UC RIVERSIDE

DEPARTMENT OF ENTOMOLOGY

ENTM250 Seminar Series

Speaker:

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Date: Monday, May 16, 2022
Time: 4:00 pm - 4:50 pm
Format: In-Person Seminar & Virtual Access
Location: Genomics Auditorium 1102A

Zoom: 948 0131 1028
Passcode: 347039

Title:

"Misery Loves Company: Exploring Variation in Social Structure in a Desert Ant"

Abstract:

The evolution of complex societies is likely to have been a multi-step process, involving sequential evolutionary shifts in dispersal, grouping, and cooperation. Each evolutionary decision point involves a distinct set of costs and benefits, but it is not yet clear how complex social strategies develop and what combination of selective forces leads to alternative social outcomes. An ideal model system for investigating this question is the colony founding phase in eusocial insects, during which reproductively totipotent foundresses face both grouping and cooperation decisions: they either found alone (haplometrosis) or in unrelated multi-foundress groups, and then once within groups, they can either cooperate long-term (polygyny) or compete for reproductive dominance (secondary monogyny). In this talk, I will discuss insights gained from the desert seed-harvester ant, *Veromessor pergandei*, the only ant species known to show all three social strategies across its range in the desert southwest of North America. The distribution of both grouping and long-term cooperation largely match regional patterns of environmental harshness, with the largest, most cooperative groups occurring at sites at which resource and water availability are both initially low, promoting grouping, and persist throughout the first year of colony growth, promoting long-term tolerance. To understand the evolutionary history of behavioral divergence, we characterized population genetic structure using mitochondrial sequencing and microsatellite markers to reconstruct historical relationships among the three behavioral regions, and the biogeography of strategy origins and expansion. The mitochondrial phylogeny indicated clear separation of all three strategies corresponding with two ancient water barriers, the first of which isolated the secondary monogyny region ~5mya, and the second which split the haplometrotic and polygynous regions ~2-3mya. Microsatellite allele frequencies largely reflected the historical barriers, but indicated subsequent incursion into and replacement of secondary monogyny by both polygyny and haplometrosis in the regions of secondary contact. Thus, the current distribution of alternative strategies likely reflects a complex interplay of historical isolation, local adaptation, and competition between alternative strategies under spatially varying selection pressures.

Refreshments will be served in the Entomology Building Courtyard at 3:00pm