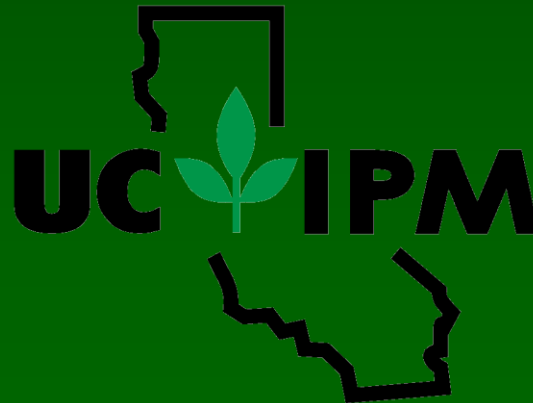


Managing ground squirrel populations

Roger A. Baldwin

UCCE Wildlife Specialist-UC Davis



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.



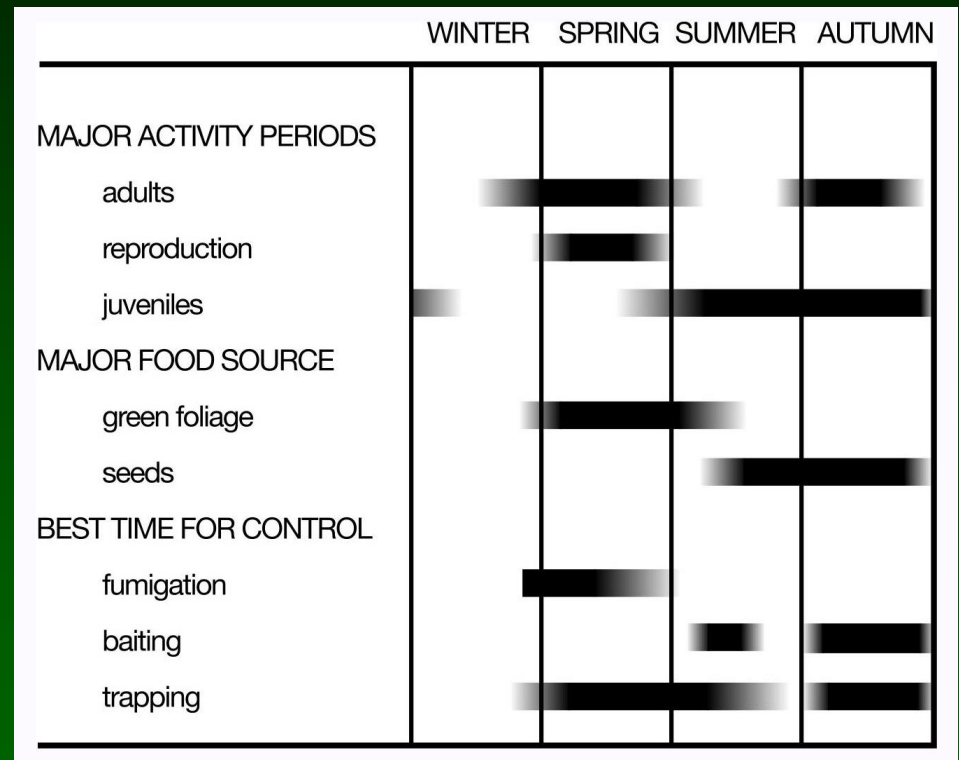
Current Control Strategies

- 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	X				X

Control Options—Biocontrol

- Natural predators have been used to control vertebrate pest populations.
- Raptor perches are inconclusive at best.



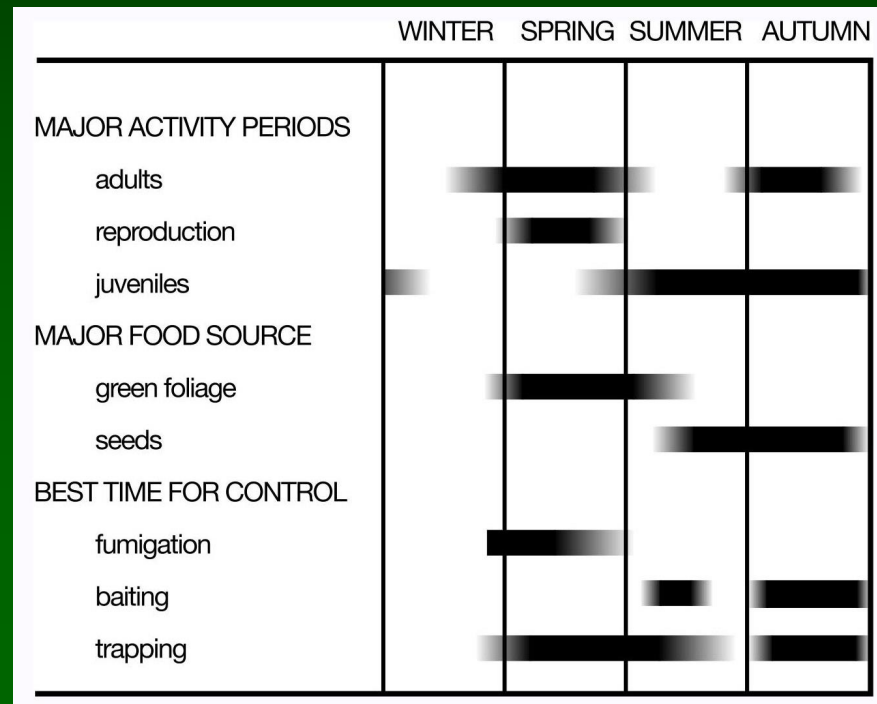
Control Options—Habitat Modification

- Involves altering habitat to reduce the desirability for ground squirrels.
- Example:
 - remove brush piles to control ground squirrels.



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 and can be a good follow up to alternative control methods.



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 euthanization of vertebrate pests.



Control Options—Trapping

- Conibear traps can be placed at burrow entrances.
- Conibear traps can also be placed inside boxes to bait ground squirrels in while excluding larger animals.



Control Options—Trapping

- Gopher box traps can be used in tandem when set along runways.
- Tube traps can be set along runways, as well.
- Live traps are also effective. However, they require euthanizing captured animals.



Control Options—Baiting

- Involves use of poison baits to control vertebrate pests.
- Two main kinds:
 - anticoagulants
 - acute toxicant



Control Options—Baiting

- Two kinds of anticoagulants:
 - first generation
 - second generation
- First generation options
 - chlorophacinone
 - diphacinone
- Are now restricted-use



Control Options—Baiting

Anticoagulants

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



Control Options—Baiting

Bait station design

- Commercial
- Upside down T



Control Options—Baiting

Bait station design

- Commercial
- Upside down T
- Modifications to upside down T
- Use in K-rat territory



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.



Weighing the Positive and Negative Attributes of Rodenticides

1st generation anticoagulants

Positive attributes:

- lower primary nontarget risk
- antidote available
- good bait acceptance
- readily available

Negative attributes:

- requires larger amount of bait
- some potential for secondary risk
- slower time to death than other toxicants
- is restricted-use material



Weighing the Positive and Negative Attributes of Rodenticides

Zinc phosphide

Positive attributes:

- short time from consumption to death provides quick control
- less expensive than anticoagulants
- essentially no secondary risk

Negative attributes:

- acutely toxic; primary risks can be high for aboveground applications
- bait acceptance can be poor
- precipitation can influence efficacy
- no antidote
- is restricted use material



Control Options—Fumigation

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

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



Control Options—Fumigation

Aluminum phosphide

- Tablets can be used for ground squirrels.
- Is a restricted use pesticide.
- Recent study exhibited 97–100% control.



Control Options—Fumigation

Recent changes

- Buffer zones extended from 15 to 100 feet.
- Application sites now are to be posted.
- Fumigation Management Plan is still required.
- Contact local Ag Comm. office for details.



Control Options—Fumigation

Gas cartridges

- Recent study exhibited 62–86% control.
- Caution must be used with gas cartridges to prevent fires.



Control Options—Fumigation

Carbon monoxide producing machines



Control Options—Fumigation

- Steve Orloff and I have already begun to collect efficacy data.
- PERC appears to be moderately effective, while the Cheetah was completely ineffective.

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

Control Options—Shooting

- Shooting can be effective for controlling ground squirrels although it is labor intensive.
- Lead bullets are no longer allowed in California Condor range and banned statewide starting 2019.



Control Options—Other Strategies

Gas explosive device



Control Options—Other Strategies

Burrow ripping



Case Study Example

California ground squirrel

Specifics

- very large population in vineyard
- initiating control after harvest
- certified applicator
- no endangered species

Potential plan

- zinc phosphide in autumn
- aluminum phosphide in spring
- anticoagulant bait stations or trapping in summer



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 is positioned above the squirrel, containing the word "Questions?". The background shows a rocky, hilly landscape under a clear sky.

Questions?