

Developing a management plan for burrowing rodents in organic production

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Species Identification (Ground Squirrels)

- Gray-brown fur with semi-bushy tail.
- Are social.
- Damage includes girdling of trees, consumption of forbs and grasses, chewing of irrigation lines, and abundant burrow openings.



Species Identification (Ground Squirrels)

- Squirrels are active throughout the day and are frequently visible.
- They prefer to burrow next to buildings, on field edges, and alongside fencerows and roadsides.



Species Identification (Pocket Gophers)

- Burrowing rodent about 6-8 in long; rarely seen above ground.
- Gopher mounds are plugged and often fan-shaped.



Species Identification (Pocket Gophers)

- They feed on taproots weakening and/or killing plants.
- Then can girdle trees, particularly below ground.
- Mounds can also kill plants and can create weed seed-beds.



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.



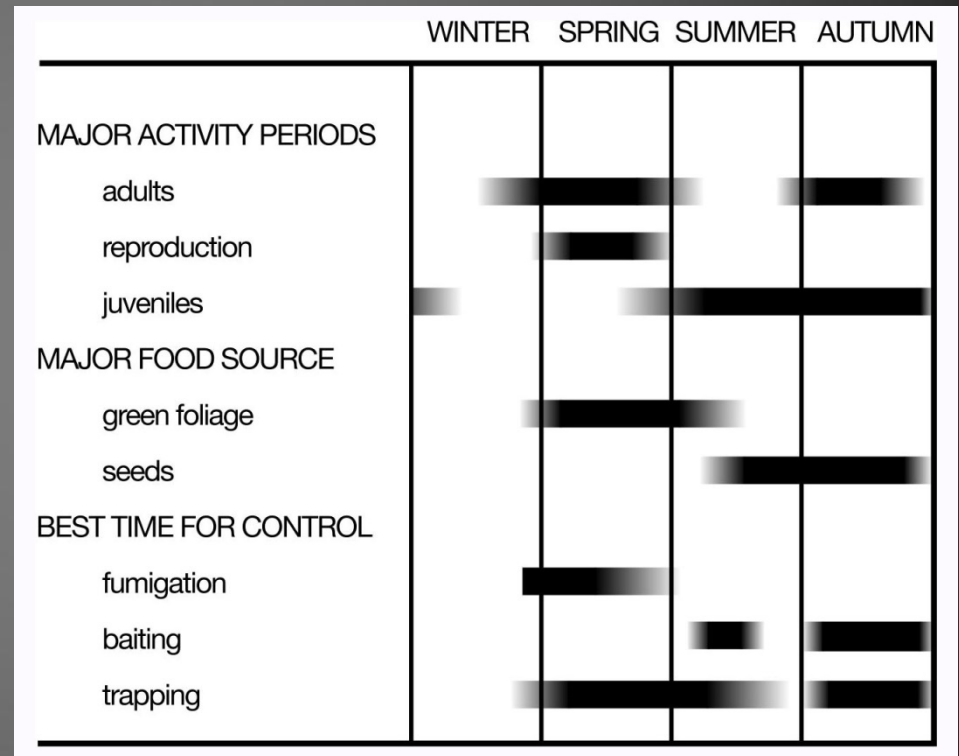
Current Control Strategies

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



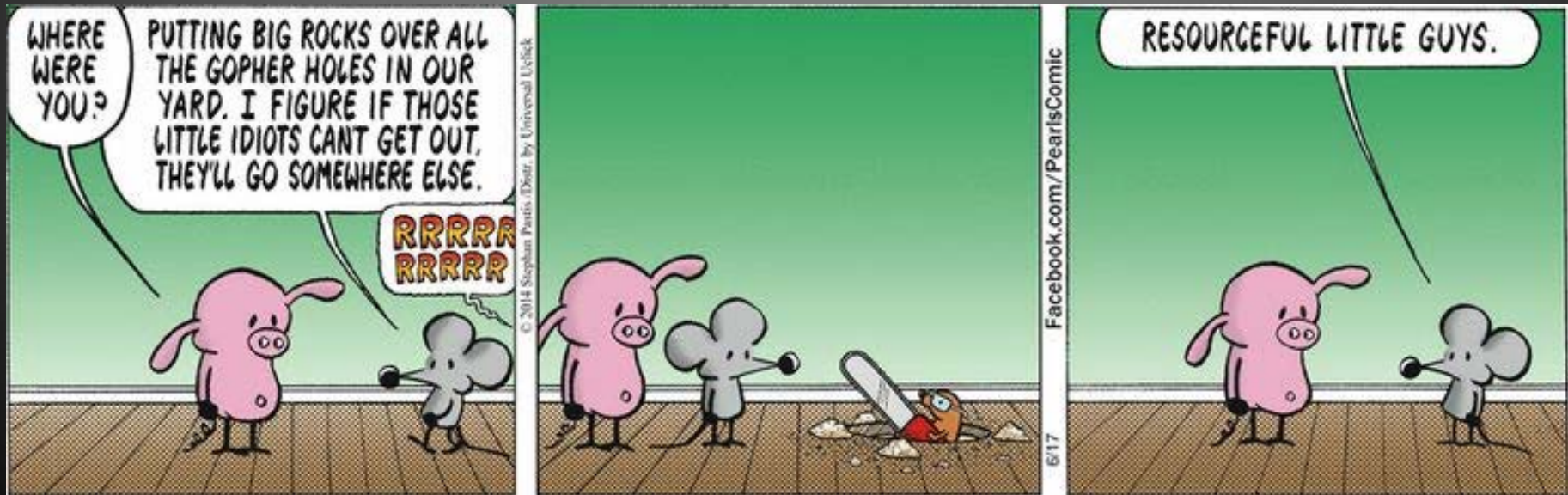
Importance of Biology/Ecology

- Understanding the biology and ecology of vertebrate pests will guide management decisions.
- Example:
 - ground squirrels



What Control Options are Available?

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



Control Options—Biocontrol

- Natural predators have been used to control vertebrate pests.



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- Owl boxes are inconclusive for gophers; raptor perches appear ineffective for ground squirrels.
- 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:
 - remove brush piles to control ground squirrels



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- Example:
 - remove brush piles to control ground squirrels
 - reduce cover for voles
 - control weeds to reduce food for gophers



Control Options—Cultural Practice

- Deep ripping to remove burrow systems



Control Options—Cultural Practice

- Deep ripping to remove burrow systems
- Irrigation strategy



Control Options—Exclusion

- Gopher fencing ineffective.



Control Options—Exclusion

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- Raised flower beds and wire baskets.



Control Options—Exclusion

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



Control Options—Exclusion

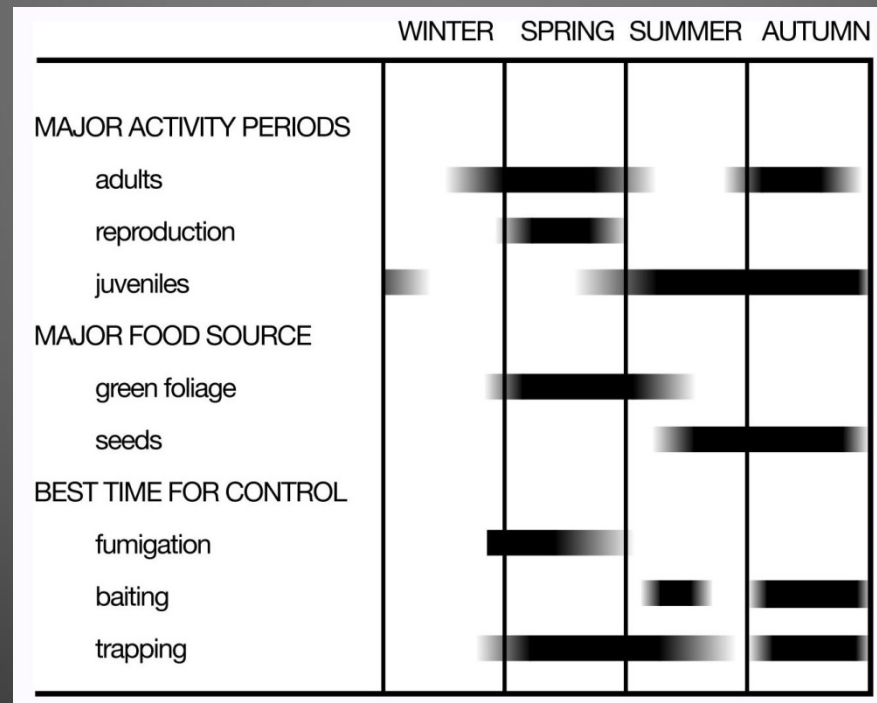
Voles

- 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—Trapping

- Control of small populations of ground squirrels is possible with traps.
- Trapping for ground squirrels is effective year round except during middle of summer.



Control Options—Trapping

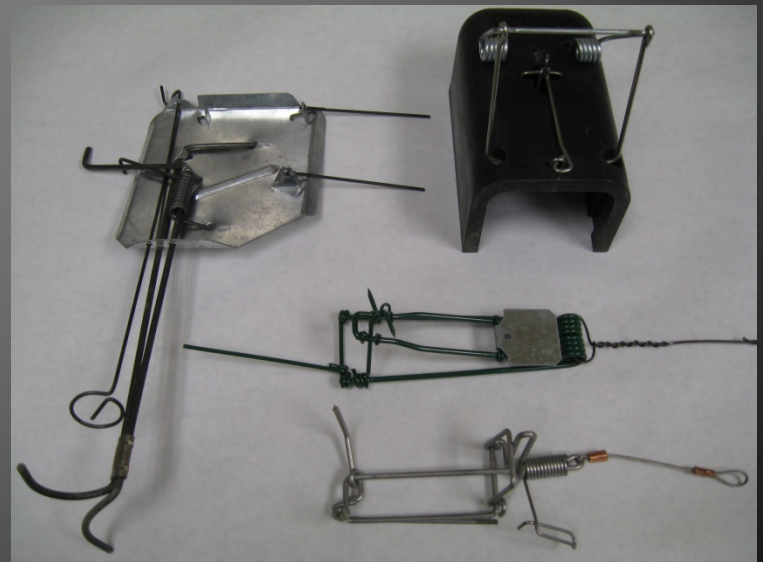
- Body-gripping traps, tube traps, and box-type squeeze traps are common kill traps.
- Wire cage traps are common live traps.
- Live traps require euthanasia.



Control Options—Trapping

Pocket gophers

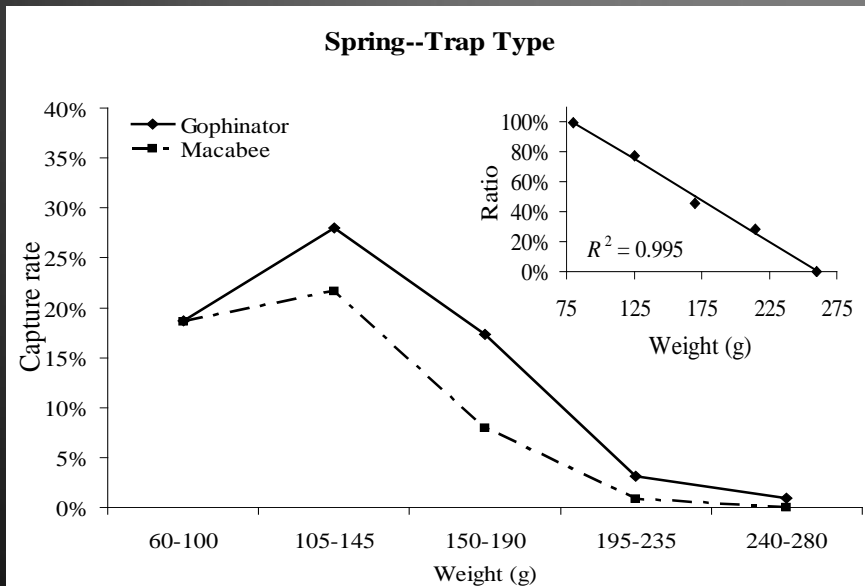
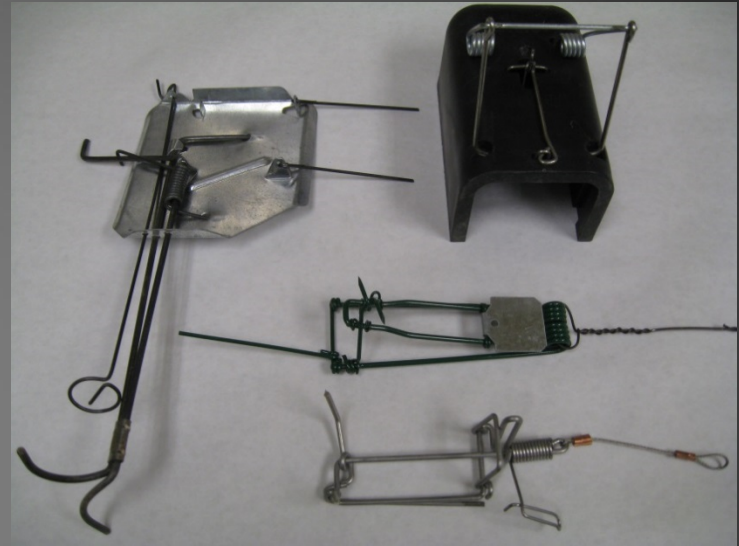
- Has many positive attributes including:
 - knowledge that you've removed the target animal.
 - no use of toxic chemicals.
 - available for use in organic setting.
 - can be efficient and economical once user becomes proficient at trapping.
- Two main kinds of traps: pincers and squeeze-type box traps.



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

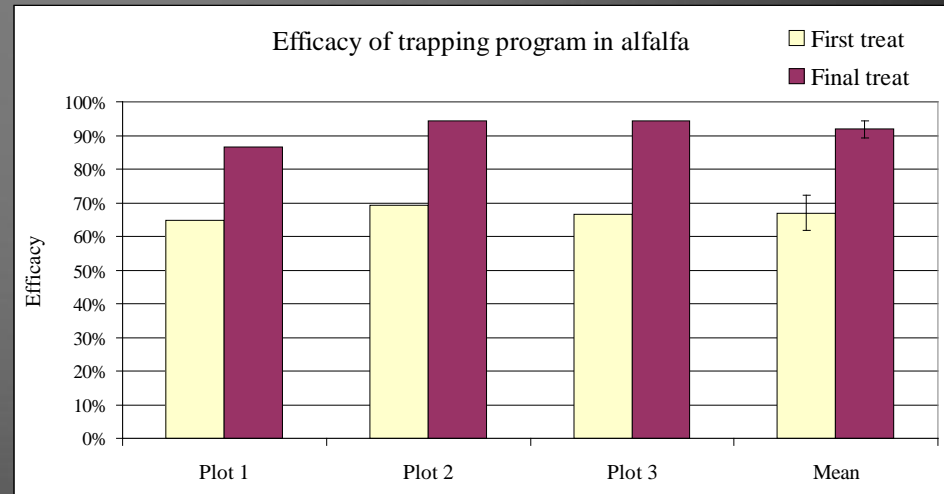
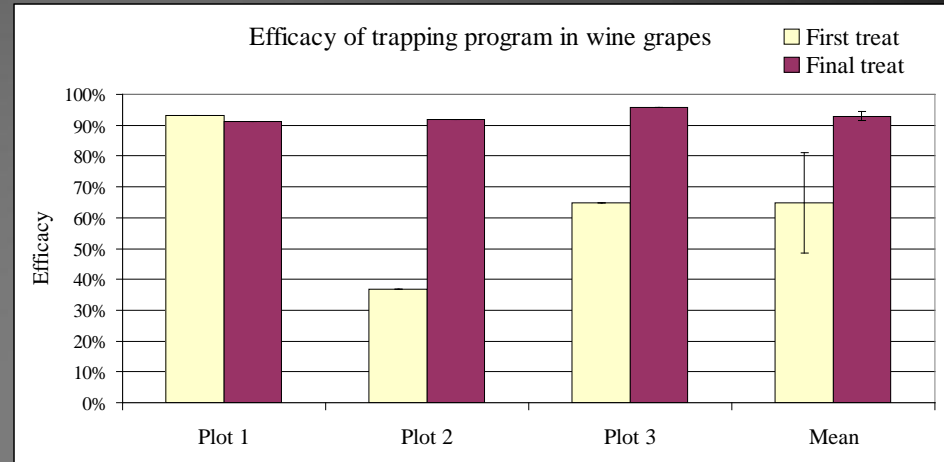
- Covered sets yielded slightly higher capture rates in spring-summer, but not autumn.
- Efficacy was offset by setting time.
- We did not observe a difference in the number of captures across attractants.
- Human scent had no effect.



Trapping—Efficacy

Pocket gophers

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



Control Options—Shooting

- Shooting can be effective for controlling ground squirrels although it is labor intensive.
- Lead bullets are no longer allowed in many areas in CA and will be banned statewide starting 2019.



Ground Squirrel BMP website

<http://www.groundsquirlrelbmp.com>



Biology

Identification

Management

Regulations

Resources

FAQs

Search



Ground squirrel management for California



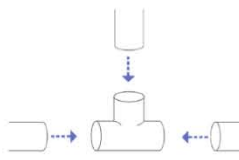
What are BMPs?

What is IPM?



Timing and Efficacy

Compare management methods for:
California Ground Squirrel
Belding's Ground Squirrel



Step-by-Step Guides

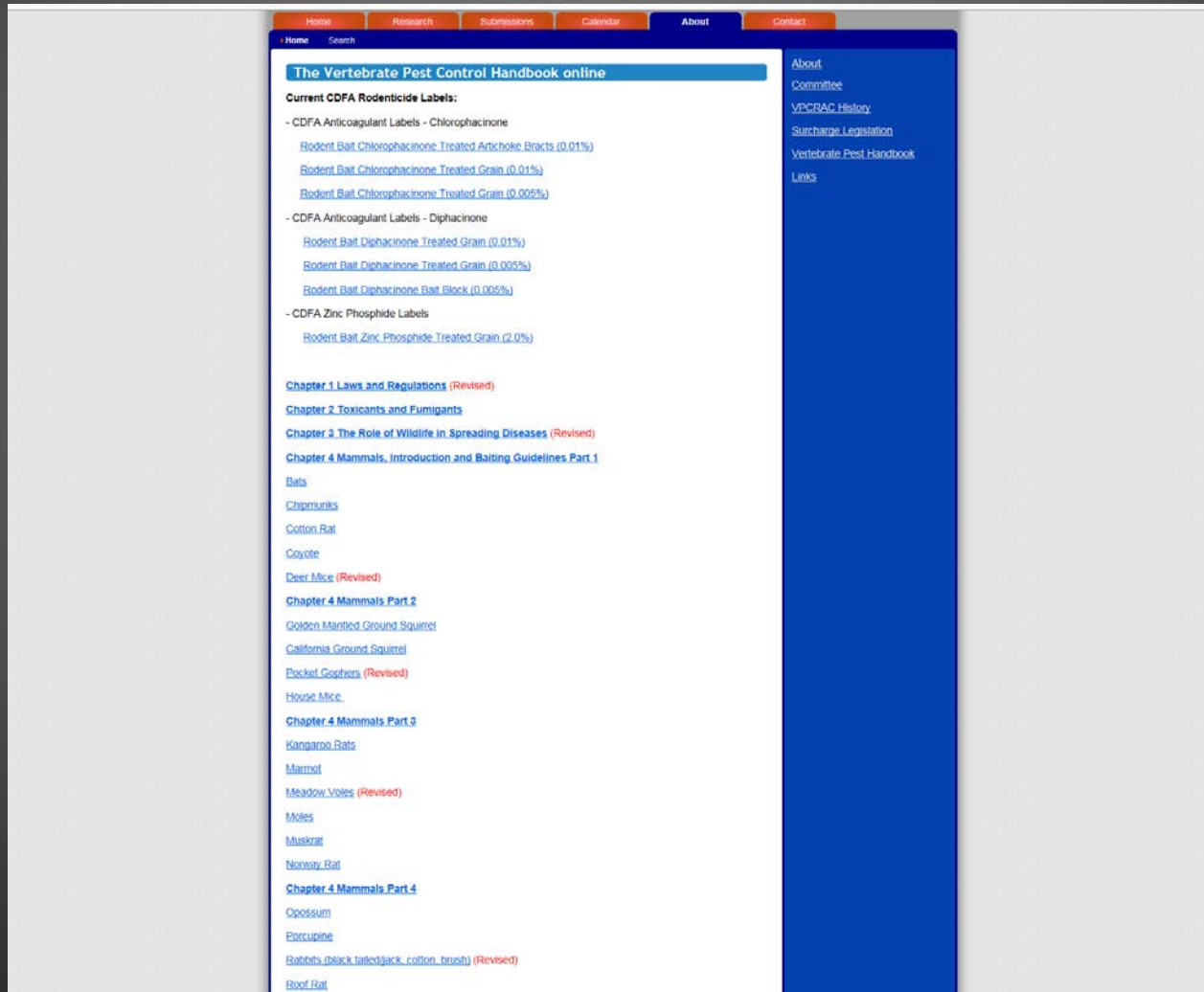
Visual how-to's for:
Bait Station Construction
Calculating CO₂ Flow
Spreader Calibration

Protecting Wildlife

Avoid harm to non-target wildlife:
 Range Maps for Endangered Species
 Range Maps for Non-Pest Ground Squirrels
 Legislation and Best Baiting Practices

Vertebrate Pest Control Handbook

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



A photograph of a squirrel sitting on a bed of dry grass and twigs. To the right of the squirrel is a white PVC pipe that has been cut and is lying on its side. A speech bubble with a grey background and a white outline is positioned above the squirrel, containing the word "Questions?" in yellow text. The background shows some dry vegetation and a clear sky.

Questions?