

## IMPACT of NOVIFLUMURON on WHOLE COLONIES of PHARAOH'S ANTS

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The impact of noviflumuron on whole colonies of Pharaoh's ants, *Monomorium pharaonis* L., was investigated in a series of laboratory experiments. Large colonies (tens to several hundred queens, 0.5 to 2 grams brood, and 2,000+ workers contained in nine cm diameter by two cm high plastic Petri dishes with a water-absorptive base) were transferred directly from laboratory colonies to test arenas (55 x 42 x 8 cm plastic boxes or 7.6 m x 10 cm diameter PVC tubes) and allowed to settle for two days. Foraging tubes were used to simulate the distance ants might travel to forage for and collect a bait material. After two days, each colony was provided either peanut oil (control treatment) or peanut oil containing 0.10% noviflumuron. Fresh bait was provided daily for four days. After four days, baits were removed and all colonies resumed feeding on their normal laboratory diet for the remainder of the study. Each treatment was replicated 2 to 4 times and all studies were conducted at 25-27°C and 35 to 40% RH.

The day baits were provided, and weekly thereafter brood (collectively eggs, larvae, and pupae) was quantified by placing a piece of clear acetate (0.5 cm grid) over the top of the nesting cell and counting the number of squares below which lay any amount of brood. Egg production was determined weekly by placing one wingless queen from each replicate into a fluon-lined 20 ml soufflé cup and holding it, without food and water, for one day at 26°C. After one day, the number of eggs produced from each queen was recorded, and she then returned to her respective replicate. The number of dead queens and workers was tallied for each replicate. At the end of the experiment, each colony was divided into its component life stages, and the quantity of each stage was determined.

### RESULTS

Consumption of noviflumuron by colonies of Pharaoh's ants resulted in a rapid decline of larvae and pupae; 4 weeks after treatment little brood remained, and for each of the remaining weeks the only brood detected in treated colonies was eggs. Isolation of individual queens confirmed that noviflumuron did not prevent them from producing eggs. Eggs produced by noviflumuron-treated queens were comparable in quantity, size, color, and appearance to eggs produced by queens fed the control bait (no noviflumuron) but did not hatch or died during hatching. At the end of the trials (16 or 24 weeks) control colonies were comprised of all stages of brood (0.1387 to 3.0853 grams total), queens, and workers; noviflumuron-treated colonies were comprised of eggs ( $\gg 0.0010$  grams) (but no larvae or pupae), queens, and workers. As expected, noviflumuron was not acutely toxic to either workers or queens.

### SUMMARY

Noviflumuron is a new insecticide that acts by inhibiting chitin synthesis. Although not acutely toxic to worker or queen Pharaoh's ants, noviflumuron slowly eliminated whole Pharaoh's ant colonies by preventing egg hatch and by killing larvae. Noviflumuron is a new active ingredient with potential to eliminate Pharaoh's ant colonies over the long-term and potentially play a key role in the integrated pest management of urban pest ants.