

## VERTEBRATE PEST MANAGEMENT IN NORTHEASTERN CALIFORNIA

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In northeastern California, prior to the development of sprinkler irrigation systems, much of the land that is now growing alfalfa was high mountain desert. The resident fauna of the region evolved over thousands of years and the introduction of alfalfa production systems produced an oasis in the desert.

Growers in much of northeastern California encounter one or more vertebrate pest problems each growing season. Throughout much of the region the three most severe problem rodent species are Belding ground squirrels, gophers, and meadow mice. The major large vertebrate pests are antelope and deer. Other species which occasionally cause problems include jack rabbits, yellow-bellied Marmots, and badgers.

Until 1989 attempts to control the major rodent pests usually involved the distribution of acute toxicants on various bait forms. Since the cancellation of all above ground uses of strychnine in 1989 and the cancellation of all uses of Compound 1080 in 1990, there are no effective acute toxicants available to growers to use to reduce Belding Ground Squirrel pest problems. Strychnine bait is still available for underground burrow treatment of gophers and zinc phosphide and anticoagulants are available to treat meadow mice. The two toxicants that are still registered for use on Belding ground squirrels (zinc phosphide and anticoagulants) are not readily accepted in the bait forms currently available, and thus result in less than acceptable pest population reduction. Most growers have resorted to the use of smoke bombs and shooting to reduce Belding ground squirrel populations, however, these practices usually result in less than acceptable levels of pest reduction, and can be quite expensive.

### INTEGRATED CROPPING SYSTEMS AND ROTATION

It appears that new strategies are needed to assist growers with vertebrate pest management in the intermountain area.

#### Deep Ripping:

One approach which we have worked on in Modoc County is burrow system destruction by sub-soil ripping. This method appears to have some merit but should be used in combination with crop rotation and re-invasion prevention measures.

Shorter Crop Rotation:

Another approach is to rotate out of alfalfa in three to four years rather than maintaining stands for six to ten years.

Weed Control:

It appears that the increase in Belding ground squirrel populations in older alfalfa stands is proportional to the increase in Kentucky bluegrass and other weed populations. When the squirrels first emerge in February and early March the Kentucky bluegrass is their main feed source until the alfalfa breaks dormancy and begins regrowth.

Convert from Sprinkler to Flood Irrigation:

Fields that are flood irrigated usually have fewer rodent pest problems than sprinkler irrigated fields. Where feasible, some growers may wish to convert to flood irrigation. The trade-offs are usually fewer acres irrigated with a limited volume of water and often increased costs for land leveling.

Exclusion by Fencing:

Deer, antelope, and jack rabbits can be excluded from production areas by perimeter fencing. However, this measure is usually too expensive for most growers.

Costs and Trade-offs:

All of the strategies mentioned in this presentation require more intensive management inputs, increased costs and may not result in effective pest population reductions. Growers should conduct thorough cost benefit analysis to determine if any one or combination of measures would be cost effective for their area.