Vertebrate Pest Management in Pistachio Orchards

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Vertebrate Pests in Pistachio Orchards

- Ground Squirrels
- Tree Squirrels
- Pocket Gophers
- Meadow Voles
- Birds
- Rabbits/Hares
- Wild Pigs
- Coyotes
- Deer
Vertebrate Pest Management

• Identify the pest
• Assess management options
• Develop and implement a plan
• Monitor results
• Perform continued management as needed
Species Identification
Ground Squirrels - Control

<table>
<thead>
<tr>
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<th>WINTER</th>
<th>SPRING</th>
<th>SUMMER</th>
<th>AUTUMN</th>
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<td><strong>MAJOR ACTIVITY PERIODS</strong></td>
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<tr>
<td>adults</td>
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<tr>
<td>reproduction</td>
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<td>juveniles</td>
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<td><strong>BEST TIME FOR CONTROL</strong></td>
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<tr>
<td>trapping</td>
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</table>
Meadow Voles – Biology

Vole Population Cycling

Voles/sq acre

## Control Options

<table>
<thead>
<tr>
<th>Animal</th>
<th>Habitat modification</th>
<th>Baiting</th>
<th>Burrow fumigation</th>
<th>Trapping</th>
<th>Exclusion</th>
<th>Repellent</th>
<th>Frightening</th>
<th>Shooting</th>
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</table>
Fumigation

- Aluminum phosphide
- Gas Cartridges
- Carbon Monoxide
  - PERC
  - Cheetah
Fumigants – What’s New?

• Aluminum Phosphide
  – Fumigant management plan required
  – Application sites must be posted
  – Not labeled for use within 100 ft of occupied structure

• Gas Cartridge
  – Effective against ground squirrels, not gophers
  – Not very cost effective

• PERC – Pressurized Exhaust Rodent Controller
  – Up to 6 hoses per machine (treat multiple burrows at once)
  – 50-70% efficacy with gophers; multiple treatments can reach 100% efficacy
  – Up to 100% efficacy with Ground squirrels
  – PERC machines for commercial sale must be registered with DPR
  – Approved for use in schoolyards
Baiting Options

- 1\textsuperscript{st} generation anticoagulants
- 2\textsuperscript{nd} generation anticoagulants
- Strychnine
- Zinc phosphide
- Bromethalin
- Cholecalciferol
# Baiting Options

<table>
<thead>
<tr>
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<th>1st Generation Anticoagulants</th>
<th>2nd Generation Anticoagulants</th>
<th>Zinc phosphide</th>
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<td>Moles</td>
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<tr>
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<td>Mice and Rats</td>
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Toxic Baits – What’s New?

• 1\textsuperscript{st} generation anti-coagulants
  – Now a restricted use material
  – 1-7% of raptors and kit foxes exhibited exposure

• 2\textsuperscript{nd} generation anti-coagulants
  – Restricted use material under some circumstances
  – Can only purchase at Ag Supply stores, in bulk
  – Can be used up to 50 ft from a building (labels may vary)
  – Must use approved, tamper-proof bait station
  – Higher risk of secondary toxicity
    • More potent and last longer inside animal
    • 85-90% of raptors and kit foxes exhibited exposure

• Strychnine
  – Use in ag production/cultivated areas okay
  – Cannot use in park-like areas on valley floor
Control Options—Baiting

Limited training

Thorough training

Efficacy

Field 4
Field 6
Field 7
Mean
Control Options—Trapping

Gophinator vs. Macabee Weight Comparison--Spring/Summer

Photo courtesy of Steven Albano
Pocket Gophers - Trapping

Capture Rate

Mean capture efficiency

Capture Efficiency

Mean capture rate

Day 1  Day 2  Day 3  Day 4
Tree Squirrels – Control

• Only Eastern Fox Squirrel can be taken without permit
  – Other three species need a permit to control

• Trapping

• Exclusion
Roof Rats and Deer Mice

• Difacinone bait
• Non-bearing season
• ANR Publication 8513
Bird Control Options

Chapter 5 Birds Part 1

American Coot
American Crow
Band tailed Pigeon
Blackbirds and Cowbirds (Revised)
Cedar Waxwing
Cliff Swallows
Common Raven
Crowned Sparrows

Chapter 5 Birds Part 2

Goldfinches
Gulls
Horned Lark
House Finch
House Sparrow (Revised)
Jay
Maples
Red breasted sapsuckers
Rock Doves (domestic & feral pigeons)
Starling (Revised)
Waterfowl (ducks & geese)
Woodpecker and Common Flicker

Chapter 6 Reptiles
Hares and Rabbits - Control

• Game animals
  – No license required if a rabbit is causing damage

• Traps
  – Useful for jackrabbits and cottontails
  – Live traps not recommended

• Exclusion
  – Fencing
  – Trunk guards

• Baiting
  – Only registered for use in ag situations
  – All carcasses must be recovered
Other Species of Concern
Control Options—Other Strategies

• Shooting
  – Labor intensive
  – Compliment to frightening

• Gas explosive device

• Biocontrol

• Exclusion
  – Netting
  – Tree Guards
Assessing Options

- Integrated approach
- Endangered species habitat
- Ag Commissioner
- Resources on CDPR website
  - [http://www.cdpr.ca.gov/](http://www.cdpr.ca.gov/)
  - PRESCRIBE
Useful Information

UC IPM Pest notes:

UCCE Vertebrate Pest Control Education Videos:
- http://groups.ucanr.org/vpctraining/

Vertebrate Pest Management Specialist Roger Baldwin
- http://baldwin.ucdavis.edu/

California DPR Endangered Species Query:
- http://calpip.cdpr.ca.gov/county.cfm

The Vertebrate Pest Control Handbook:
- http://www.vpcrac.org/about/handbook.php

The Internet Center For Wildlife Damage Management
Questions?

Oh Daddy, look at the kittens!