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Role of queen promiscuity in reproductive swarming by honeybees

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Whenever hymenopteran queens mate multiply and create work forces with multiple patrilines of workers, the benefits of unusually high levels of genetic diversity for division of labor and colony efficiency have been of interest to researchers. Evidence shows that multiple-patriline honeybee colonies (the derived state for *Apis*) have a more responsive foraging effort, maintain more stable nest conditions, and better resist disease than colonies with only a single patriline of workers (the ancestral state for Hymenoptera). These enhanced colony-level traits are important but indirect proxies of probable increased fitness. We examined the role that genetic diversity plays in the swarming process, a colony-level phenomenon that is linked directly to reproductive success for *Apis*. We created honeybee (*A. mellifera*) swarms that were composed either of multiple or single patrilines of workers, then we monitored swarms in pairs as they selected new nest sites. Across nine pairs of such swarms, we measured the number of dances that were performed by house-hunting workers as they examined potential nest sites (per capita and per swarm), the number of sites that were reported by workers in each swarm, and the time that it took for swarms to select and depart for a new home. Although workers in honeybee colonies with multiple patrilines did not report more potential nest sites or produce more dances throughout the decision-making process, they did dance at higher rates than workers in colonies with only a single patriline, which resulted in swifter decisions and earlier liftoffs on average. Thus, multiple-patriline swarms reduced the time they spent in a vulnerable 'homeless' state without sacrificing the amount of information that they used to choose a new home. We provide insight into some of the ways that queen promiscuity and patriline diversity directly benefit reproduction in a social insect.