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*G. Amdam, A. Csondes, M. Kim Fondrk, and R. E. Page, Jr. 2005. **Complex Social Behavior Derived from Maternal Reproductive Traits.** Nature 439: 76-78*



oney bees are important pollinators of agricultural crops. By understanding what factors influence how and why worker honey bees collect pollen, we may be

able to manipulate bee populations to make commercial colonies better pollination units or increase honey production as needed. Honey bee social behavior is marked by a division of labor among the female worker bees. Older bees perform foraging tasks collecting either pollen or nectar, while younger bees work in the nest. Previous research has shown honey bee foraging behavior is linked to the insect reproductive state. Workers with less developed ovaries forage for sugars from flowers, e.g. nectar, to maintain themselves. Workers with more developed ovaries forage for protein, e.g. pollen, to support egg production. Using NRI funding, Dr. Page and colleagues examined the effect of the insect reproductive plan on foraging specialization in honey bees. First, their work examined differences between two strains of honey bee: a high pollen-hoarding strain, which can collect and store large quantities of pollen, compared to a low pollen-hoarding strain. The work confirmed the high pollen-hoarding strain of honey bee possess more ovarioles. Second, the two strains were introduced into host colonies with and without a queen present. The high pollen-hoarding strain displayed a higher frequency of advanced reproductive state in both situations. Finally, wild-type foraging honey bees were collected, regardless of hoarding potential. Upon returning from a foraging trip, the bees were dissected and their ovaries examined. The researchers found the wild-type bees possessing a higher number of ovarioles began their foraging flights at a younger age and were more likely to collect pollen rather than nectar. The research supports the hypothesis that the division of labor in the honey bee social structure evolved from a solitary ancestry. Knowledge gained from this research will advance agriculture's ability to better utilize honey bee colonies to increase honey production as well as be more efficient pollinators.

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