

EVALUATION OF PYRETHROID POTTING MEDIUM TREATMENTS FOR THE SUPPRESSION OF RED IMPORTED FIRE ANTS

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The red imported fire ant, *Solenopsis geminata* Buren, is an introduced species. Quarantine regulations, developed by the United States Department of Agriculture (USDA) and enforced by the Texas Department of Agriculture (TDA), are in effect for this species. These regulations prohibit the shipment of nursery stock outside of quarantined counties to uninfested counties unless certified as free of fire ants. Treatments for fire ant elimination from potting media have changed over time. Chlordane products used in the early 1980's have been banned. Chlorpyrifos-based treatments used during the late 1980's provided only a short interval of ant suppression. More recently, pyrethroid insecticides (Talstar® 0.2G and Talstar® T&O Insecticide containing bifenthrin) have been registered for use to suppress fire ants in potting media. This trial was conducted to evaluate the effectiveness of Talstar® 0.2G and other candidate pyrethroid insecticide formulations for long-term suppression of fire ants in treated media.

Materials and Methods

On 9 October 1990 one flat of four-inch square plastic pots was treated as described below:

<u>Treatment:</u>	<u>Rate:</u>
1) Pounce® 1.5G (permethrin)	- 0.5 tsp./gallon
2) Pounce® 1.5G (permethrin)	1.0 tsp./gallon
3) Ammo® 0.75G (cypermethrin)	1.0 tsp./gallon
4) Talstar® 0.2G (bifenthrin)	1.0 tsp./gallon
5) Untreated control	---

All treatments were applied to the custom-blended potting media obtained from Powell Plant Farm in Troup, Texas, immediately after mixing.

Evaluations were conducted using bioassay with fire ants. Six pots from each flat were randomly selected and each placed in a plastic bag. The bags were secured around the rim of the pots with a rubber bands to force the ants into the media. Approximately one-half teaspoon of worker ants, brood, and at least one queen was added to each pot. The top of the bag was then quickly sealed to prevent ant escape. The pots were then placed in Fluon®-treated plastic boxes to further guard against escape. After 24 hours, the bags were cut open and ant activity evaluated by estimating

the percent mortality and making other descriptive observations. In addition, from 14 to 26 April, 1992, a 2 week exposure of ants to treated media was monitored, and between 18 and 20 January 1993 a 3 day period of exposure was monitored. Following all assays, the pots were frozen to kill any remaining ants and discarded. The flats were stored uncovered in a cool, dry environment between evaluations.

Results and Discussion

All treatments yielded roughly the same rate of kill and knockdown immediately after treatment (Table 1, Appendix). After 16 months, the effectiveness of Talstar® 0.2G was virtually unchanged. Both Pounce® 1.5G rates resulted in good, but not total kill. The Ammo® 0.75G was still causing 50% kill, but knockdown was incomplete. After two weeks exposure to the media (26 April 1992), Talstar® 0.2G treated media had 100 percent kill; 1 tsp. Pounce® 1.5G - 80 percent; and 0.5 tsp. Pounce® 1.5G - 40 percent. The Ammo® 0.75G and control pots had been frozen due to high ant activity and escapes. It was obvious, at this point, that only the Talstar® 0.2G was providing acceptable levels of control.

After 27 months, Talstar® 0.2G continued to provide 90-95 percent kill and 100 percent knockdown. Though its effectiveness was somewhat slower, it was still an effective treatment. Both Pounce® 1.5G and Ammo® 0.75G treatments provided only partial kill (Pounce® 1.5G 0.5 tsp./gal. - 50%; Pounce® 1.5G 1.0 tsp./gal. - 80-90%; and Ammo® 0.75G - 75-80%) even after 3 days exposure to the treated media (20 January 1993) indicating that some insecticidal properties remained, but that effectiveness had degraded considerably.

Table 1. Red imported fire ant mortality after 24-hrs. exposure to potting media treated 9 October 1990.

<u>Treatment and rate</u>	<u>Percent mortality</u>		
	<u>24 hours</u> <u>10 Oct. 1990</u>	<u>16 months</u> <u>14 Apr. 1992</u>	<u>27 months</u> <u>18 Jan. 1993</u>
Pounce® 1.5G (permethrin) 0.5 tsp./gallon	99%	99%	55%
Pounce® 1.5G (permethrin) 1.0 tsp./gallon	99%	99%	50%
Ammo® 0.75G (cypermethrin) 1.0 tsp./gallon	99%	50-75%	50% kill (90% knockdown)
Talstar® 0.2G (bifenthrin) 1.0 tsp./gallon	100%	99%	90% kill (100% knockdown)
Untreated control	0%	0%	0%

Appendix. General Observations

October 10, 1990 - 24 hours post-treatment

Pounce 1.5G, 0.5 tsp./gal. - Most knocked down or dead, a few affected but not knocked down.

Pounce 1.5G, 1.0 tsp./gal. - Most dead, a few appeared unaffected.

Ammo 0.75 G, 1.0 tsp./gal. - A few unaffected ants were found in every pot, though most were dead or knocked down. Large numbers of incapacitated ants were found between the bag and pot in three pots, indicating possible repellency. Not noted in any other treatment.

Talstar 0.2G, 3.5 tsp./gal. - All ants appeared dead or knocked down.

Untreated - Ants active, media heavily worked

April 14, 1992 - 16 months post-treatment

Pounce 1.5G, 0.5 tsp./gal. - 99% kill, a few unaffected

Pounce 1.5G, 1.0 tsp./gal. - 99% kill, a few unaffected

Ammo 0.75 G, 1.0 tsp./gal. - 50-75% kill, other ants slowed, but not knocked down.

Talstar 0.2G, 3.5 tsp./gal. - 99% kill, all affected.

Untreated - Ants active, media heavily worked.

April 26, 1992 - (2 week exposure to media)

Pounce 1.5G, 0.5 tsp./gal. - 4 of 6 pots with live ants

Pounce 1.5G, 1.0 tsp./gal. - 1 of 6 with live ants

Ammo 0.75 G, 1.0 tsp./gal. - not evaluated

Talstar 0.2G, 3.5 tsp./gal. - 0 of 6 with live ants

Untreated - not evaluated

January 18, 1993 - 27 months post-treatment

Pounce 1.5G, 0.5 tsp./gal. - 55% kill, many ants between bag and pot, lethargic

Pounce 1.5G, 1.0 tsp./gal. - 50% kill, many ants between bag and pot appearing more strongly affected than 0.5 tsp. rate.

Ammo 0.75 G, 1.0 tsp./gal. - greater than 50% kill, 90% knockdown, some unaffected

Talstar 0.2G, 3.5 tsp./gal. - 90% kill, remainder knocked down

Untreated - Ants active, media heavily worked.

January 20, 1993 - (3 day exposure to media)

Pounce 1.5G, 0.5 tsp./gal. - 50% alive

Pounce 1.5G, 1.0 tsp./gal. - 80-90% kill

Ammo 0.75 G, 1.0 tsp./gal. - 75-80% kill, (better kill than 0.5 tsp. Pounce, less than 1 tsp. rate

Talstar 0.2G, 3.5 tsp./gal. - 95% kill, 100% knockdown

Untreated - not evaluated - Ants active, media heavily worked