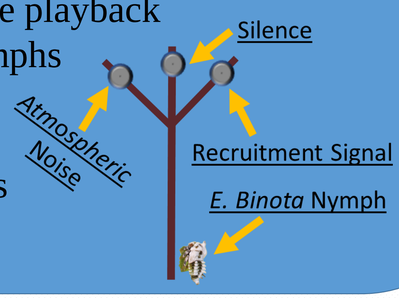

Figure 2: Setup for testing responses of *Enchenopa* nymphs to signals

Expected Results

Expected Results:

- Nymphs will walk towards the source of the potential recruitment signal
- Nymphs will attempt to forage near the recruitment signal
- Nymphs will signal back while walking towards recruitment signal (call-and-response signaling), similar to *Calloconophora pinguis* treehoppers

Future Directions

- Study the benefits of group foraging for treehoppers to find out why it occurs more frequently during the juvenile stage
- Find out if group size plays a role in the effectiveness of recruitment
- Use obtained data to create a database of signals and find out the differences between the various signals juvenile treehoppers send
  - Ex: signaling for help when in distress vs signaling for food

Acknowledgements & References

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- Cocroft, R. B. (2005). *Vibrational communication facilitates cooperative foraging in a phloem-feeding insect*. Proceedings of the Royal Society B: Biological Sciences, 272(1567), 1023–1029.
- Rodríguez, R. L., Ramaswamy, K., & Cocroft, R. B. (2006). Evidence that female preferences have shaped male signal evolution in a clade of specialized plant-feeding insects. *Proceedings of the Royal Society B: Biological Sciences*, *273*(1601), 2585–2593.