Diet Effects on Social Communication and Colony Success of the
*Aphaenogaster rudis* species-complex

Social insects use specialized chemical signaling that provides the foundation for communication and organization of social structure. Social insects use a class of chemicals called cuticular hydrocarbons for recognition and communication. The ability to identify the recognition cues of members of the same colony versus members of other colonies, or other species, is crucial for the ecological success of the colony. Previous research has shown that the compositions of the cuticular hydrocarbon profiles may change based on nest substrate and nutrient availability in the diet. Determining how social insects respond to variation in nutrition should provide us with a better understanding of social insect behavior. In this investigation a diet manipulation was performed on colonies of the *Aphaenogaster rudis* species-complex collected from three sites: a northern site, a mid-latitude site, and a southern site. We examined the effects of three diets with varying protein:carbohydrate ratios (3:1, 1:1 and 1:3). Twenty-seven colonies of the *Aphaenogaster rudis* species-complex were reared on the 3 experimental diets, with 9 colonies per treatment group, for 6 weeks. Workers were sampled at the beginning and end of the 6 weeks for chemical analysis of their cuticular hydrocarbons. Food consumption rate and mortality rate was quantified for each colony. We found that food consumption rate varied between the three sites. Food consumption rate was highest on the high carbohydrate diets; however, this was also correlated with high levels of hoarding of food inside of their nests. Mortality rate was highest on the high protein diets for all three sites. Future work will include analysis of how cuticular hydrocarbon profiles vary between diets and sites. This research should further our understanding of how shifts in resource availability affect physiological and behavioral traits in social insects.