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THE EFFECTIVENESS OF A NEW MOLE REPELLENT FOR PREVENTING DAMAGE TO LAWNS BY EASTERN MOLES

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ABSTRACT: A new product containing 65% castor oil with the trade name Mole-Med was evaluated for its effectiveness in repelling eastern moles (Scalp pus a uaticus from lawns. Seven lawns in southern Michigan during September, 1993 was selected as preliminary test sites, and the ridges over mole tunnels in the lawns were flattened each day for 3 days. If some existing and new ridges were raised each day, the site was classified as having mole activity and continuing damage. The repellent was then applied according to label directions, and ridges above mole tunnels were flattened as described previously. If no tunnels were raised on the test lawn after one week, the repellent was considered to be effective. The repellent was classified as effective on all 7 test lawns. In May-July, 1994, 17 additional lawns were selected in the same way as preliminary test sites and classified as having or not having mole damage. Eleven received repellent treatment, while 6 were considered control, 3 adjacent to a treated area, 3 not adjacent to treated areas. Raised mole produced ridges were flatted on all test sites. On any site where ridges remained flattened and no new ridges were created for one week, moles were considered repelled. Mole activity as indicated by raised ridges ceased on eleven treated sites but continued on 5 of 6 control sites. The effectiveness of the repellent as indicated by the lack of new ridges continued for 65 days on one treatment site and for 30 days on the remaining treatment sites.

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The burrowing of eastern moles Scalo us a aticus within 2-4 inches of the soil surface creates winding ridges in lawns that cause problems unacceptable to most affected property owners. The grass over the ridges dies, the ridge may be scalped by lawn mowers, and people sometimes fall and are injured where they unknowingly step on the ridge and it collapses beneath them into the underlying burrow (Elshoff & Dudderar, 1989, Henderson, 1994).

The damage caused by moles is controlled by a variety of methods: lawn rolling, capturing or killing the mole as it burrows, trapping, soil insecticide application, burrow fumigation, and the use of mechanical repellents (Henderson, 1995). Each of these methods has some disadvantage, ranging from people's reluctance to kill moles or use insecticides to the need for special application skills or extensive visible application. An effective, easily applied repellent would provide an alternative for property owners or pest control operators unwilling or unable to utilize the other damage control methods.

METHODS

A potential mole repellent containing castor oil was provided by Mole-Med, Incorporated for efficacy testing. In all test applications, the repellent was mixed and applied as a spray according to label directions - 8 ounces of repellent mixed with 8 gallon of water and applied to 2,500 square feet of lawn thoroughly wetted before and after application.

In September 1993, 7 lawns in Ingham County Michigan were selected for preliminary testing because ridges above mole tunnels were raised after all ridges on the site were flattened for 3 consecutive days. Mole repellent was applied to each site during September 7-9, 1993. For the next 30 days, sites were inspected periodically and all ridges above mole tunnels were flattened. If any ridges were observed and flattened, mole activity was recorded as present. All sites had a clay soil.

In May and June of 1994, 17 sites in southeast Michigan were selected for treatment and control. Of these 17, 6 sites were selected as controls and were not treated. Three of these 6 sites

were adjacent to treated sites, 3 were not. All sites except the adjacent control sites were at least 350 metes apart. The mole repellent was applied to 11 test sites on June 21 as described for the September 1993 preliminary test, and the evidence of mole tunneling was observed and recorded twice weekly for the next 30 days, again using the same method as described for the September 1993 preliminary test.

Because of complications caused by weather, the experiment just described was repeated in June and July of 1994. In addition, 4 treated sites and one adjacent control site were treated 3 weeks after the initial treatment. All sites had soils classified as clay or silt loam.

RESULTS

Preliminary test

All of the 7 lawns treated with the mole repellent between September 7-9, 1993 in Ingham Comfy, Michigan had no mole activity 12 days after treatment and no further evidence of mole tunneling was observed in 1993.

Comparison Test

All of the 11 lawns treated with the mole repellent on May 15, 1994 in southeast Michigan had no mole activity by May 20. By May 25, however, all untreated control areas also had no mole activity (Table 1). From May 1 to June 15, 1993 less than 1 inch of rain was reported by local weather service and soil on all test sites was dry and hard to a depth of over 4 inches. On June 14-15 thunderstorms produced over 3 inches of rain over most of southeast Michigan, and rainy periods occurred for the next 5 days. Near surface mole tunneling indicated by raised ridges resumed during this period, and test sites were revisited and categorized as before. Mole tunneling had resumed on all treated sites except 2 and 3. All test were then retreated, including sites 2 and 3 because mole activity had been observed prior to May 15. In every treated site, mole tunneling near the soil surface stopped or did not resume, and no ridges, new or restored, were seen until after July 8 (Table 1). Mole tunneling on both adjacent and non adjacent control sites continued as before, except that on one adjacent control site mole tunneling occurred where it had not occurred previously.

A series of heavy rains fell during the week of July 10-14, and renewed mole tunneling was noticed on test sites 1, 2, 8 and 11. These sites were retreated on July 18, after which no mole tunneling was detected until observations ended on July 23. In addition, an adjacent control site was also treated at this time at the request of the homeowner, after which all mole tunneling ceased until observations ended July 23 (Table 1).

DISCUSSION AND CONCLUSIONS

Between September 1993 and July 1994, 18 different lawns were treated with the mole repellent and in all casts near surface mole tunneling as indicated by raised ridges in the lawn ceased within 6-12 days treatment. The cessation of mole tunneling in the preliminary tests in September of 1993, however, may have also been caused by the on-set of cold weather. The lack of control sites preclude determining whether the repellent, weather, or a combination of the two contributed to the decline of mole tunneling.

Mole tunneling on 11 application sites in May of 1994 also ceased within 5 days of treatment, but mole tunneling also eventually ceased on the untreated control sites. This cessation was probably due to the lack of rainfall from May 1 to June 15 and the subsequent drying and hardening of the soil on the sites. The fact that mole tunneling resumed on all but 4 sites after rainfall during June 15 to June 20 further supports this relationship. Thus even with untreated control sites, it was not possible to distinguish between the effects of the repellent and the effects of weather.

After mole tunneling resumed in June following the heavy rainfall, the cessation of mole tunneling on all test sites following retreatment, and

the continued mole tunneling on 5 of the control sites clearly indicates the effectiveness of the repellent. However, the resumption of mole tunneling on 4 treatment sites following heavy rainfall in mid-July suggests that rain may reduce the effectiveness of the repellent. The fact that retreatment of these 4 sites resulted in a cessation of mole tunneling further supports this conclusion.

Because mole tunneling occurred on an adjacent control site within 5 days after application of the repellent to a treatment site, the moles present on the treatment site may have been repelled onto the adjacent control site. Unfortunately, no similar occurrences were systematically observed, but a casual observation during the preliminary test revealed a similar relationship. The unplanned treatment of an adjacent control site having mole tunneling was also successful, thus raising the number of successful treatments to 12.

The repellent was effective for at least 30 days on all treatment sites and effective on 1 treatment site for 65 days. A single retreatment effectively repelled moles for 65 days on 10 treatment sites. Weather, however, may reduce the time of effectiveness or give the appearance of extended effectiveness.

Because all treatment sites were either clay or silt loam, no conclusions can be made about the effectiveness of the repellent or other soil types. Similarly, no conclusions can be made about its effectiveness on other species of moles.

LITERATURE CITED

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Adjacent control	No	--	Yes	Yes	Yes	Yes	--	Ye

Table 1. Response of mole activity in lawns to treatment applications of Mol-Med in June and July 1994 in southern Michi

Test Site		Mole Activity	Treatment			Mole Activity
	6-20		6-24	6-30	7-,8	7-15
1	Yes	6-21	No	No	No	Yes
2	No	--	No	No	No	Yes
3	No	--	No	No	No	No
4	Yes	6-21	No	No	No	No
5	Yes	6-21	No	No	No	No
6	Yes	6.21	No	No	No	No
7	Yes	6-21	No	No	No	No
N						
8	Yes	6-21	No	No	No	Yes
9	Yes	6-21	No	No	No	No
10	Yes	6-21	No	No	No	No
11	Yes	6-21	No	No	No	Yes
Non adjacent control	Yes	-	Yes	Yes	Yes	Yes
Non adjacent control	Yes	-	Yes	Yes	Yes	Yes
Non-adjacent control	No	-	No	No	No	No
Adjacent control	Yes	-	Yes	Yes	Yes	Yes
Adjacent control	Yes	-	Yes	Yes	Yes	Yes