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Breeding Biology of the Desert Leaf-Cutter Ant
Acromyrmex versicolor (Pergande)
(Hymenoptera: Formicidae)

ROBERT A. JOHNSON* AND STEVEN W. RISSING

Zoology Department, Arizona State University, Tempe, Arizona 85287-1501

ABSTRACT: Mating flights of *Acromyrmex versicolor* (Pergande) occur in early morning following substantial summer rains. Males fly from the nest first and form mating aggregations over prominent shrubs. Females mate with multiple males.

We observed mating flights of the desert leaf-cutter ant *Acromyrmex versicolor* (Pergande) on 19 September 1985, and 29 August and 25 September 1986, in North Scottsdale, Maricopa County, Arizona, about 3.2 km west of the McDowell Mountains (see also Rissing et al., 1986), and on 15 August 1990, about 1 km north of the San Tan Mountains, Pinal County, Arizona. All major mating flights were preceded on the previous day by a heavy late-summer rain (see Wheeler, 1917) that wetted the soil to ≥ 13 cm. Flights were aborted by cold early morning temperatures; few alates flew on 24 September, 1986, when air temperature was 13°C, compared to the major flight that occurred the following day when the air temperature was 17°C. In Arizona, mating flights of *A. versicolor* occur from late July to October, depending on rainfall patterns.

Mating flights of *A. versicolor* began in early morning with emergence of workers and alates of both sexes; on 29 August 1986, alates first appeared at 0545 and began to fly about 0600, while on 25 September 1986, alates emerged at 0600-0615 and began to fly about 0715. Flights began with departure of males (63 of 69 early departing alates from one nest were males, $\chi^2 = 47.1$ using an expected 50:50 distribution, $P < 0.01$), who may fly at least 100 m to mating aggregation sites. Sex ratio of three nascent aggregations (12 ♂:3 ♀, 22 ♂:1 ♀, and 20 ♂:0 ♀, $\chi^2 \geq 5.4$, $P < 0.03$) indicated that males arrived first and formed these aggregations; females were likely attracted to these sites by visual cues or release of pheromones. Aggregations were maintained for about 1-1.5 hr.

Mating occurs by males grappling females in mid-air. Pairs then fall to the ground and copulate, with up to nine males surrounding one female. Copulation averaged 5'43" ($N = 4$, range = 3-8 min) at a ground temperature of 23°C. As in several related species (Page, 1986), *A. versicolor* females are capable of mating with multiple males. Such behavior was determined by placing several females that

* Present address: Department of Botany, Arizona State University, Tempe, Arizona 85287-1601.
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had just finished mating in a covered 10" × 6" × 4" clear plastic box with several males; all of these females were in copulo within minutes.

At the McDowell Mountain site, aggregations most commonly formed in washes, over or adjacent to prominent shrubs that were surrounded by large barren areas. Washes were less common near the San Tan Mountains, however, where aggregations invariably formed over creosotebush (*Larrea tridentata*). Aggregation sites may be used over several seasons; the same creosotebush at the edge of a relatively large wash was used as an aggregation site during all of three observed flights. Dimensions and densities of mating aggregations paralleled those described by Wheeler (1917); aggregations are small and localized, being elliptical, about 6–10 ft vertically, 3–4 ft wide, 6–15 ft above ground, and ranging from about 50–150 ft apart.

Overall, mating assemblies of *A. versicolor* closely resemble those of *Pogonomyrmex* spp. and some vertebrates (Hölldobler, 1976). *Pogonomyrmex* spp. also fly following heavy summer rains, with males flying prior to females and congregating at perennial mating sites from which they attract females by release of pheromones (Hölldobler, 1976). Aggregation sites of *A. versicolor* are similar to those of *P. rugosus* and *P. barbatus*, which form near the ground adjacent to prominent shrubs that are surrounded by relatively barren areas (Hölldobler, 1976). However, unlike these species, *A. versicolor* mates in small, localized aggregations (see also Wheeler, 1917).

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