

Vertebrate Pest Control Without Poisons

Thomas Wittman



Rodent Control in Leafy Green Vegetable Production

- Read Coop Extension's Crop Notes May, 2008
"FOOD SAFETY AND SALINAS VALLEY CROPS: RODENT CONTROL IN LEAFY GREEN VEGETABLE PRODUCTION"

Terry Salmon, Richard Smith and Steve Koike
County Director and Extension Vertebrate
Specialist, San Diego County and
Farm Advisors, Monterey County

Farm Advisors Findings

“In general, using rodenticides indiscriminately and extensively is ill advised due to the risk for developing resistance in the rodent population.

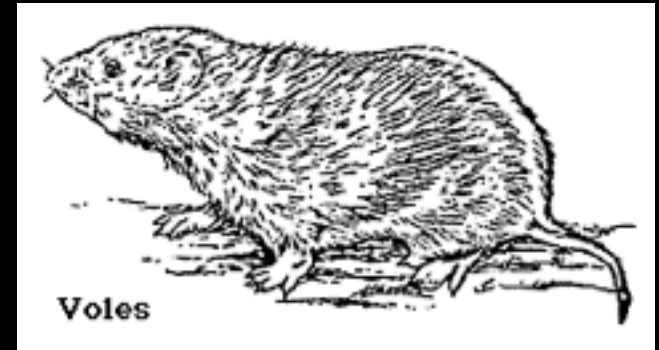
Other measures for controlling rodents include trapping. Exclusion fences may be effective for mice, but are not effective for ground squirrels.”

“To our knowledge, voles, mice, ground squirrels, and other rodents in coastal California agricultural fields have not been found to harbor pathogenic *E. coli*. Based on the studies mentioned above, it appears unlikely that these rodents will be found to be a common or important source of O157:H7 and other pathogenic strains.”

Gopher and Mole and Vole



Gopher



Vole



Mole

Meet a Pocket Gopher



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To View online go to [youtube.com/gopherslimited](https://www.youtube.com/gopherslimited)



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Gopher (*Thomomys bottae*)



Broad Footed Mole



A large thomomys bottae gopher

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Gopher and Mole Skulls



Made for chopping and grinding



Made for capturing and tearing flesh



Gopher Lifestyles

- Solitary with own burrow containing nests, food caches , dumps for feces and water sump holes to avoid flooding
- Territorial by nature and will fight to the death if caged together, gophers will share burrows during mating season
- Some gopher burrows are common and used by many gophers
- Re-occupancy of burrows is rapid – within minutes or hours
- There can be from 1 to 200 gophers per acre but usually range from 24 to 36

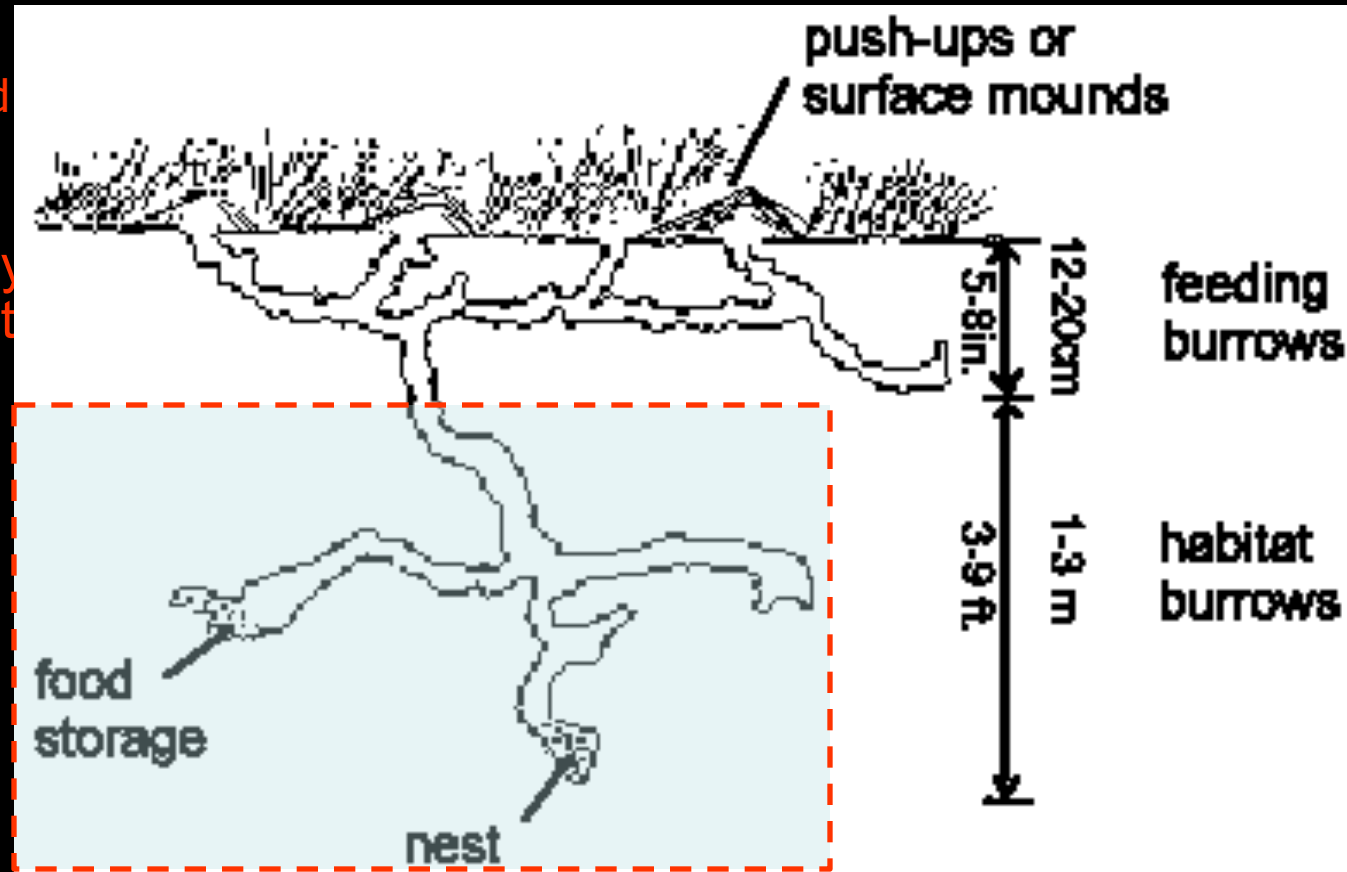
One gopher's work



One gopher's work over two week period

Burrow System

- Burrow system can be up to 3 hundred square yards but a small area is base
- There are surface mounds and feeding burrows
- Burrows are plugged during inactivity or nesting
- Nest portion is usually under a bush or tree to provide water





One gopher's burrow system

Nesting Site



More Gopher Nests



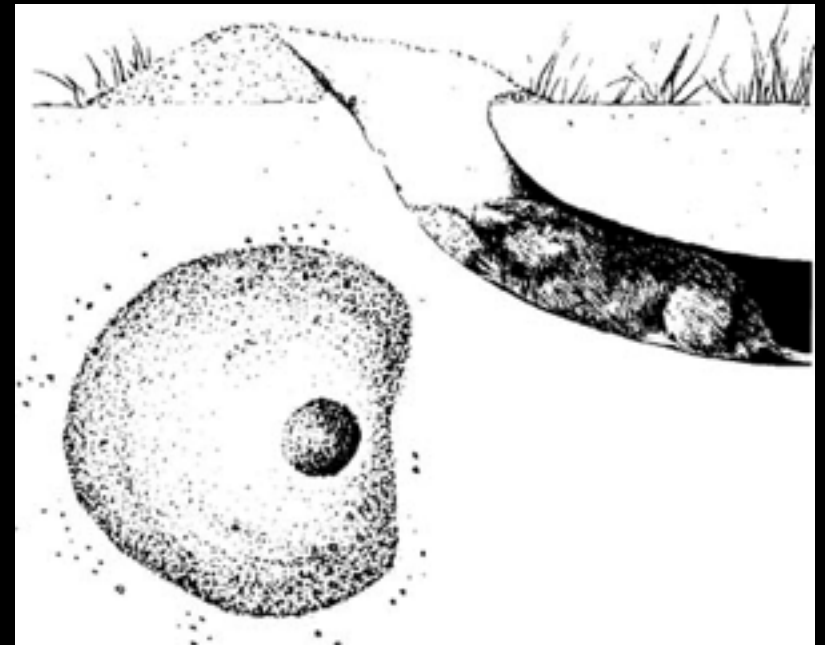
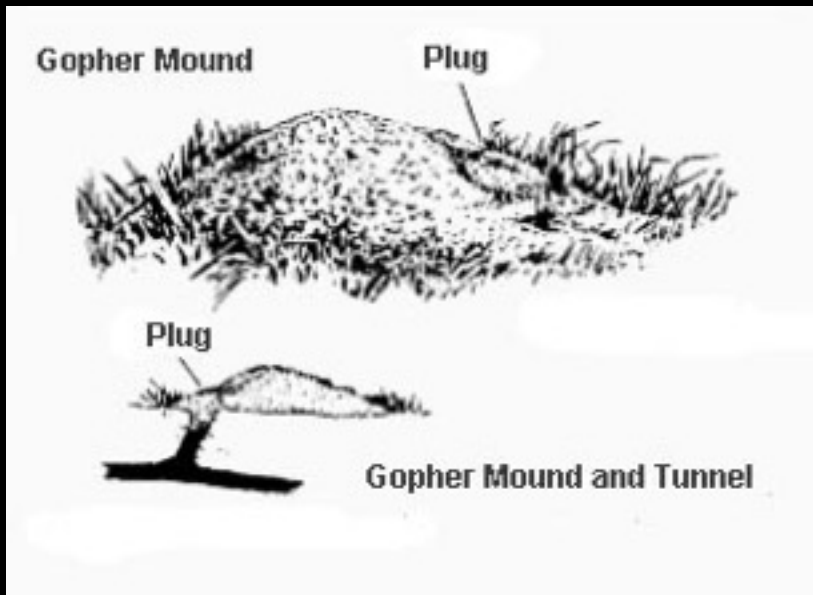
Gophers often invade from the surface at night



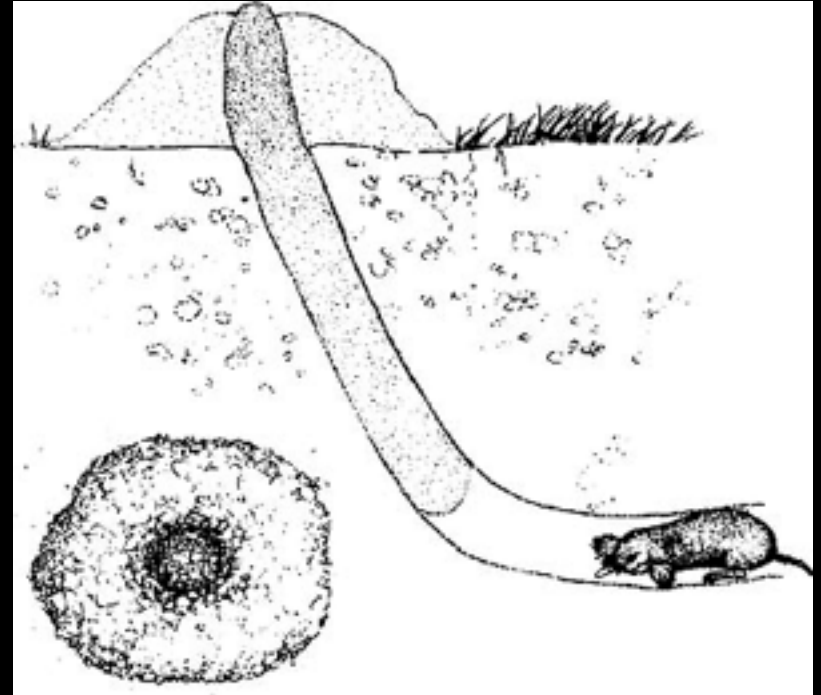
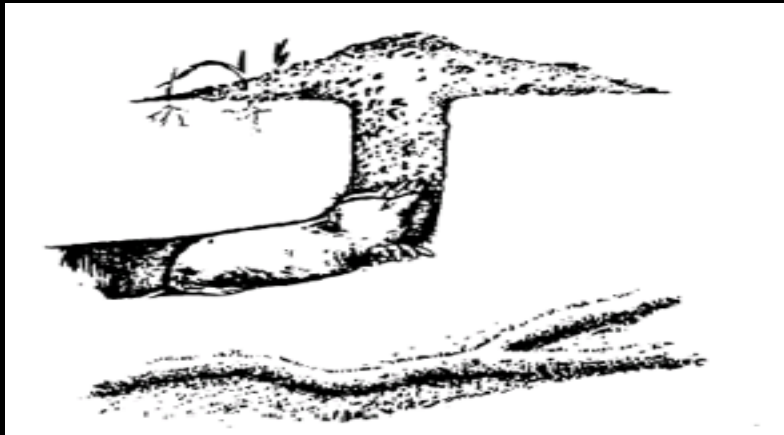
Gopher Mounds and Mole Hills



Gopher Mounds



Mole Mound



Mole Mounds



Mole Surface Trails







Gopher mounds and mole hills within two feet





Broad Footed Mole

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Gopher or Mole?





Habitat Modification to minimize voles

- Eliminate weeds, ground cover, and litter in and around crops
- Lawn and turf should be mowed regularly
- Mulch should be cleared 3 feet (1 m) or more from the bases of trees
- Soil tillage is effective in reducing vole damage as it removes cover
- Keep a barrier of clean land around crops – 15 feet if possible



Voles love rock walls

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Vole damage on broccoli and chard



Nearby vole colony



Vole damage on ornamental kale next to agapanthus

Safe Vole Trapping



Mouse trap with large trigger with 4 penny nail to stabilize trap

Note: see video of this method at gopherslimited.com



Traps are covered with plastic channel to protect other animal and direct voles into traps



Note that mice also invade vole burrows

Plants Gophers Eat Last

- Amaryllis, daffodils, datura, crinum, sage, canna, most iris, geranium, salvia, snapdragons, marigolds, dianthus, nicotiana, vinca, scabiosa and gypsophilia, sea stacice , dahlias, ageratum
- Best choices are aromatic, herbaceous, drought tolerant perennials
 - Lavender, sages, rosemary, thyme, oregano

Crop Strategies for Gopher Control

- Rotate to decrease populations by alternating crops that attract gophers
 - Crops with tubers and crowns are favorites
- Cover crops mixes with bell beans, fava beans and grains drive gophers to edges
- Most clovers attract gophers
- Many native weeds provide food for gophers
 - Malva, poppies, plantain, oxalis, crab grass

Sour Clover (*Melilotus indica*)

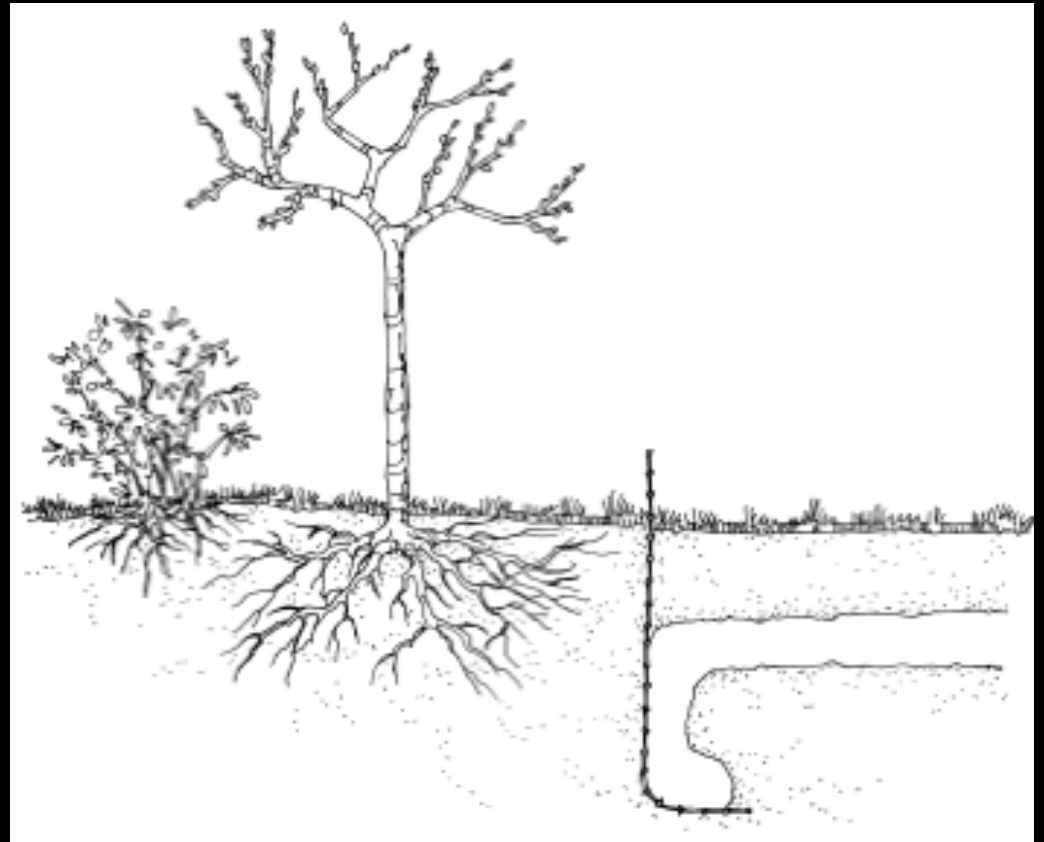
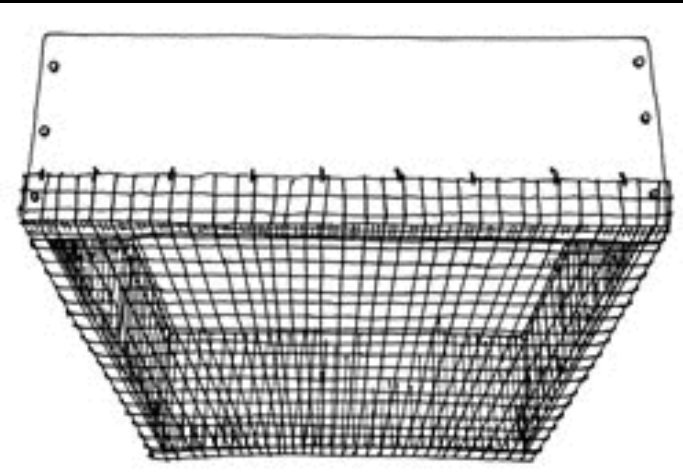
- contains Coumarin in its roots.
- Sour clover is nitrogen fixing
- re-seeds readily
- Attracts Beneficial Insects
- May be excellent for orchard covers



Gopher Purge



Gopher Barrier Setup



Can Gophers Climb?

To view this video online go to youtube.com/gopherslimited

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Raised Garden Beds







Gopher Proof Fortress



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Gopher Baskets and Wire



Galvanized Wire
Limited Life
Environmental Pollution

Stainless Steel
Lasts Forever
Costs More



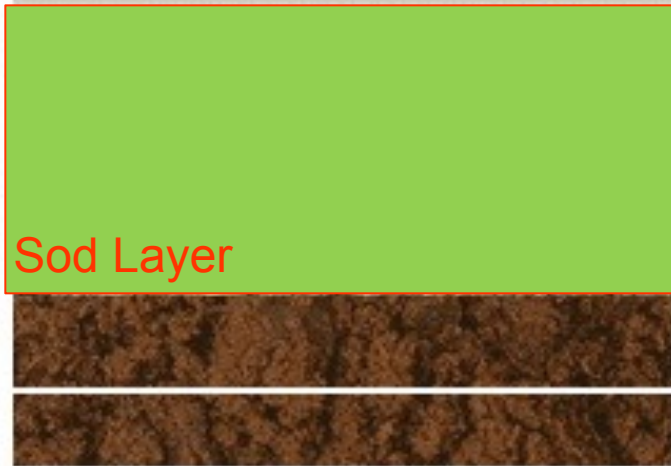
Aviary wire eaten through



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Gopher and Mole Wire Under Lawns and Gardens

Mesh should have 1-2 inches of soil from roots of sod



If wire is too shallow gophers pull grass down moles push dirt up

If too deep, gophers and moles live above the wire

Wire is lapped 6" and joined by landscape staples, hog rings or zip ties



Rodent Fence Constructed of 48" Stainless Steel Mesh



4"

6"



Vertical Barrier



Predators of the Pocket Gopher, Moles and Voles

“Our cat is a petite tabby, weighing only 9.5 pounds”

- Our cat's records for the past several years are:
- 2001: 58 gophers, 4 mice
- 2002: 65 gophers, 7 mice
- 2003: 43 gophers, 6 mice, 2 moles
- 2004: 28 gophers, 4 mice



projectpurr

831-423-MEOW

**"Will Work For Food...Barn Cats:
Non-Toxic Pest Control"**

WWW.GOPHERSLIMITED.COM



A dog can do 10X the damage
of a gopher and still not catch it



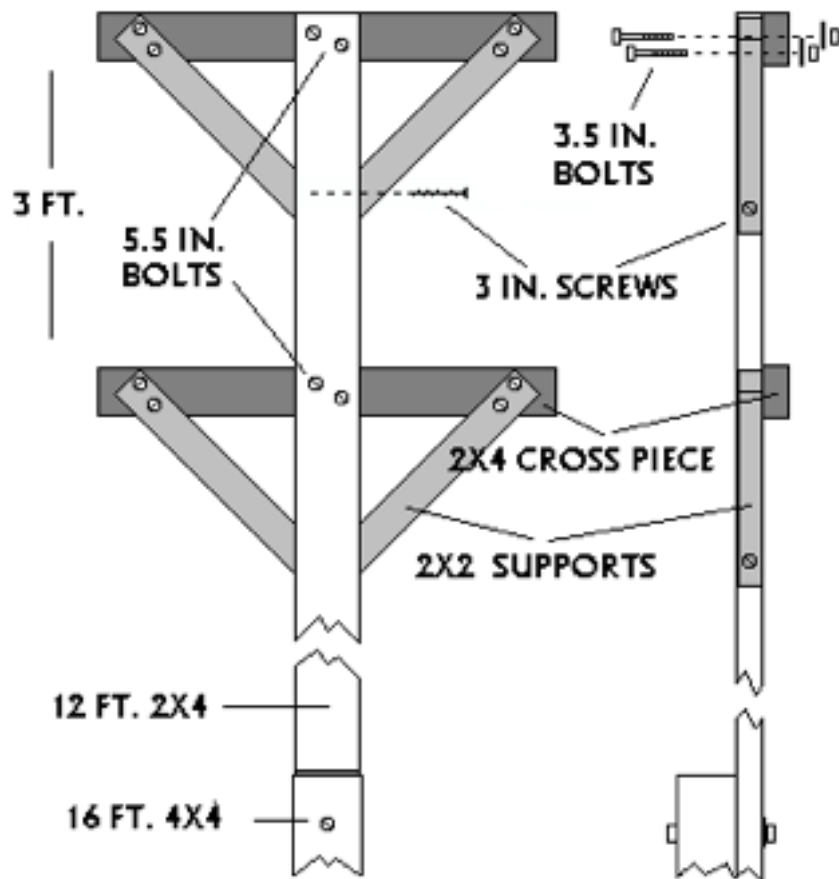
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Gopher Snake





**RAPTOR PERCH MADE FROM 2X4'S
WITH TWO CROSS PIECES FOR OVER-
HEAD PROTECTION**



Great Blue Heron and Egret





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The Hungry Owl Project



\$85

www.hungryowl.org/boxes.html

Alex Godbe

Program Director

415-454-4587

WWW.GOPHERSLIMITED.COM





Barn owl box destined for predation by Great Horned Owl

Flagpole Mount –
easy to clean and
maintain





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Urban Myths and Subjective Solutions

- Juicy Fruit Gum
- Ex Lax, chocolate flavored
- Glass
- Rose cuttings
- Hair
- Cat Litter

Repellent Liquids

- Drenches of foul tasting and smelling liquids can be effective for single plants and trees (Ropel, castor oil)
- Coyote and cat urine can also work in specific areas for a short time (so will yours)
- Fish emulsion and other meat products can work around perennials

Sonic and Other Noisemakers

- May be effective in small area for short time
- Can be homemade or purchased at craft fairs
- No scientific research yet exists





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Smoke bombs available in many hardware stores

Large smoke bombs available from Agricultural Commissioner. Blower can add effectiveness

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Light, cover with soil, come back next day to see if burrow is open or new digging present, if new activity repeat. Beware of fire danger.



\$124.95

Rodex Gopher Torch





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Rodent Blaster Can Start a Fire!





PRESSURIZED EXHAUST RODENT CONTROLLER

H&M Gopher Control
Manufacturing & Sales

Phone: (530) 667-5181
Toll-Free: (855) 667-5181
Cell (Voice or Text): (530) 640-3981



PERC units pressurize exhaust gas (carbon monoxide) and inject gas into gopher runs .

In University of California field trials, 65% of gophers and 75% of ground squirrels were consistently killed, Hurlburt maintains.



PERC 206 \$5,590.00



PERC 412 \$8,295.00



PERC 620 \$14,995.00



The Cheetah is \$989.00

CO2 Burrow Fumigation



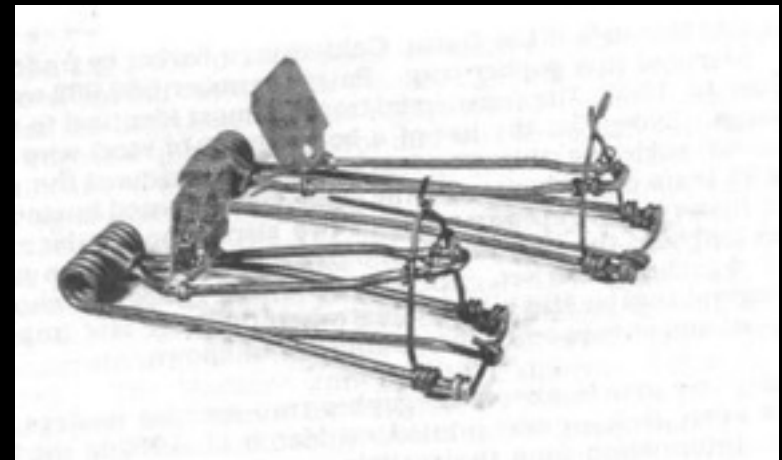
Gophers Limited \$189

Juggling For Gophers



Gopher Traps: History

- First patented and commercially produced trap was the Woods Gopher trap, Patented in 1870 by Romanso Wood of Santa Cruz, California
- By 1900 12 more traps were patented all from California and Zephyr Macabee developed and patented his trap that has survived unchanged to this day




More out of control



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Find freshest run



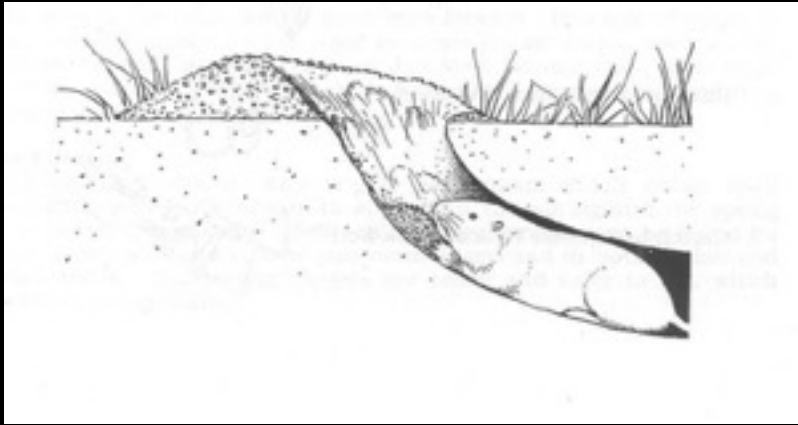
A close-up photograph of brown soil. In the center, there is a small, dark hole in the ground. To the left of this hole, there is a small, raised mound of soil. A light blue speech bubble with an orange border points from the text towards the hole. The soil is composed of small clumps and some dry, white plant matter.

Find fresh
burrow



Right after rain – note texture and color

Locating Run Entrance



Basic Farm Trapping Strategies

- Early morning - burrows open right after dawn
 - Early evening
 - Early in spring prior to first litters
 - During fall just after planting cover crops
 - After a weather event or irrigation
 - After a field operation
 - Tilling, rolling, harrowing, mowing
 - During other operations in the field
 - Morning crop count
 - Moving irrigation pipe or repairing drip
 - During harvest
-
- Best to keep traps in ground instead of barn so trapping becomes a continuous operation integrated into the general operation of a farm or ranch

Local Gopher Trap Collection





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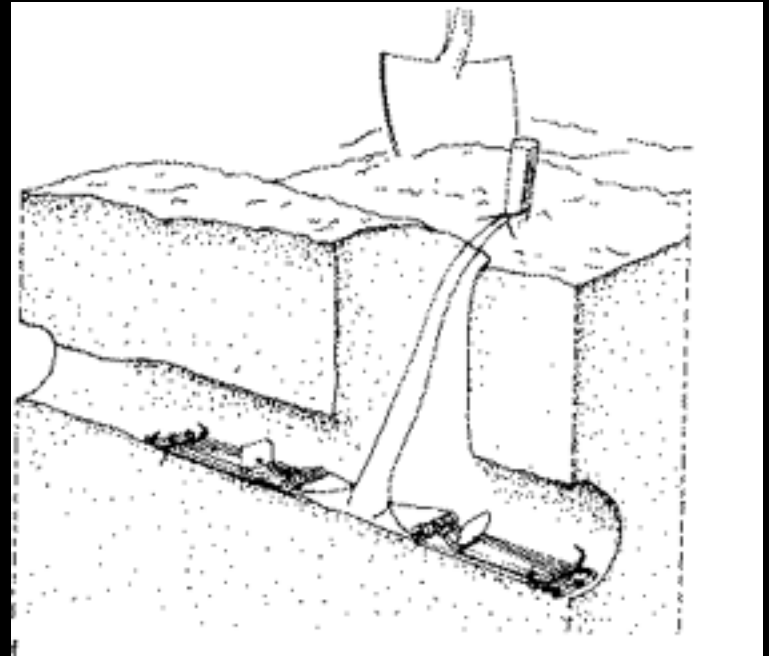
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Lethal Trapping Techniques

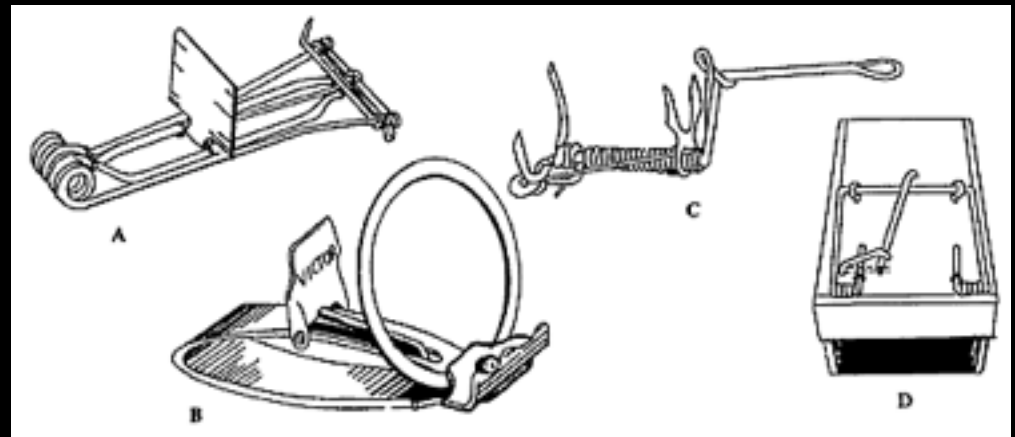
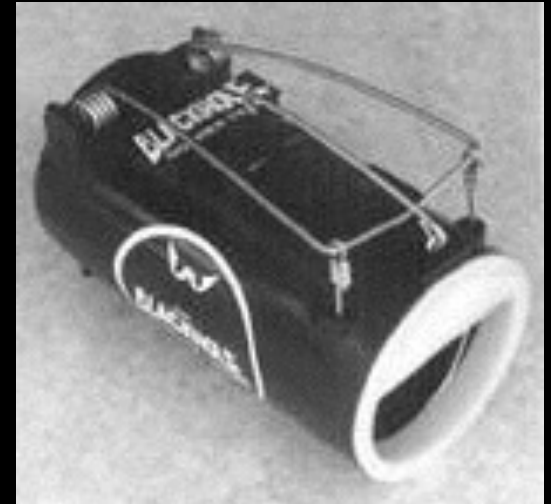
- Main Burrow Trapping
 - Dig to main burrow
 - Set two or more traps and stake them
 - Bury or cover excavation
 - Monitor by digging up excavation
- Surface Trapping
 - Open burrow entrance
 - Set trap
 - Monitor from above ground

Macabee and Box Types

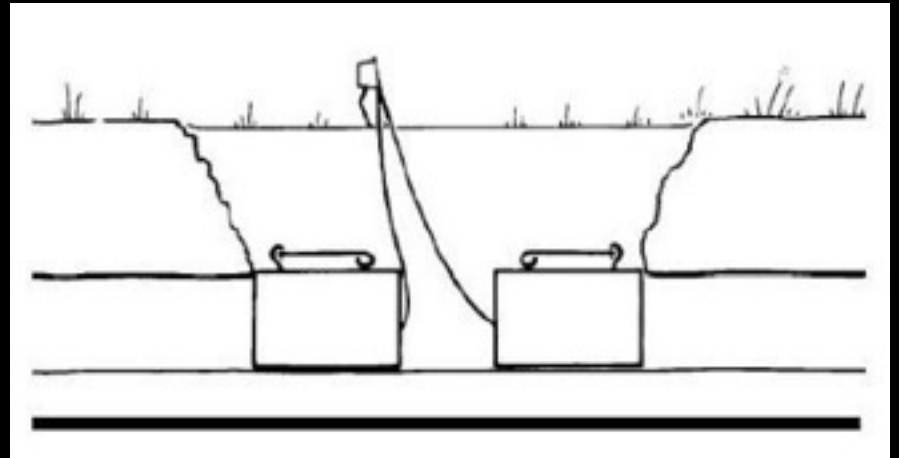
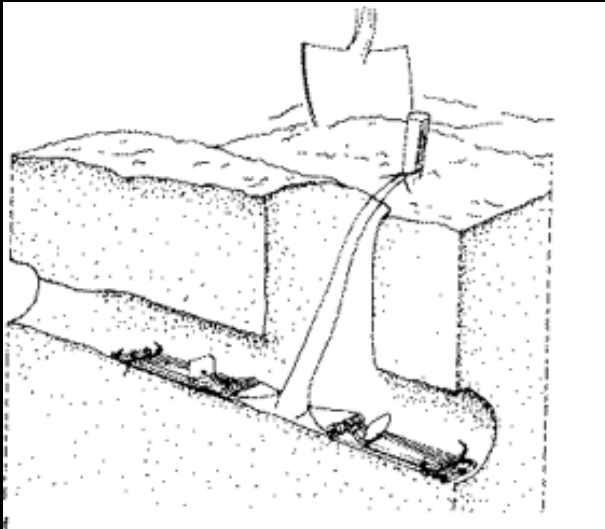
- If using Macabee or box type traps, excavate at mound or probe for burrow, trap both ends of exposed burrow
- Check daily by pulling traps out of burrows



Macabee and Box Style Traps



Setting Up Macabee and Box Traps



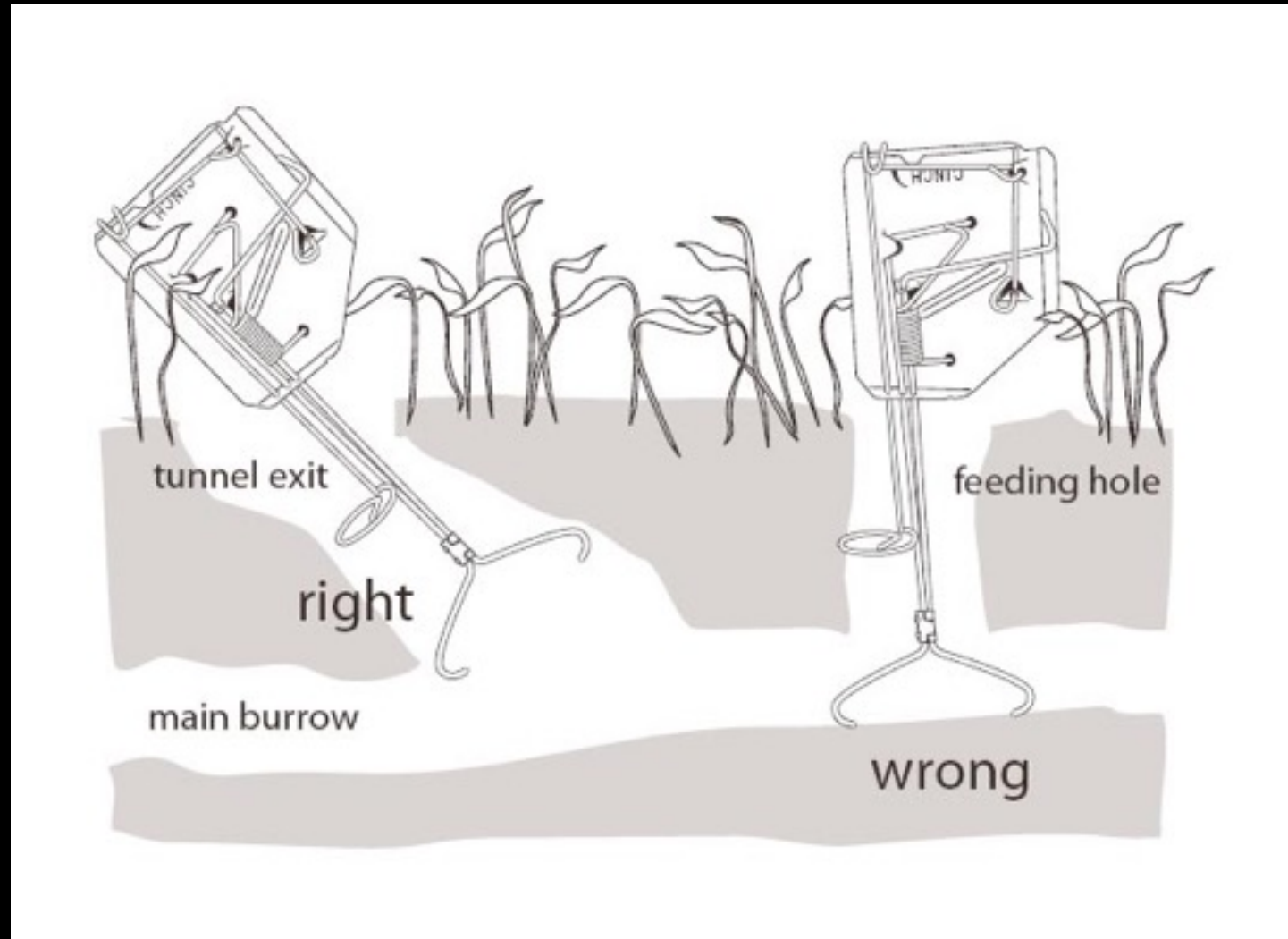
Gophers always plug open burrows



Cinch Trapping Video

*Surface Trapping
Gophers with the
Cinch Trap
gopherslimited.com*

Proper Cinch Setting Technique



Make New Burrow



Trap whole Burrow



Hair In Trap is Good





Integrated Approach to Controlling Burrowing Rodents

Roger A. Baldwin

UCCE Wildlife Specialist, Department of Wildlife, Fish, and
Conservation Biology, UC-Davis



EVALUATION OF THE EFFICIENCY OF THREE TYPES OF TRAPS FOR CAPTURING POCKET GOPHERS

MICHAEL J. PIPAS, GEORGE H. MATSCHKE, and GERALDINE R. McCANN, USDA National Wildlife Research Center, 4101 LaPorte Avenue, Fort Collins, Colorado 80521-2154.

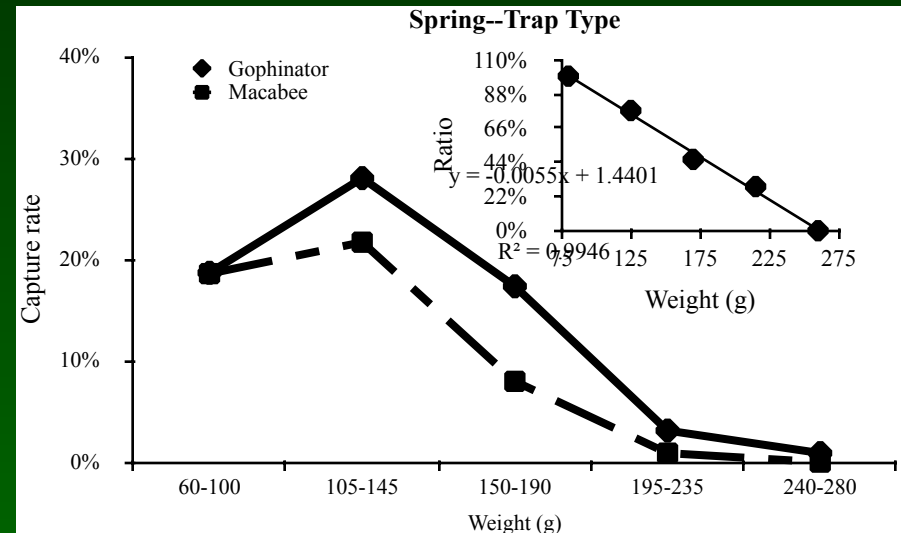
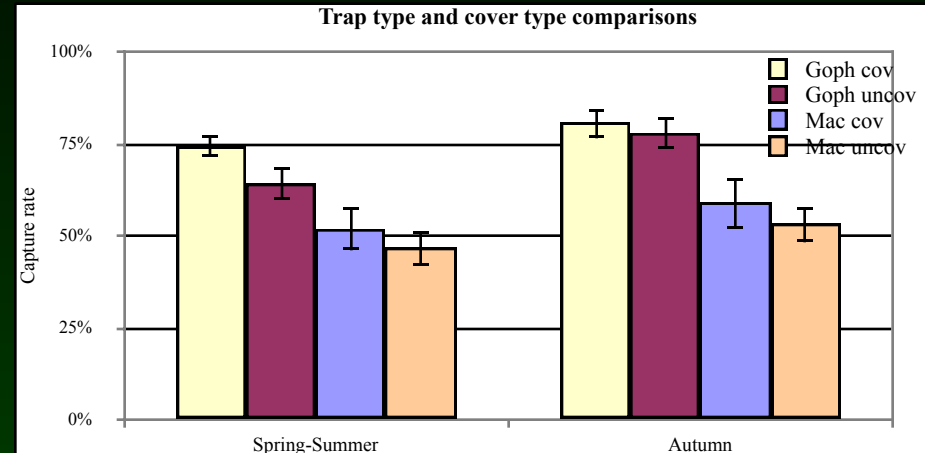


Trap Type	Number Trap Stations	Capture Efficiency (%) ^{1,2}	Time Efficiency ^{1,3}
Blackhole	121	18.3 ^a	0.032 ^a
Cinch	115	41.7 ^b	0.046 ^a
Macabee	124	27.7 ^a	0.036 ^a

Trapping—Options

Pocket gophers

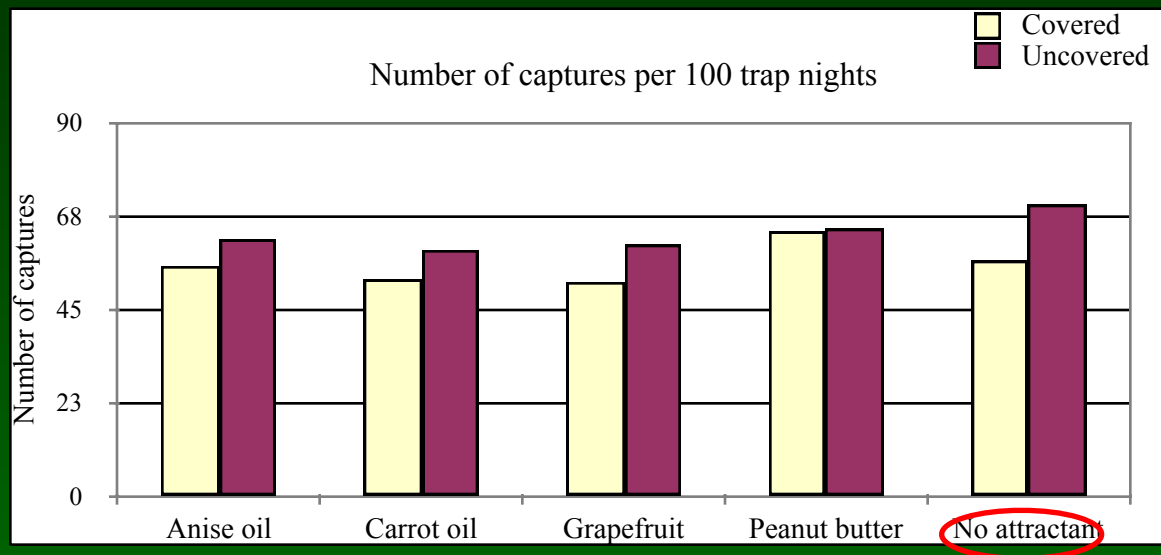
- Gophinator trap was more effective.
- Covered sets yielded slightly higher capture rates in spring-summer, but not autumn.
- Efficacy was offset by setting time.



Trapping—Attractants

Pocket gophers

- We tested 4 attractants using uncovered trap-sets.
- We did not observe a difference in the number of captures across attractants ($P > 0.123$).



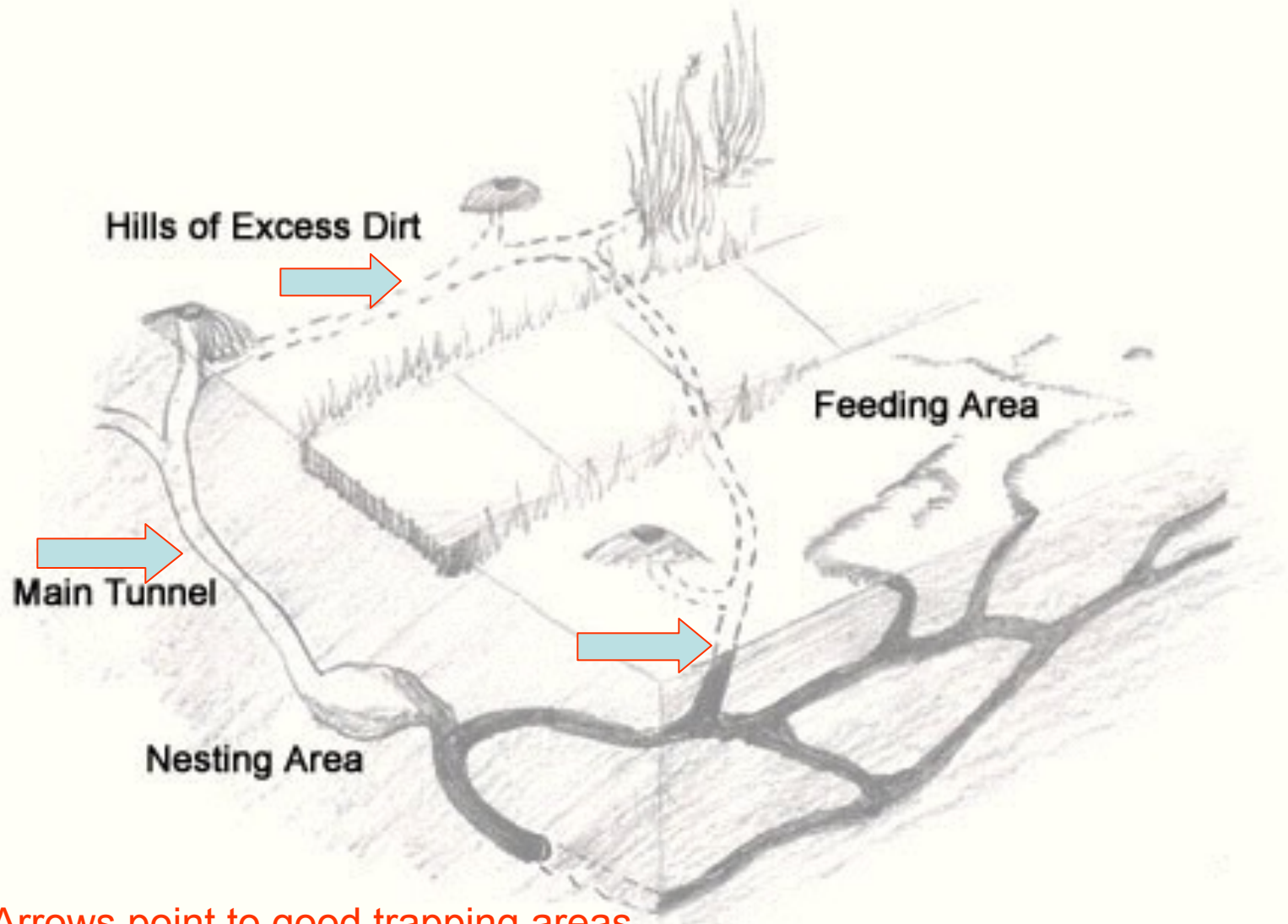
Can you Eat Gophers?

- Gopher Pie

- 1 Gopher, skinned and cleaned
- 1/4 cup onion
- 1/4 cup green pepper
- 1/2 tbsp minced parsley
- 1 tbsp. salt
- 1/8 tsp. pepper
- 4 1/2 tbsp. flour
- 3 cups broth



Mole Mounds



Arrows point to good trapping areas





Typical Mole Trapping Setup
Using Cinch Traps



Tree Squirrels

- * Trim limbs and trees to 6 to 8 feet prevent squirrels from jumping onto roofs.
- * Avoid attracting squirrels with bird feeders and other outside food
 - Block the “squirrel highway.” with sticky barriers
 - Remove or relocate problem squirrels

Tree Squirrels



California Ground Squirrels



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Basic California Ground Squirrel Biology

- Burrows are 4 inches in diameter, 5 to 30 or more feet in length and go to a depth of 2 to 4 feet.
- Breed once a year, 7-8 per litter from December to April
- Eat grasses and plants in Spring, seeds and nuts in fall





UC Statewide IPM Project
© 2000 Regents, University of California

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Ground Squirrel Control

- **Trapping with live and kill traps**
 - Conibear No. 110, box traps, Tomahawk, Black Fox or Havaheart
- **Fumigating with gas cartridges**
 - Purchase from Ag Commissioner or hardware store
 - Best done in winter or spring or after irrigation
- **Toxic Baits**
 - Rodetrol may work if bait stations are on paths and it is fall
- **Habit Modification**
 - Eliminate brush piles and debris
 - Destroy burrows constantly by disking or other means
- **Rodent Torch blasting**
- **Shooting**

Black Fox Repeating Squirrel Trap



13 Squirrels

8 Squirrels

www.thetrappmaker.com \$45.00



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Ground Squirrel Trapping Using a Repeating Trap

- Pre bait area near burrow but not at burrow entrance
- Bait with grains during dry times, fruits and nuts during wet times
- In some climates Ground Squirrels do not hibernate or aestivate
- Bait until squirrels are congregating at bait pile
- Bait every day at same time
- Leave trap next to bait so squirrels become used to it
- When feeding frenzy is steady, open cage outer doors to expose one way doors
- Empty trap early in the day and dispatch animals
- Do not leave trap open over night



Euthanasia Box



GROUND
SQUIRREL

'08  REPEATED

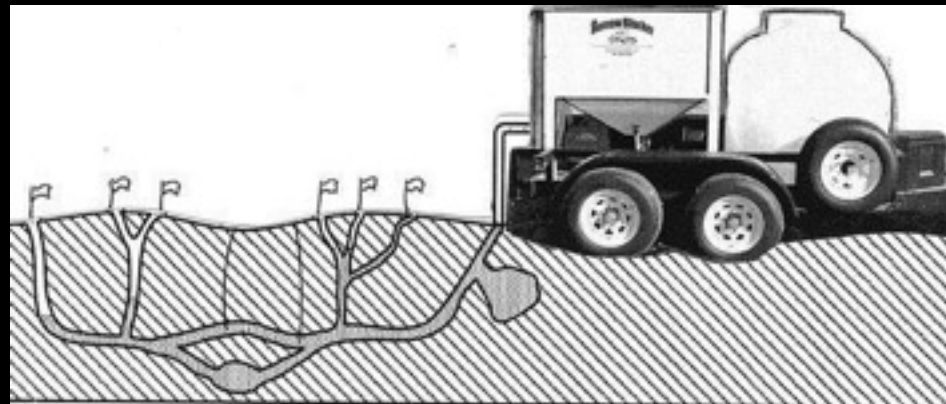
Ground Squirrel Containment Barriers

- **Can discourage dispersal or invasion because:**
- **Ground squirrels are visually oriented animals that have a strong need to keep their burrow entrances in sight at all times.**
- **Vinyl barriers**
 - **Root Guard, lawn edging strips or any wide slippery material**
- **Wood slatted privacy fencing (at least 3' high) in conjunction with wire mesh and vinyl barriers**
- **Tall grasses used along with other barriers can lead to permanent solution**
- **Electric Fence set at 1 and three inches over plastic weed barrier**

Rodenator at Esalen



Burrow Blocker



Amerigreen Technology Inc.
dba Burrow Blocker
P.O. Box 1540
Byron, CA 94514
Phone: (925) 634-9204
Fax: (925) 634-9595
info@burrowblocker.com

Home Made Squirrel Trap



Yellow Bellied Marmots



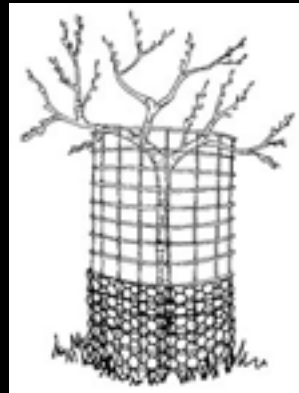
Size: 12"-24" long, weighing 6 ½ - 15 ½ lbs
Color: Long thick fur that is yellowish brown, brown, reddish black, or a mixture of grey and white

also known as the "Whistle Pig" or the "Rock Chuck."

Very similar to Ground Squirrels and can be controlled in same way. As this animal is new to coastal California, be very aggressive about colony build up

Building a fence is also an option, but it must be high off the ground so the marmot can't climb it, and it must be deep enough so the marmot can dig under it.

Rabbits



Rats and Mice

- Wood Rats, Roof Rats, Norwegian Rats



Ways to Deal with Rats and Mice

- Exclusion is best
 - Wire or cover openings
- Remove food source if possible
 - Bird and chicken feeders
 - Compost and vermicompost piles

Poisoning rats can lead to smells in walls

Rats destroy 20% of world's food supply every year

Rat Trapping - Lethal



*Also available in UV



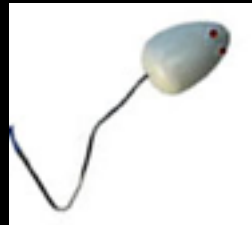
General Rat Trapping Rules

- Set traps in path of animal
- Leave traps unset for first couple of days
- If you use bait tie it to trap trigger
- Vary trapping methods
- Be careful not to trap non target animals

Typical Rat Entrance Under Eaves



Rat Trapping - Electronic



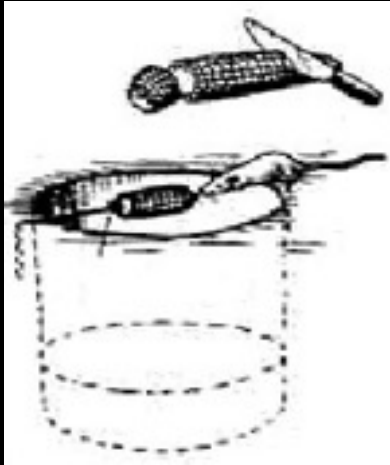
Rat Zapper



Use Protective Trap Enclosures for Outdoors



Rat and Mouse Bucket traps



Just Google rat bucket trap and search images for hundreds of variations

Bucket Trap Roller



New Zealand Repeating Rat Trap

SHOP

SUPPORT

RATS & MICE

DISTRIBUTORS

ABOUT

HOME / SHOP / A24 TRAPS / A24 RAT AND MOUSE TRAP KIT WITH COUNTER

IN
STOCK



A24 Rat and Mouse Trap Kit with Counter

\$199.99 (Free Shipping)

The Goodnature A24 Automatic Rat and Mouse trap is a revolution in pest control!

It combines superb design engineering principles and behavioral science with the highest manufacturing standards to deliver a trap that lasts for years and kills 24 times per CO₂ canister.

[Click Here](#) for important delivery information.

1

Add to cart

SKU: A24CM-01 Category: [A24 Traps](#)

Goodnature Trap



Rats, Mice Eating Auto Wiring

- Leave the hood up. ...
- Hide your food, dog food, cat food, etc
- Remove or seal off rat hiding places
- Block holes to the engine compartment
- Use electronic deterrent devices
- Make your engine and its entrances smell bad, at least to rats. (Critter Ridder)

Wiring protection



Does Your Car have soy based wiring?

- Many 2012-2016 Toyota models
- Many 2012-2016 Hondas
- Many more mostly in those years



[https://
www.howtopreventratsfromeatingcarwires.com/
2017/02/10/does-your-car-have-soy-based-
wiring/](https://www.howtopreventratsfromeatingcarwires.com/2017/02/10/does-your-car-have-soy-based-wiring/)

Working With Larger Animals

- Determine if there is a way to deter or exclude animal
- Discourage animal by adding odors
- Use one way doors
- Trapping is last resort
 - Use proper trap for target animal
 - Be aware of spring litters
 - Be sure to check local laws

Larger Animal Problems



- Raccoons, Skunks and Opossums
 - May be deterred by sprays
 - Motion sensor sprinklers
 - Fencing





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SCARECROW Sprinkler



Deer, Cats, Rabbits,
Raccoon, Dogs, Squirrels,
Skunks, Garden Pests,
Rats/ Mice, Moles, Ground
Hogs, Geese, Heron,
Cranes, Raccoons,
possum, cougar, bear

\$50-80

Ultra sonic Repellers



\$20-100



WWW.GOPHERSLIMITED.COM

Deer Shield



\$250



\$545 with 1 speaker
\$85 per additional
speaker

Digital recordings of
alarmed, aggressive,
hostile and territorial
deer

Motion activated or
timer activated on
smaller unit

Each speaker protects
up to 1.5 acres

WWW.deershield.com

Electric fence can keep animals in and out



PoultryNet™ 12/42/3 Kit - (42" x 164') \$169



Hot Pepper Sprays

- **Hot Pepper Repellant Recipe**

- You need:

- 1. One chopped yellow onion

- 2. One chopped Jalapeno pepper

- 3. One tablespoon of Cayenne Pepper

Boil ingredients for 20 minutes in two quarts of water. Then let it cool and strain the mixture through cheesecloth. Lasts for three to five days.



Pepper Sprays That Stick



Smelly Formulas



Small Critter
Powder
(Fox Urine
Powder)
100% Natural
1 1 1 1

putrescent egg



Havahart Critter Ridder



Oil of Black Pepper 0.480%
Piperine (From Oleoresin of Black
Pepper) 0.185%
Capsaicin and Related Capsaicinoids (From
Oleoresin of Capsicum)

OMRI Listed Organic

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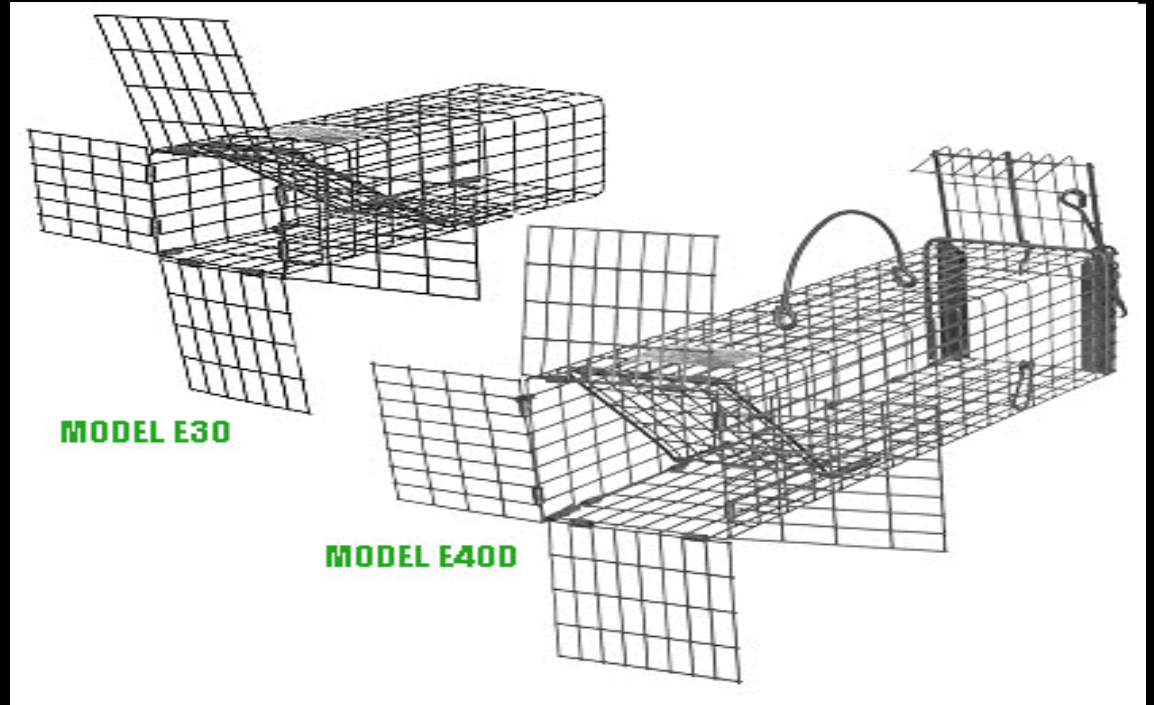
Live Trapping Large Pest Animals

- Use Cage traps
- Take to Native Animal Rescue
- Be sure to get whole family
- Have a plan
- Remember that trapping is last resort

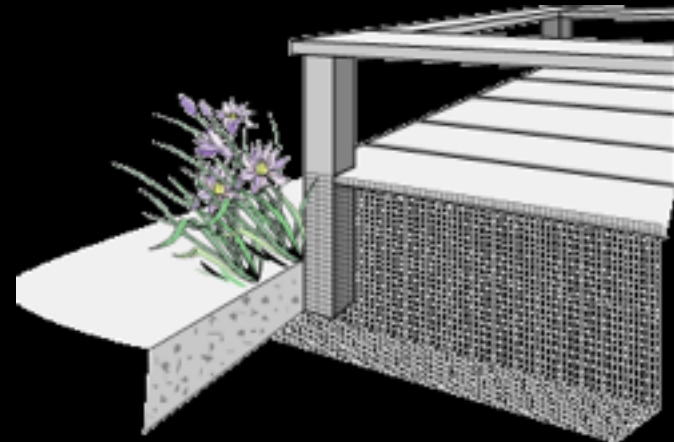
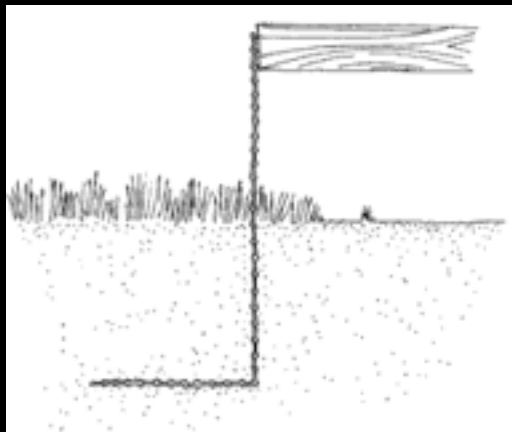
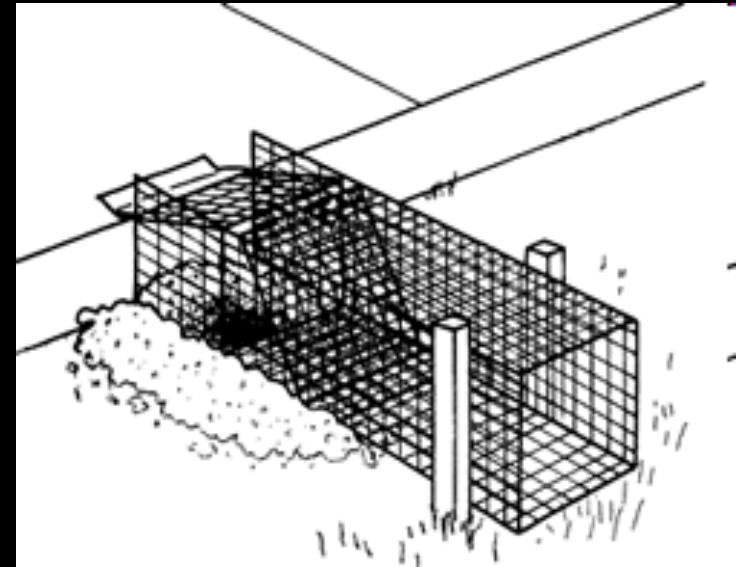
Live Traps



One Way Doors



Exclude and use one way doors



Common Skunk Damage and Access





Bucket Trap



Easy Release from Bucket Trap





DuraPoly Live Trap

-Easy to use

-Animal feels safe
and contained

-Protects trapper
from bites
diseases and
sprays

-Can be used as a
euthanization
chamber



Using Durapoly Traps



Deer and Wild Pigs

- Wire Fence is best solution
 - Inexpensive net fence
 - Electric fence problems
- Sprays and drenches are temporary and high maintenance solutions



Wild Pigs Garden Barrier



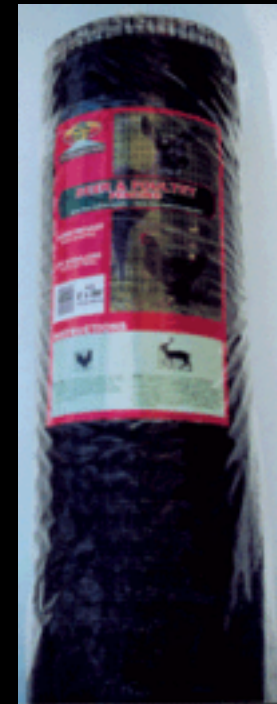
Surround your garden with fine plastic mesh. Lay it low on the ground so that it is 2 to 4 inches above the soil. Plants will grow through the mesh, but it works as a barrier. Pigs will not traverse an area where their feet may become entangled.

Electric Fence For Wild Pigs



Who to Call if you have a wild pig

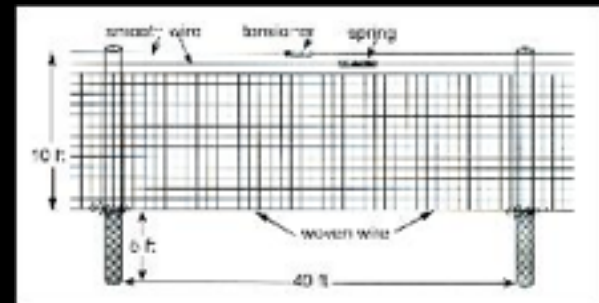
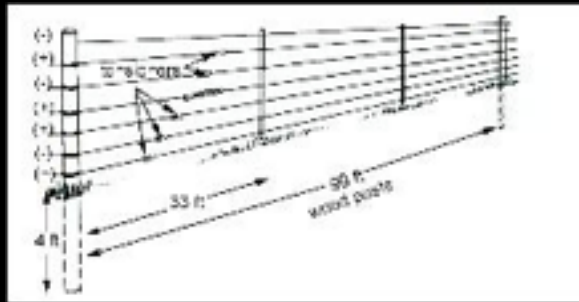
- Invite a licensed hunter(s) onto your property under DFG regulations to take the pig(s).
- Call Vector Control to come out and assess. If they trap an animal, they will dispose of it.
- Call your County Agricultural Commissioner
- Call the California Department of Fish and Game
- Call the local USDA Wildlife Services staff or County Trapper



Standard 7'7" 328 ft \$330
Heavy Duty 165' \$225
UCSC Arboretum 4272998

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High Tensile Wire Deer Fence



Resources and Questions

- A lot of information is on the web. Use keywords like “gopher trapping”, “pocket gopher”, “gopher traps”
- Talk to neighbors about joining you in this mission
- Enlist the aid of trappers or professional landscapers

Web Resources for Gopher, Mole and Vole Control

www.bugspray.com A very complete online catalog and information site with an index of pest problems and a narrative solution portion linked to products

<http://www.nwtrappers.com/catalog/traps/gophermole.asp> Also known as Cumberland's Northwest Trappers Supply is probably the most complete trap supply house in the US. Cinch, No-mole, Macabee, drenches and many other products at reasonable prices.

www.molepro.com This site is mainly concerned with moles and is packed with useful information about myths and natural history of moles. There are many tips on keeping them away and on trapping

Common Sense Pest Control by Bill and Helga Olkowski and Shiela Daar This book is available from almost any book seller and is an encyclopedia of useful non toxic information about pest control and has a great section on gophers and other burrowing animal pests.

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→ contact me

→ See this lecture online

→ Links to more information

→ Purchase traps, gopher
wire, tools and video

