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EFFECTIVENESS OF ELECTRO-ACOUSTIC SCARES OF “ANTY-MYSIOR” TYPE IN LAWN PROTECTION AGAINST MOLE (*Talpa europaea* L.)

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ABSTRACT. Electro-acoustic scares “Anty-Mysior plus” (60 dB) and “Anty-Mysior” (40 dB) emitting continuous sound may be used in lawn protection against the mole (*Talpa europaea* L.). While applying the above mentioned devices a significant decrease was observed in the number of active molehills in comparison to the control, amounting to 64.22% and 56.40%, respectively. No significant differences in relation to the control were found in case of the application of a prototype “Anty-Mysior” scare emitting an interrupted sound signal. In the latter case a decrease in the number of active molehills was relatively low and amounted to 7.16%.

Key words: lawns protection, mole, electro-acoustic scares, effectiveness

Introduction

The common mole (*Talpa europaea* L.) undoubtedly belongs to very noxious pests found in lawns. This animal, digging underground tunnels when searching for food, damages the root system of growing plants. Foraging for food by moles frequently leads to the sinking in of the sward. Rain water accumulates in such places, causing partial rotting of grasses. Withering of plants is also observed under mounded molehills. Places not covered with vegetation and mounded molehills are distinctly visible on the surface of lawns, which considerably lowers their decorative value. Large amounts of soil together with stones mounded on the lawn surface not only result in deteriorated aesthetic qualities of the turf, but also cause significant difficulties in its cultivation, e.g. mowing. Lifting up the turf causes wilting and eventually dying of the plants (**Romankow-Żmudowska** 1985, **Skorupska** 2000, 2002, **Górski** and **Nowak** 2004, **Górski et al.** 2004).

In recent years the population of moles has considerably increased and this pest causes more and more damage. At present there are no effective plant protection methods

against moles. In modern agriculture increasing importance in pest control is attached to methods, which apart from high effectiveness, are also environmentally friendly. From the ecological point of view it is advisable in crop protection against moles to apply special devices, the so-called electro-acoustic scares. They make it possible to effectively chase out a mole from the area it inhabits without killing it. At the same time these devices do not cause soil contamination, as it happens in case of some chemical pesticides recommended for crop protection against moles.

The aim of the study was to evaluate the effectiveness of electro-acoustic scares of the “Anty-Mysior” type in lawn protection against moles. Observations were conducted on such devices as “Anty-Mysior” with a continuous sound signal and sound intensity of 40 dB, “Anty-Mysior plus” with strengthened (60 dB) continuous sound signal, and a prototype version of “Anty-Mysior” scare with a discontinuous sound signal (40 dB).

Material and Methods

Investigations on the effectiveness of “Anty-Mysior” electro-acoustic scares in lawn protection against moles (*Talpa europaea* L.) were conducted in the period from 13 June to 18 November 2004 in a grassy area of the total area of 2400 m², located in the vicinity of the town of Czarnków.

Experiments were carried out in 4 combinations, out of which each had the area of 600 m². In individual combinations 3 plots (replications) of 10 × 20 m with the area 200 m² were selected. Two electro-acoustic scares were placed in each plot (apart from the control combination). The distance (isolation) between particular combinations was 200 meters.

Repellent action against moles was determined for such scares as “Anty-Mysior” with a continuous sound signal and sound intensity of 40 dB, “Anty-Mysior plus” with a strengthened (60 dB) continuous sound signal and a prototype version of the “Anty-Mysior” scare with a discontinuous sound signal (40 dB).

Electro-acoustic “Anty-Mysior” type scares are small devices powered by two R-20 batteries, except for “Anty-Mysior plus” with a strengthened sound signal, where four batteries are used. These devices emit sounds and vibrations at the frequency of 4 kHz, which have an irritating effect on the sense of hearing in moles and while not killing them they still force the animals to leave the area they inhabit. When applied appropriately early, they make it impossible for pests to have access to protected crops. Scares are placed vertically in tunnels dug by pests, leaving their wider part, i.e. the head, on the surface of the ground. Emitted sounds displace in the soil through a system of tunnels dug by the animal. On average one scare is used per 100 m² area. “Anty-Mysior” scares are very simple to use and their maintenance is limited only to the replacement of batteries, one set of which is sufficient for one vegetation season.

Tested devices were placed in actively used burrows, which were selected after a newly mounded molehill was excavated.

Since the moment electro-acoustic scares were installed, observations of their effectiveness were carried out, consisting in monitoring the number of appearing molehills, the so-called active molehills. The area was controlled twice a week. After the observations were completed, mounded molehills were raked out on the surface of the lawn.

Every 7 days the position of scares on experimental plots was changed so that they were placed in active molehills. The obtained results were analyzed statistically using Duncan's test at the level of significance $\alpha = 0.05$.

Results

The effectiveness of electro-acoustic "Anty-Mysior" scares in lawn protection against moles (*Talpa europaea* L.) is presented in Table 1.

Table 1
The effectiveness of electro acoustic scares in lawn protection against mole (*Talpa europaea* L.)
Skuteczność działania odstraszaczy elektroakustycznych w ochronie trawników przed kretem (*Talpa europaea* L.)

Type of acoustic scare Typ odstraszacza akustycznego	Number of active molehills (total) Liczba czynnych kretowin (ogółem)	Mean number of active molehills on plot Średnia liczba czynnych kretowin na poletku	Decrease percentage of number of active molehills in relation to control Procent spadku liczby czynnych kretowin w stosunku do kontroli
"Anty-Mysior plus" – strong (60 dB), continuous sound signal „Anty-Mysior plus” – wzmożony (60 db), ciągły sygnał akustyczny	525	3.80 a	64.22
"Anty-Mysior" – continuous sound signal (40 dB) „Anty-Mysior” – ciągły sygnał akustyczny (40 dB)	639	4.63 a	56.40
Prototype version of "Anty-Mysior" scare – interrupted sound signal (40 dB) Wersja prototypowa odstraszacza „Anty-Mysior” – przerywany sygnał akustyczny (40 dB)	1 361	9.86 b	7.16
Control – Kontrola	1 465	10.62 b	–

Mean values marked with the same letter do not differ at the significance level $\alpha = 0.05$ according to Duncan's test.

Średnie oznaczone tą samą literą nie różnią się istotnie na poziomie istotności $\alpha = 0,05$ według testu Duncana.

It results from this table that after the application of electro-acoustic scares "Anty-Mysior plus" and "Anty-Mysior", emitting a continuous sound signal, a statistically significant decrease in the mean number of active molehills in protected plots was re-

corded in comparison to the control. This decrease amounted to 64.22% and 56.40%, respectively. The analysis of variance based on Duncan's test at the level of significance $\alpha = 0.05$ showed that the results obtained in both combinations of electro-acoustic scares did not differ significantly.

After the use of a prototype version of the "Anty-Mysior" scare with a discontinuous sound signal no significant differences were found in comparison to the control. A decrease in the number of active molehills was relatively small and amounted to 7.16%.

Discussion

In the conducted experiments on lawn protection against the mole (*Talpa europaea* L.) a significant decrease was found in the number of active molehills in comparison to the control after the application of electro-acoustic scares "Anty-Mysior plus" and "Anty-Mysior" with a continuous sound signal. The efficiency of scares was 64.22% and 56.40%.

After a prototype version of the "Anty-Mysior" scare with a discontinuous sound signal was used, no significant differences were found in comparison to the control. This scare showed a very small effectiveness (7.16%), which could have been caused by a considerable sensitivity of this device to a drop in voltage in batteries. At a voltage lower than the recommended 3.0 V, the sound from the scare was gradually fading. The fading of the emitted sound was observed after a very short time of the device use, i.e. after 2 weeks.

There is small information in literature on the effectiveness of electro-acoustic scares in crop protection against moles. Studies on the effectiveness of the "Anty-Mysior" scare (40 dB) in crop protection against moles were conducted by **Siudak** (2000). This author found a much higher effectiveness of the "Anty-Mysior" scare in comparison to the results obtained in this study, as it was 97.00%. This relatively high efficiency of the scare reported by **Siudak** (2000) could have resulted from the black foil additionally used in the experiment to cover the surface of the area with the positioned electro-acoustic devices in order to amplify the sound emitted in the ground.

The amount of information available in literature on the effectiveness of chemical odorizing agents with repellent action in crop protection against moles is more abundant. **Skorupska** (2000), while testing the pesticide Kretol 2.5 VP found that this preparation showed a repellent action against moles for a relatively short time, i.e. 3-4 weeks. After that period pests returned to the previously inhabited area. In the investigations conducted by the author of this study a much longer repellent action against moles was observed in case of electro-acoustic scares type "Anty-Mysior" as it lasted for 6 months. In a study conducted by **Górski** and **Nowak** (2004), a significant decrease was observed in the number of active molehills in the surface of the lawn after the application of an odorizing repellent Kretol 5 GR, amounting to 68.31%. In case of Kretol 02 VP the decrease in the number of active molehills was higher, amounting to 70.58%. In other studies, **Górski et al.** (2004) when applying in grassy areas a chemical odorizing agent Kretol Mega VP with a repellent action also reported a significant decrease in the number of active molehills, amounting to 69.74%.

These results indicate that odorizing repellents have a slightly higher effectiveness than electro-acoustic scares type "Anty-Mysior". However, it needs to be stressed that the application of electro-acoustic scares is environmentally friendly. It is a humane method of chasing the pest out without causing soil contamination at the same time. An additional advantage of the application of "Anty-Mysior" scares is the fact that these devices may operate incessantly throughout the vegetation season, as well as during winter.

Conclusions

1. "Anty-Mysior plus" and "Anty-Mysior" electro-acoustic scares may be successfully used in lawn protection against the common mole (*Talpa europaea* L.). When the above mentioned devices were used, a significant decrease was found in the number of active molehills in comparison to the control combination.

2. The prototype version of the "Anty-Mysior" scare may not be recommended for crop protection against the mole (*Talpa europaea* L.) due to the low effectiveness of this device.

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SKUTECZNOŚĆ DZIAŁANIA ODSTRASZACZY ELEKTROAKUSTYCZNYCH TYPU „ANTY-MYSIOR” W OCHRONIE TRAWNIKÓW PRZED KRETEM (*Talpa eropaea* L.)

Streszczenie

Badania nad skutecznością działania odstraszczy elektroakustycznych typu „Anty-Mysior” w ochronie trawników przed kretem (*Talpa europaea* L.) przeprowadzono w okresie od 13 czerwca do 18 listopada 2004 roku na terenie trawiastym, o łącznej powierzchni 2400 m², w okolicy Czarnkowa.

Doświadczenia wykonano w 4 kombinacjach, z których każda miała powierzchnię 600 m². W poszczególnych kombinacjach wyznaczono 3 poletka (powtórzenia) o powierzchni 200 m². Na każdym poletku (oprócz kombinacji kontrolnej) umieszczono po dwa odstraszacze elektroakustyczne.

W badaniach zastosowano następujące urządzenia odstraszające: „Anty-Mysior” o ciągłym sygnale akustycznym i natężeniu dźwięku wynoszącym 40 dB, „Anty-Mysior plus” o wzmożonym (60 dB), ciągłym sygnale akustycznym oraz wersję prototypową odstraszacza „Anty-Mysior” o przerywanym sygnale akustycznym (40 dB). Od momentu zastosowania urządzeń odstraszających prowadzono obserwacje skuteczności ich działania, która polegała na kontroli liczby pojawiających się kretowin (czynnych kretowin). Obserwacje przeprowadzono dwa razy w tygodniu. Uzyskane wyniki poddano analizie statystycznej opartej na teście Duncana na poziomie istotności $\alpha = 0,05$.

Po zastosowaniu odstraszaczy elektroakustycznych „Anty-Mysior plus” oraz „Anty-Mysior” emitujących ciągły sygnał dźwiękowy, zanotowano statystycznie istotne zmniejszenie liczby czynnych kretowin w porównaniu z kombinacją kontrolną, które wynosiło odpowiednio 64,22% i 56,40%. Po użyciu wersji prototypowej odstraszacza „Anty-Mysior”, o przerywanym sygnale akustycznym, nie stwierdzono istotnych różnic w stosunku do kontroli. Zmniejszenie liczby czynnych kretowin było stosunkowo niewielkie i wynosiło 7,16%.

Na podstawie przeprowadzonych badań można stwierdzić, że odstraszacze elektroakustyczne „Anty-Mysior plus” i „Anty-Mysior” wykazują dużą skuteczność działania i mogą być przydatne w ochronie trawników przed kretem (*Talpa europaea* L.).