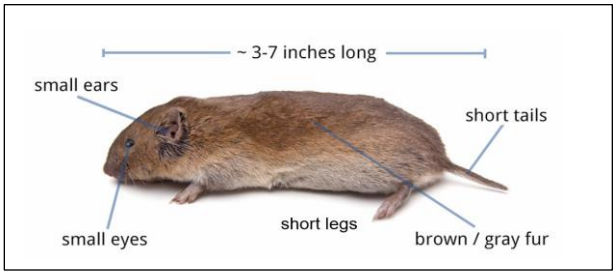
Vole Repellents and Baits FS-4



Introduction

Vole damage to agricultural grain crops has become a major problem, especially in no-till and cover cropped fields. Repellants, alternative feeds, and toxicants (baits) are common tools used to control vole populations. No one management practice has proven to be effective at consistently controlling vole numbers, so many different strategies need to be utilized.

Extensive Vole Damage in a soybean field.

Photo by: Alan Sundermeier, Ohio State University Extension, Bowling Green Ohio

Repellants

In soybean fields, soybean seed and soybean cotyledons are an attractive food sources to voles due to their high protein content. Repellants need to be strong and persistent to overcome the vole's appetite for these food sources. Stinky insecticides have been successfully used to deter voles. Past research has indicated some effectiveness in repelling voles, but these products are not labeled for that use in no-till crops. Repellant effectiveness is greatly reduced with high rainfall or under wet soil conditions.

The active ingredient capsaicin (the hot in hot peppers) is a taste repellent labeled for use against voles in field crops. These products are labeled for use in a spray that can be applied between crop emergence and when edible portions of the plant begin to form. Effectiveness is reduced during periods of wet weather. Capsaicin is usually used on soybeans since voles like to eat the emerging cotyledons. Some farmers mix 2 ounces of cayenne pepper in with the soybean seed (injected into a bag with a syringe) to reduce vole feeding by masking the smell of the soybean seed. Some voles may get use to the hot taste if the voles are hungry or food is scarce. This strategy may work better if combined with drilling soybean seeds deep (>2 inches).

Alternative Feeds

Alternative feeds include wheat, corn, and soybeans. The goal is to actively feed the voles during the planting season to deter the voles from digging up or damaging emerging plants. The first 21 to 28 days after planting is the most critical time to prevent vole damage in no-till fields. To be effective, alternative feeding must be:

- As attractive to the vole as is the planted seed.
- Applied before planting.

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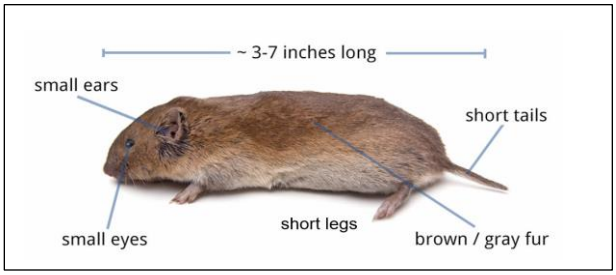

- Applied in a sufficient amount to feed the vole population for at least 21 to 28 days.
- Applied in an even distribution across the areas of the field populated by voles
- Free of weed seeds

Cracked corn (bottom) is better utilized as an alternative feed than whole corn (top) because the cracked corn will not germinate and cause problems with volunteer plants. Alternative feeds work best in corn fields with low vole populations and seldom work effectively in soybean fields.

Research indicates that both coarse cracked corn and whole-kernel corn or whole soybeans have been effective (at times) as an alternative food source. Use a fertilizer buggy to broadcast the seed over the field one or two days before planting. Results have been mixed. Two bushels of coarse cracked corn provides control without concern for the development of volunteer plants. Alternative feeding may not be as successful in no-till soybeans. Cotyledons appear to be too attractive to voles. The only effective alternative feeding in no-till soybeans is two bushels of broadcast whole soybeans/acre which is probably too expensive. A key note is that alternative feeding does not reduce the vole population and with high vole populations, alternative feeds have not been successful. Alternative feeds generally work better when vole populations are lower. When food sources are high, voles have a lot of food choices to choose from and alternative feeding tends to be less successful.

Toxicants (Baits)

For toxicant (baits) to be effective the baits must be implemented at critical times and locations:

- Check fields in late winter for active vole colonies to determine the populations' potential.
- Runs will be very evident in area with heavy residue, particularly after a period of snow cover.
- Target application of Zinc phosphide baits in furrow (Follow label). Zinc phosphide pellets may only be needed on the outside rows using insecticide boxes.

Zinc phosphide pellets applied in the furrow at planting may do the following:

- Zinc phosphide pelletized bait is labeled for the control of small rodents such as voles (field mice). Must be applied in-furrow and must not be crushed. One 50-pound bag of bait treats about 10 acres. The label is for the use of 4 to 6 pounds per acre of Prozap zinc phosphide pellets (1/8 inch). Controls the vole population

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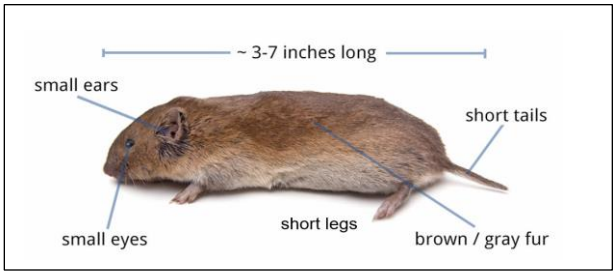

on site, thus preventing vole movement or migration to adjoining fields.

- Allows maximum growth and benefit from cover crops or grain crop before planting. When vole populations are high, apply zinc phosphide pellets a week before planting to maximize effectiveness. If applied at planting or replanting, voles may prefer to consume freshly planted soybeans or emerging soybean cotyledons over a toxicant (bait).
- Allows the producer to treat only field border rows that are adjacent to grass waterways, roadsides or other areas of good vole habitat.
- Provide more consistent, economically effective control of vole damage at planting than most other available options.
- Zinc phosphide is labeled as a restricted-use pesticide and applicators must be licensed to apply this product. It is a single-dose toxicant that is acutely toxic to all vertebrates and presents risks to non-target wildlife as well as safety risks to humans. The product must be applied in-furrow ONLY, using the proper equipment to meter and apply the pellets in the proper manner. Correct application (i.e., closure of seed slot and no spillage on the ground) is imperative to reduce the exposure to non-target species. Applicators must follow all label directions for safe use and proper application of this product. This bait must be available for 5 days to work. Zinc Phosphide baits and pellets work better on meadow voles than prairie voles.
- Approved federal label for the application of 2 percent zinc phosphide pellets at planting in no-till or reduced tillage corn provides is another vole control option labeled only for corn. It may prove most beneficial for use on corn planted into high residue or grass sod/green cover crops that have the potential for being heavily infested with large vole populations.
- For proper application of pellets in the furrow, the planter must be slightly modified.

Two available application device options have been developed. These include the use of a modified rotor for applying and metering the pellets through the planter insecticide boxes (positive placement kits — PPK), and the attachment of a GANDY PDM applicator and hoses for application through the planter seed drop tubes. Both applicators, if properly adjusted, can do an excellent job of applying the pellets in the furrow under high residue conditions.

Zinc Phosphide pellets are a highly toxic bait that must be applied in-furrow. Read and follow the pesticide label and follow all federal, state, and local laws regarding pesticide application. Photo: Neogen

For alternative feeds and toxicants (baits), they must be evenly distributed over the field (alternative feeds) or in furrow (baits) to be effective and generally only last a few days before they begin to mold. The active time-period for vole feeding is 21 to 28 days after planting. High continued feeding doses and consistent vole intake is

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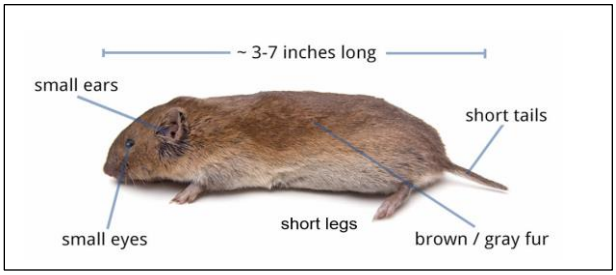

required for toxicant (baits) to be effective. Voles may survive low doses and may learn to avoid the toxicant (baits) in the future. Generally, baits are only about 50% effective at controlling voles so other vole management practices are generally needed to reduce vole populations.

Summary

Repellants, alternative feeding, and toxicants (baits) have been successfully used to reduce vole numbers, with some limitations. Wet weather at planting reduces the effectiveness of most repellants alternative feeds, and toxicants (baits). Alternative feeds need to be more attractive than other vole food sources and tends to be expensive. Alternative feeds do not reduce the vole number, and in no-till soybeans, soybean seeds and soybean cotyledons are very attractive food sources to voles. Toxicants (baits) need to be used for multiple days (5 days) to work effectively and voles may recover from low doses and learn to avoid these products. Toxicants (baits) may need to be used for several years to effectively lower vole populations until crop damage is minimized. Often these practices must be used with other management practices to reduce vole numbers and vole damage to agricultural crops.

Fact sheets in this Series:

1) Vole Biology FS-1
2) Vole Scouting FS-2
3) Vole Predators FS-3
4) Vole Repellants & Baits FS-4
5) Vole Management Practices FS-5

References

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