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MANAGING THE DARK ROVER ANT USING BAITS

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Abstract The dark rover ant (DRA), *Brachymyrmex patagonicus*, is an invasive ant species that is found in many parts of the world. DRA can become a structural pest when they enter buildings in search of stored food or shelter, or when they swarm inside. Managing DRA can be difficult since they don't respond well to all baits, leading to failed pest control efforts. This research studied the efficacy of commercial baits containing borax, imidacloprid, thiamethoxam, clothianidin, and indoxacarb. The results showed a significant difference in the survival rates among active ingredients, with products containing imidacloprid, thiamethoxam, and clothianidin being the fastest-acting treatments, while indoxacarb failed to show any statistically significant difference from the untreated control. When under water stress, all baits killed DRA at a faster pace. Nevertheless, the indoxacarb-containing gel bait still failed to kill the workers at a significantly faster rate compared to the untreated control. When exposed to borax bait, there was no significant difference in the survival of DRA that were not starved compared to those starved for 24 hours. There was a significant difference between the survival of DRA that were not starved and those starved for 48 hours.

Key words Brachymyrmex patagonicus, baiting

INTRODUCTION

The dark rover ant (DRA), *Brachymyrmex patagonicus* Mayr, is an invasive species native to South America. It is currently found in South America including Argentina, Paraguay, Bolivia, Brasil, and Venezuela. It was first reported in the United States of America in Madisonville, Lousiana (Wheeler and Wheeler, 1978) and has spread to many other states. It is found in Southern United States, Arizona, Nevada, California, as well as Europe. It was first found in California in 2010 in a residential area in Anaheim, Orange County (Martinez et al., 2011). This ant is commonly found in urban streets and parks as well as agricultural fields of Southern California including the Riverside, Orange, and Los Angeles Counties (personal observations). S. Taravati DRA nest both inside and outside structures, with a strong preference for sweet such as honey. Workers are often observed on countertops and walls. In Arizona, male and female alates have been collected from mid-April to early November. While they do not cause structural damage, they are considered a nuisance species. Due to their relatively recent emergence, little is known about their susceptibility to current management strategies and insecticides (Miguelena and Baker, 2014).

Results from the laboratory foraging experiments revealed that *B. patagonicus* readily relocates its colony closer to food and water sources. Data from these trials also confirmed that foragers must maintain contact with the queen and brood to forage. Laboratory trials showed that *B. patagonicus* foragers favored carbohydrate-rich food in controlled settings, whereas field trials demonstrated a seasonal preference shift—with carbohydrates being preferred in winter and spring, and protein in fall and summer. These findings suggest that this species adjusts its food lure preference based on seasonal availability (Keefer, 2016).

In a previous study on DRA using two field trials on 30 structures and one laboratory trial, showed that Demand CS provided the greatest reduction in ant activity. Gel baits on the other hand caused a higher mortality than granular baits 11 days after the treatment. After 90 days, the gel bait-only treatment achieved the highest level of control (Keefer, 2016).

In many locations, *B. patagonicus* is commonly found in urban environments and areas with high human activity, such as heavily used recreation sites in state parks, gas stations, restaurants, grocery stores, and highway edges. Like many other invasive pests, this species tends to reestablish quickly after control efforts, often returning alongside other ant species (MacGown et al., 2007). Studies suggest that its population may increase following the suppression of imported fire ants (Dash, 2004).

MATERIALS AND METHODS

Workers of DRA were collected from multiple urban locations in Riverside, California, USA, between September 2023 and September 2024. They were transported to the laboratory and kept in an incubator set at 26°C inside 33 ml cylindrical plastic vials, which served as the experimental units. Each vial contained 10 DRA. Ants were collected using an inhalation aspirator, which vacuumed them into a plastic vial. The vials had small ventilation holes in the lid to aid air circulation. Until the experiment began, ants were provided with water and sucrose solutions absorbed onto small rectangular pieces of paper towel.

Survival of DRA in Response to Bait Exposure

Vials containing DRA ants were divided into blocks and arranged in a randomized complete block design. Each block contained treatments of sucrose solution, Advion Ant Gel (Indoxacarb), Maxforce Quantum Ant Bait (Imidacloprid), Optigard Ant Gel Bait (Thiamethoxam), Intice Rover Ant Bait (Borax), and Sumari Ant Gel Bait (Clothianidin). In each vial, liquid food, water, and bait were applied to pieces of paper. Bait and water were replenished as needed. All vials were randomly placed within blocks in centrifuge tube racks and transferred to an incubator set at 26°C. Ants were starved for 12 hr prior to the experiment's start.

Survival of DRA in Response to Bait Exposure in the Absence of Water

Vials containing DRA ants were divided into blocks and arranged in a randomized complete block design. Each block included treatments of sucrose solution, Advion Ant Gel (Indoxacarb), Maxforce Quantum Ant Bait (Imidacloprid), Optigard Ant Gel Bait (Thiamethoxam), Intice Rover Ant Bait (Borax), and Sumari Ant Gel Bait (Clothianidin). The experiment was replicated five times. Except for the untreated control, which received both sucrose and water, all other treatments received only bait applied to small rectangular pieces of paper towel. No additional water was provided in the bait vials. Bait and sucrose were replenished as needed, and ants were allowed to feed ad libitum. All vials were randomly placed within blocks in centrifuge tube racks and transferred to an incubator set at 26°C. Ants were starved for 12 hr before the experiment.

Survival of DRA in Response to Bait Exposure in the Presence and Absence of Water

Vials containing DRA ants were divided into blocks and arranged in a randomized complete block design. Each block included the following treatments: untreated control (sucrose solution) + water, untreated control (sucrose solution) without water, Advion Ant Gel (Indoxacarb) + water, Advion Ant Gel (Indoxacarb) without water, Maxforce Quantum Ant Bait (Imidacloprid) + water, Maxforce Quantum Ant Bait (Imidacloprid) without water, and Intice Rover Ant Bait (Borax) + water, Intice Rover Ant Bait (Borax) without water. The experiment was replicated six times. In each vial, liquid food, water, or bait was applied to pieces of paper towel. New bait and water were replenished as needed. All vials were placed within blocks in centrifuge tube racks and transferred to an incubator set at 26°C. Before the experiment began, ants were starved for 12 hours. Ants were starved for 12 hours before the onset of the experiment.

Effect of Starvation on the Efficacy of baits against DRA

Vials containing DRA ants were divided into blocks and arranged in a randomized complete block design. Each block contained an untreated control (sucrose water) + water starved for 24 hours, Intice Rover Ant Bait (Borax) without starvation, Intice Rover Ant Bait starved for 24 hours, and Intice Rover Ant Bait starved for 48 hours. The experiment was replicated seven times. In each vial, liquid food, water, or bait were added to small rectangular paper towel pieces. New bait and water were replenished as needed, and ants were allowed to feed ad libitum. All the vials were placed inside blocks in centrifuge tube racks and transferred to an incubator set at 26°C. Ants were starved 12 hours before the onset of the experiment.

Statistics. Survival analysis was performed using the Kaplan-Meier estimator to evaluate the impact of different bait treatments. Right-censoring was applied to account for ants that remained alive at the end of the study period. Survival curves were compared using the log-rank test via the survdiff function. Pairwise comparisons were adjusted using the Benjamini-Hochberg (BH) method to control false discovery rates. All statistical analyses were conducted using RStudio (version 2024.12.0) and R (version 4.2).

RESULTS AND DISCUSSION

Survival of DRA in Response to Bait Exposure

A statistically significant difference was found in the survival of DRA among the treatment groups ($\chi^2 = 32.4$, df = 5, $p < 0.0001$), with Maxforce Quantum Ant Bait causing the fastest mortality (shortest survival) and Advion Ant Gel causing the slowest mortality (longest survival) (Figure 1). All baits significantly reduced DRA survival, except Advion Ant Gel, which did not cause a statistically significant difference in survival compared to the untreated control.

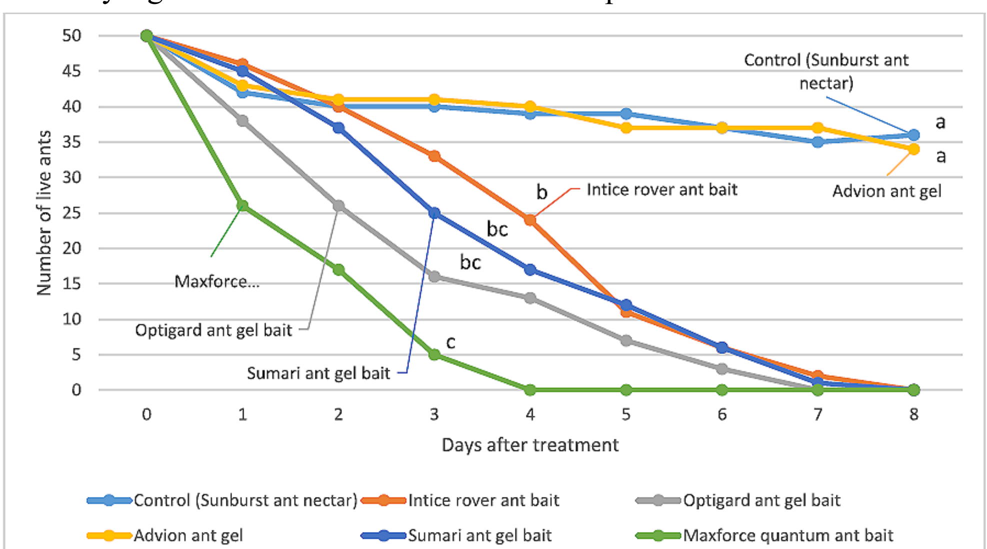

Figure 1. Number of dark rover ants surviving after the onset of the baiting experiment. All ants had access to food/bait and water.
Lines with the same letter on top are not significantly different ($P > 0.05$).

Survival of DRA in Response to Bait Exposure in the Absence of Water A statistically significant difference was observed in DRA survival among the treatment groups ($\chi^2 = 21$, df = 5, $p < 0.0001$), with Maxforce Quantum Ant Bait and Intice Rover Ant Bait causing the fastest mortality (shortest survival). Survival in the untreated control differed significantly from all other treatments, including Advion Ant Gel (Figure 2)

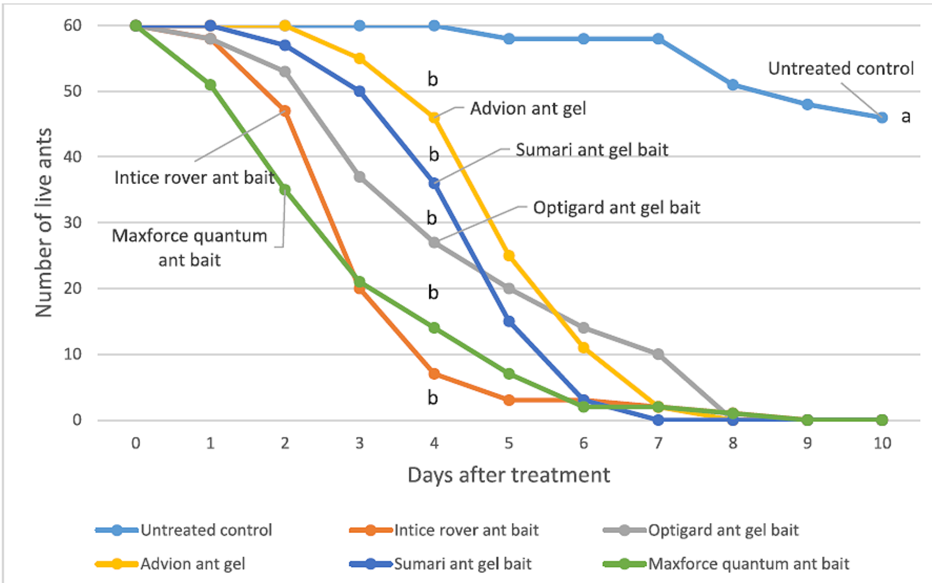

Figure 2. Number of dark rover ants surviving after the onset of the baiting experiment. Ants in the untreated control group had access to sucrose water and water separately. All other treatments had access to bait only and no water. Lines with the same letter on top are not significantly different ($P > 0.05$).

Survival of DRA in Response to Bait Exposure in the Presence and Absence of Water
A statistically significant difference was observed in DRA survival among the treatment groups ($\chi^2 = 69.2$, df = 7, $p < 0.0001$). Bait-only treatments (without water) resulted in significantly shorter survival times compared to those that included water. The untreated control + water treatment had a significantly longer median survival time than all other treatments, except for “Advion Ant Gel (Indoxacarb) + water” and “Advion Ant Gel (Indoxacarb) without water”. A statistically significant difference was also found between the survival of "untreated control + water" and "untreated control without water". The shortest median survival was observed in Maxforce Quantum Ant Bait (Imidacloprid) without water (3 days), followed by Intice Rover Ant Bait (Borax) without water (4 days). The longest median survival was recorded in the untreated control without water (8 days) treatment.

Effect of Starvation on the Efficacy of Baits Against DRA

A statistically significant difference was observed in DRA survival among the treatment groups ($\chi^2 = 22.2$, df = 3, $p < 0.0001$). Median survival differed significantly between the "Intice Rover Ant Bait without starvation" and "Intice Rover Ant Bait starved for 48 hours" treatments. However, there was no significant difference between the "Intice Rover Ant Bait without starvation" and "Intice Rover Untreated control Intice rover ant bait Optigard ant gel bait Advion ant gel Sumari ant gel bait Maxforce quantum ant bait 0 10 20 30 40 50 60 0 1 2 3 4 5 6 7 8 9 10 Number of live ants Days after treatment Untreated control Intice rover ant bait Optigard ant gel bait Advion ant gel Sumari ant gel bait Maxforce quantum ant bait a b b b b b S. Taravati Ant Bait starved for 24 hours" or between the "Intice Rover Ant Bait starved for 24 hours" and "Intice Rover Ant Bait starved for 48 hours" treatments (Figure 3).

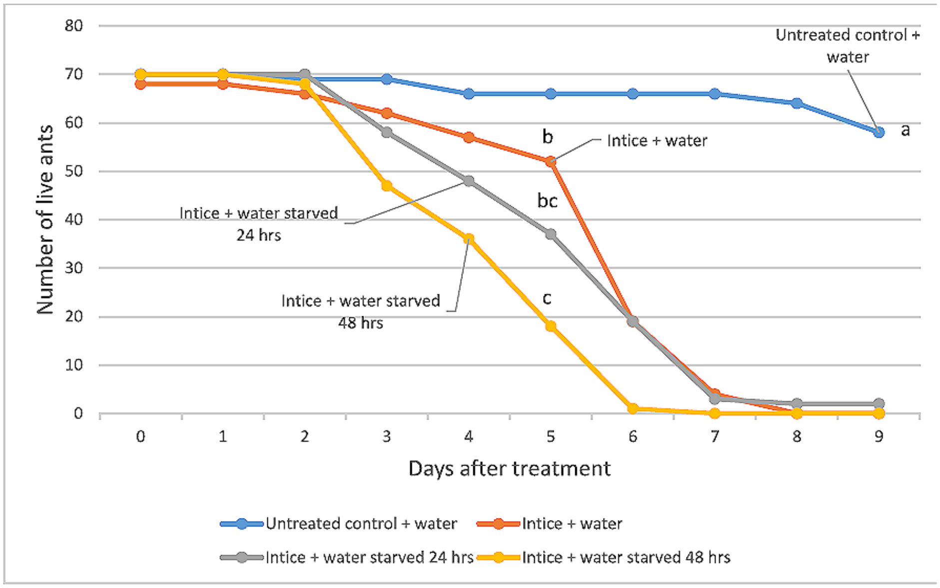

Figure 3. Number of dark rover ants surviving after the onset of the baiting experiment. Lines with the same letter on top are not significantly different (P > 0.05).

The data presented in this article demonstrate that there is a significant difference in the efficacy of various baits against the DRA. Bait such as the Maxforce Quantum Ant Bait and Intice Rover Ant Bait provide the fastest kill in DRA while the Advion Ant Gel did not provide any significant reduction in DRA in any of the experiments when compared to the untreated control. Whether or not these differences are caused by a difference in bait preference, toxicity of baits, or a combination of both requires more studies. Pest management professionals who deal with DRA infestations must use the right product to be able to control these ants. Choosing the wrong product and active ingredients may result in ant management failure, leading to an increased customer dissatisfaction and customer callbacks, a very costly phenomenon for the pest control industry.

In this study, it was shown that the borax bait (Intice Rover Ant Bait), when given enough time, was very effective in killing DRA. This is in contrast to some previous studies such as Miguelena and Baker (2014) which showed that borax bait is ineffective against DRA. However, a deeper look into the details of their experiment design reveals that they provided their baits along with a competing alternative food source. While this design provides a rigorous way of measuring bait preference and efficacy against DRA, the lack of statistically significant mortality in experimental DRA may not necessarily mean that borax or its commercial product (Intice Rover Ant Bait) is ineffective in a field scenario. Like many other baits, borax baits are known to be effective against ants when given enough time, as long as they ants accept the bait to a considerable level. Keefer (2016) reported that among several baits, a borax bait (Terro PCO gel) was the most effective bait for managing DRA at 11 days after treatment while dinotefuran (Alpine ant gel) was the fastest acting bait.

It was shown that in the absence of a water source, all the baits studied in this research became more effective against the DRA. Higher efficacy of baits was evident in shorter survival times of commercial bait products and even in the untreated control treatment which only had a sucrose solution. Also, indoxacarb ant gel (Advion) which was not shown to be effective in any of the experiments in the presence of water, proved to be effective against the ants in the absence of water. This suggests that the absence of water in a treatment either causes lethal dehydration in ants, encourages ants to feed more on the baits, or a combination of the two. I suggest more studies on this subject to determine the exact cause of higher mortality in DRA in the absence of a separate water source.

Finally, I was able to show the effect of starvation on the survival of DRA. While a 24 hour starvation is considered as a standard practice in ant management experiment design, it did not cause any significant change in the survival of DRA using my experiment. A 48 hour starvation, however, cause a significant reduction in the survival time of the DRA.

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REFERENCE CITED

Dash, S. T. 2004. Species diversity and biogeography of ants (Hymenoptera: Formicidae) in Louisiana with notes on their ecology. Louisiana State University and Agricultural & Mechanical College. https://search.proquest.com/openview/7ac64210362ea32c0d1e7e1d4ebf35c3/1?pq-origsite=gscholar&cbl=18750&diss=y

Keefer, T. C. 2016. Biology, Diet Preferences, and Control of the Dark Rover Ant Brachymyrmex Patagonicus (Hymenoptera: Formicidae) in Texas. https://hdl.handle.net/1969.1/157072

MacGown, J. A., Hill, J. G., and Deyrup, M. A. 2007. *Brachymyrmex patagonicus* (Hymenoptera: Formicidae), an emerging pest species in the southeastern United States. Florida Entomologist, 90 (3), 457–464.

Martinez, M. J., Wrenn, W. J., Tilzer, A., and Cummings, R. F. 2011. New records for the exotic ants *Brachymyrmex patagonicus* Mayr and *Pheidole moerens* Wheeler (Hymenoptera: Formicidae) in California. The Pan-Pacific Entomologist, 87(1), 47–50.

Miguelena, J. G., and Baker, P. B. 2014. Evaluation of liquid and bait insecticides against the dark rover ant (*Brachymyrmex patagonicus*). Insects, *5*(4), 832–848.

Wheeler, G. C., and Wheeler, J. 1978. *Brachymyrmex musculus*, a new ant in the United States. https://pascalfrancis.inist.fr/vibad/index.php?action=getRecordDetail&idt=PASCALZOOLINEINRA7