The Mating Swarm of the Texas Harvester Ant[1] (*Pogonomyrmex barbatus*, F. Smith)

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The activities of the reproductive forms of the Texas harvester ant *Pogonomyrmex barbatus*, F. Smith, after leaving the parent colony and constructing new nests have been known for many years, but the events occurring between these two periods are not well understood. Mating in this species differs materially from that occuring in most species. Usually mating in ants occurs when the reproductives in an area leave the nests at about the same time, copulate while flying, drop to the ground and the queens start new colonies alone. When the wings get in the way they are removed by biting or rubbing. Observations by the authors along with those made by other investigators, which are given below, tend to show that this is not the case with the Texas harvester ant.

As far as could be determined, only two records of the mating of the Texas harvester ant appear in the literature. The first of these appears in a book entitled, "The Natural History of the Texas Agricultural Ant" by McCook[1]. McCook gives an account that was observed by Lincecum on June 27, 1863: "About noon the reproductives left the mother colony and flew to a large central mating area. Ants seemed to come to this spot from all the surrounding county. The area was 107 yards long and 10 yards wide. This entire area was covered with reproductives. Females outnumbered the males two to one. Four or five males were seen balling up on one female. After copulation the females flew off immediately. Upon landing, the queens quickly began the construction of nests. When the ants' wings became a hindrance they chewed them off".

The only other record found was a recent paper by Michener[2]. He observed a swarm on June 23, 1947, at El Paso, Texas, which began at 3:00 p. m. This swarm was on a hill and covered an area 15 feet square. He stated that no nests of this species were found around the mating area. Most of the ants in the swarm were males since, after copulation one or more times, the females left. The males moved around very actively, probably because they had to come close to the females before they recognized them. Michener also recorded a mating swarm that took place in a tree. It seemed to be his opinion that the mating took place on high points in the terrain such as a hill or a tree. He pointed out, however, that in at least one case the mating did not occur on the highest point in the terrain.

Wheeler[3] makes no mention of observing a mating swarm but does record mating on top of the mound before leaving the parent colony.

OBSERVATIONS

On August 2, 1954, at the Ft. Reno Experiment Station 3 miles west of the city of El Reno, Oklahoma, the senior author observed a large mating swarm in a bare area in a moderately grazed pasture of gently rolling land.

The night before the activities described below, .49 inch of rain fell. This was the first measurable precipitation that had fallen since June 15, 1954 when .75 inch of rain was recorded. Only .02 of an inch was reported for this area during the entire month of July. The average daily maximum temperature for the month of July was 102.2° F. The maximum daily temperature ranged from 93 to 109° F. The temperature on August 2, the day the observations were made, was 98° F. The day was clear. About 1:30 p.m. it was noted that reproductives were present on the nests of all Texas harvester ants examined. The workers around these nests were very ag-

[1] Received for publication December 17, 1954.

gressive and stung at every opportunity. They militantly followed the author from one side of the nest to the other in an apparent effort to protect the reproductives.

About 2:00 p. m. the winged reproductives left the mounds and assembled in large numbers in an area recently cleared of vegetation by a bulldozer. Within 30 minutes an area 100 by 25 feet was literally covered with winged ants. Apparently ants came from all directions and from considerable distances. No mounds of this species existed in the mating area.

Mating took place entirely on the ground. Males seemed to greatly outnumber the females. This was probably due, as has been pointed out by Michener[2], to the females leaving the area after mating, which resulted in a build-up of males. Many times, several males would run to a single female, actually balling up around the female. Many of these rolling, tumbling balls could be seen on the ground. The few weed stubs in the area were covered with ants. The entire area was covered by copulating ants, even the author's shoes.

A male would mount the back of a female, usually clasping her thorax with his mandibles approximately at the point of attachment of the hind wings. The male would then spread his squamae and volsellae and attach them firmly over the tip of the female's abdomen. The tips of the two abdomens of the two ants would then be drawn perpendicular to the main body axis of the two copulating ants. Other males, however, did not give up their efforts once a female was in copulation, and many times the copulating male was dislodged. When this occured the females would begin to walk about, dragging the male. This action did not cause the male to loose his hold in any case observed.

After mating, the females left the area by walking or flying, but no males were seen leaving the breeding area. When a fertilized female found a favorable area for a nest, she broke off her wings by strenuously rubbing them with her hind legs. In no case observed did the queen wait until she had begun construction of a nest to break her wings off. No biting of the wings was observed.

Dying males were seen about two hours after the beginning of the swarm. Many of these were eaten by the smaller ant, *Solenopsis xyloni*, McCook.

In a count of the mounds in this pasture (153 acres in size), 331 mounds of the Texas harvester ant were found. In an adjacent more heavily grazed pasture of 120 acres, 585 mounds of the same species were found.

On August 2 the Entomology Department received many phone calls concerning the large numbers of red ants digging holes in lawns, paths, driveways, and similar areas. Similar information was requested by mail from all over the State and all replies reported large numbers on the afternoon of August 2. Many other species of ants swarmed at the same time.

DISCUSSION

These observations agree with those reported in literature in most respects, but there are some differences. The swarm that Michener[2] saw was much smaller than the swarm reported here and the swarm seen by Lincecum was much larger. Wheeler[3] found that not all of the ants swarmed at the same time. This might explain why the swarm seen by Michener was not as large as the one seen here. His swarm could have been a swarm preceding or succeeding the main one. Another answer to the difference of size of the swarm could be the difference in population. As shown by the figures given here, the area where swarming was observed in this account was densely populated with this species. Probably the extended period of dry weather suppressed swarming until a large number of reproductives

had built up in the colony. As mentioned, the first rain in over a month had fallen the night before and many other species swarmed at the same time.

If Michener's writings have been interpreted correctly, it was his opinion that swarming occurs on some high object, but not necessarily on the summit of the area. The swarm observed here was not on any high object; in fact, it occurred on a gently rolling area with higher hills within flight distance in all directions. Trees were also present but were not used for swarming as reported by Michener.

Lincecum found that the queens immediately flew off after mating; then when the queens came to earth again they at once began construction of their nests. When their wings began to hinder their digging, they chewed them off. Michener observed that the queen did not leave the area immediately after copulation but many times remained to copulate a second time. The authors agree with the latter. It is also our opinion that the queens do not always fly away from the mating area, as many were seen walking from the area and found a favorable nesting spot before taking wing. It was our observation that upon coming to earth the queens did not begin construction at once, but ran along the ground for a short period and then broke off their wings with their hind legs. In no case were queens with wings attached seen beginning to construct their nests, and in no case were they seen employing the mouth parts to shed the wings.

It is hoped that other opportunities will arise to study the mating swarm *Pogonomyrmex barbatus*. Extensive observations will be made the day following a general rain after a drought period.

Literature Cited

(1) McCook, H. S. 1879. The Natural History of the Agricultural Ant of Texas, Lippincott's Press, Philadelphia. 300 p.

(2) Michener, C. D. 1948. Observations on the Mating Behavior of Harvester Ants. New York Ent. Soc. Jour. Vol. 56. pp. 239-242.

(3) Wheeler, W. M. 1913. Ants Their Structure, Development and Behavior. Columbia Press, New York City. 660 p.