

LABORATORY TRIALS TO DETERMINE EFFICACY OF VARIOUS BAITS FOR SLUG CONTROL

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A laboratory trial was conducted to observe the response of the gray garden slug, *Deroceras reticulatum*, Mueller, to three molluscidal baits. Bait treatments consisted of GWN-1450 (2% methiocarb), CP Snail and Slug Bait® (1.75% thiodicarb), and Deadline Bullets® (4% metaldehyde). An untreated control was included for comparison.

Adult and large juvenile slugs were collected from a commercial field of perennial ryegrass and confined with lettuce for 48 hours. Food was then withheld for 48 hours prior to the onset of the experiment.

Slugs were confined in cages in the laboratory throughout the length of the trial. Cages consisted of plastic buckets (2.5-gallon capacity, 10-inch diameter) that were fitted with screened lids. Water-soaked paper towels placed on the bottom of each cage provided high relative humidity. In addition, a small plastic card, shaped into a tent, was put in each cage to provide shelter. Cages were kept indoors at ambient temperatures, which ranged from 36 to 66°F. Treatments were arranged in a completely randomized experimental design with five replicates. Each cage contained 15 live slugs at the time treatments were introduced.

Baits were applied at 1.0 gram of product per cage on May 18, 1998 and remained in the cages until termination of the trial on May 28, 1998. In addition to the baits, 2.25 grams of fresh carrot, cut into pieces and put on small plastic trays, were added to each cage on a daily basis. Every 24 hours the carrots were removed, oven-dried and weighed to determine consumption by the slugs.

Efficacy of the treatments was evaluated by two different methods: percent slug mortality and quantity of carrot consumed (indicating efficacy of bait as a feeding deterrent). Every 24 hours for 10 days, the numbers of dead slugs were recorded and removed from each cage. At the same time, carrot pieces were removed and replaced with 2.25 grams of fresh carrot pieces. The carrots were then oven-dried and weighed to determine the amount of dry weight consumption. Previous replicated testing and calculations revealed that 2.25 grams fresh carrots weigh 0.3 grams after being oven dried. This figure (0.3 grams) was used to determine amount of carrots consumed each day by the slugs remaining in the cages.

Results and Discussion:

I. Mortality

Statistically significant differences between treatments occurred on all evaluation dates, except the first day after treatments were applied (Table 1). Having no significant difference between treatments on Day 1 was not unexpected. A certain amount of time is needed for feeding and digestion before effects of bait are observed. GWN-1450 provided the quickest control; almost 50% mortality occurred by Day 4. In contrast, 50% mortality occurred on Day 6 for the Deadline Bullets® and on Day 7 for the CP Snail and Slug Bait®. GWN-1450 and Deadline Bullets® caused significant mortality, starting on Day 2, compared to the untreated control. CP Snail and Slug Bait® did not cause significant mortality until Day 6. All treatments were comparable to one another by Day 8. The untreated control had 1.3% mortality by Day 3 and reached 8% mortality by Day 10; cause of mortality in the untreated control was undetermined.

All baits absorbed water upon contact with the moist paper towel lining on the bottom of the cages. GWN-1450 bait did not swell appreciably but the CP Snail and Slug Bait® and the Deadline Bullets® swelled to at least twice their dehydrated size within minutes. Mold appeared on the Deadline Bullets® and CP Snail and Slug Bait® on Day 7; GWN-1450 bait remained free of mold throughout the trial period.

II. Carrot Consumption

Baits may protect plants due to slug mortality as well as through reduced plant consumption. After feeding on bait, slugs may cause less damage to the target crop. The untreated control had statistically significant more carrot consumption on Day 1 and Day 2 than did any of the bait treatments (Tables 2 and 3). Slugs had free choice to eat either baits or carrots and by the end of Day 1, it appears that they ate a little of both. Slugs apparently ate no carrots in any of the treatments during Day 2. Carrot consumption was variable in and between treatments from Day 3 through Day 10, being significantly greater in the untreated control only on Day 4 and Day 7 (Tables 2 and 3).

Table 1. Effect of baits on slug mortality in caged laboratory trial, 1998.

Treatment	Percent mortality ¹									
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
	------(%)-----									
GWN-1450	1.3	17.3 a ²	37.3 a	49.3 a	58.7 a	73.3 a	77.3 a	77.3 a	77.3 a	78.7 a
CP S&S Bait	1.3	4.0 b	6.7 b	14.7 bc	17.3 bc	36.0 b	53.3 b	58.7 a	65.3 a	65.3 a
Deadline Bull.	2.7	13.3 a	25.3 a	32.0 ab	37.3 b	50.7 b	61.3 ab	64.0 a	70.7 a	77.3 a
Untreated	0.0	0.0 b	1.3 b	1.3 c	1.3 c	2.7 c	5.3 c	8.0 b	8.0 b	8.0 b

¹ Based on 0% at Day 0.

² Means followed by the same letter within a column do not differ significantly at $P \leq 0.05$; no letter indicates a non-significant ANOVA.

Table 2. Effect of baits on individual slug feeding (carrot pieces) in caged laboratory trial, 1998.

Treatment	Amount of carrots consumed per day (mg) ¹									
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
	------(mg/day)-----									
GWN-1450	1.38 a ²	0.00 a	3.31	0.00	5.54	6.18	0.00	0.00	2.37	7.30
CP S&S Bait	3.43 a	0.00 a	2.97	0.67	2.21	5.51	2.83	5.00	11.52	0.00
Deadline Bul.	1.43 a	0.00 a	0.00	1.11	2.54	1.67	0.00	11.25	14.00	12.00
Untreated	9.33 b	6.67 b	3.33	3.43	4.71	2.00	3.53	2.25	2.15	1.48

¹ Dry weight

² Means followed by the same letter within a column do not differ significantly at $P \leq 0.05$; no letter indicates a non-significant ANOVA.

Table 3. Effect of baits on slug feeding (carrot pieces) in caged laboratory trial, 1998.

Treatment	Amount of carrots consumed per day (mg) ¹									
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
GWN-1450	20 a ²	0 a	30 ab	0 a	40	20	0 a	0	10	30
CP S&S Bait	50 a	0 a	40 b	10 a	30	50	20 b	10	50	10
Deadline Bul.	20 a	0 a	0 a	10 a	20	10	0 a	20	30	20
Untreated	140 b	100 b	50 b	50 b	70	30	50 c	30	30	20

¹ Dry weight

² Means followed by the same letter within a column do not differ significantly at $P \leq 0.05$; no letter indicates a non-significant ANOVA.