

Honey Bee (*Apis Mellifera*) Drone Flight Behavior Revealed by Radio Frequency Identification: Short Trips That May Help Drones Survey Weather Conditions

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Abstract : During the mating season, honeybee drones make mating flights to congregation areas where they face fierce competition to mate with a queen. Drones have developed distinct anatomical and functional features in order to optimize their chances of success. Flight activities of western honeybee (*Apis mellifera*) drones and foragers were monitored using radio frequency identification (RFID) to test if drones have also developed distinct flight behaviors. Drone flight durations showed a bimodal distribution dividing the flights into short flights and long flights while forager flight durations showed a left-skewed unimodal distribution. Interestingly, the short trips occurred prior to the long trips on a daily basis. The first trips of the day the drones made were primarily short trips, and the distribution significantly shifted to long trips as the drones made more trips. In contrast, forager trips showed no such shift of distribution. In addition, drones made short trips but no long mating trips on days associated with a significant drop in temperature and increase of clouds compared to the previous day. These findings suggest that drones may have developed a unique flight behavior making short trips first to survey the weather conditions before flying out to the congregation area to pursue a successful mating.

Keywords : *apis mellifera*, drone, flight behavior, weather, RFID

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