Developing a management plan for gophers, moles, and voles in organic production

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Species Identification (Pocket Gophers)

- Burrowing rodent about 6-8 in long; rarely seen above ground.

- Gopher mounds are plugged and often fan-shaped.

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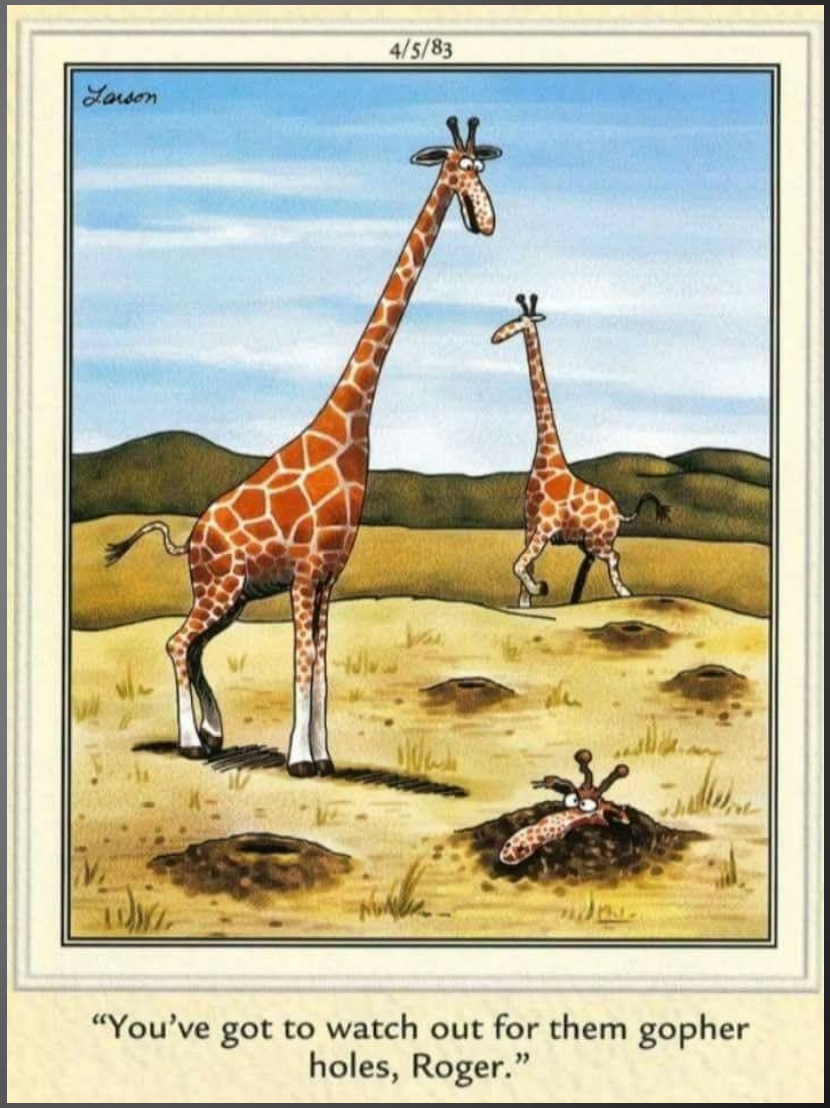

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Species Identification (Moles)

- Are burrowing mammals with a pointed snout and broad feet that eat worms and insects.
- As such, moles cause less damage to gardens than gophers, though linear ridges and mole mounds do cause damage.

Species Identification (Moles)

- Mounds are volcano shaped with the plug in the center of the mound.
- Can also be identified from raised earth indicating underground tunnels.

Species Identification (Meadow Voles)

- Have dark grayish brown fur and are 4-6 inches in length.
- Populations tend to cycle, exhibiting irruptive growth patterns.

Species Identification (Meadow Voles)

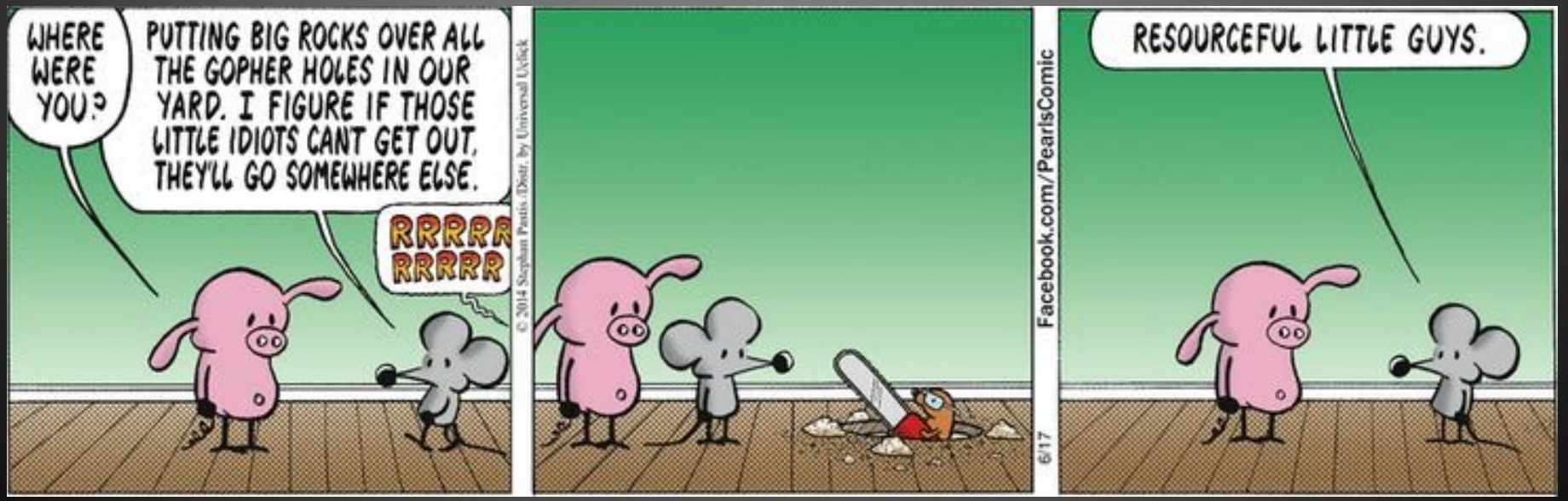
- Dig shallow burrows and leave well-worn trails. Fecal pellets are often present.
- Primary damage caused by girdling of stems, consumption of vegetation, and gnawing of cables, pipes, etc.

Current Control Strategies

- Currently, we focus on an integrated approach that utilizes a number of strategies and tools to control vertebrate pests.

What Control Options are Available?

	Habitat modification	Baiting	Burrow fumigation	Trapping	Exclusion	Repellent	Frightening	Shooting
Pocket gopher	X			X	?			
Mole				X	?	?		
Vole	X			?	X			



Control Options—Biocontrol

- Natural predators have been used to control vertebrate pests.

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- Natural predators have been used to control vertebrate pests.
- Gopher snakes kill a few gophers but are unlikely to control populations.

Control Options—Habitat Modification

- Involves altering habitat to reduce the desirability for pests.
- Example:
  - reduce cover for voles

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- Example:
  - reduce cover for voles
  - control weeds/cover crops to reduce food for gophers

Control Options—Cultural Practice

- Discing to remove burrow systems

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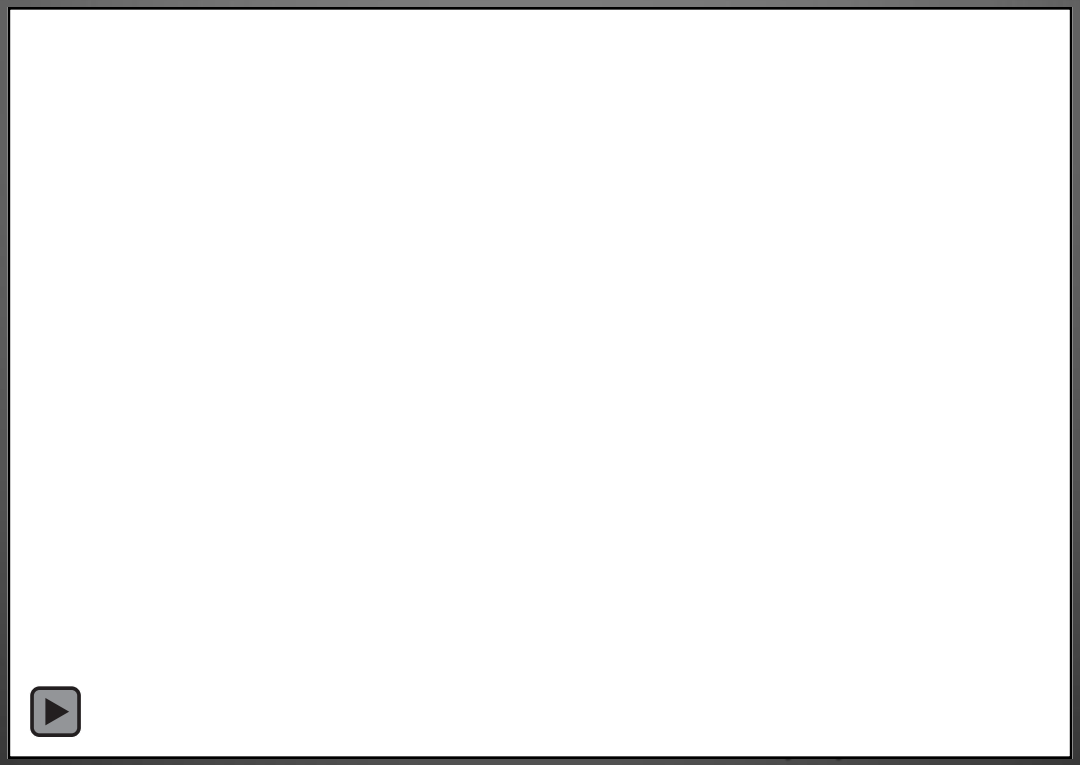
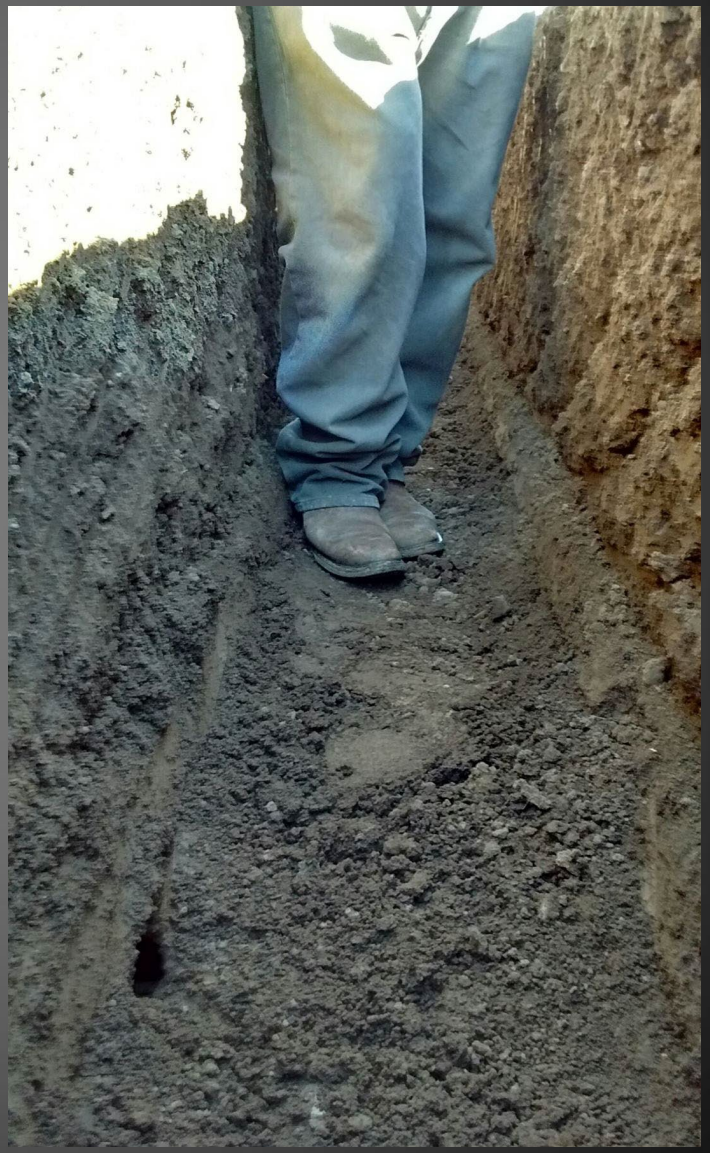
- Irrigation strategy



Control Options—Exclusion

- Gopher fencing ineffective.



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- Raised flower beds and wire baskets.
- Tree protectors for voles.

Control Options—Exclusion

Voles

- Plastic mesh-style fencing has been effective at slowing movement of voles into artichoke fields.
- Fencing should be buried at least 6 inches below ground and extend 8-12 inches above ground.
- Aluminum flashing may provide more long-term functionality.
- Must consider equipment movement into and out of fields.

Control Options—Repellents

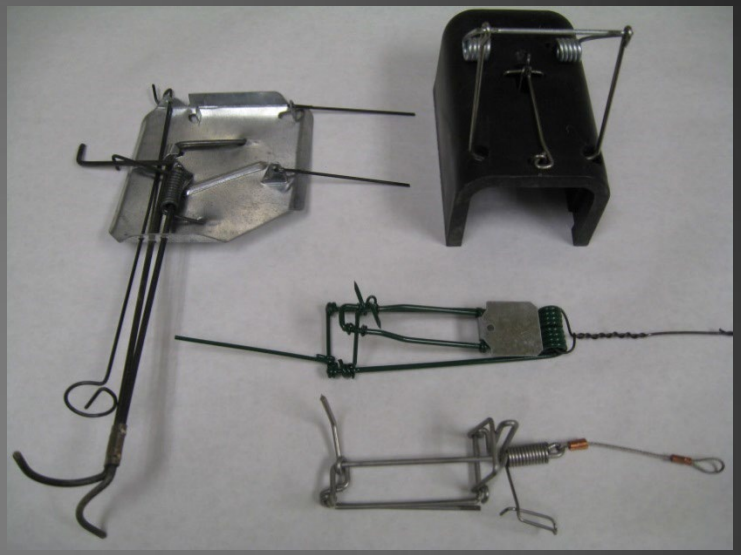
- Repellents rely on objectionable odors or unpleasant tastes.
- Might for a short while, but effectiveness is spotty and usually only temporary.

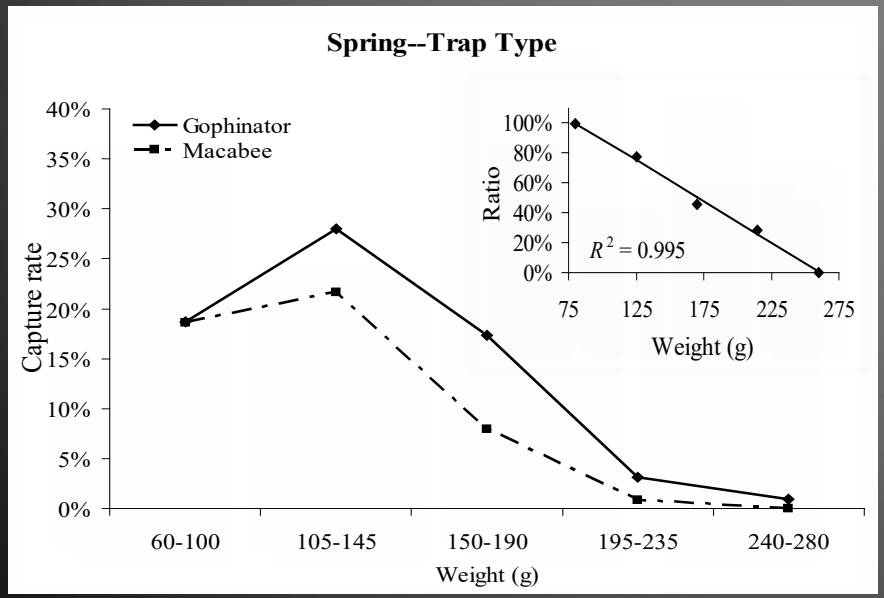
Control Options—Trapping

Pocket gophers

- Gophinator trap was more effective than Macabee trap.

- Captured heavier gophers at a greater rate.





Control Options—Trapping

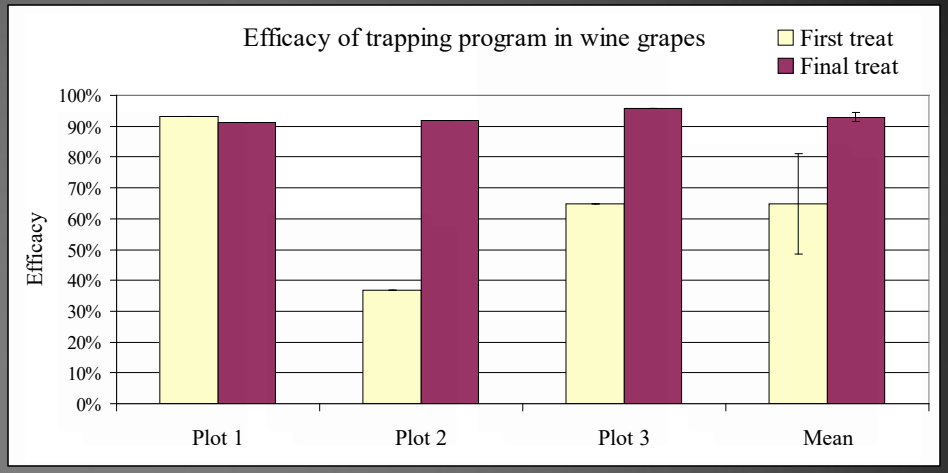
Pocket gophers

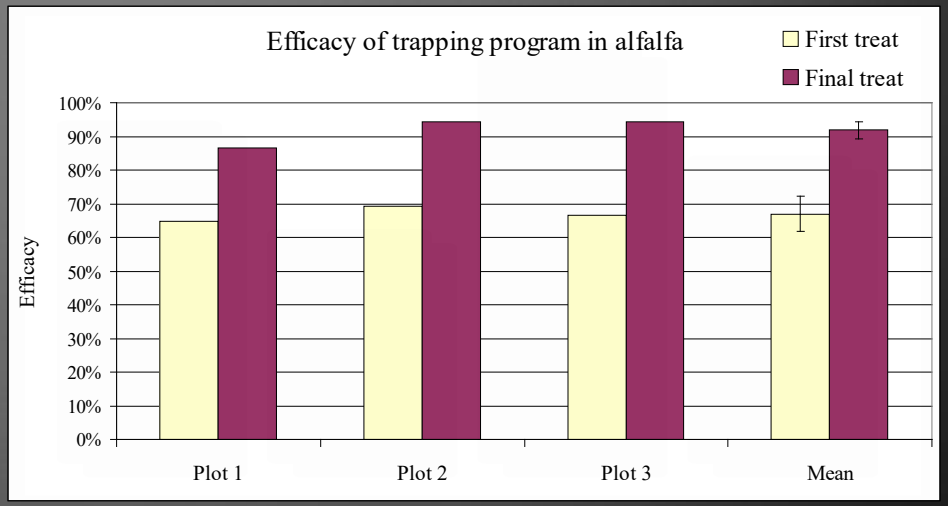
- Covered sets yielded slightly higher capture rates in spring-summer, but not autumn.
- Efficacy was offset by setting time.
- We did not observe a difference in the number of captures across attractants.
- Human scent had no effect.

Control Options—Trapping

Pocket gophers

- Exhibited high efficacy in wine grapes after two treatments.
- Exhibited high efficacy in alfalfa after two treatments.

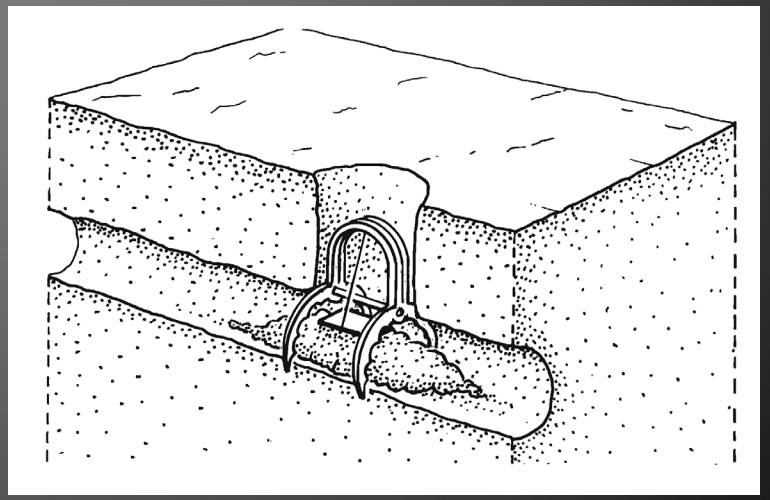




Control Options—Trapping

Moles

- Number of different kinds of traps including harpoon, choker, scissor-jaw, and body gripping.
- Body gripping and scissor-type appear to be most effective.
- Are placed in or over tunnels.



Control Options—Trapping

Voles

- tend to be too numerous for trapping to be practical

Control Options—Trapping

Voles

- Use of snap traps can be effective for small populations.

ANR Publication

https://anrcatalog.ucanr.edu/pdf/8688.pdf

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UC PEER REVIEWED

Burrowing Rodents: Developing a Management Plan for Organic Agriculture in California

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Burrowing rodents can cause extensive damage in organic production systems. The three most common species that cause damage are

- California ground squirrels (*Otospermophilus* spp.)
- pocket gophers (*Thomomys* spp.)
- meadow voles (*Microtus* spp.)

IDENTIFICATION

Body features, activity patterns, damage caused, and appearance of burrow entrances are useful in identifying burrowing rodents.

California ground squirrels

Ground squirrels are grayish-brown rodents (fig. 1) in the squirrel family that primarily live on or in the ground, although they occasionally climb trees to access fruit and nuts. They are active during the day, when they move around foraging for food. When alarmed, they give a loud chirp and often drop into burrows that they have dug (and where they nest). Their burrow entrances remain open at the surface, often with multiple entrances within a small area. They readily coexist with people, creating burrows in and around buildings. They also create burrows next to trees (fig. 2) and along field edges, fencerows, and roadsides. Ground squirrels hibernate during the winter, but can remain active in areas with mild winters (Quinn et al. 2018).

Figure 1. California ground squirrel.

Figure 2. Ground squirrel burrow entrance.

Ground squirrels can severely reduce seedling stands when they feed on emerging plants. They can kill limbs and entire trees through girdling activities. They feed on fruit and nut crops, reducing yield. They also chew on irrigation lines, necessitating costly repairs, and their burrows can disrupt irrigation systems, damage crops, lead to erosion concerns, and pose a hazard to farm equipment and farmworkers. Ground squirrels sometimes travel 100 yards or more to feed on crops and frequently create burrows in perennial crops such as orchards.

Vertebrate Pest Control Handbook

http://vpcrac.org/about/vertebrate-pest-handbook/