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

Are social integration signals slowly evolving and widely shared in treehoppers?

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Animal communication is studied because of its divergence across species. However, although mating signals evolve rapidly, social integration signals often evolve more slowly. For example, traits of infant distress vocalizations and parental responses are widely shared across mammals. Because social integration signals are more cooperative than competitive, there aren't many selection pressures that influence its diversification, which could explain why some similarities can be seen across species. We studied the signals involved in cooperative foraging in treehoppers, which are group-living insects that live and feed on plant sap and communicate using plant-borne vibrations. In *Tylopelta gibbera* (Hemiptera: Membracidae) treehopper nymphs, we have recognized a pattern in their social signals. While walking to search for a new feeding site, *T. gibbera* often use a signal similar to a purr, and occasionally pause; we call this individual the searcher. During this pause, individuals already at a feeding site produce short 'ticks' in response to the purr, and the searcher uses these ticks to locate and join the group. We hypothesize that treehoppers have a fundamental signaling structure, episodic walking guided by short signals from settled individuals, that represents a widely shared, slowly evolving social integration system in treehoppers. Preliminary analysis of an archive of recordings made by one of the authors reveals that the first prediction is met: multiple treehopper species share the pattern of walking bouts (with or without signals) followed by short 'tick' signals from other individuals. We next plan to run playback experiments to test whether searching *T. gibbera* nymphs will orient to tick signals from related species. The findings of this experiment can help us better understand the evolution of social integration signals in treehoppers and can give us more insight to the divergence of animal communication as a whole.