Drone Honey Bee[1] Flight from Clustered Swarms[2]

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ABSTRACT

The mating flight behavior of drone honey bees from swarm clusters is compared to drone mating flight behavior from colony situations. Duration of flight from swarms and colony situations is similar. Swarm drones appear to take as many flights/day but spend less time between flights than colony drones.

The flight activity of male honey bees (drones) from queen-right colony situations is well studied and documented. Drones fly during the afternoon generally from 1230 to1700 h. Maximum flight activity occurs between 1400 and 1600 h (Mikhailov 1928, Howell and Usinger 1933, Oertel 1940, and Lavrekhin 1947, 1960).

Minderhoud (1932) reported drone flights lasted between 25 and 30 min. Howell and Usinger (1933) gave a mean of 27.5 min; they noted two different types of flight: those of a short duration (1–6 min) they termed orientation flights and those of a longer period were termed mating flights. Witherell (1971) reported a mean flight duration of 33 min with some individual flights lasting over 2 h. The number of flights/day was reported to be 3.1 on sunny days and 1 on cloudy days (Howell and Usinger 1933), 1–8/day (Kurennoi 1954). and up to 4/day (Oertel 1956).

Witherell (1972) found that drones of a normal stock, with a mean life span of 21.2 days, made an average of 25 flights during their life time. Drones that lived for 40 days averaged 62 flights.

The in-hive time between flights was reported by Mikhailov (1928) to average nearly 22 min while Minderhoud (1932) reported intervals of only 3–4 min. In a comprehensive study of this subject, Witherell (1971) reported large variations with an in-hive time of slightly over 17 min.

This report compares drone flight from clustered swarms with that of drone flight from colony situations.

MATERIALS AND METHODS

Three natural primary swarms and 1 secondary swarm were used for the observation of flight activity. The queens were placed in standard Benton queen cages which were then affixed to the horizontal members of wooden crosses (dimensions, 154.4 cm by 45.7 cm) which served as clustering sites.

Drones were individually marked with color-coded, numbered disks. Observation of drone flight was done by the author with the asistance of one observer. Observations began between 1230 and 1400 h and continued until 1700 h or the cessation of maximum flight activity. The time in flight for each drone was calculated to the nearest 5 sec interval. The observations were done on July 1, 7, August 6–8, and September 8, 1970.

On a swarm cluster exposed to full sunlight, there is no specific area of exit or entry for flight as there is from a colony, especially a colony whose entrance is restricted for such purposes. Drones left and reentered the cluster from any point, which hampered observation of each individual flight.

RESULTS

Drones in colony situations preen themselves prior to afternoon flight (Howell and Usinger 1933). This behavior was also observed in drones accompanying swarms. This action involved elaborate cleaning of the antennae and continual stroking of the compound eyes with the forelegs. Abdominal movements were observed where the abdomen rotated along its horizontal axis.

The average time in flight from the swarm clusters was 24.99±15.96 min (Fig. 1). Of the 192 recorded flights, 28 were less than 10 min in duration and were classed as orientation flight (mean 3.98±2.74 min). 164 flights were longer than 10 min and were classed as mating flights (mean 28.54±14.44 min).

During the latter part of this study, the fourth swarm (ca. 3500 workers) was observed for the number of drone flights/day. The swarm contained 3

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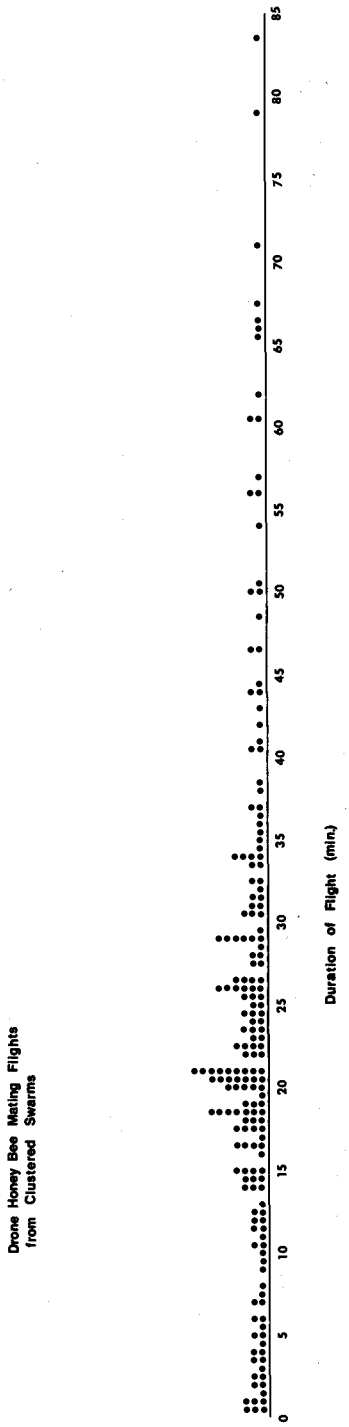

FIG. 1.—Duration of male honey bee flights from clustered swarms.

marked drones. On September 8, each drone made 3 flights. The mean flight time was 26.43±9.23 min. The average time on the cluster between flights was 2.35±0.53 min.

DISCUSSION

The flight behavior of drones in a swarm is similar to that of drones in a colony situation. A mean flight time of 28.54 min for mating flights corresponds favorably to the published figures for done flight from colony conditions. Swarm drones would appear to take as many flights/day as hive drones.

Concerning the time between flights, swarm drones differ from hive drones; however, the mean of 2.34 min is from a sample of only 9 drone flights. Swarm drones replenish their crop supplies by direct trophallaxis from worker bees in the swarm cluster (Burgett 1973) which would reduce the amount of time spent on the swarm cluster.

The behavior of queens and workers in a swarm is markedly different from that in the hive. Egg laying on the part of the queen stops; foraging, care of the brood, guarding the hive and other normal worker activities cease. Only a small percentage of the worker population in a swarm is active, mainly scout bees searching for a new home site. In contrast, drone behavior in the swarm cluster follows patterns established in the colony situation. These data confirm that drone behavior continues independently from queen and worker behavior.

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