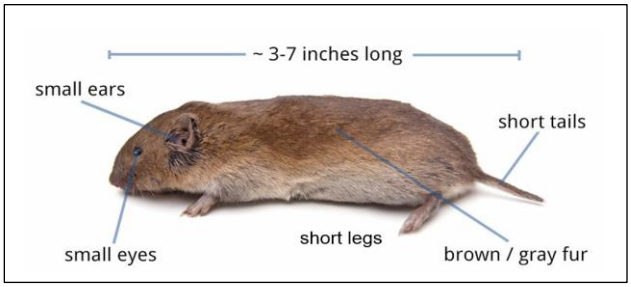
Vole Management Practices FS-5



Introduction

Controlling voles in agricultural crops is difficult because vole numbers peak rapidly every 2-5 years. To control voles, producers must understand:

1) Vole Biology, Habitat, and Environment
2) Vole Scouting and Vole Density
3) Manage or Reduce Vole Food and Shelter
4) Increase Vole Predators
5) Utilize Repellants, Alternative Feeds, and Toxicants (Baits) effectively
6) Combine a combination of management strategies to keep vole numbers at an economical level that does not excessively damage agricultural crops.

No one strategy has proven to be consistently successful at controlling vole populations. This fact sheet will summarize various vole management practices.

Farm Management Practices that Enhance Vole Numbers

1) Dense tall vegetation (fence row, buffers, waterways, filter strips): food & shelter, few predators
2) Planting cover crops early resulting in thick dense vegetation: food and shelter
3) No-till or minimal soil disturbance: food and shelter
4) Leaving unharvested seed on the soil surface (shattering, poor grain cleaning): food
5) Broadcasting cover crop seed on the soil surface: food source
6) Poor chaff spreaders: Provides both food from residue, grain, and shelter.
7) Mild winter, cold wet spring: Allows vole numbers to expand rapidly, delays crop growth
8) Open seed trench or open seed slot at planting: Easy food source, reduced plant growth
9) Slow Plant Growth: More time for voles to eat lush growth before it lignifies or grows too tall.
10) Legumes and clovers are a preferred food source; alfalfa, red clover, sweet clover, winter peas, soybeans which are high in crude protein (Voles do not like Crimson Clover!)

Crimson clover is not a vole food source

Source: bing.com

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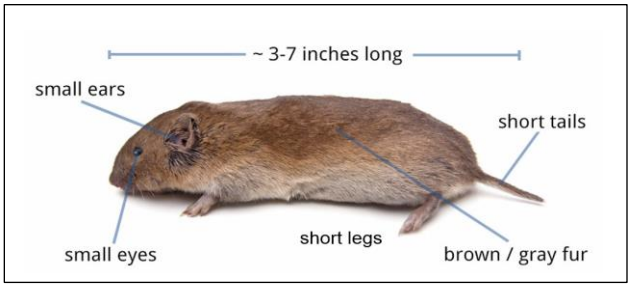

11) Grasses: wheat, corn, oats, cereal rye, annual (perennial) ryegrass, bluegrass, sorghum, Sorghum Sudan, Sudan, millets.
12) Brassicas: rape or canola
13) Weeds: dandelion, giant ragweed, purslane, lambsquarter, plantain, wild strawberry, foxtail, velvet leaf, cheat grass, pennycress
14) Lack of predators: No predators to reduce vole numbers and keep populations stable
15) Hunting: Reduces mammals that eat voles e.g. fox, coyote, raccoon, mink etc.
16) Lack of den trees or dead trees: No place for owls, hawks, kestrels/falcons to make nests or perches to reduce vole numbers.
17) Ponding water: Free standing water is a requirement for meadow voles.

Vole Nests above or below ground may be disrupted by drills, rotary hoes, harrows, and mowing.

Cultural Practices to Control Voles

Several cultural practices may be needed to control vole numbers. Drilling crops versus planting crops in 15 to 30 inches rows is more effective simply because it kills more voles. The disc's on no-till drills disrupt the vole environment and reduces vole numbers by killing adults or disrupting nests. Some producers are using roller crimpers with sharp blades and knifes to not only crush or crimp cereal rye, but it is also effective at reducing fleeing voles.

Cold wet springs do not allow grain crops to grow quickly. If plants grow fast enough, they may outgrow vole damage or reduce the amount of damage that voles cause. Row cleaners and sweepers may move crop residue away from the emerging plant, allowing the soil to warm up and result in faster plant growth. Zone tillage also warms the soil and improves crop growth. Both row cleaners/sweeps and zone tillage may have little effect on actual vole numbers, but they allow the emerging crop to grow faster and possibly outgrow vole damage.

Chaff spreaders spread crop residue and reduce sources of vole food and shelter.

Voles (and slugs) love matted residue. Rotary hoeing, harrow, and crimping 2-3 hours after dawn or 2-4 hours before sunset when voles

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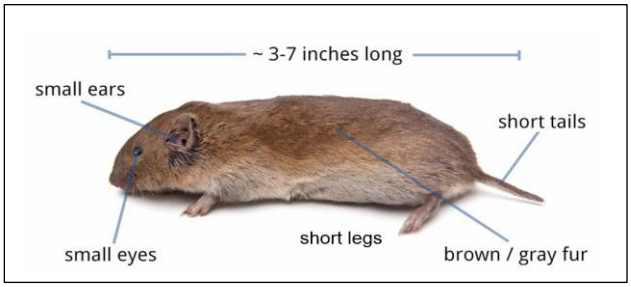

are most active may reduce vole numbers. Voles are more nocturnal during the summer but also need to eat every 2-3 hours. Double sets of rotary hoe blades may terminate more voles. Running the rotary hoe or harrow at night is also an option in late spring or early summer (after wheat harvest). Rotary hoes or harrows do the following:

1) Rotary hoes and harrows move residue and dries out vole habitat.

2) Rotary hoe or harrow in the fall if there is a major vole population to reduce residue matts and to disrupt vole nests.

3) Rotary hoe or harrow in spring before planting crop to reduce residue matts and disrupt vole nests.

4) Rotary hoe or harrows also terminate fleeing adults if they are present and not underground.

One way to reduce grain residue and chaff at harvest is to use full width chaff spreaders or choppers. Spread chaff and grain residue around to reduce the vole food and shelter. Draper headers do a better job of spreading residue. Harvest corn plants higher and try to keep the stalks standing to reduce the vole habitat and change their environment. This practice also allows the soil to dry out faster and keeps the stalks attached to the soil so the corn stalks do not wash off during a rain event.

Mowing (<8 inches) or grazing reduces the tall thick vegetation and allows predators to find the voles. Mowing around field edges or borders, filter strips, grass waterways, or buffers also reduces vole habitat. In land enrolled in the Conservation Reserve Program (CRP), mow and terminate vegetation by early fall before returning to crop production. For NRCS government contracts, discuss these practices with your local representative before implementing. Mowing may affect other resource concerns (wildlife, rabbits, and quail) and your government payment.

Mowing and grazing are effective tools to controlling vole populations.

Infield burning may temporarily reduce vole populations but voles may return once vegetation starts growing again. Burning also leaves the soil susceptible to soil erosion.

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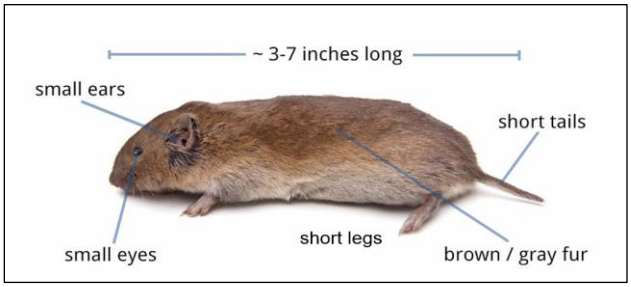

Voles prefer lush green newly emerging plants as a food source which may quickly return after a burning event. For that reason, burning fields has not really proven to be effective. One of the most effective management practices has been to apply an early herbicide burn down 30-45 days before planting to reduce vole food and shelter.

As a last resort, vertical tillage, 3-4 inches deep will destroy vole burrows when vole numbers are extremely high and generally will reduce vole numbers by 60%. Tilling 15-20 feet strips around a field to exclude voles will succeed as long as vole numbers are not too high initially. If voles are hungry, they will find the food. Voles are reluctant to cross bare soil due to predators.

Planting green into cover crops is acceptable if vole populations or vole damage is minimal. No-till systems that combine cover crops and crop rotation and are ecologically balanced tend to have less pest problems. Enhancing predator habitat is critical to successful pest control in these systems.

Most Effective Practices to Control Voles

1) Kill vegetation 30-45 days before planting to reduce food and shelter. If producers have a history of planting green and acceptable or low vole numbers along with high predation, killing vegetation early may not be needed.
2) Graze cover crop, with high stocking density: Disrupts habitat (Reduces food and shelter)
3) Prevent pest migration by mowing field borders, waterways, buffers, filter strips.
4) Plant grain crop >2 inches deep so voles may not smell the seed as a food source.
5) Spread chaff evenly in the fall which reduces food and shelter and dries out soil.
6) Rotary hoe or harrow in fall and/or spring to spread residue and reduce vole numbers. Spring operations may be especially effective because due to low vole populations.
7) Drill all grains crops and cover crops versus broadcasting the seed: Reduces food source.
8) Drill a higher population of soybeans: reduces vole numbers and allows soybean yields to compensate if vole numbers are low.
9) Select fast emerging crop varieties that will outgrow vole feeding.
10) Plant non-food source cover crops: Crimson clover is a non-vole food source
11) Plant 50% cover crop mixtures that winter kill: reduces food, shelter, and opens

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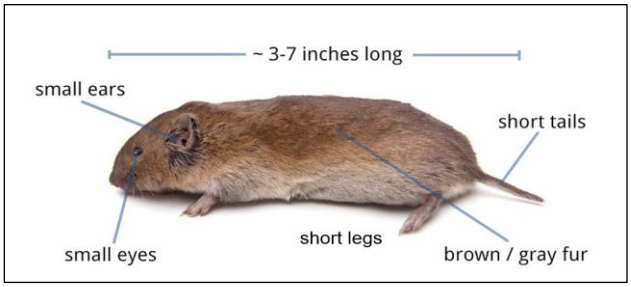

canopy up to predation. Also dries out the soil.

12) Using a crimper with many sharp blades spaced close together may be effective at terminating adult voles and disrupting vole nests when vole populations are high.
13) Using controlled drainage to raise the water table may decrease vole numbers because the voles do not tolerate flooded fields, however; standing water is required for meadow voles.
14) Scout and monitor fields in the fall and 30-45 days before spring planting.
15) Utilize perches and bird houses to enhance owl, hawk, and falcon predator numbers.

Predators reduce vole populations and protect crops from vole damage.

16) Allow dead trees, den trees, and wooded fence rows to remain to provide predator habitat.
17) Restrict or avoid over hunting of fox and coyote which are beneficial vole predators.
18) Enhance the environment for other predators: shrews, crows, ravens, herons, blue jays, possum, skunks, raccoons, mink, snakes, salamanders, etc.
19) Till 15-20 feet around field borders to reduce vole migration.
20) Vertical tillage 3-4 inches deep may reduce high vole populations by 60% but is a last resort and typically not effective as a lone practice.
21) Utilize repellants: Use stinky insecticides on corn and soybeans that voles tend to avoid.
22) Capsaicin (hot pepper) as broadcast spray to emerging soybeans or applying 2 ounces cayenne pepper per bushel/acre in the seed row may reduce vole feeding.
23) Use alternative feeds (2 bushel cracked corn in corn fields or 1-2 bushels whole soybeans in soybean fields). May not work under high vole populations and abundant food sources. Alternative feeds need to deter voles for 21-28 days after feeding to prevent crop damage.
24) Baits: Apply Zinc Phosphide pellets when vole numbers are high using labeled rates.
25) Buy a rat terrier or other good mouser! Avoid promoting feral cats which are detrimental to many song bird species.

Vole Parasites, Diseases, and Benefits

Producer should NOT handle voles because they have several potentially harmful parasites, diseases, but also offer a few benefits. Ecto vole parasites include trematodes, cestodes,

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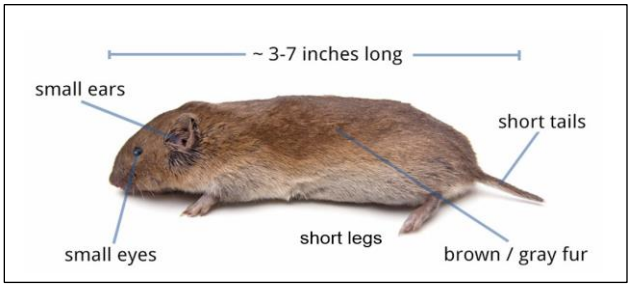

nematodes, Dipthera and Endo vole parasites include ticks, mites, lice, fleas. Human diseases transmitted by voles include Cystic hydatid, tularemia, bubonic plague, babesiosis, giardiasis (diarrhea), and Lyme disease (spirochete *Borrelia burgdorferi*). Voles benefit humans by spreading mycorrhizae fungus in agricultural fields and consuming weed seed.

Summary

Once vole population gets out of control, several management practices will likely be needed to reduce vole numbers to economically acceptable levels. The first step is understanding vole biology. Second, scout for voles and reduce or modify their food and shelter. Third, learn how to utilize and enhance natural predators to reduce vole populations. Fourth, utilize repellants, alternative feeds, and toxicants (baits) to control vole damage. Fifth, utilize all management practices outlined in this fact sheet to successfully control voles. An integrated approach utilizing multiple strategies will be needed to adequately control vole damage. Vole populations run in 2 to 5-year cycles determined by weather, food, shelter and the environment.

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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Ideal vole habitat is anywhere with permanent herbaceous cover,

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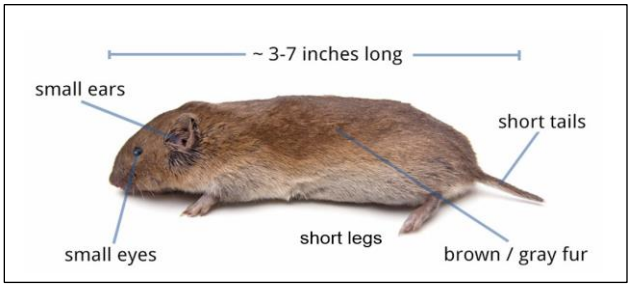

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