



## **Sharing the Throne: Induced polygyny in honey bees (*Apis mellifera*)**

Author(s): James Martin Withrow, James Martin Withrow , David R. Tarpy

Institution(s): Biology and Entomology Programs, North Carolina State University, Raleigh, NC, USA ; Biology and Entomology Programs, North Carolina State University, Raleigh, NC, USA ; Biology and Entomology Programs, North Carolina State University, Raleigh, NC, USA

Unlike some other eusocial insects, honey bees (*Apis mellifera*) are typically monogynous, with single queens monopolizing reproduction in colonies consisting of tens of thousands of individuals. This monogynous state is behaviorally enforced through aggressive interactions in both queen-queen fighting and worker-queen acceptance. By overcoming these behavioral obstacles to establish a pseudomutant polygynous state, with multiple queens sharing reproduction in a single brood nest, we have developed a novel means to study the social interactions and evolutionary history of honey bees, as well as selective tradeoffs driving the evolution of sociality. This research paradigm also offers the potential for a new management strategy to address queen failure, one of primary challenges facing the apiculture industry, by utilizing still-productive cull queens that would otherwise be sacrificed to instead produce larger, more productive, and more genetically diverse polygynous colonies. We discuss the behavioral dynamics of induced polygyny, including queen-queen, worker-queen, and worker-brood interactions, as well as the potential for utilizing this system in the apiculture industry.