

P136*Conditional mutualism emerges from a largely antagonistic species network***Rachelle M. M. Adams**, Joanito Liberti, Anders Illum, Tappey Jones, David Nash, Jacobus Boomsma

Collective decision-making characterizes all advanced social insects and is particularly important for the acquisition and defense of nests. The outcomes of such collective decisions are usually adaptive for colonies, even though they are based on many binary individual decisions. Here we report on an unusual conditional decision-making system involving three antagonistic ant species: A *Sericomyrmex* fungus-farming host ant, a parasitic *Megalomyrmex* guest ant producing alkaloid venom, and a raiding *Gnamptogenys* agro-predator. We show experimentally that a complex conditional mutualism is mediated through simple pairwise interactions at both individual and colony levels. We treat the system as a symbiotic species network (host ant-fungus-social parasite), building from interaction trials with few individuals to a colony level choice experiment. The guest ants effectively protect their host colonies against agro-predator raids because their alkaloid venom is more potent than the biting defenses of the host ants. Relatively few guest ants are sufficient to kill raiders that invariably exterminate host nests without guests. We also show that the odor of guest ants discourages raider scouts from recruiting nestmates to host colonies. Our results imply that *Sericomyrmex* fungus-growers obtain a net benefit from their costly guest ants behaving as a functional soldier caste to counter agro-predator raiders (www.megalomyrmex.com/videos). The different life histories of the agro-predators and guest ants can facilitate their coexistence in a negative frequency dependent manner. Because a guest ant colony is committed to exploit a single host colony for life, the guests would harm their own interests by not defending the host. Cooperation is thus enforced by external threat according to the principle that the enemy of my enemy is my friend. This conditional mutualism is analogous to episodes in human history when mercenary city defenders offered net benefits or imposed net costs, depending on the level of threat from invading armies.