

An integrated approach to managing ground squirrels and pocket gophers

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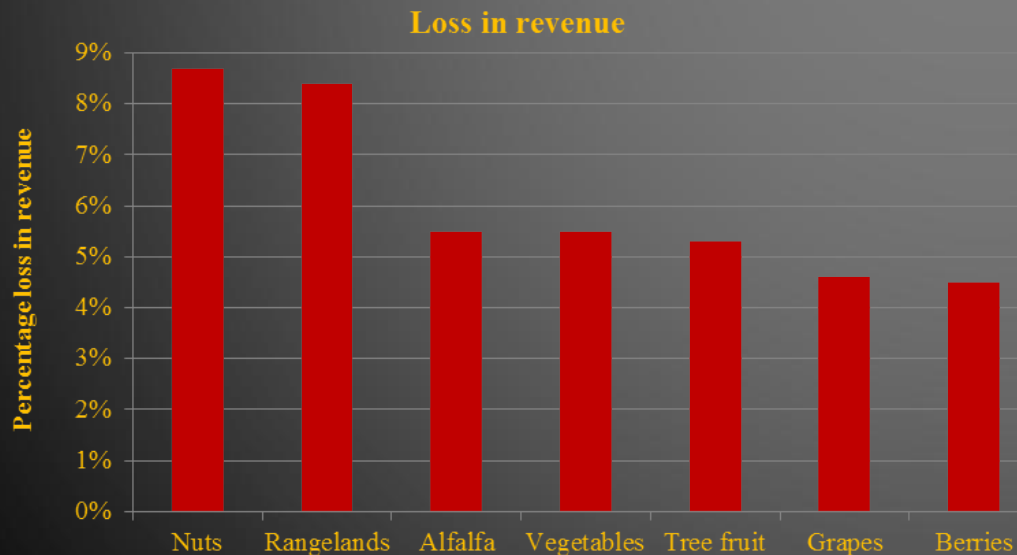
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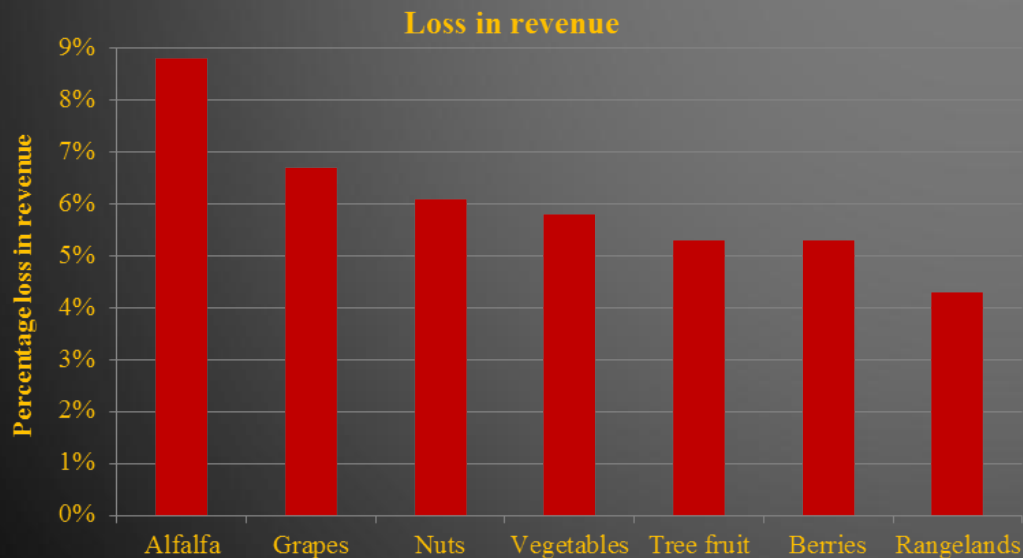
Species Identification (Ground Squirrels)

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



Species Identification (Pocket Gophers)

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



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

	WINTER	SPRING	SUMMER	AUTUMN
MAJOR ACTIVITY PERIODS				
adults		██████████	██████████	██████████
reproduction		██████████		
juveniles	██████████		██████████	██████████
MAJOR FOOD SOURCE				
green foliage		██████████	██████████	
seeds			██████████	██████████
BEST TIME FOR CONTROL				
fumigation		██████████		
baiting			██████████	██████████
trapping		██████████	██████████	██████████

Question 1

California ground squirrels cause which kind of damage?

- a) Girdling of trees and vines above ground
- b) Consumption of fruits and nuts
- c) Chewing damage to irrigation lines
- d) All of the above

Question 2

Pocket gophers cause which kind of damage?

- a) Girdling of trees and vines above ground
- b) Frequent transmission of diseases to humans
- c) Feeding on taproots of plants, often leading to mortality of the plant
- d) All of the above

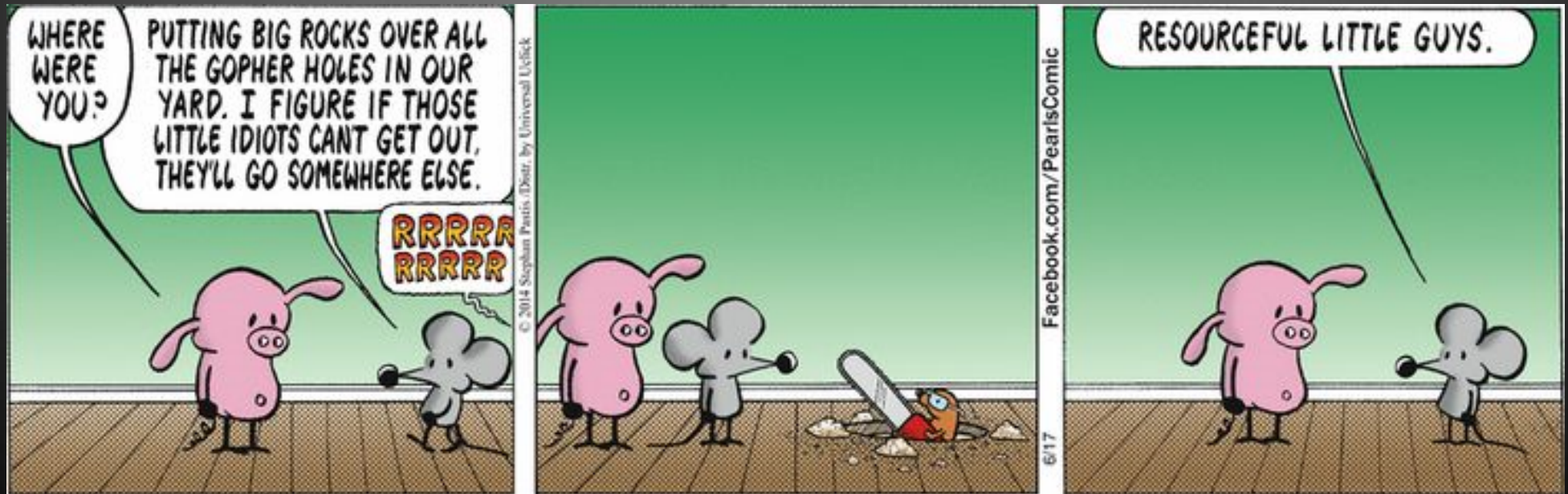
Question 3

Which of the following is a good season to apply burrow fumigants for ground squirrels?

- a) Early winter
- b) Early spring
- c) Early summer
- d) Early fall
- e) All of the above

What Control Options are Available?

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



Control Options—Biocontrol

- Natural predators have been used to control vertebrate pests.



Control Options—Biocontrol

- Natural predators have been used to control vertebrate pests.
- Owl boxes are inconclusive for gophers; raptor perches appear ineffective for ground squirrels.



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:
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 - destroy old burrows



Control Options—Habitat Modification

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- Example:
 - remove brush piles to control ground squirrels
 - destroy old burrows
 - control weeds to reduce food sources for gophers



Control Options—Trapping

Ground squirrels

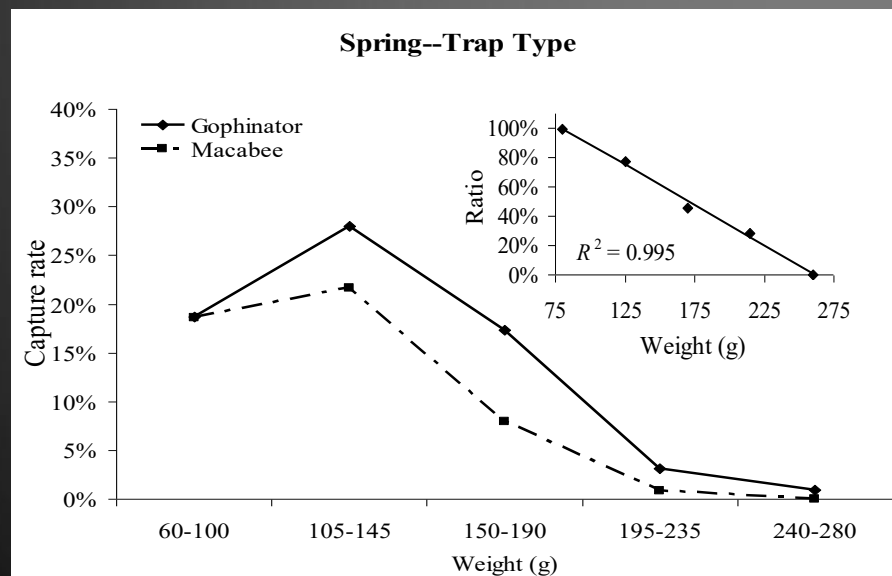
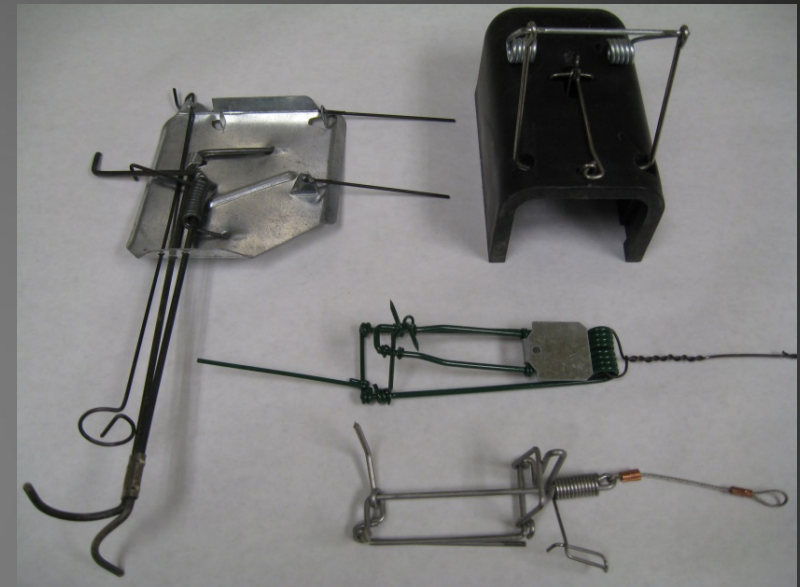
- Body-gripping traps, tube traps, and box-type squeeze traps are common kill traps.
- Wire cage traps are common live traps.
- Live traps require euthanizing target animals.



Control Options—Trapping

Pocket gophers

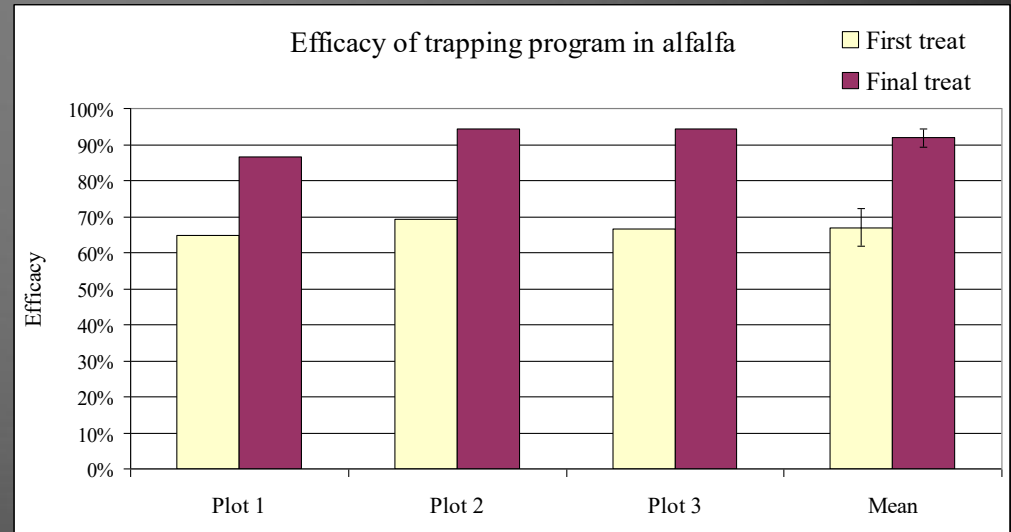
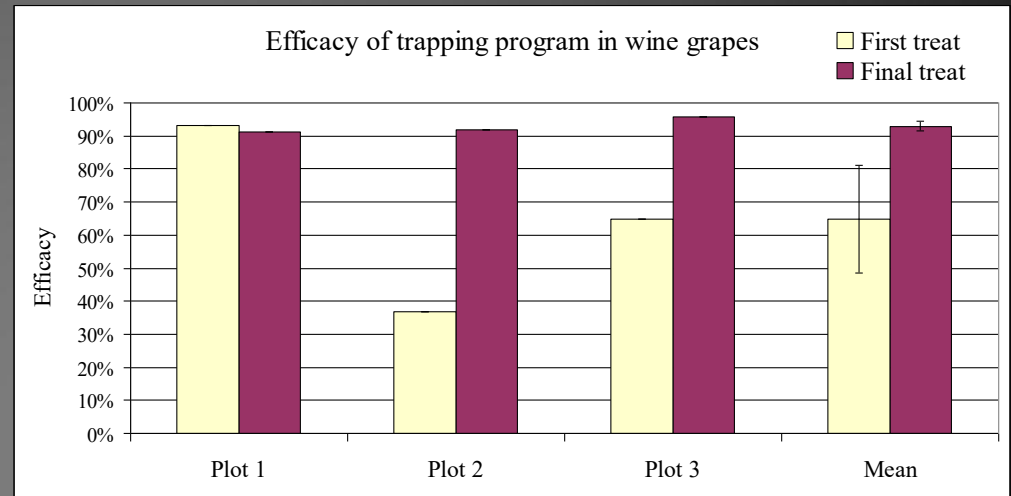
- Gophinator trap was more effective.
- Covered sets yielded slightly higher capture rates in spring-summer, but not autumn.
- Efficacy was offset by setting time.
- We did not observe a difference in the number of captures across attractants.
- Human scent had no effect.



Control Options—Trapping

Pocket gophers

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



Question 4

Which of the following is NOT an effective management tool for pocket gophers and ground squirrels?

- a) Rodenticide bait application
- b) Repellents
- c) Trapping
- d) Habitat modification

Question 5

True or False: It is legal to translocate live-trapped animals off your property

Question 6

Which of the following is a true statement about gopher trapping?

- a) Attractants can greatly increase trapping efficiency
- b) Human scent does not impact capture success of gophers
- c) Trapping is not a very effective tool for managing gophers
- d) All of the above

Control Options—Baiting

- Involves use of poison baits to control vertebrate pests.
- There are restricted use and non-restricted use baits but typically most are now restricted use unless using in your yard or garden.

	Anticoagulants	Zinc phosphide	Strychnine
Ground squirrels	X	X	
Pocket gophers	X	X	X

Control Options—Baiting

Anticoagulants

- used for spot treatments, broadcast, or in bait stations
- require multiple feedings



Control Options—Baiting

Zinc phosphide

- is an acute toxin.
- potential bait shyness.
- can be used for spot treatments and broadcast baiting.
- not to be used in or around buildings.



Control Options—Baiting

Pocket gophers

- Strychnine works best.
- Use probe to find tunnel.
- Dispense bait in tunnel.



Control Options—Fumigation

- Involves use of poison gas in burrows to control vertebrate pests.
- Works best when soil moisture is high (late winter early spring for gophers and after ground squirrels emerge in spring).
- Fumigants should not be used around buildings.



Control Options—Fumigation

Gas cartridges

- Effective for ground squirrels (62–86% control).
- Not effective for gophers.
- Caution must be used to prevent fires.



Aluminum phosphide

- Highly effective for both ground squirrels (97-100%) and gophers (90-100%).
- Is a restricted use pesticide.



Control Options—Fumigation



Control Options—Fumigation

Species	Device	Authors	# of fields	Efficacy
Pocket gopher	PERC	Orloff	3	56%
Pocket gopher	PERC	Baldwin & Orloff	3	62%
Pocket gopher	PERC	Baldwin & Orloff	2	68%
Belding's GS	PERC	Orloff	2	76%
California GS	PERC	Baldwin	2	66%
California GS	PERC	Baldwin	2	100%
California GS	Cheetah	Baldwin	3	-7%

Question 7

True or False: Strychnine is an effective and legal option for managing ground squirrels.

Question 8

True or False: Burrow fumigants cannot be used in close proximity to buildings.

Question 9

True or False: Use of multiple tools generally results in more effective management of burrowing rodents.

Useful Information

UC IPM Pest notes:

- <http://www.ipm.ucdavis.edu/PMG/menu.vertebrate.html>

UC IPM Pest Management Guidelines:

- <https://www2.ipm.ucanr.edu/agriculture/>

The Vertebrate Pest Control Handbook:

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

Ground Squirrel Best Management Practices Website

- <http://www.groundsquirrelbmp.com>

California DPR Endangered Species Query:

- <http://calpip.cdpr.ca.gov/county.cfm>

A photograph of a squirrel sitting on the ground next to a white PVC pipe. The squirrel is facing left and has its paws near its mouth. A speech bubble with the word "Questions?" is positioned above the squirrel. The background shows dry grass and a large rock.

Questions?