Progressive Farmer's Meeting

Management of Rodent Pests in Agriculture

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Human-Wildlife Interactions Advisor

University of California Cooperative Extension

University of California
Agriculture and Natural Resources

CALIFORNIA RESTRICTED MATERIALS REQUIREMENTS

A FEDERAL RESTRICTED USE PESTICIDES

(Included by reference as California Restricted Materials)
Pesticides display the RESTRICTED USE PESTICIDE (RUP) statement on the pesticide container similar to the statement shown here. RUPs require an RUP statement enclosed in a box, at the top of the front panel of the label.

RESTRICTED USE PESTICIDE
DUE TO (reason for restricted use classification)
For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification.

Some product labels require a Certified Applicator be "physically present" at the use site.

B CALIFORNIA RESTRICTED MATERIALS

This section is written in a quick reference format; refer to Title 3, California Code of Regulations (3 CCR) section 6400 for complete text.

Acrolein, labeled for use as an aquatic herbicide
Aldicarb – unregistered
All dust (except products containing only exempt pesticides)**
Aluminum phosphide
Any pesticide containing active ingredients listed under section 6800(a), labeled for agricultural, outdoor institutional, or outdoor industrial use[1]
Any pesticide pursuant to Section 18 of FIFRA (Emergency exemption)
4-Amino pyridine
Azinphos-methyl – unregistered
Brodifacoum
Bromadiolone
Calcium cyanide – unregistered
Carbaryl**[†]
Carbofuran – unregistered
Chloropicrin
3-Chloro-p-toluidine hydrochloride
Dazomet, labeled for production of agricultural plant commodities
Dicamba*
2,4-dichlorophenoxyacetic acid (2,4-D)*
2,4-dichlorophenoxybutyric acid (2,4-DB)*
2,4-dichlorophenoxypropionic acid (2,4-DP)*
1,3-Dichloropropene (1,3-D)
Difenacoum
Difethialone
Disulfoton** – unregistered
Endosulfan**
Ethoprop, labeled for turf
Fenamiphos – unregistered
Lindane** – unregistered
Magnesium phosphide
Metam sodium, labeled for the production of agricultural plant commodities
Methamidophos – unregistered
Methidathion
Methomyl[††]
Methyl bromide
2-methyl-4-chlorophenoxyacetic acid (MCPA)*
Methyl iodide – unregistered
Methyl isothiocyanate (MITC), labeled for the production of agricultural plant commodities
Mevinphos – unregistered
Molinate - unregistered
Oxydemeton-methyl
Paraquat
Parathion-methyl – unregistered
Phorate
Phosphine gas
Potassium n-methyldithiocarbamate (metam-potassium), labeled for the production of agricultural plant commodities
Propanil (3,4-dichloropropionanilide)
Sodium cyanide
Sodium fluoroacetate (compound 1080) – unregistered
Sodium tetrathiocarbonate – unregistered
Strychnine**
Sulfotepp – unregistered
Sulfuryl fluoride
Thiobencarb
Tribufos
Tributyltin, organotin, or a tri-organotin compound formulated as an antifouling paint, coating, or compound and labeled for the control of fouling organisms in an aquatic environment
Zinc phosphide**

EXCEPTIONS FROM RESTRICTION

** Products labeled only for one or more of the following uses: home use, structural pest control, industrial use, institutional use, public agency vector control district use per Health and Safety Code section 116180.

[†] Carbaryl formulated as a bait or used directly on livestock or poultry; additional exceptions include those in ** above.

[††] Fly baits containing not more than 1% methomyl

* 2,4-D labeled only for use as a plant growth regulator

For 2,4-D; 2,4-DB; 2,4-DP; Dicamba (Phenoxy); MCPA:
* Liquid formulations packaged in containers of 1 quart or less
* Liquid formulations packaged in containers of 1 gallon or less that contain 15% or less of the active ingredient
* Liquid formulations labeled for use without further dilution
* Dry formulations packaged in containers of 1 pound or less. (For dicamba/phenoxy labeled to be further diluted.)
* Dry formulations packaged in containers of 50 pounds or less, containing 10% or less of the active ingredient, and labeled for use without further dilution

APPLICATORS WHO HAVE MET THE CERTIFICATION REQUIREMENTS FOR RESTRICTED MATERIALS PURSUANT TO FOOD AND AGRICULTURAL CODE SECTION 14015

CERTIFIED COMMERCIAL APPLICATORS
(PERSONS OTHER THAN PRIVATE APPLICATORS USING RESTRICTED PESTICIDES)

- Journeyman Pilots
- Qualified Applicator Licensees
- Qualified Applicator Certificate Holders
- Structural Pest Control Field Representatives
- Structural Pest Control Operators
- Vector Control Technicians

A PESTICIDES ONLY IN "A" ABOVE – NO PERMIT REQUIRED

B PESTICIDES IN "B" ABOVE -- PERMIT REQUIRED; EXCEPTIONS APPLY

CERTIFIED PRIVATE APPLICATORS
(GROWERS, NURSERYMEN, AND OTHERS USING RESTRICTED PESTICIDES TO PRODUCE AGRICULTURAL COMMODITIES)

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EXCEPTIONS FROM PERMIT REQUIREMENT

- No permit required for pesticides used by persons licensed by the Structural Pest Control Board per Food and Agricultural Code section 14006.6(d)
- No permit required for antifouling paints or coatings containing tributyltin per 3 CCR section 6414(c)
- [1]No permit required for certified applicators using pesticides listed in 3 CCR section 6800(a) *(Potential to Pollute Ground Water)* outside of a Ground Water Protection Area: Atrazine Bentazon (Basagran®) Bromacil Diuron Norflurazon Prometon Simazine

Rules and regs and burrowing rodents

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Agriculture and Natural Resources

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Restricted Materials Permit

- This is the responsibility of the owner of the property or business operator
- However, it is your responsibility to check that before you apply a restricted use material that the owner of the property has the material listed on their permit
- You, not the property owner, will receive the violation

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Notice of Intent

- You must give a NOI to your County Ag Commissioner's Department at least 24 hours before the application of a restricted use material
- The applicator has up to four days after the planned date (the date on the notice) to begin the application.
- If the pesticide application is not started in four days, a new Notice of Intent must be filed

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Written recommendation

- A written recommendation is required for the application of any pesticide on any production or non-production ag site
- One copy of each such written recommendation shall be signed and dated and shall be furnished to the operator of the property prior to the application
- Where a pesticide use is recommended a copy shall also be furnished to the dealer and the applicator prior to the application

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MUST have a copy of the label!

SPECIMEN LABEL

Ramik® Green

Fish Flavored, Weather-Resistant Rodenticide
For Control of Commensal Rats and Mice
Indoors and Outdoors
This product may only be used inside and within 100 feet of buildings or inside of transport vehicles (ships, trains, or aircraft).
{Text For Individual Container: It is Illegal to Sell This Package Individually.}
{Text For Container: This Product May Not Be Sold in Packaging that Holds Less Than 4 Pounds of Bait.}

ACTIVE INGREDIENT:

Diphacinone (2-Diphenylacetyl-1,3-Indandione)	0.005%
OTHER INGREDIENTS:	99.995%
TOTAL:	100.000%

EPA Reg. No. 61282-46 EPA Est. No. 61282-WI-01

KEEP OUT OF REACH OF CHILDREN
CAUTION

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
CAUTION: Harmful if swallowed or absorbed through the skin. Causes moderate eye irritation. Avoid contact with eyes, skin, or clothing. Keep away from children, domestic animals and pets.

Personal Protective Equipment (PPE):
All handlers (including applicators) must wear long-sleeved shirt, long pants, shoes, socks and water-proof gloves. Any person who retrieves carcasses or unused bait following application of this product must wear waterproof gloves.

User Safety Requirements
Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash hands thoroughly after applying the bait and before eating, drinking, chewing gum, using tobacco or using the toilet and change into clean clothing.

FIRST AID

If on Skin or Clothing	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a poison control center, or doctor, or **1-800-498-5743** immediately for treatment advice.
If in Eyes	• Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center, or doctor, or **1-800-498-5743** immediately for treatment advice.

NOTE TO PHYSICIAN
If swallowed, this material may reduce the clotting ability of the blood and cause bleeding. If ingested, administer Vitamin K_1, intramuscularly or orally. Repeat as necessary based on monitoring of prothrombin times.

TREATMENT FOR PET POISONING
If animal eats bait, call veterinarian or **1-800-498-5743** at once.

NOTE TO VETERINARIAN
Anticoagulant Diphacinone: For animals ingesting bait and/or showing poisoning signs (bleeding or elevated prothrombin times), give Vitamin K_1.

For 24-hour emergency information on this product, call 1-800-498-5743 (US & Canada) or 1-651-523-0318 (all other areas).

ENVIRONMENTAL HAZARDS
This product is extremely toxic to mammals, birds and other wildlife. Dogs, cats and scavenging mammals and birds might be poisoned if they feed upon animals that have eaten this bait. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not allow bait to be exposed on soil surface. Do not apply where runoff is likely to occur. Do not contaminate water when disposing of equipment wash water or rinsate.

PRECAUTIONARY STATEMENTS
Hazard to Humans and Domestic Animals

CAUTION: May be harmful if swallowed or absorbed through the skin because this product reduces the clotting ability of blood and causes bleeding. Keep away from children, domestic animals and pets. Do not get in eyes, on skin, or on clothing. Any person who retrieves carcasses or unused bait following application of this product must wear gloves. All handlers (including applicators), must wear long sleeved shirt and long pants, shoes plus socks, and gloves.
USER SAFETY REQUIREMENTS: Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash hands thoroughly after applying bait and before eating, drinking, chewing gum, using tobacco or using the toilet and change into clean clothing.
FIRST AID: Have this label with you when obtaining treatment advice.
If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor.
If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.
If on skin or clothing: Take off contaminated clothing. Rinse skin with plenty of cool water for 15-20 minutes. Call a poison control center or doctor for treatment advice.
If inhaled: Move person to fresh air. If person is not breathing, call 911 or ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call a poison control center or doctor for treatment advice.
NOTE TO PHYSICIAN: Contains, chlorophacinone, an anticoagulant. For humans that have ingested this product, or have obvious poisoning symptoms (bleeding) or prolonged prothrombin times, give Vitamin K_1 by intramuscular or oral administration. Check prothrombin time every 3 days until values return to normal.

TREATMENT FOR PET POISONING: If animal eats bait, call veterinarian at once.
NOTE TO VETERINARIAN: Anticoagulant Chlorophacinone: For animals ingesting bait and/or showing poisoning signs (bleeding or elevated prothrombin times), give Vitamin K_1.

ENVIRONMENTAL HAZARDS: This product is toxic to fish and wildlife. Dogs and other predatory and scavenging mammals and birds might be poisoned if they feed upon animals that have eaten the bait. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water by cleaning of equipment or disposal of wastes. Runoff also may be hazardous to aquatic organisms in water adjacent to treated areas.
ENDANGERED SPECIES CONSIDERATIONS: Do not use this product within prairie dog towns in the range of the black-footed ferret without first contacting endangered species specialists, U.S. Fish and Wildlife Service, Denver Regional Office. This pesticide should not be used within one mile of active dens of the San Joaquin Kit Fox in the following California counties: Kern, Kings, Fresno, San Luis Obispo, Merced, Monterey, Santa Barbara, Ventura, Tulare, and San Benito. Prior to use, contact endangered species specialists at the California Department of Fish and Game or the U.S. Fish and Wildlife Service, Portland Regional Office, for recommendations.

rozol®
POCKET GOPHER BAIT

POCKET GOPHER BAIT

FOR THE CONTROL OF POCKET GOPHERS ONLY

This product may only be used to control pocket gophers in manual, below-ground applications.

Active Ingredient: chlorophacinone	0.005%
Inert Ingredients	99.995%
Total	100.000%

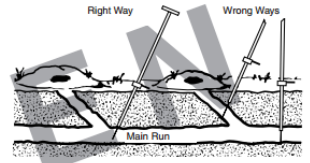
KEEP OUT OF REACH OF CHILDREN
CAUTION: See side panel for additional precautionary statements.

LIPHATECH®

Liphatech, Inc.
3600 W. Elm Street
Milwaukee, WI 53209
(800) 351-1476

This product ***not*** registered for sale or use in Alaska, Hawaii, North Carolina or Pennsylvania.

DIRECTIONS FOR USE
It is a violation of Federal law to use this product in a manner inconsistent with its labeling. **READ THIS LABEL** and follow all use directions and use precautions.
USE RESTRICTIONS: Use only to control pocket gophers (*Thomomys* spp. and *Geomys* spp.) on lawns, golf courses, alfalfa fields, rangeland, orchards and groves, and non-crop areas. Bait must be applied directly into pocket gophers' burrow systems. Only apply bait underground. Apply only for the sites, pests and application methods specified on this label.
Application Directions: Burrowing pocket gophers throw out low, fan-shaped mounds on either side of their underground tunnel. These lateral tunnels coming to the surface are on the flat side of the fan and these holes plugged with loose soil.
Treatment: Can be made in one or both of the following ways.
1. With a long-handled tablespoon, carefully remove the plug on the flat side of the fan. Carefully insert 1/2 cup of bait as far down into the hole as possible. Re-close the opening, using care not to cover the bait with soil.
2. Using a metal rod, probe 6–12 inches deep to locate the main tunnel. Consult diagram below for location to probe. Drop 1/2 cup of bait into the tunnel and cover the hole so light will not enter the tunnel system.
Consult Federal and State rodent control bulletins for a full discussion of pocket gopher burrowing habits. Make 2–3 treatments per burrow system. Wearing gloves, immediately bury dead animals and spilled bait found on soil surface. Maintain a constant supply of bait in the burrow system for as long as there is gopher activity. Do not apply bait on surface of soil.



The right and the wrong ways to use a probe for poisoning gophers are shown above. Be sure that bait is in the main runway - not in the laterals or imbedded in the bottom of the runway. (13909)

STORAGE AND DISPOSAL
Do not contaminate water, food or feed by storage or disposal.
Pesticide Storage: Store in original container in a cool, dry place inaccessible to children and pets.
Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.
Container Handling: This is a nonrefillable container. Do not reuse or refill this container. Offer for recycling if available or dispose of empty container in a sanitary landfill, or by incineration, or if allowed by state and local authorities, by burning. If burned, stay out of smoke.

WARRANTY: To the extent consistent with applicable law, seller makes no warranty, expressed or implied, concerning use of this product other than indicated on the label. Buyer assumes all risk of use and/or handling of product when such use and/or handling is contrary to label instructions.

EPA Reg. No. 7173-184
EPA Est. No. 7173-WI-1

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Laws and Regulations	Who applies ?	Federally Restricted	State Restricted	Other pesticide	Organic (No EPA #)
Restricted Use Permit	Self applied				
	Hired				
Notice of Intent	Self applied				
	Hired				
Written Recommendation	Self applied				
	Hired				
License	Self applied				
	Hired				
Reporting CCR6624. Pesticide Use Records	ALL				

Don’t forget about endangered species!!!

University of California
Agriculture and Natural Resources

CalPIP Home
My Selections

DATA SOURCE:
PRESCRIBE

Endangered Species Bulletin

Location
County
MTRS
Zip Code

Product
Name Search

Help

CALIFORNIA PESTICIDE INFORMATION PORTAL (CALPIP)

Endangered Species Custom Bulletin

Select County

About PRESCRIBE (Endangered Species Bulletin)

PRESCRIBE Mobile

Step 1. Select County

To begin, select a county where your pesticide use will occur then click on the Select button.

Available Counties(58):

01 ALAMEDA
02 ALPINE
03 AMADOR
04 BUTTE
05 CALAVERAS

NOTE: You must specifically select one or more county(s) before making a Meridian/Township/Range/Section (MTRS) selection.

Select

Counties Selected (1):

30 ORANGE

Unselect | Unselect All

To continue, click on Next.

Next | Reset | Start Over

CalPIP Home
My Selections

DATA SOURCE:
PRESCRIBE

Endangered Species Bulletin

Location
County
MTRS
Zip Code

Product
Name Search

Help

CALIFORNIA PESTICIDE INFORMATION PORTAL (CALPIP)

Endangered Species Custom Bulletin

Species Located

Step 3. Non-target species in selected section(s) by status:

- **[FT] DESERT TORTOISE**

Species Status Key:

[FE] = Federal Endangered
[FT] = Federal Threatened
[FPE] = Federal Proposed Endangered
[FPT] = Federal Proposed Threatened
[R] = Rare, Not Currently Listed

To continue, click Next to select the products that you intend to use.

Next | Start Over

Endangered Species Custom Bulletin

Endangered Species Pesticide Use Limits

Step 5. Use Limit Codes for Selected Products

Pesticide use limitations for the products that you have selected, applicable to the species identified in your locations, if they exist, are listed below. Scroll to the bottom of the page to see a description/instruction of the use limits.

For protection of the following species:

- [T] DESERT TORTOISE

That occur in the following selected sections:

County	Township	Range	Sections
33 Riverside	05S	22E	01 , 02 , 03 , 04 , 05 , 06 , 07 , 08 , 09 , 10 , 11 , 12 , 13 , 14 , 15 , 16 , 17 , 18 , 19 , 20 , 21 , 22 , 23 , 24 , 25 , 26 , 27 , 28 , 29 , 30 , 31 , 32 , 33 , 34 , 35 , 36

When using selected products:

Product	Use Limits
GAS CARTRIDGE	5

That contain these active ingredients (chemicals):

- SODIUM NITRATE
- SULFUR
- MINERAL OIL
- CARBON
- PHOSPHORUS
- SAWDUST

Observe Use Limits for Selected Products:

Code	Use Limitations
5	Trained Applicator: Use shall be supervised by a person (wildlife biologist, county agricultural commissioner, university extension advisor, state or federal official or others) who is trained to distinguish dens and burrows of target species from those of non-target species. Use shall occur only in the active burrows of target species. The person responsible for supervision shall be aware of the conditions at the site of application and be available to direct and control the manner in which applications are made (per Section 6406 of Title 3, California Code of Regulations). Contact your county agricultural commissioner for information on training.

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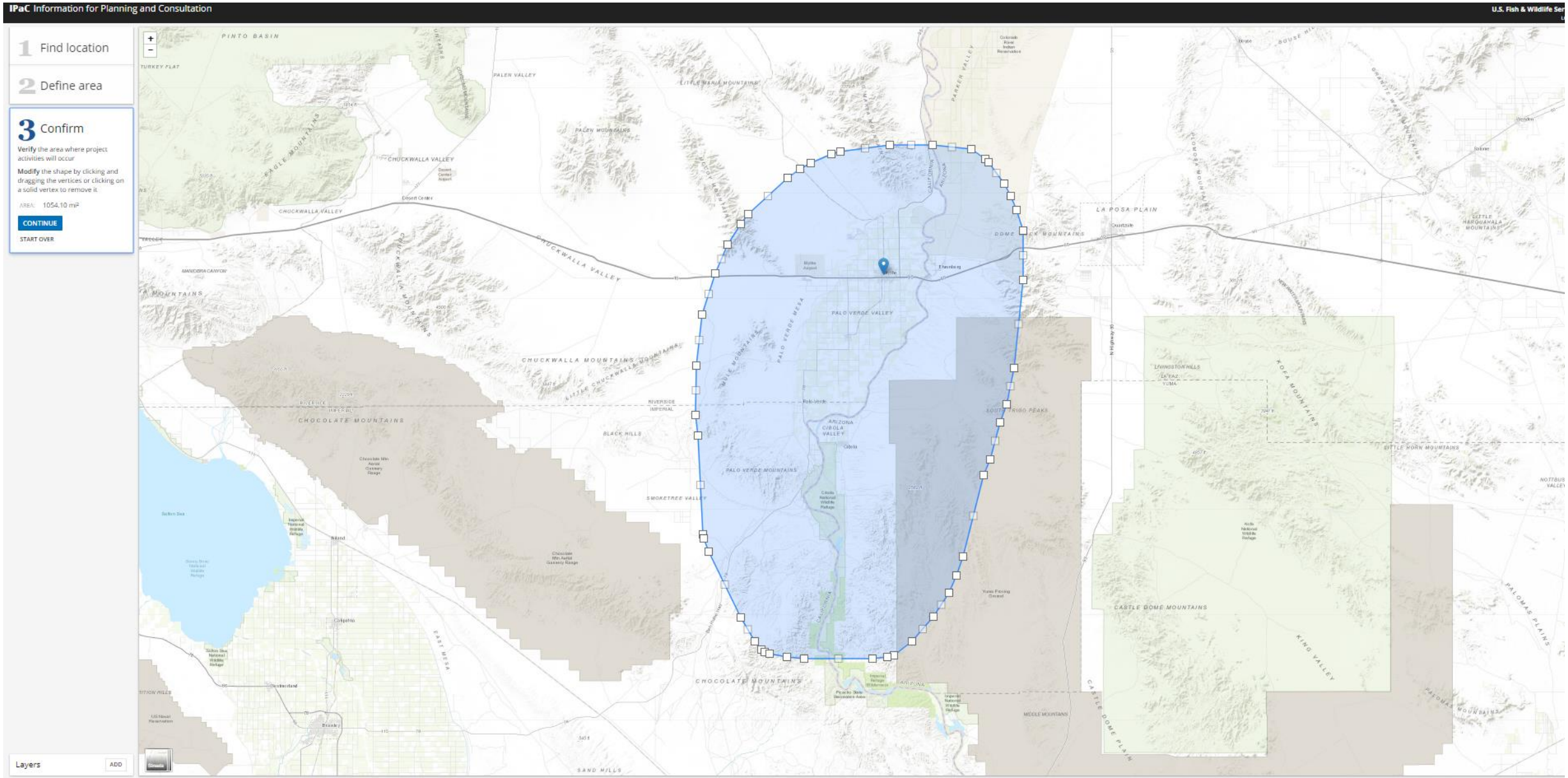
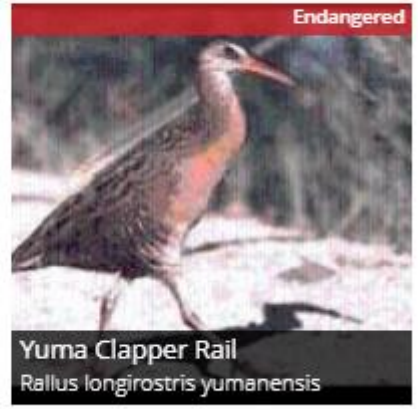
IPAC


IPaC Information for Planning and Consultation
U.S. Fish & Wildlife Ser
1 Find location
2 Define area
3 Confirm
Verify the area where project activities will occur
Modify the shape by clicking and dragging the vertices or clicking on a solid vertex to remove it
AREA: 1054.10 mi²
CONTINUE
START OVER
Layers
ADD
PINTO BASIN
TURKEY FLAT
PALEN VALLEY
LITTLE MARIA MOUNTAINS
PALEN MOUNTAINS
EAGLE MOUNTAINS
CHUCKWALLA VALLEY
Desert Center
Desert Center Airport
CHUCKWALLA MOUNTAINS
MANDORA CANYON
PARKER VALLEY
Colorado River Indian Reservation
LA POSA PLAIN
Quartzsite
DOME ROCK MOUNTAINS
FLORIDA MOUNTAINS
LITTLE HARQUAHALA MOUNTAINS
Wenden
Salome
Blythe
Blythe Airport
Ehrenberg
PALO VERDE VALLEY
PALO VERDE MESA
MULE MOUNTAINS
LITTLE CHUCKWALLA MOUNTAINS
RIVERSIDE
IMPERIAL
Palo Verde
CHOCOLATE MOUNTAINS
BLACK HILLS
ARIZONA
CIBOLA VALLEY
Cibola
LOWER RIDGE PEAKS
PALO VERDE MOUNTAINS
SMOKETREE VALLEY
Cibola National Wildlife Refuge
Chocolate Mtn Aerial Gunnery Range
Imperial National Wildlife Refuge
Salton Sea
Niland
Calipatria
EAST MESA
Westmorland
Brawley
Salton Sea National Wildlife Refuge
TITION HILLS
US Naval Reservation
Yuma Proving Ground
CASTLE DOME MOUNTAINS
KOFA MOUNTAINS
LIVINGSTON HILLS
LA PAZ
YUMA
LITTLE HORN MOUNTAINS
KOFA National Wildlife Refuge
KING VALLEY
PALOMAS PLAINS
PALOMAS MOUNTAINS
CASTLE DOME PLAIN
MIDDLE MOUNTAINS
Picacho State Recreation Area
SAND HILLS
Streets

Mammals

Birds



Reptiles

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Gophers

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Don’t ever do a google image search for the word “gopher”

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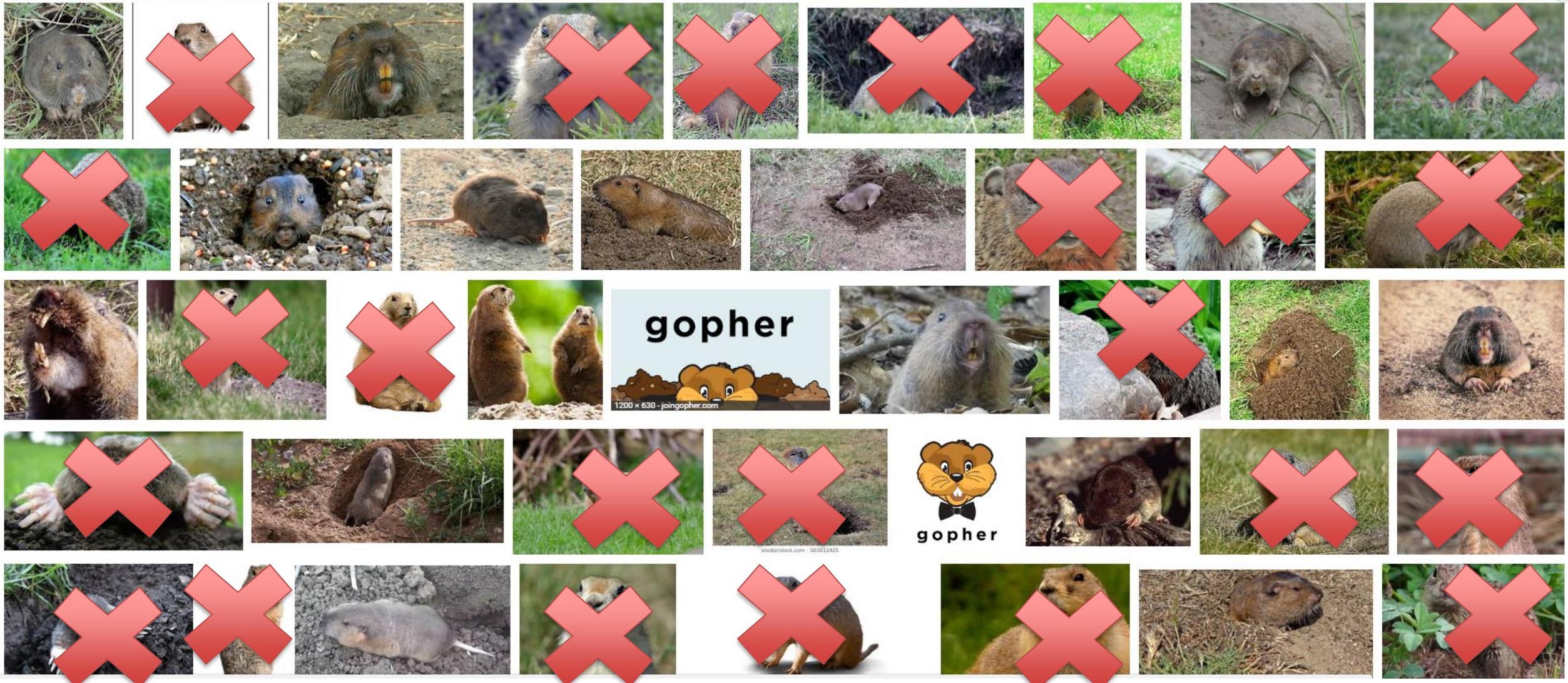
groundhog | prairie dog | mole | chipmunk | rat | rodent | badger | arizona | california | texas | florida | utah | oklahoma | small | underground | tail | head | foot | hand | ear | mouth | large | burrow | black | brown | white



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Gophers

- Considerable research in the last 10 years on gopher research
- Much of it carried out in California

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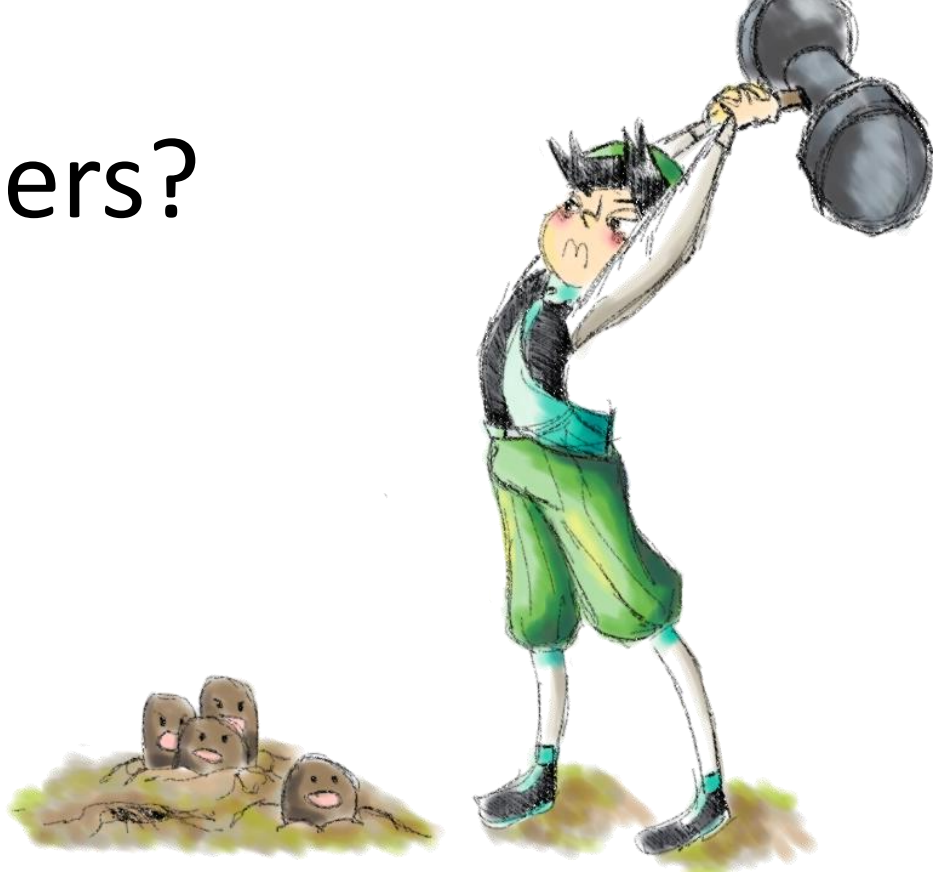
Why manage gophers?

- Mounds are a tripping hazard
- Chew irrigation lines (if you have them)
- Can damage valuable crops
- Soil erosion



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- Pocket gophers are classified as nongame mammals by California Department of Fish and Wildlife
- No permit required
- If injuring crops or property , they can be taken anytime by any legal means

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Typical gopher mounds

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Gopher mounds

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Mole mound

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Gopher mound?

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Management options

Habitat modification	Baiting	Burrow fumigation	Trapping	Exclusion	Repellent	Frightening	Shooting
✓	✓	✓	✓	✓	✗	✗	✗

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

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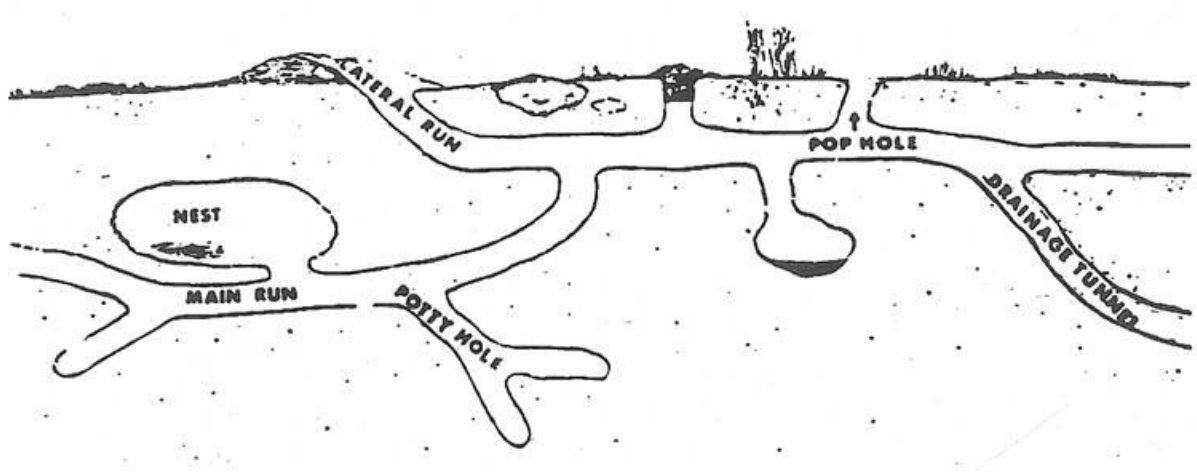
Habitat modification

- Deep disking/ripping
- Not generally an option in urban Southern California



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However……

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Biocontrol

- Natural predators have been used to control vertebrate pests
- Owl boxes are not appropriate for ground squirrels

- Pest rodents are generally r-selected species
  - Good colonizers
  - Fast reproducers
- Predators are generally not know to control any r-species

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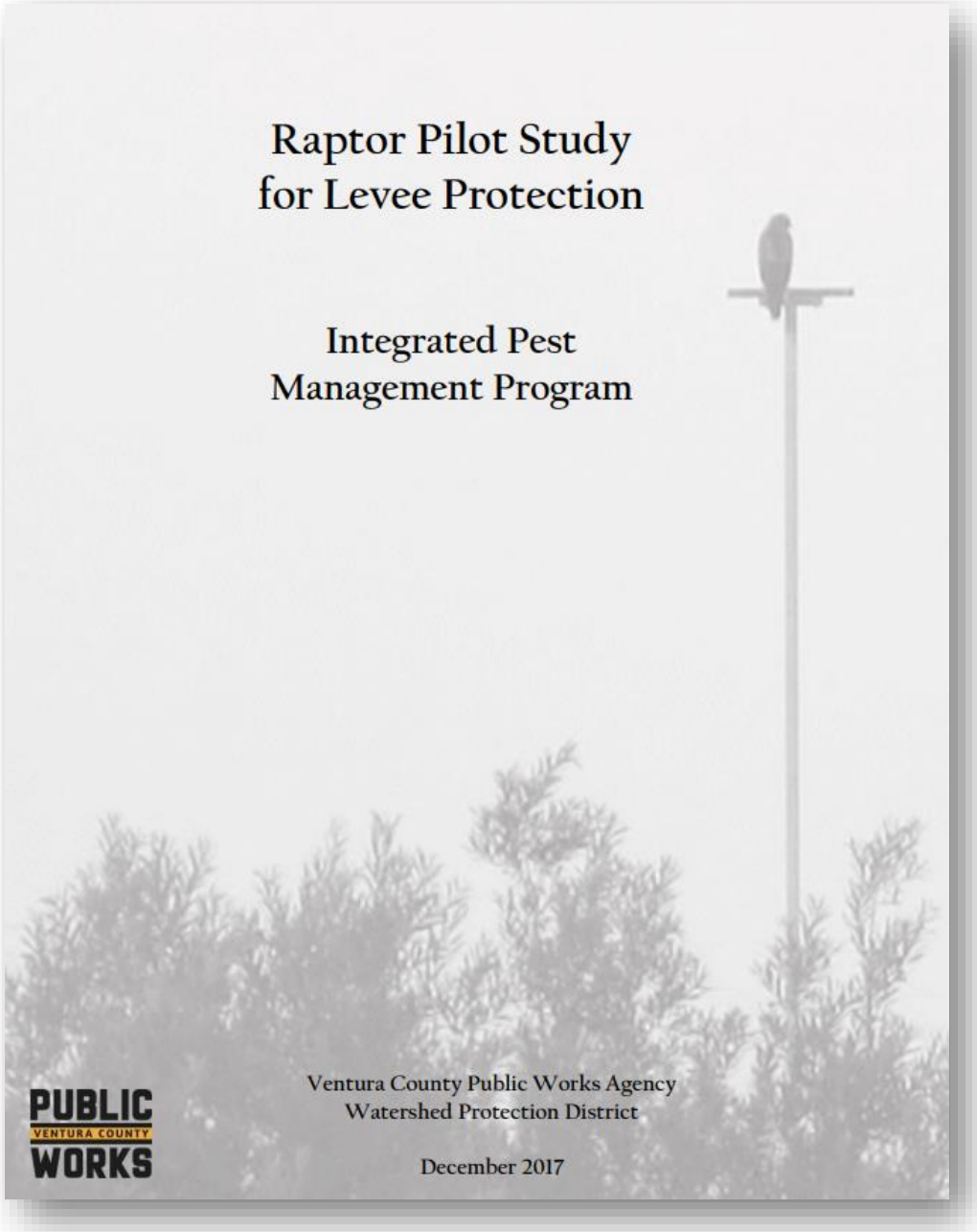

- Ground squirrel are one of the major causes of levee collapse
- Findings supported the use of raptors in place of anticoagulant rodenticide
- Important not to rely on any one management option
- One tool does not an IPM plan make!!!

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Baiting

- Mostly restricted use in CA (unless used by homeowner)
  - Anticoagulants
  - Zinc phosphide
  - Strychnine

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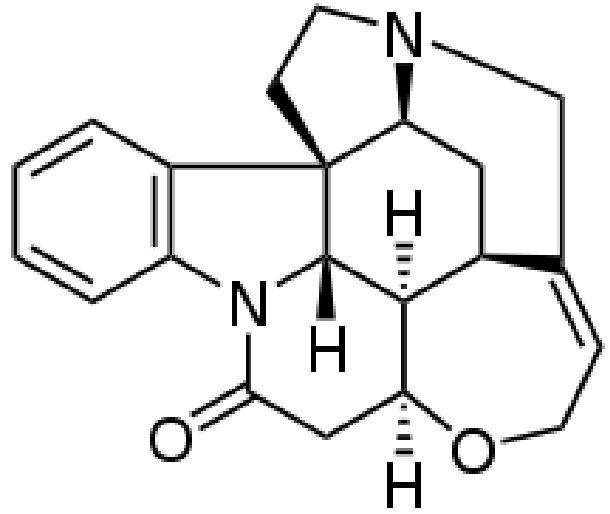
Strychnine

Hire a pro

- Acute toxicant
- Preferred bait for controlling gophers given its acute toxicity
- More palatable flavor than zinc phosphide
- Very effective
- Behavioral resistance to strychnine baits
- Current shortage of strychnine baits in the United States



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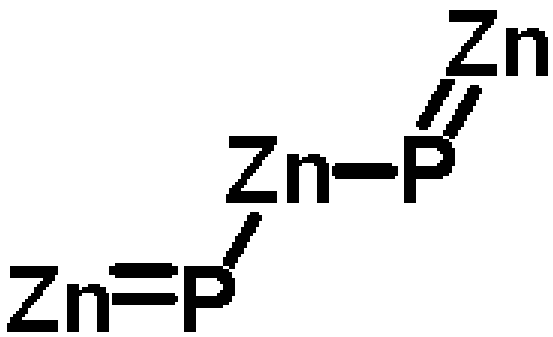
Zinc Phosphide

DIY



- Acute toxicant
- Can also be effective
- Gophers can develop bait shyness
- More readily available than Strychnine

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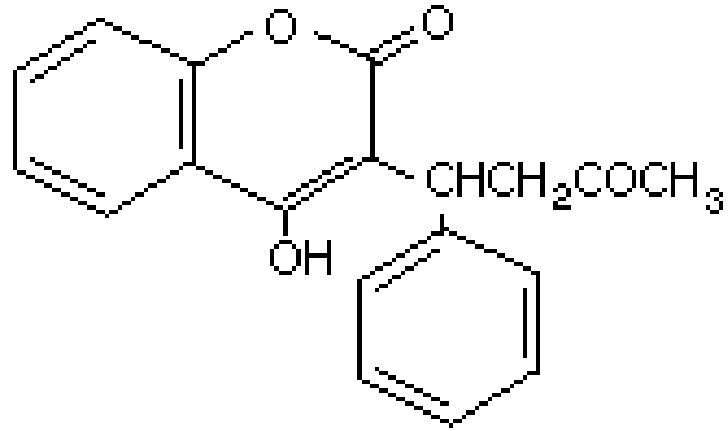
Anticoagulant rodenticides

Hire a pro

- Diphacinone and Chlorophacinone
- First generation anticoagulant rodenticides
  - Multiple feeding
- Use when worried about primary toxicity from other products
- Risks of secondary toxicosis
  - Low



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DIY

Fumigation

Hire a pro

- Gas cartridges
  - Effective for ground squirrels (62–86% control).
  - Not effective for gophers.

- Aluminum phosphide
  - Highly effective for gophers (90-100%).
  - Is a restricted use pesticide.

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Fumigation

- Aluminum phosphide is a restricted material
- Requires a restricted use permit to purchase and use.
- You must also be a qualified applicator or be supervised by a qualified applicator to use this material.

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Fumigation Management Plan

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Utah Department of Agriculture and Food

PLANT INDUSTRY

February 5, 2010

TRAGIC FATAL INCIDENT

Report says phosphine gas caused death of Balderas kids

DIY

Hire a pro

Carbon Monoxide

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Fumigant	Efficacy (%)	Study
Aluminum phosphide	90	Baker 2004
Aluminum phosphide	81	Baldwin et al. 2016
Gas cartridge	17	Matschkte et al. 1995
PERC	56	Orloff 2012
PERC	56	Baldwin et al. 2016
PERC	68	Baldwin & Meinerz 2016

CO_2 now registered in California

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Rodenator

DIY

Trapping

- Maccabee vs Gophinator
- Covered vs uncovered
- Attractant vs no attractant
- Trained vs untrained
- Gloves vs no gloves
- “Above” ground traps vs “in” tunnel traps

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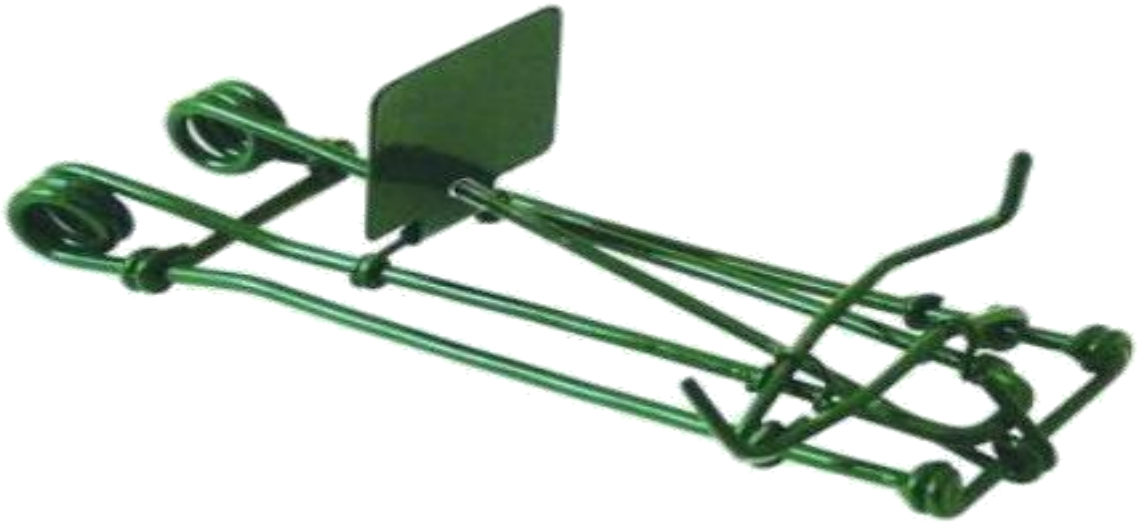
Macabee vs Gophinator



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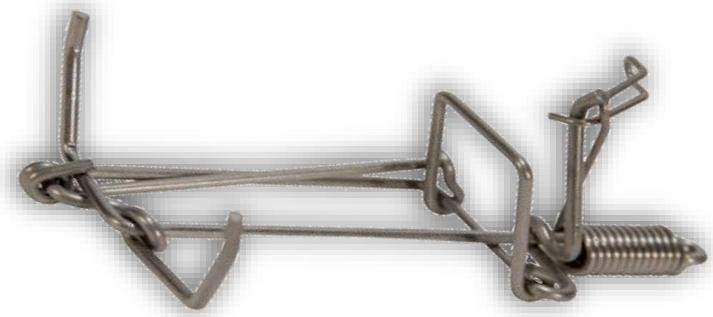
Gophinator

- Powerful trap
- Grips the animal high on the body
- Trigger arm offset to prevent upward pressure on gopher
- Rotating pincer arm that clamps to stationary arm
  - More secure capture



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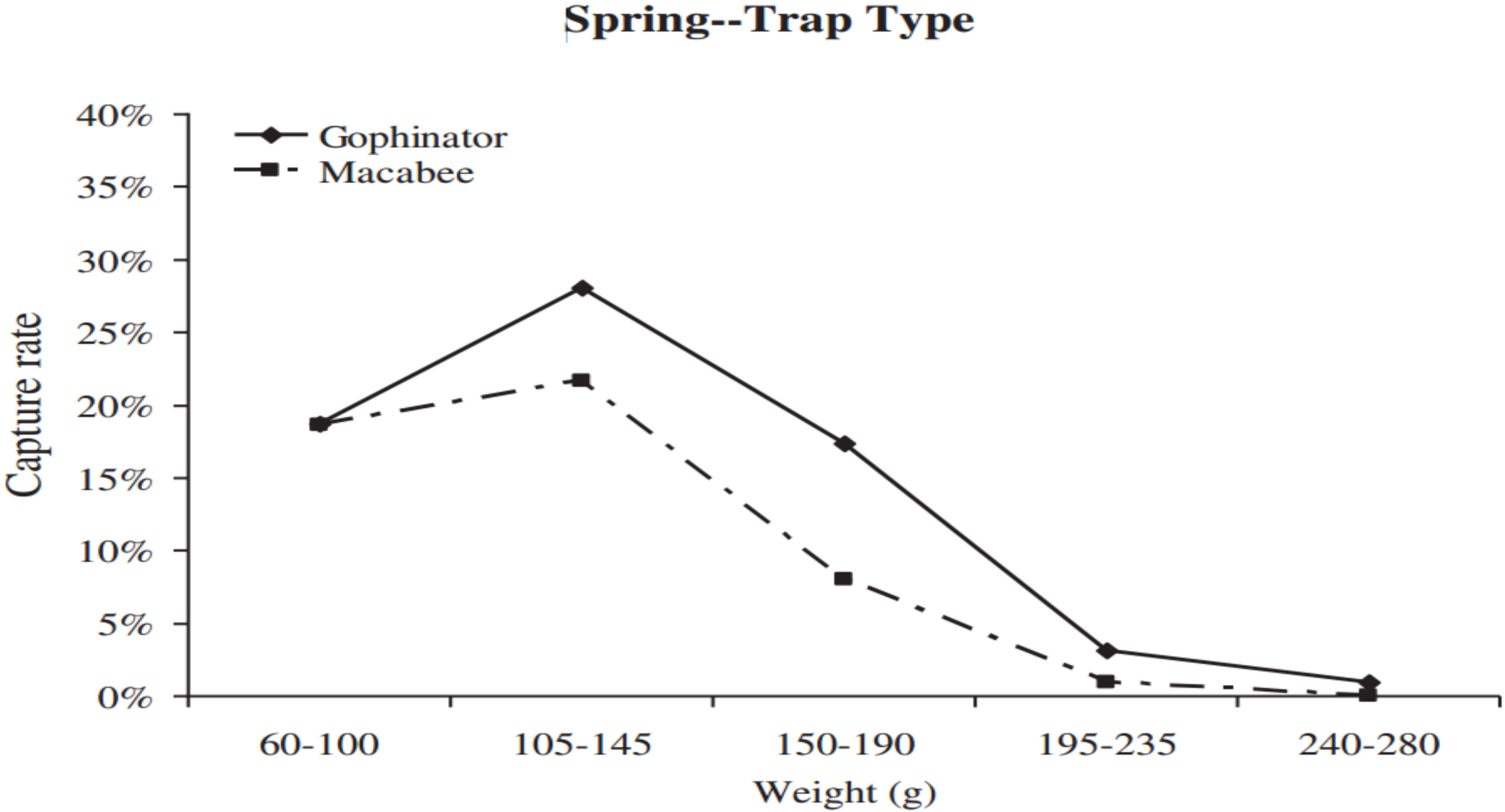
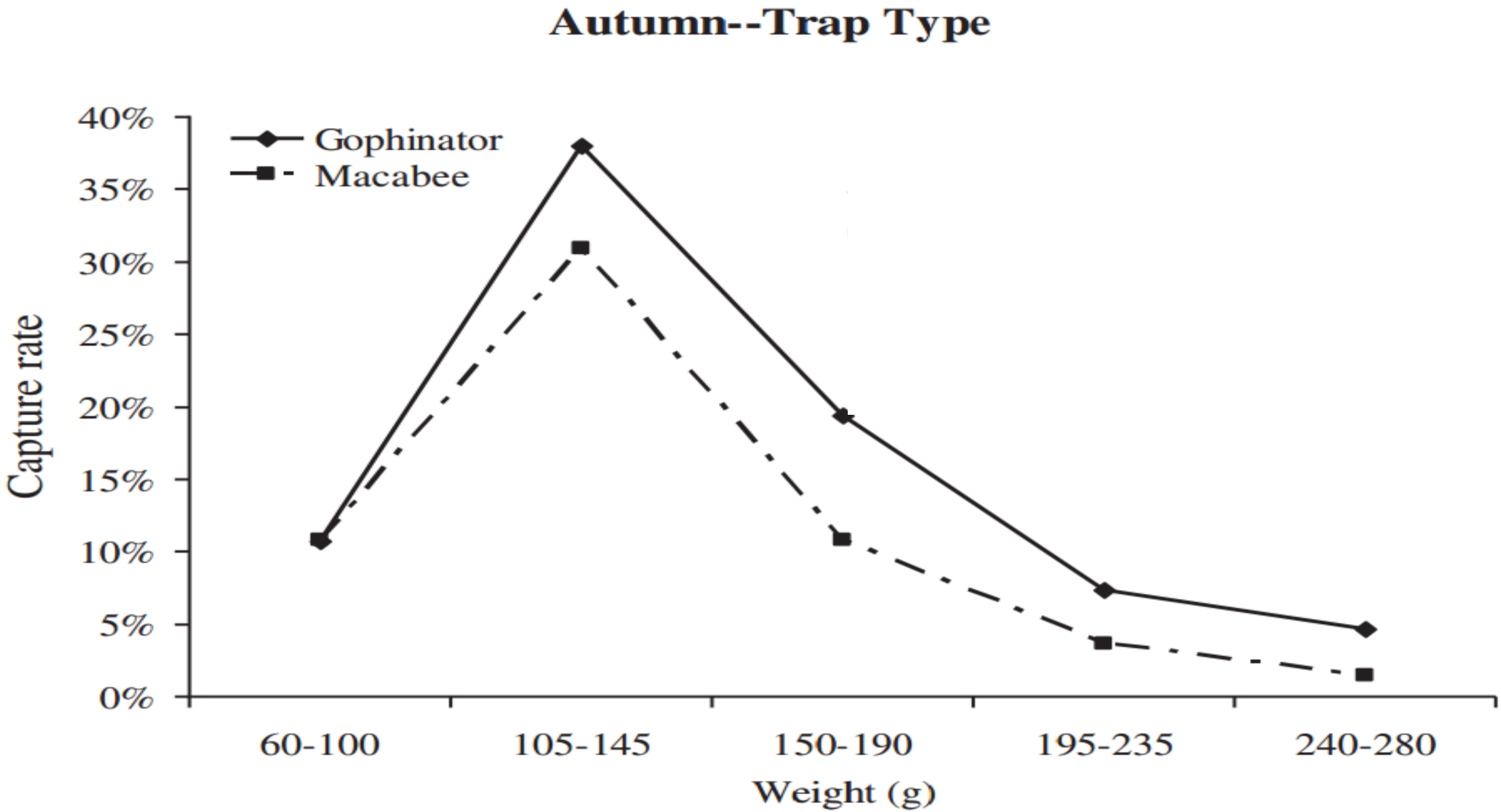
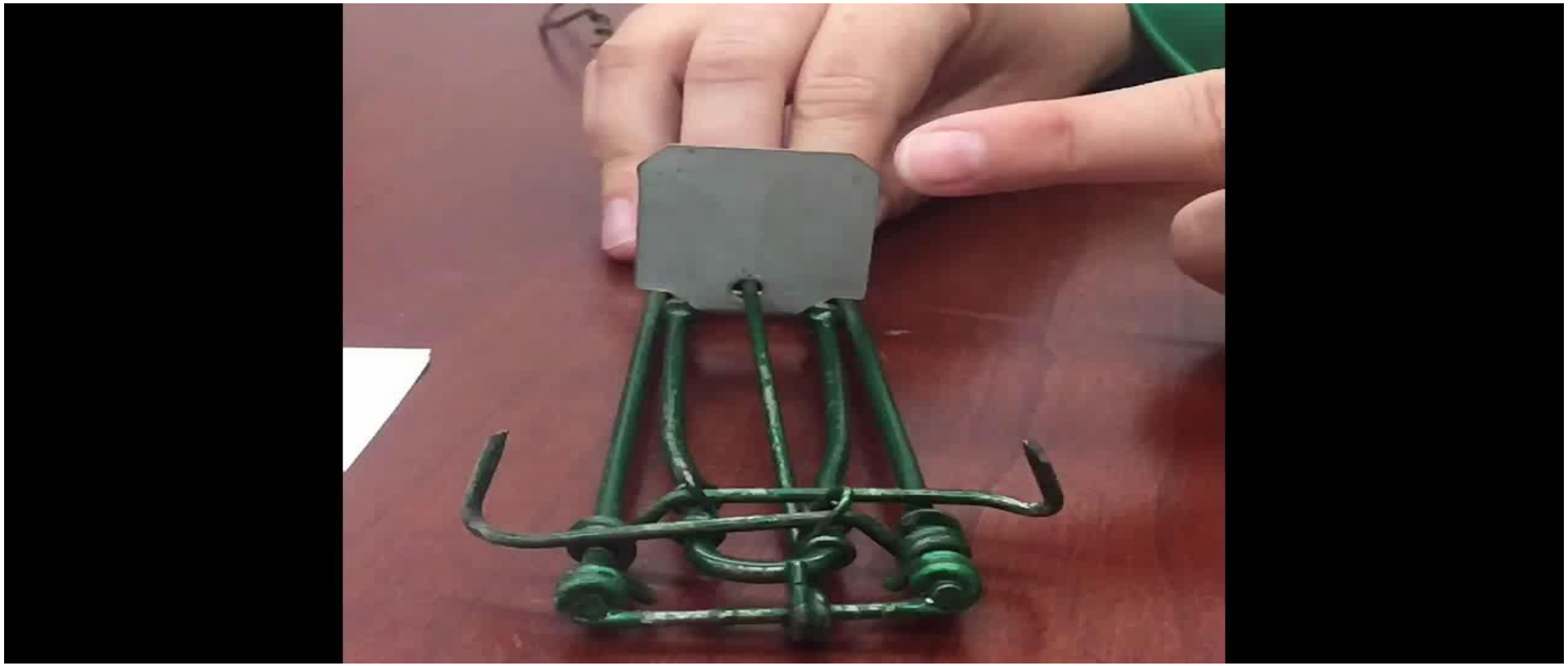

Spring--Trap Type
Gophinator
Macabee
40%
35%
30%
25%
20%
15%
10%
5%
0%
Capture rate
60-100
105-145
150-190
195-235
240-280
Weight (g)


Autumn--Trap Type
Gophinator
Macabee
40%
35%
30%
25%
20%
15%
10%
5%
0%
Capture rate
60-100
105-145
150-190
195-235
240-280
Weight (g)



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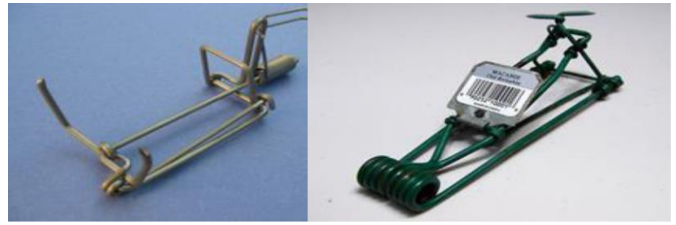
Types of trap

- Turf damage
  - Gophinator
  - Maccabee
  - Black hole and box
- Less turf damage
  - Cinch trap
  - Gopher Hawk



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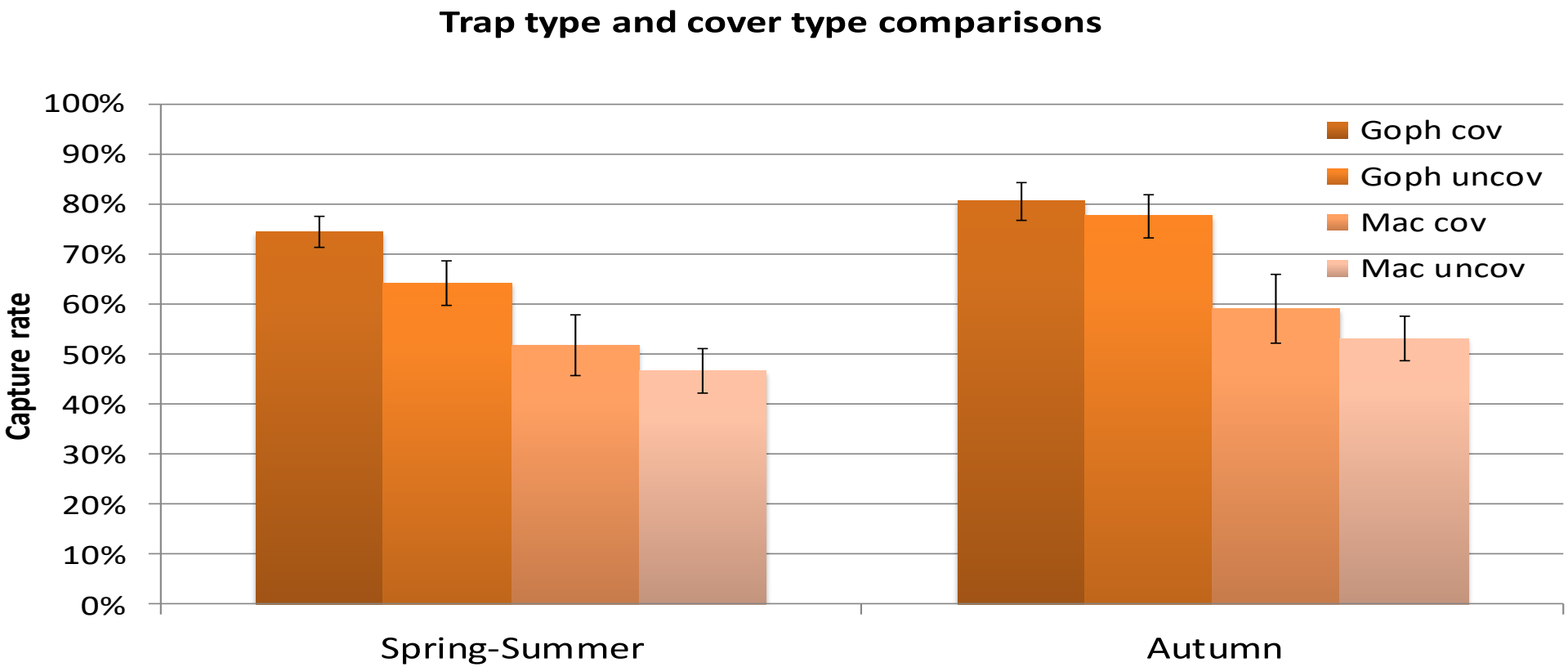
Covered vs uncovered



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Refinement of a trapping method increases its utility for pocket gopher management

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A R T I C L E I N F O

Article history:
Received 15 June 2015
Received in revised form
5 August 2015
Accepted 7 August 2015
Available online xxx

Keywords:
California
Gophinator
Modified Macabee
Pocket gopher
Scent
Trap

A B S T R A C T

Trapping is a useful and effective tool for managing detrimental pocket gopher populat
to increase its effectiveness are in high demand. The Gophinator trap previously pro
than the Macabee trap, primarily because of its ability to capture larger pocket goph
Macabee is still widely used given large stockpiles of these traps by land managers
operators. The addition of a cable restraint to the front of the Macabee may be suffici
individuals from escaping capture, thereby allowing trappers to more effectively use t
Human scent may also impact trap success by deterring pocket gophers from e
Therefore, we tested the capture efficiency and visitation rate of trap sets when using
and modified Macabee traps to determine the potential utility of these trap designs. W
results to a previous investigation to better define the potential usefulness of the cab
Macabee. We also tested the impact of human scent on capture efficiency and visitation
the potential relevance of eliminating human scent from trap sets. Gender and weig
dividuals were used to determine their potential impacts on capture efficiency and v
found that the Gophinator was a more effective trap than the modified Macabee becau
capture larger pocket gophers more efficiently. However, the modification did appear t
efficiency of larger individuals when compared to the standard Macabee, suggesting
cation could be used to increase the effectiveness of trapping programs when Gop

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Trapping

- Materials
  - Traps
  - Probe
  - Gloves
  - Wire
  - Flags
  - Kneepads

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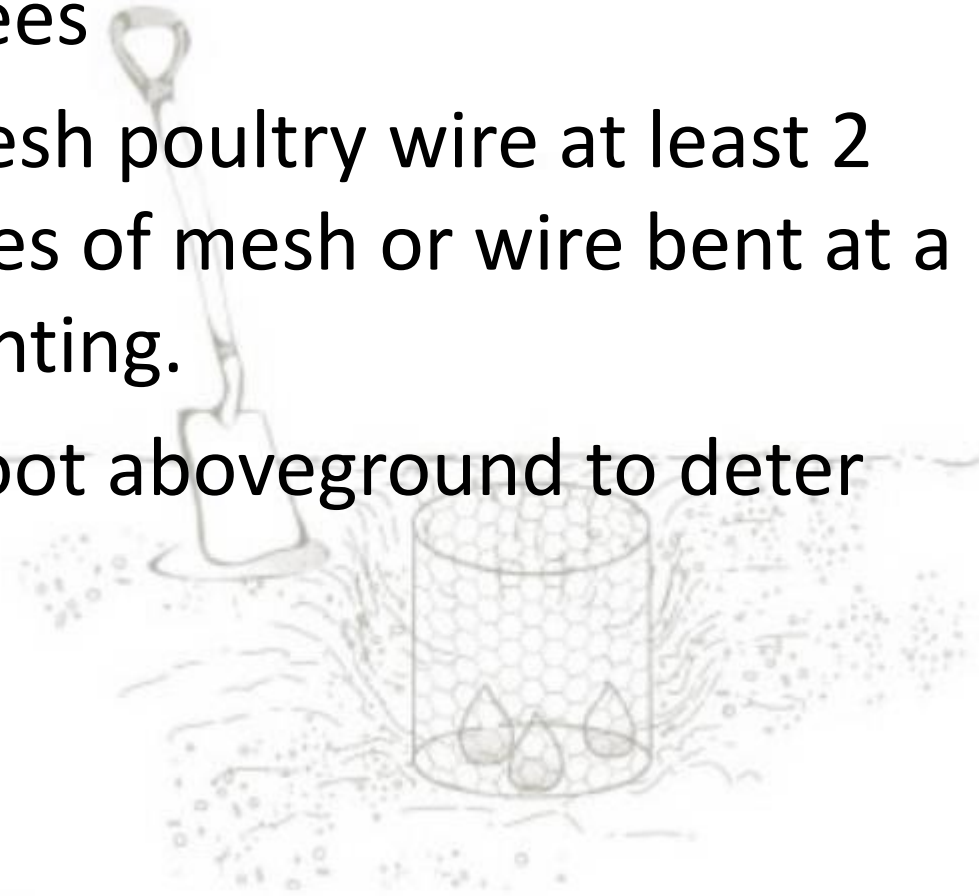
- Active mounds
- Probe for tunnel
  - Watch out for back-filled tunnels
- Leave probe in mound
- With hori-hori, dig hole
- Examine burrows for
  - Size
  - Turns
  - Divides

Exclusion

- Underground fencing might be justified for valuable ornamental shrubs or landscape trees
- Bury hardware cloth or 3/4-inch mesh poultry wire at least 2 feet deep with an additional 6 inches of mesh or wire bent at a 90-degree angle away from the planting.
- Also extend the fencing at least 1 foot aboveground to deter gophers moving overland..



Rats

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What is a commensal rodent?

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- House mouse
  (*Mus musculus*)
- Norway rat
  (*Rattus norvegicus*)
- Roof rat
  (*Rattus rattus*)

Why do we need to control commensal rodents?

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Public Health Threats

Carriers of Diseases- salmonellosis, plague, leptospirosis, murine typhus, hantavirus etc

Rats carry multiple internal parasites that can also be transmitted to humans and domestic animals

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Food Contamination

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Damage to Fruit and Vegetables

House mice

- Relatively small
- 0.5 ounces
- Large ears
- Small black eyes

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House Mice

- Light brownish to grey
- Almost hairless tail
- An adult is ~ 5-7 inches long

  (including tail)

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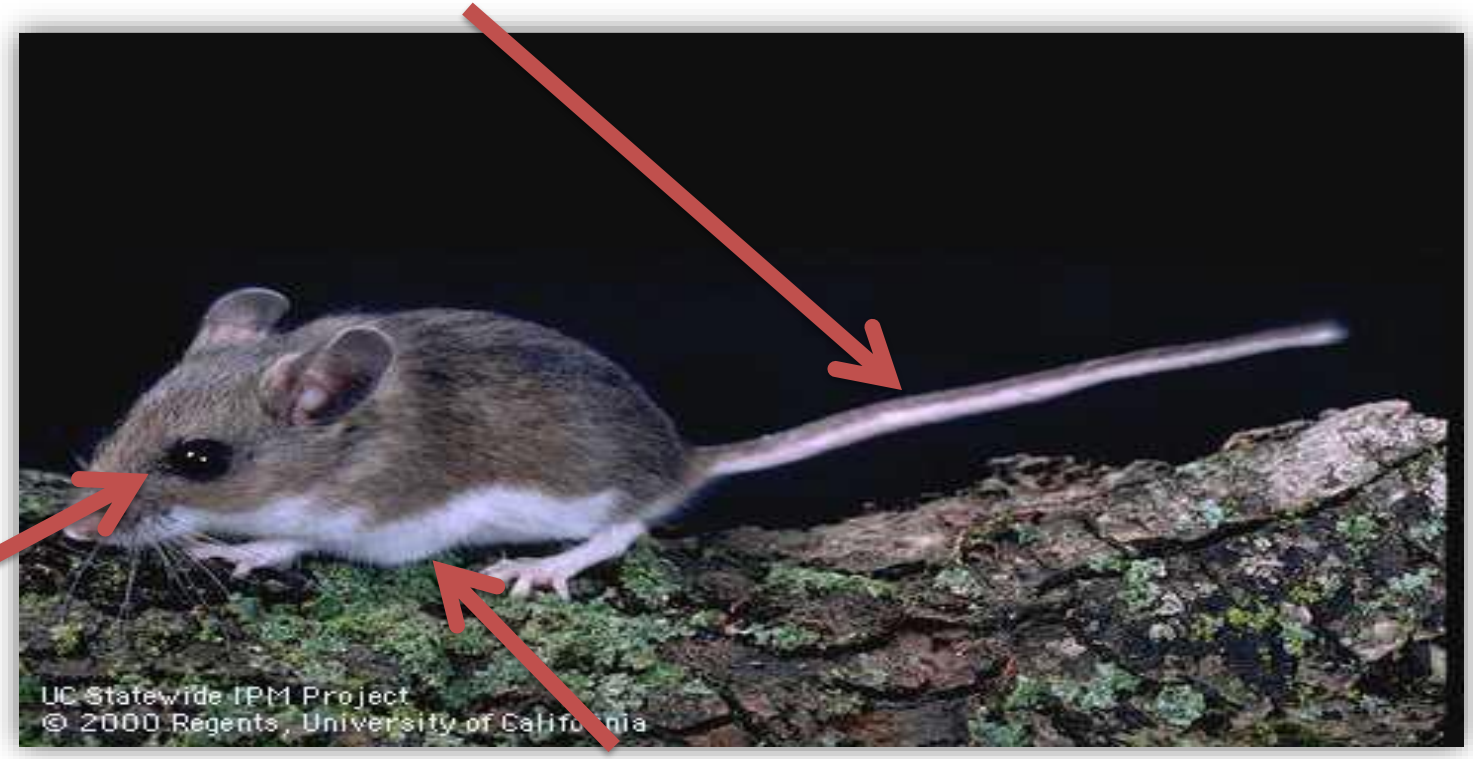
Deer Mice

- Larger eyes
- White underside
- Bicolored and well furred tail



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House Mice-diet

- Omnivorous
  - Prefer seeds and grain
- Not neophobic about new foods
- May prefer foods that are
  - Fat
  - Protein
  - Sugar
- Survive with very little water

House Mice-Reproduction

- Breed year round
- Litters
  - 5-6 young
  - 19-21 days after conception
  - Sexually mature at 6-10 weeks
  - 5-10 litters a year

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House Mice-behavior

- Make small excursions
- 10-30 ft
- Can make them difficult to control in certain situations

Roof Rats

- Sleek and agile
- 5-10 ounces
- Very large ears
- Small black eyes
- Light brownish to grey

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Roof Rats

- Uniformly dark tail with fine scales
- An adult is ~ 6-8 inches long
- Tail is 7.5- 8.5 inches long
- Tail as long, or longer than head and body

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Roof Rats-Diet

- Omnivorous
- Prefer a wide variety of fruit and nuts
- Feed on vegetative parts of ornamentals
- Do require water
  - May be acquired from food

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Roof Rats-Reproduction

- Breed all year round (habitat dependent)
- Litters
  - 5-8 young
  - 21-23 days after conception
  - Sexually mature at 12 weeks
  - 3-5 litters a year

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Roof Rats-Behavior

- Can travel considerable distances for food
  - 100-300 ft
- Live in one areas and feed in another
- Neophobic

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Norway Rats

- Large and robust
- 7-18 ounces
- Small ears
- Small eyes

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Norway Rats

- Brownish or reddish gray above
- Whitish gray on the belly
- Adult is ~ 8-10 inches long
- Tail-7-10 inches long
- Shorter than body, dark above and pale below, scaly

Norway Rats- diet

- Omnivorous
- Varied diet
  - Cereal grains
  - Meat and fish
  - Some types of fruit
- Require water but it may be obtained from food

Norway Rats-reproduction

- Year round reproduction (habitat dependent)
- Litters
  - 6-12 young
  - 21-23 days after conception
  - Sexually mature at 12 weeks
  - 4-6 litters a year

Norway Rats-behavior

- Make shorter excursions
- Eat large amounts from small number of food sources
- Neophobic

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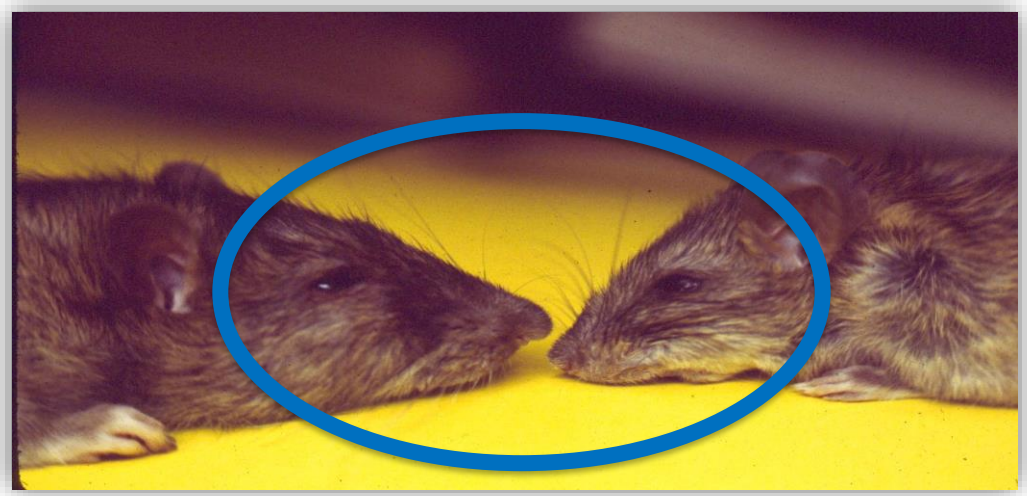
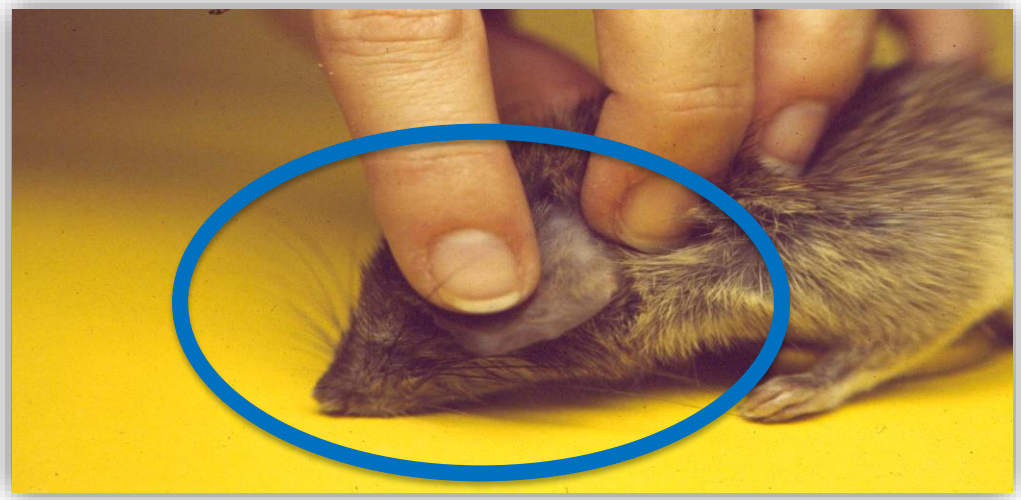
Cotton rat (Sigmodon hispidus)

Hispid Cotton Rat
Sigmodon hispidus
M123





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Photographs courtesy of Rex Baker

What aspects of rodent biology make them so successful and difficult to control?

- Adaptability
- Diet
- Size
- Reproduction
- Behavior

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Reproduction- Why are rodents so successful?

- Roof rat is slightly less prolific than the Norway rat
- Sexually mature at 12 weeks
- 5-8 young
- Adults live for 5-18 months

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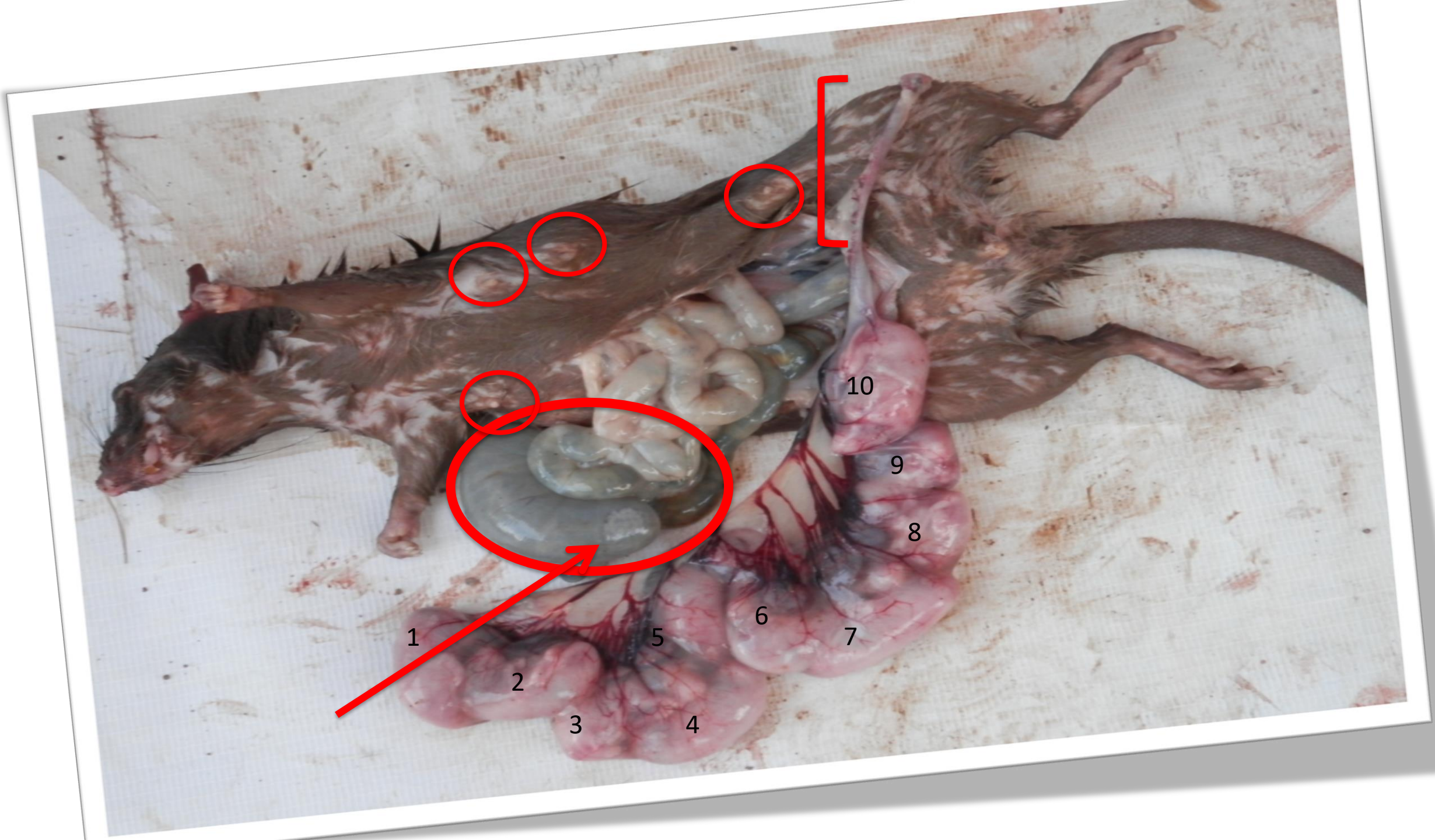
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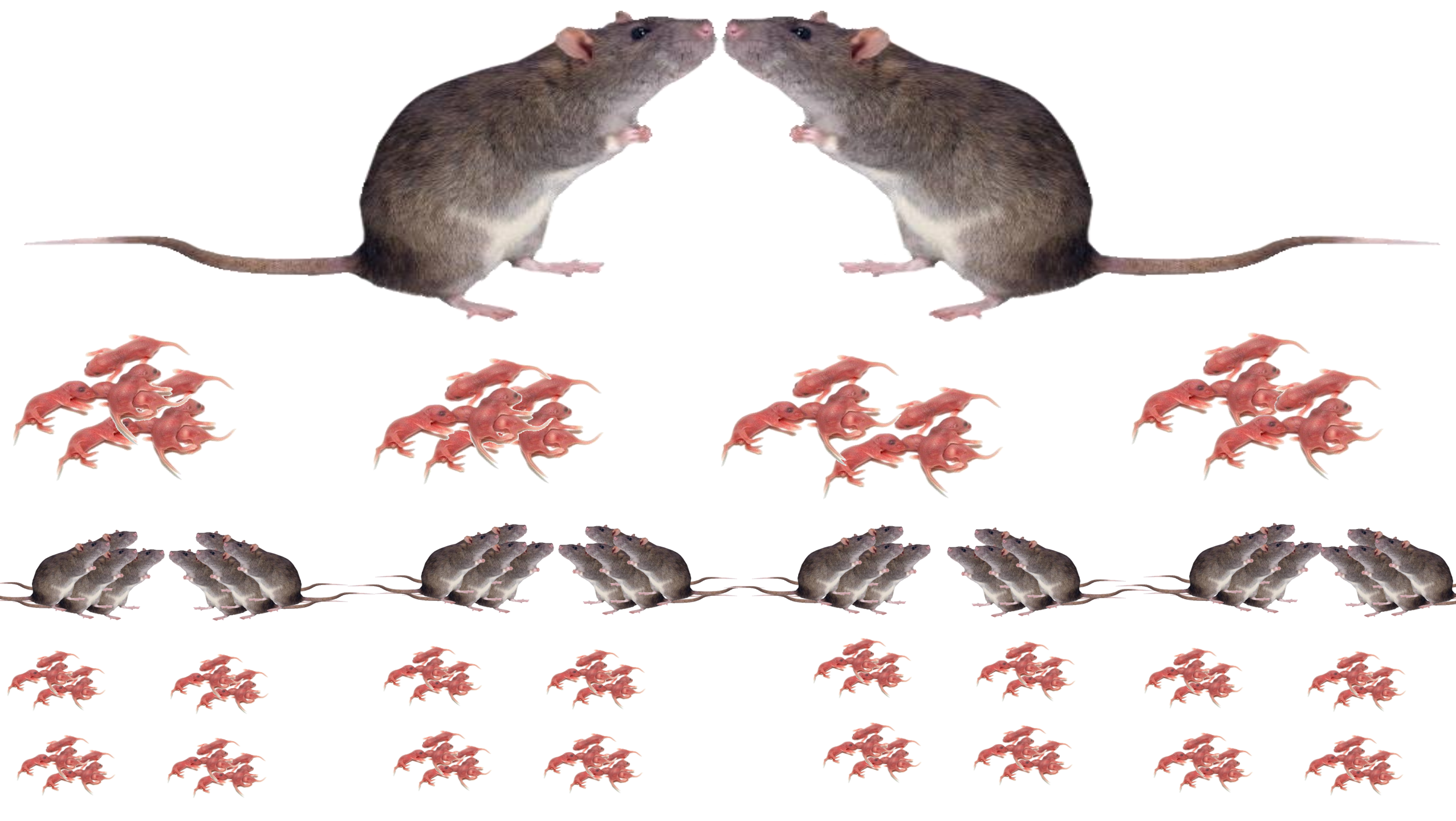

- One rat
  - Breeds 4 times in a year having about 8 pups per litter
    - 4 x 8= 32
      - 50% are female and breed only once a year
        - » 8 pups by four females/litter
          - 8 x 4 x 4
            - Plus the original 32 rats

160 rats!

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hots


UC Statewide IPM Program
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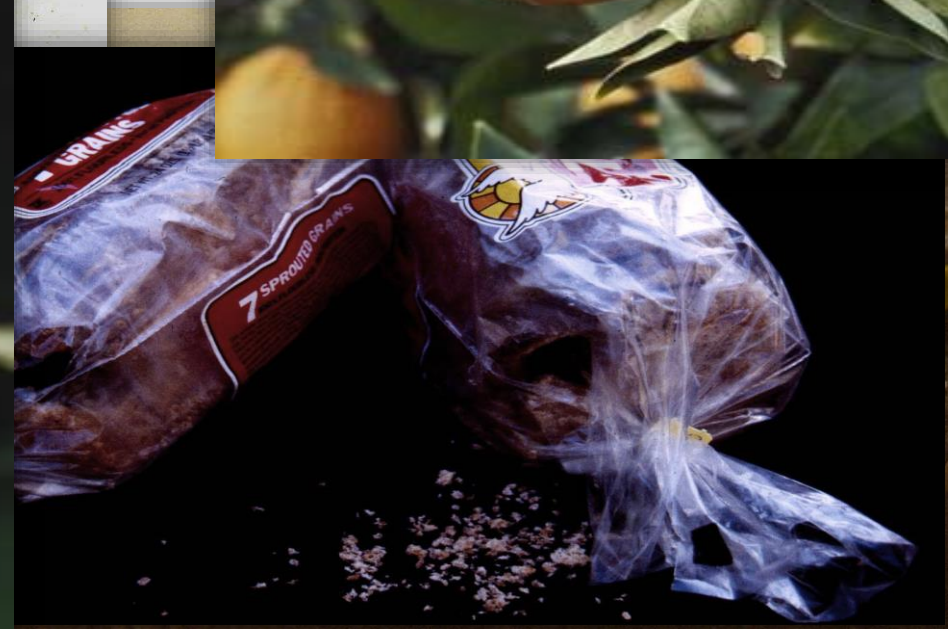
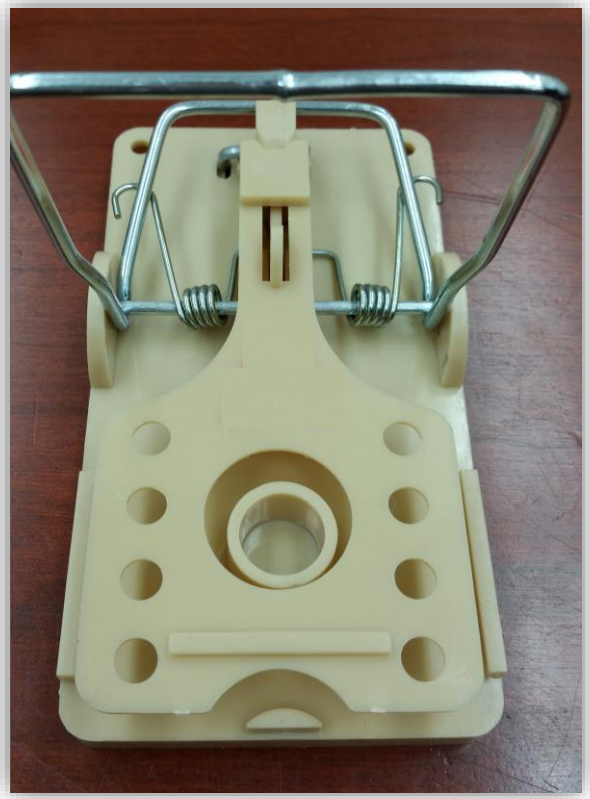

GRAINS
7 SPROUTED GRAINS

Lethal control



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Nontargets

- Know where the endangered species are
- Glue boards are very nondiscriminatory
  - not recommended for outdoor use

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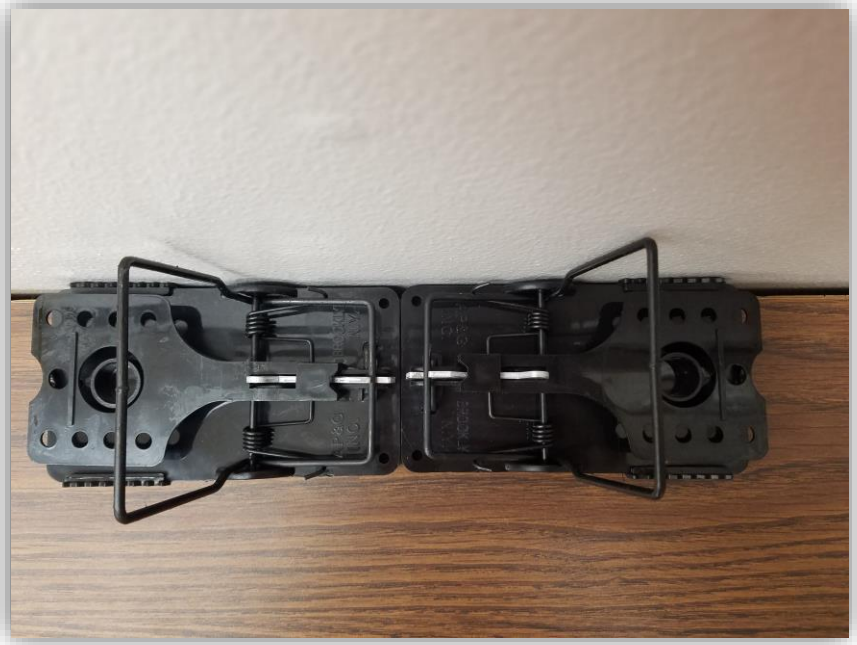

Setting your traps

- Always in twos

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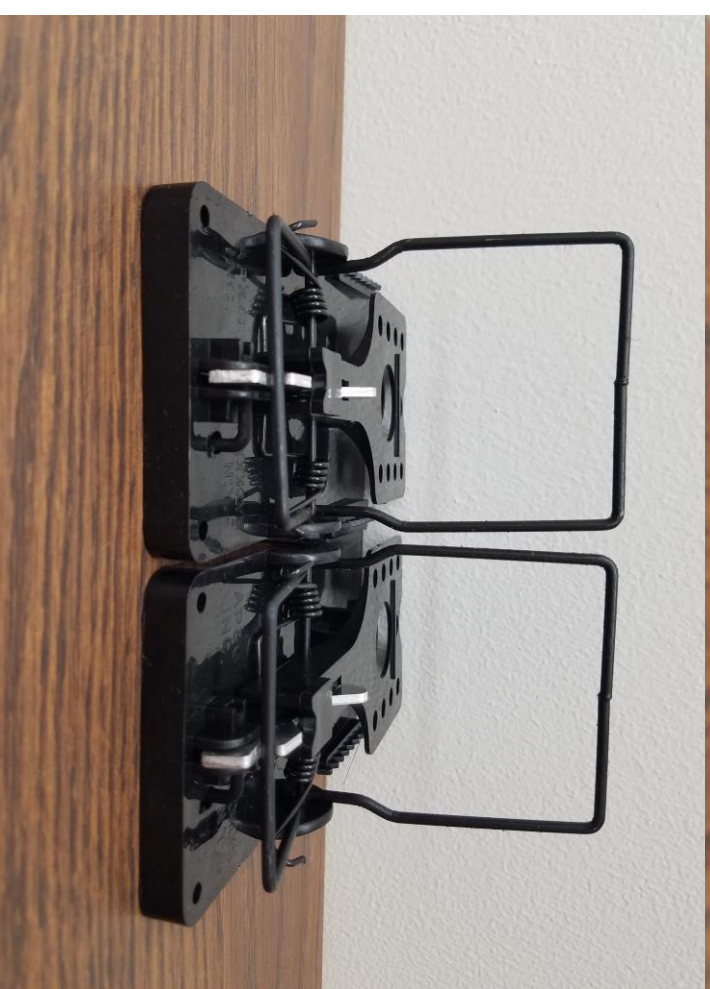
AP&G
INC.
AP&G
INC.




WOODSTREAM CORP.
LITITZ, PA. USA
VICTOR
WOODSTREAM CORP.
VICTOR

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Rodenticide

- First-generation anticoagulants (FGARs)
  - Chlorophacinone
  - Diphacinone
  - Warfarin

Multiple feeding

- Second-generation

  Not available for application in production agriculture unless used in or adjacent to a man-made structure like hose, barn, storage area.

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nia

ources

I have rats in my fruit/nut trees

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https://anrcatalog.ucanr.edu/pdf/8513.pdf

Managing Roof Rats and Deer Mice in Nut and Fruit Orchards

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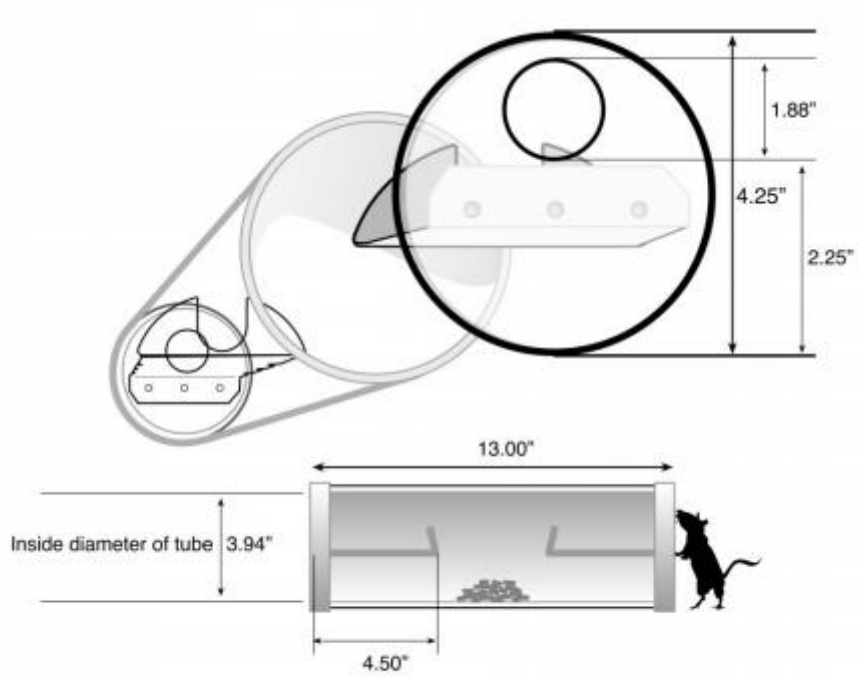

Figure 3. Design of bait stations used to control roof rats and deer mice.

$$DEL = \frac{.aa \times spacing}{2}$$

$$DEW = \frac{.bb \times spacing}{2}$$

Here is an example of the calculations for a square, 80-acre orchard (1,867 ft × 1,867 ft):

$$\frac{Length\ of\ orchard}{Spacing} = NLength.aa \quad \frac{1{,}867\ ft}{164} = 11.38\ ft$$

$$\frac{Width\ of\ orchard}{Spacing} = NWidth.bb \quad \frac{1{,}867\ ft}{164} = 11.38\ ft$$

$$NLength \times NWidth = NBS \qquad 11 \times 11 = 121\ bait\ stations$$

$$\frac{.aa \times spacing}{2} = DE \quad \frac{0.38 \times 164\ ft}{2} = 31\ ft$$

$$DE = \frac{.aa \times spacing}{2}$$

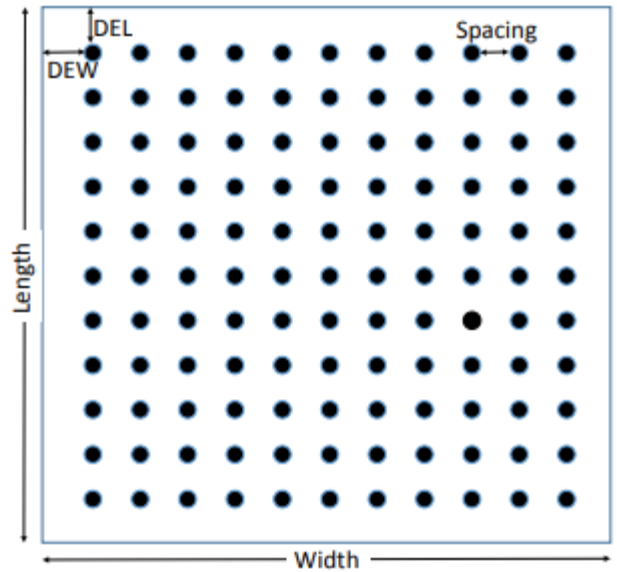

Figure 4. Example of the layout of bait stations (black-filled circles) for an 80-acre, square-shaped orchard. The length and width of the orchard are both 1,867 ft. In this example, only roof rats are present, so we use 164-ft spacing between bait stations. Initial bait stations are 31 ft from the edge of all sides of the orchard (DEL and DEW).

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Nutria

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- Late March 2017 Wildlife Services trapper conducting beaver damage management caught one animal near Gustine, CA
- CDFW Wildlife Investigations Lab determined it was a pregnant female carrying 7 young.

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- Semi-aquatic rodent. Prefers emergent marsh with shallow water.
- Body length: 2’, tail length: 1’-1.5’
- Weight: 15-20 lbs.
- White whiskers, golden hair near ears, round rat-like tail.

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- Sexually mature at 4-6 months. Produce first litter at 8 months. 2-3 litters per year of 2-13 young. Mother can breed 48 hours after giving birth.
- Consumes 10% of body weight per day. Discards 80% of vegetation during feeding.

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Nutria trapped in Merced County

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Louisiana Wildlife and Fisheries
http://www.nutria.com/site4.php

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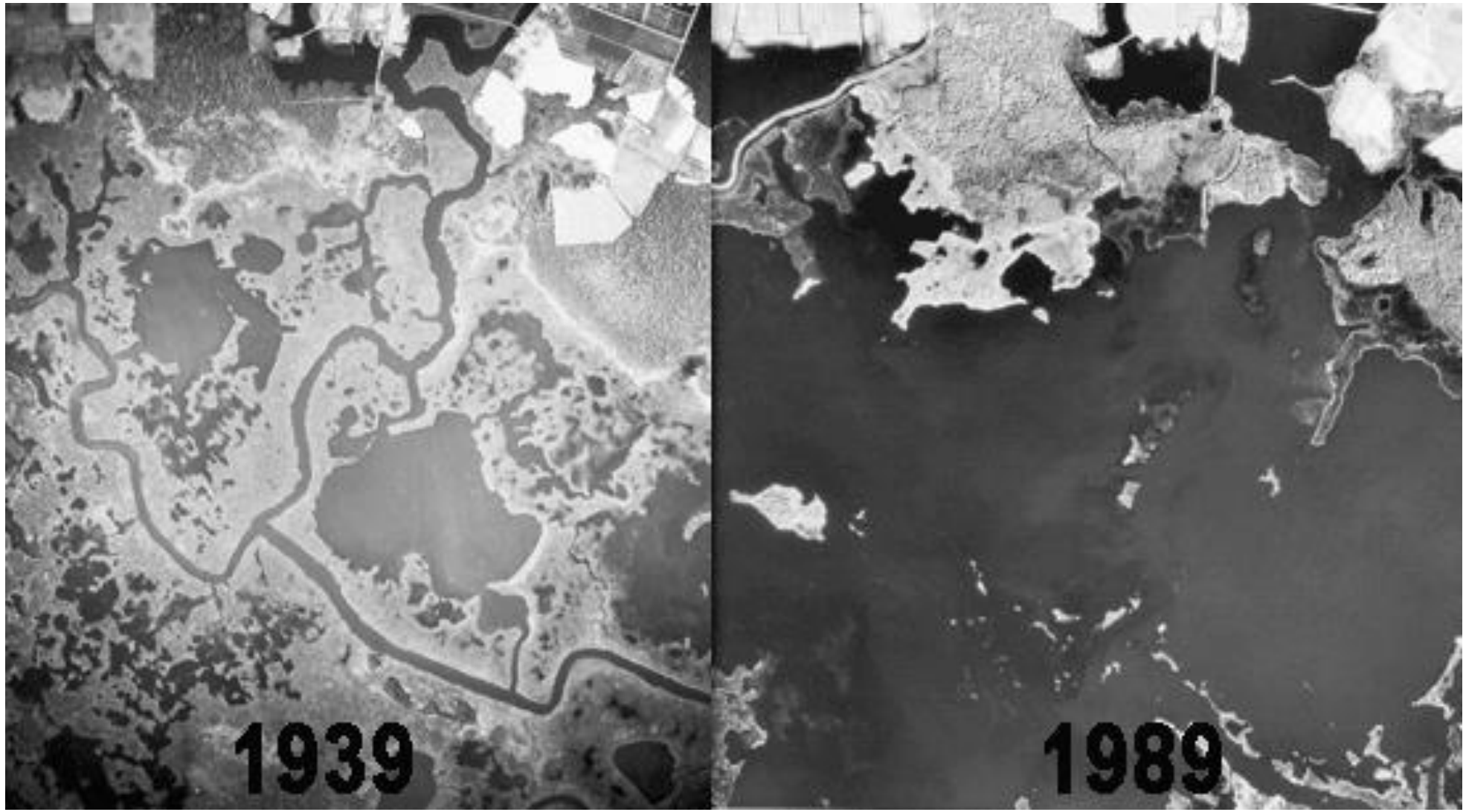
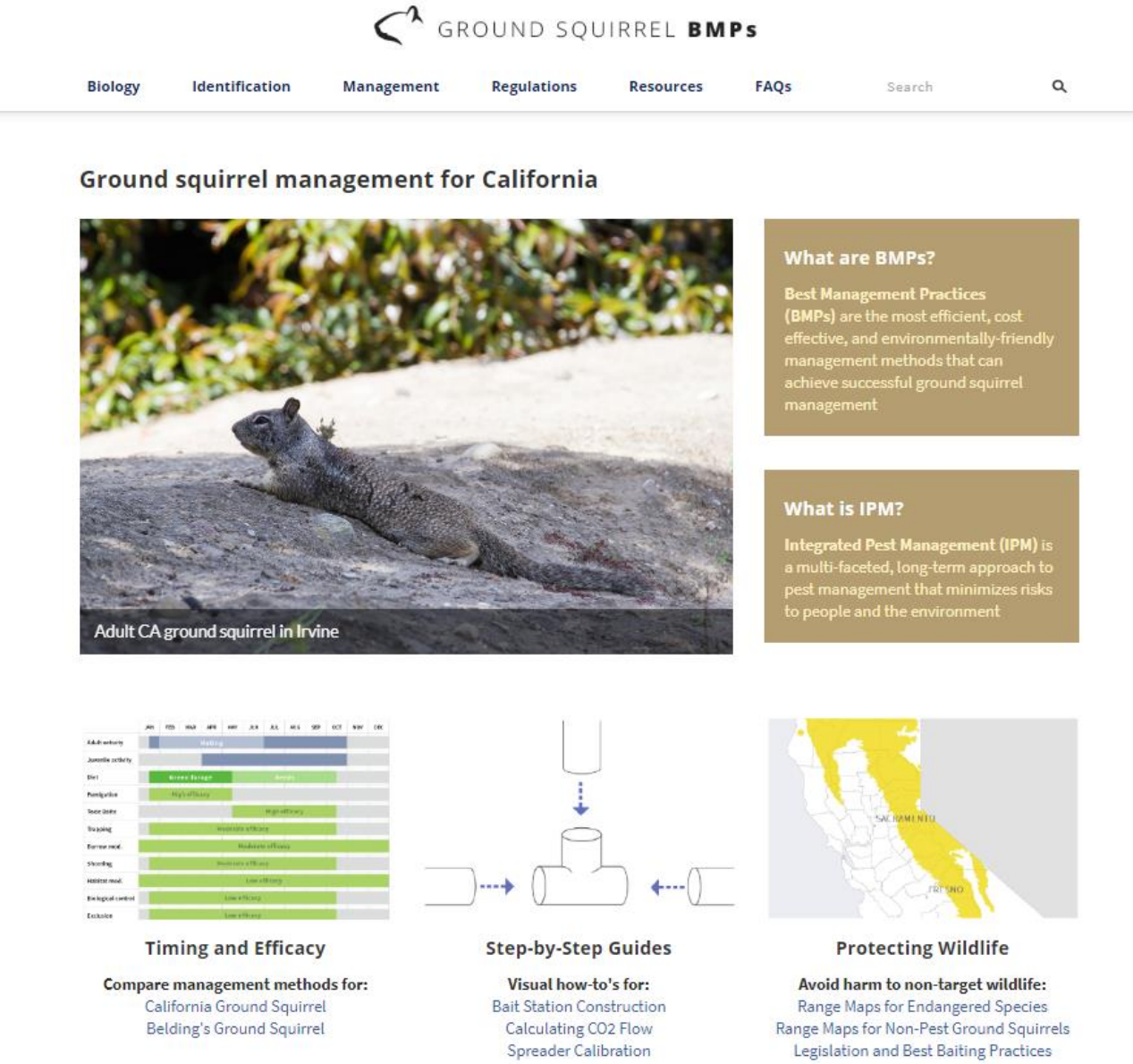
Nutria damage, Chesapeake Bay Blackwater Nat. Wildlife Refuge



The other stuff……

Ground squirrel best management practices website



www.groundsquirrelBMP.com

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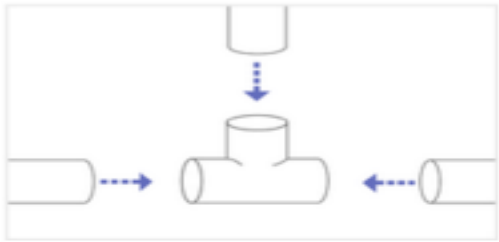
Resources FAQs

Timing and Efficacy

Compare management methods for:

California Ground Squirrel

Belding's Ground Squirrel



Step-by-Step Guides

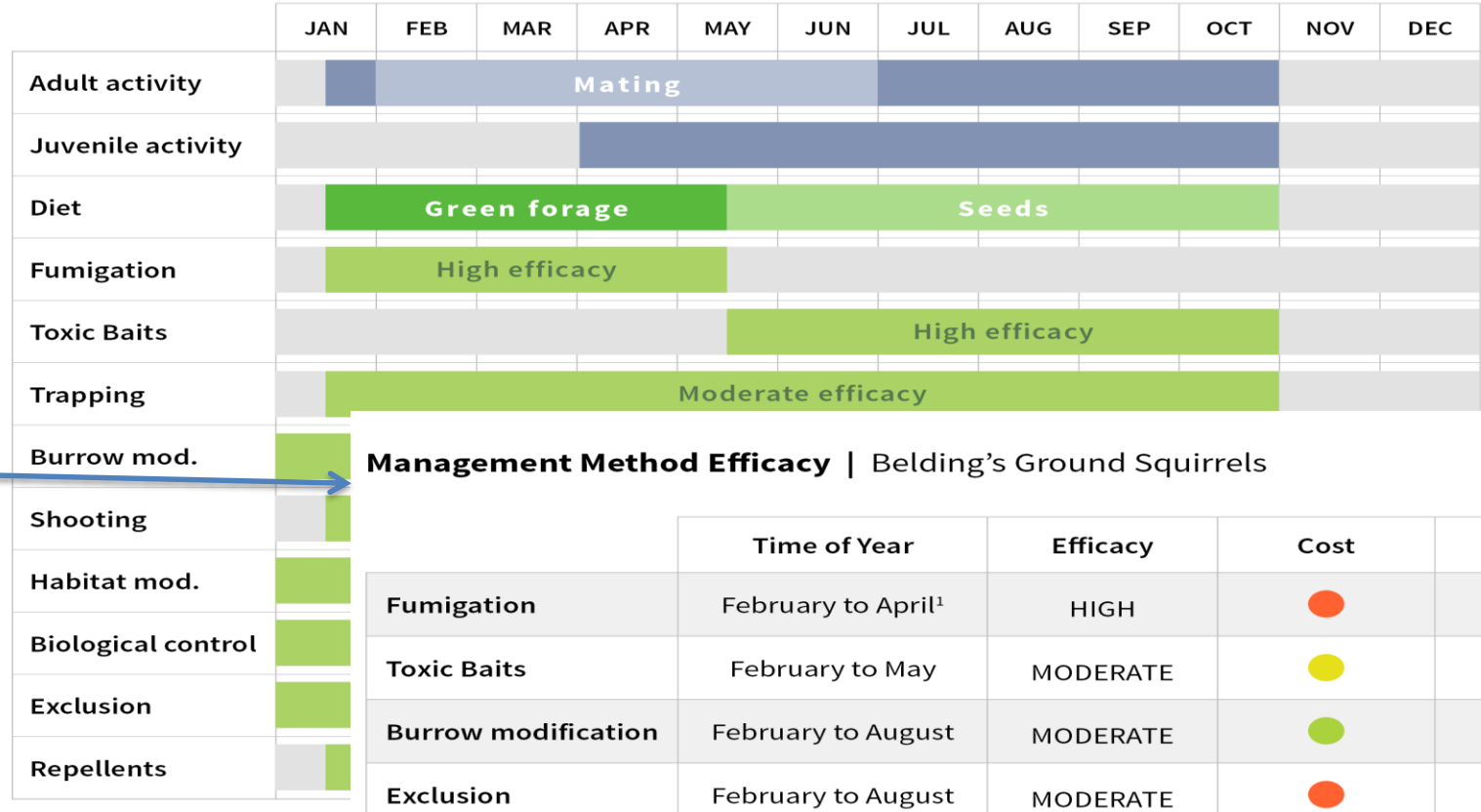
Visual how-to's for:

Bait Station Construction

Calculating CO_2 Flow

Spreader Calibration

Timing Management Efforts | California Ground Squirrels



Management Method Efficacy | Belding's Ground Squirrels

	Time of Year	Efficacy	Cost	Labor	Restrictions
Fumigation	February to April[1]	HIGH	🔴	🔴	🟡[2]
Toxic Baits	February to May	MODERATE	🟡	🟡	🔴
Burrow modification	February to August	MODERATE	🟢	🟢	🟢
Exclusion	February to August	MODERATE	🔴	🟡	🟢
Shooting	February to August	MODERATE	🟡	🔴	🟢
Habitat modification	February to August	LOW	🟢	🟢	🟢
Biological control	February to August	LOW	🟢	🟢	🟢
Trapping	February to August	LOW	🔴	🔴	🟢
Repellents	February to August	LOW	🔴	🟢	🟢

[1] Management window may be longer if high soil moisture persists, particularly following substantial irrigation.
[2] Dependent on which fumigant is used.

🟢 = Low
🟡 = Moderate
🔴 = High

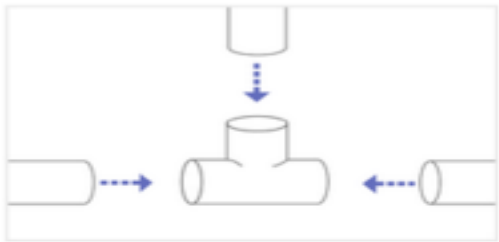
Resources FAQs

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

How to Construct a Bait Station

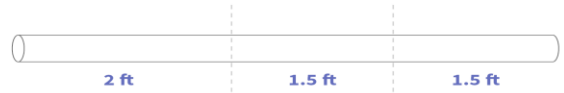
Traditional T-type

Materials

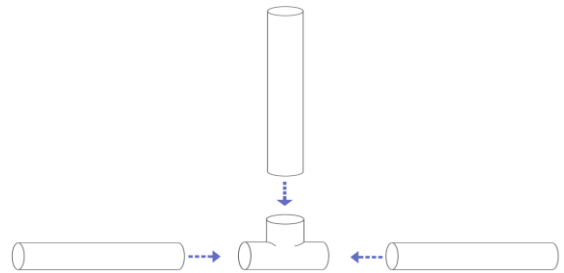
- Five feet of 4-inch PVC/NDS drainage pipe
- One T-junction
- Two 4-inch to 3-inch reducers
- One end cap
- PVC tape, PVC cement, or silicon glue
- Label

Assembly

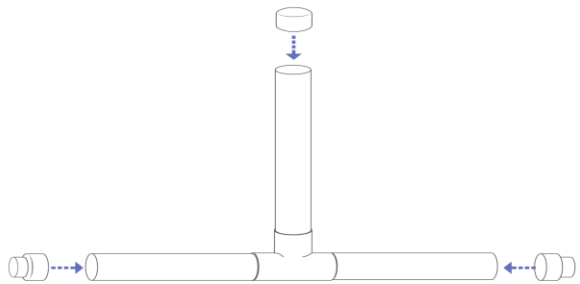
1. Cut the PVC pipe into one 2-foot section and two 1.5-foot sections.



2. Attach the T-junction to the 2-foot pipe.
3. Attach the two 1.5-foot sections into opposite ends of the T-junction.



4. Place the reducers on the base legs (1.5-foot sections) and the end cap on top of the 2-foot section.
5. Attach a service container label near the top of the bait station.



Visit www.groundsquirrelbmps.com for more information about ground squirrel management.

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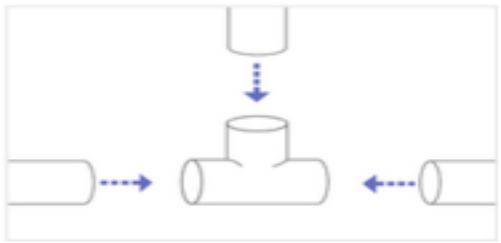
Resources FAQs

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

How to Calculate CO_2 flow

1. Measure the euthanasia chamber's size in inches: **16** in × **17** in × **35** in

2. Convert each measurement into feet. Divide each dimension by 12:
   16 ÷ 12 = **1.3** ft
   17 ÷ 12 = **1.4** ft
   35 ÷ 12 = **2.9** ft

   Multiply the three measurements together to determine the chamber's volume in cubic feet:
   2.9 × **1.4** × **1.3** = **5** ft^3

   The chamber size is **5** cubic ft.

Next, find the optimal flow rate range
(10 to 30% of chamber volume per minute).

---

3. Find the lower limit of 10%. Multiply the chamber size (in cubic feet) by 10. Then divide by 100:
   $\frac{(5\ ft^3 \times 10)}{100}$ = **0.5 ft^3**

   Find the upper limit of 30%. Multiply the chamber size (in cubic feet) by 30. Then divide by 100:
   $\frac{(5\ ft^3 \times 30)}{100}$ = **1.5 ft^3**

The CO_2 flow rate for a **5 ft^3 chamber** should be between **0.5 and 1.5 ft^3 per minute.**

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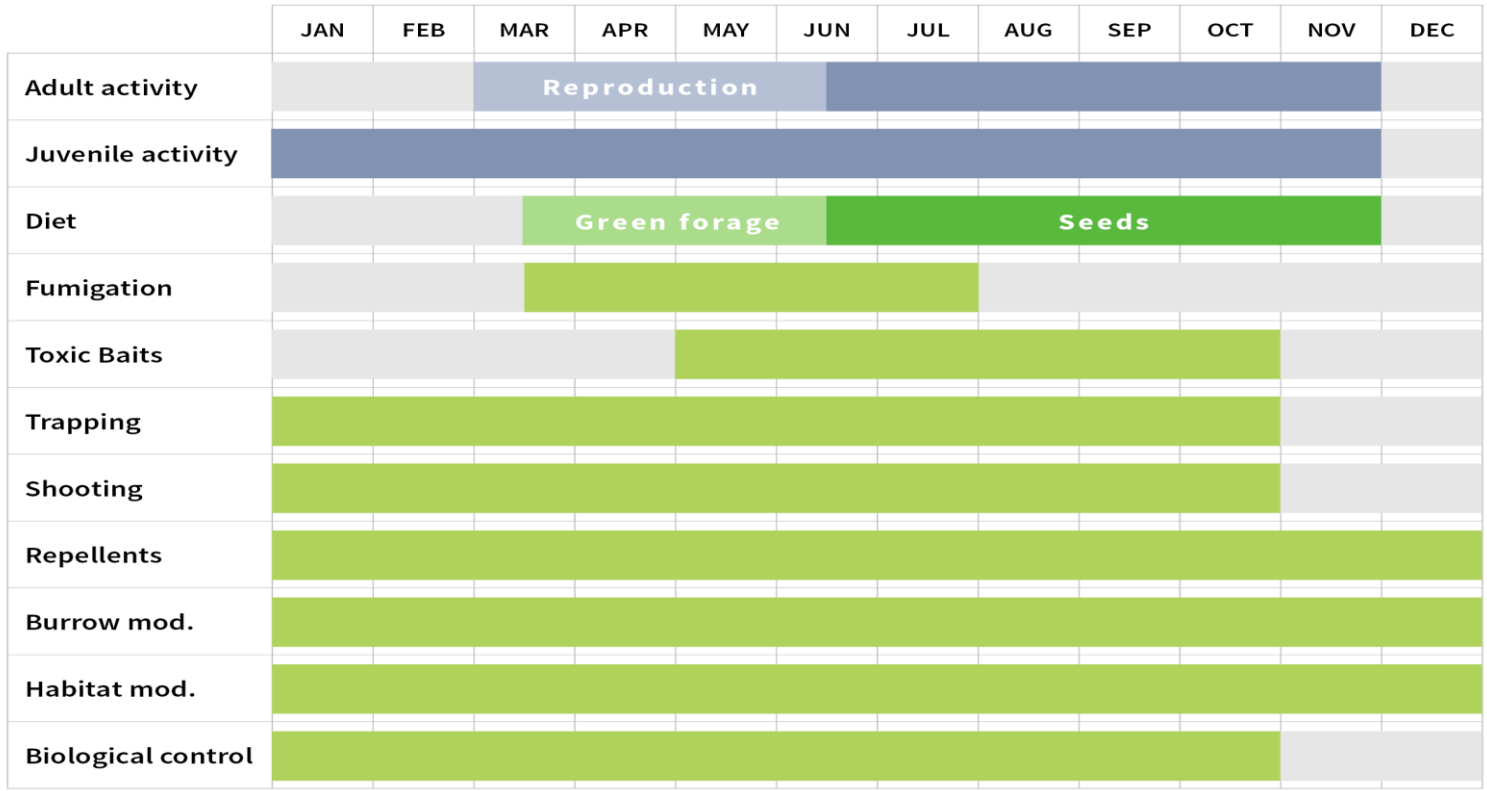

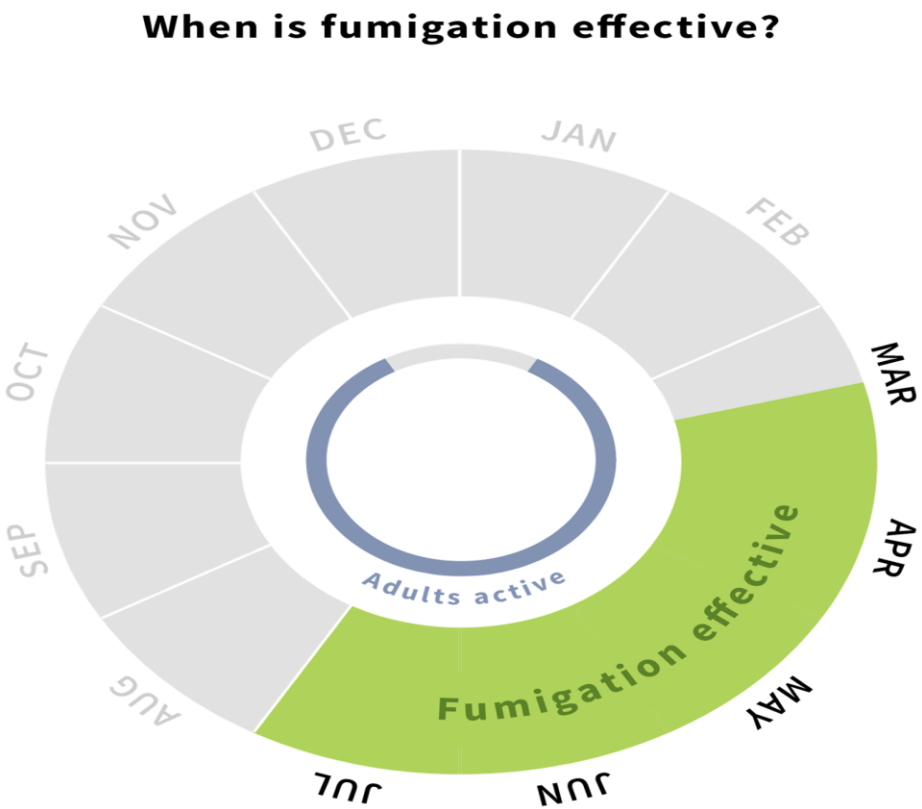

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I have tree squirrels

Information for pest management professionals and pesticide applicators

UC IPM Green Bulletin

University of California
Agriculture and Natural Resources

Vol. 5 • No. 1 • May 2015

Tree Squirrels: Identification and Management

Squirrels can be problem pests in many landscapes, gardens, and structures. California is home to several species of squirrels which can be divided into three groups: tree squirrels, ground squirrels, and flying squirrels. While ground squirrels and some species of tree squirrels can be pests, flying squirrels are very elusive and not considered pests.

There are four species of tree squirrels in California (Table 1); two species are native and two are introduced from the eastern part of the United States. Although it is easy to distinguish the different squirrel groups from each other, often it is difficult to tell the difference between the species within the groups; this is especially true for the tree squirrels. Regulations regarding management of tree squirrels are complicated, so it is extremely important to be able to identify squirrels to species level.

Tree Squirrel Species

Native western gray squirrels (*Sciurus griseus*) (Figure 1) are found throughout much of California, primarily in oak woodlands of the foothills and valleys and in pine/oak forests. The western gray squirrel is gray above with distinct white underparts and prominent ears. They are distinguished from the eastern gray and other squirrel species by their very long bushy tails that are primarily gray with white-frosted outer edges.

Eastern gray squirrels (*Sciurus carolinensis*) (Figure 2) were originally introduced from the eastern United States into Golden Gate Park in San Francisco, California. They are also established in areas of Calaveras and San Joaquin counties in California and may be expanding their range. They can be variable in color. As their name suggests, they have a mostly gray coat but some have a distinct reddish tint. Eastern gray squirrels are medium-sized, with relatively narrow tails and short ears as compared to western gray squirrels.

Eastern fox squirrels (*Sciurus niger*) (Figure 3) were also introduced from the eastern part of the United States and are well established in most major cities of California. Fox squirrels can be identified by their grizzled yellow-brown to orange coat, tan to reddish-brown underside, and bright orange-brown ears. The fox squirrel, often incorrectly referred to as the red squirrel by residents of California, is visually distinguishable from the native western gray squirrel; the

Figure 1. Western gray squirrel.
(Dr. Lloyd Glenn Ingles © California Academy of Sciences)

Figure 2. Eastern gray squirrel.
(J. P. Clark, UC)

Figure 3. Eastern fox squirrel.
(C. Christie, Baker City, OR)

...continued on page 2

WHAT'S INSIDE...

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Retail Nursery and Garden Center

IPM News

Vol. 5 • No. 3 • November 2015

Tree or Ground Squirrel: What's the Difference?

California is home to several species of squirrels, which can be divided into three groups: tree squirrels, ground squirrels, and flying squirrels.

Ground squirrels have been identified as the most common vertebrate pest in agricultural areas, but they can also be pests in urban and suburban areas. There are several species of ground squirrel in California, but the California ground squirrel is the species most likely to be a pest of landscapes, gardens, and structures.

Some tree squirrel species can also be problem pests around homes and gardens where they feed on a variety of nuts and fruits, or cause damage by gnawing on cables and gaining entry into structures. While ground squirrels and some species of tree squirrels can be pests, flying squirrels are very elusive and not generally considered pests.

It is easy to distinguish the different squirrel groups from each other: when you startle a tree squirrel it will generally run up a tree, while a ground squirrel will typically retreat to an underground burrow. Ground squirrels are capable of climbing, but they are often not seen very high in trees, and tree squirrels almost never retreat into burrows on the ground.

It can be difficult to visually tell the difference between the species within the groups, especially between tree squirrels. Squirrel management requires different tactics, so it's important to identify the squirrel species correctly and be aware of any legal restrictions before beginning any management plan.

Tree Squirrel Species

There are four species of tree squirrels in California (Table 1); two species are native and two are introduced from the eastern part of the United States. Regulations regarding management of tree squirrels are complicated, so it is extremely important to be able to identify squirrels to species level.

Douglas squirrels (*Tamiasciurus douglasii*) (Figure 1), sometimes called chickarees, are native to California and found in coniferous forest regions of the north coastal area and along the Sierra Nevada Mountain region. These very vocal tree squirrels are not usually considered pests. However, they may become garden or home pests in more remote rural areas.

Figure 1. Native Douglas squirrel.

Figure 2. Western gray squirrel.

INSIDE ...

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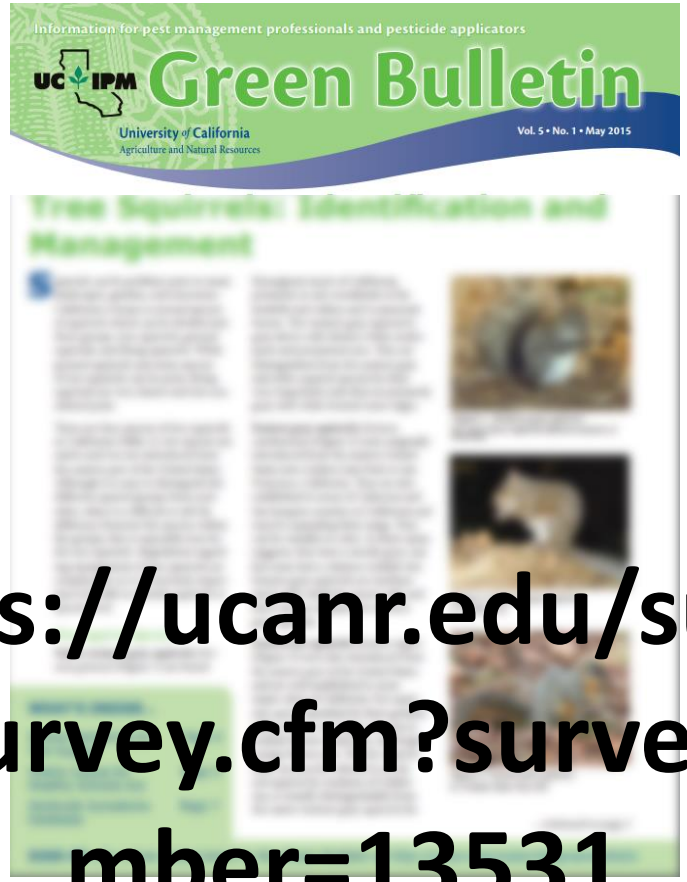

https://ucanr.edu/survey/survey.cfm?surveynumber=13531

https://ucanr.edu/survey/survey.cfm?surveynumber=11686

Something is chewing on my drip. Help!

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Repellents not known to work for coyotes

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No evidence that coyotes are looking for water and therefore rain barrels potentially ineffective and just provide breeding grounds for mosquitoes!

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Promising results in trials on AQ for rabbits

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Agriculture and Natural Resources

And voles

You can try…..

- Bury drip but watch out for issues with clogging etc
- Try deterrents other than repellents (non proven efficacy)
  - Fox lights (only work at night…if they work at all)
  - Noise makers
  - Flaggery

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Coyotes are considering nongame mammals and can be taken by any legal means

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- The California Fish and Game Code classifies jackrabbits, cottontails, and brush rabbits as game mammals.
- No license is required for the owner or tenant to take rabbits doing damage.
- A trapping license from the California Department of Fish and Game is required when trapping rabbits for hire or profit.

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California Fish and Game Code - FGC § 3004.5

- Nonlead centerfire rifle and pistol ammunition shall be required when taking big game, as defined in the department's mammal hunting regulations with rifle or pistol, and when taking coyote, within the California condor range

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- (b) Except as provided in subdivision (j), and as soon as is practicable as implemented by the commission pursuant to subdivision (i), but by no later than July 1, 2019, nonlead ammunition shall be required when taking all wildlife, including game mammals, game birds, nongame birds, and nongame mammals, with any firearm

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