



## Be on the look out for Sudden Oak Death



### Sudden Oak Death (SOD)

was the name given to a new disease that was identified in 1995 as killing tanoaks and coast live oaks. The cause of the disease has been traced to a new *Phytophthora*, a fungus-like organism in the same group as that which caused the Irish potato famine. The name Sudden Oak Death is used because of the rapid change of leaves from green to brown. A tree may be infected with the *Phytophthora* for a year or more before exhibiting this sudden change in foliage. At this time the *Phytophthora* seems to affect 3 oak species, coast live oak, California black oak, Shreve oak, and the closely related tanoak. Blue oaks and valley oaks seem to be resistant.

The pathogen that causes SOD also infects, but does not usually kill, several other woody plant species in California including rhododendron, huckleberry, California bay laurel, madrone, arrowwood, bigleaf maple and manzanita. In these species, symptoms often include branch tip dieback and spotting on leaves.

While we still have a lot to learn about this new disease, there is great concern. This disease has the potential to change an entire ecosystem, California's coastal oak woodlands. A similar event occurred in the early 1900s in forests of the eastern US when a fungus blight caused the loss of the American chestnut. In some areas of Marin County, where Sudden Oak Death was first observed, 90% of susceptible trees are infected.

This summer Contra Costa and Humboldt counties were added to the list of already-known-to-be-infested counties, bringing the total number of affected counties to twelve. The *Phytophthora* was isolated from California bay and coast live oaks trees in Wildcat Canyon. In Alameda County there is still only one confirmed infested site near Crow Canyon Blvd. in Castro Valley. Similarly, in Santa Clara County the infestation has only been confirmed in the Skyline/ Redwood Estates area near the border of Santa Cruz County.

The CDF and CA Board of Forestry have declared a "zone of infestation" which includes all 12 affected counties: Marin, Monterey, Napa, San Mateo, Santa

Clara, Santa Cruz, Sonoma, Mendocino, Alameda, Solano, Humboldt and Contra Costa. The California Department of Food and Agriculture has initiated regulations in these same counties that restricts the movement of wood, mulch, dried or preserved wreaths, bark chips, or any other product that has not been processed. These actions should help increase public awareness.

If any susceptible oak species grow on your property, look for the following symptoms:

Bleeding or seeping of a dark viscous substance near the trunk base.

Reddish or tan white fine, beetle boring dust and ambrosia beetles tunneling into the bark and/or wood. Appearance of dome-shaped fruiting bodies of *Hypoxyton* fungus, which are green when new and later turn charcoal black.

The beetle boring dust and *Hypoxyton* fruiting bodies are secondary symptoms that may occur both in trees infested, or free of *Phytophthora*. Laboratory culturing is the only way to confirm whether a symptomatic oak is infected with the *Phytophthora* that causes Sudden Oak Death.

Information about confirmation of SOD can be obtained from you local UC Cooperative Extension or the County Agricultural Commissioner's Office.

The following common-sense recommendations may be helpful to avoid the spread of Sudden Oak Death from infested counties:

Do not collect and transport plant material from infested plants (see list).

Do not transport soil or firewood.

Avoid driving or parking vehicles in areas where they may become contaminated with soil or mud.

Avoid damp soil or mud when hiking, biking, or horseback riding in infested areas.

Before returning to an area that is free of the disease, do your best to remove or wash off soil and mud from shoes, mountain bikes, pet's feet, vehicles, etc.

For more information on this issue consult the California Oak Mortality Task Force website at <http://www.suddenoakdeath.org>.

### Sudden Oak Death Science Symposium

The State of our Knowledge

December 15-18, 2002

Marriott Hotel, Monterey, California

For information on program content contact:

Rick Standiford,

University of California, Center for Forestry

510-643-5428

Visit our Web Site:

<http://danr.ucop.edu/ihrmp/sodsymposium.html>

# ***Cryptosporidium* traced to ground squirrels**

*Adapted from Livestock Lines by Franz Rulofson, UCCE Livestock and Natural Resources Farm Advisor for Tuolumne and Stanislaus Counties.*

Waterborne infection with *Cryptosporidium parvum* (*C. parvum*) has become a leading public health issue due to the severity of the disease in people with compromised immune systems and some major outbreaks in metropolitan areas. The most notable outbreak of waterborne cryptosporidiosis occurred in Milwaukee, Wisconsin in 1993 when about 400,000 people became ill from their drinking water. Since the disease-causing organisms, microscopic protozoa, can survive conventional water treatment processes, water agencies have been focusing on controlling sources.

**But what are the sources?** Shedding of *C. parvum* in feces has been confirmed in at least 80 different species of mammals. The primary source has not been identified. Although domestic livestock, grazing cattle, sheep, horses or goats seem like likely candidates. *C. parvum* contaminants pristine rivers and lakes, which are beyond the reach of domestic livestock. A statewide study, which examined the feces of 1400 cattle in California, found that shedding of *C. parvum* is primarily limited to calves less than 4 months of age. The researchers began to consider the question, "how are the young calves getting infected?"

Recent research indicates that the ground squirrel may be a significant source of *C. parvum*. They may also be responsible for infecting young cattle. Ground squirrels actively shed *C. parvum* oocysts during late summer to early winter, which corresponds to the calving season in many parts of California.

California ground squirrels (*Spermophilus beecheyi*) live in grasslands, meadows, agricultural regions, and lower-elevation woodlands from central Washington to Baja California Norte in Mexico. In California, colonies of these rodents can achieve population densities from about three to 37 adults per acre. Previous studies of gastrointestinal parasites in ground squirrels focused on Wyoming and Townsend's ground squirrels in which various species of helminths (roundworms and tapeworms are examples of helminths) and coccidians were identified.

A recent study was conducted to estimate the daily environmental loading rate of *C. parvum* for

populations of California ground squirrels. A total of 309 California ground squirrels from 17 geographic locations were tested for *C. parvum* oocysts. Sixteen percent of squirrels were shedding *C. parvum* oocysts. The mean concentration of *C. parvum* for positive squirrels was 1,527,356 oocysts per ounce of feces and for all 309 squirrels in the study was 242,194 oocysts per ounce of feces.

The average squirrel weighs 20 ounces and has a daily fecal production of approximately two percent of its body weight or four ounces per day. This means that on the average all squirrels were shedding 96,878 oocysts per day. The percentages of adults and juvenile squirrels shedding oocysts were not significantly different. Males were about one-and-a-half times more likely than females to be shedding oocysts, with males also shedding higher concentrations of oocysts than females.

Male squirrels are more likely than females to disperse from home colonies and migrate to neighboring colonies. This tendency of males to disperse to other colonies can promote the dissemination of *C. parvum* to non-relative squirrel populations.

Given the occurrence of active infection of *C. parvum* (12 to 22 percent) among the different age and sex classes of California ground squirrels during much of the season of home dispersal (late summer through early winter), it is likely that mixed cryptosporidial infections can occur when infected males, emigrate into new colonies.

California ground squirrels in this population were infected with at least two genotypes of this protozoan. Specifically, isolates consistent with previous isolation of *C. parvum* from bovine and a pattern consistent with previous isolates of *C. parvum* from porcine were found.

Having two genotypes of *C. parvum* circulating with a single host population has also been observed for humans and cattle.

# Controlling Ground Squirrels

This article was adapted from the "Prevention and Control of Wildlife Damage" publication.



In the United States, there are twenty-three species and 119 sub-species of ground squirrels. The most numerous and troublesome squirrels in California are the rock ground squirrels and the California ground squirrels.

Rock squirrels inhabit rocky areas. They live in rocky canyons or on rocky hillsides and environments, but they adapt to disturbed environments and will live along stonewalls and roadside irrigation ditches.

California ground squirrels occupy grasslands and savannah-like areas with mixtures of oaks and grasslands. They avoid moderate to heavily forested areas or dense brushlands. They generally prefer open space, but they are highly adaptable to disturbed environments and will infest earthen dams, levees, irrigation ditch banks, railroad rights-of-way, beneath buildings, and rural areas. They thrive along the margins of grain fields and other crops.

Compared to other rodents, ground squirrels have a unique annual life cycle. Most hibernate in the winter. Shortly after emerging from hibernation in the late winter or early spring, they breed. They produce only one litter annually, averaging about 7 to 8 young. Gestation is 28 to 32 days and the young are born in a nest chamber in the burrow system. The young are born hairless with their eyes closed. They are nursed in the burrow until 6 to 7 weeks of age and start feeding on green vegetation when they are one-third adult size.

Along with a unique life cycle, abrupt changes in the squirrels diet occur and are very important in planning a control strategy. California ground squirrels are well adapted to our Mediterranean type climate. Following emergence from hibernation, they feed nearly exclusively on lush green vegetation. This diet continues throughout the breeding, gestation and nursing periods. As the grasses and herbaceous vegetation begin to dry up in climates and produce seed, the squirrels switch to eating mainly fruit or seed.

## Control Methods:

**Exclosure.** In small areas, squirrels can be excluded by constructing fences, two feet deep in the soil and sheet metal four feet tall.

**Cultural Methods.** Flood irrigation discourages ground squirrels in orchards, alfalfa, and pasture lands. Deep discing or plowing destroys their habitat.

**Poison baits.** Rodenticides are the most economical of all approaches. Currently, zinc phosphide is the only acute toxicant (single feeding to produce death) that is registered. Zinc phosphide, for the most part has replaced 1080 and strychnine for squirrel control. The timing of baiting programs is critical to good control. Bait only when all the squirrels are out of hibernation and are actively feeding on seeds.

**Fumigants.** Ground squirrels can be killed in their burrow by systems of introducing one of several toxic or suffocating gases, such as phosphine gas or carbon monoxide. Fumigation should be conducted when the squirrels are out of hibernation. Hibernating squirrels plug their burrows with soil to separate and protect themselves from outside and from the toxic gas.

**Trapping.** Although labor-intensive, trapping can be highly effective in reducing low to moderate squirrel populations over relatively small acreage or where poison baits may be inappropriate. A good rule of thumb is one trap for every 10 to 15 squirrels present. If too few traps are used, the trapper becomes discouraged before the squirrel population is brought under control.

**Shooting.** If local laws permit, shooting with a .22 rifle may provide some control where squirrel numbers are low.

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## **Selling the Whole Carcass**

One issue you will face in direct marketing is how to sell both high- and low-end cuts of beef. The conventional beef market deals with the problem by using price. Chucks, hamburger, and rounds are much cheaper than loin steaks and tenderloins. You might be able to easily develop a market with a restaurant for 50 pounds of tenderloins per week, but you will have to balance that demand with a customer willing to buy 1,000 pounds of hamburger per week. If you can't match up customers with supply, you may end up having to sell some of your meat on the conventional market for a lot less.

In considering selling the whole carcass, you should have a good handle on how much yield per cut a carcass will give you. As a rule of thumb, a 1,000 pound live animal will yield about 350 pounds of saleable beef. This is different from the hanging carcass weight, which has not been trimmed or de-boned. The following table is an example of how a carcass can be cut up and how each cut will contribute to your bottom line. Actual weights may vary + or - 5% depending on genetics and slaughter weight.

<b>Cut</b>	<b>Lbs / Carcass</b>	<b>Price / pound (\$)</b>	<b>Gross (\$)</b>
Tenderloin	12	9.60	96
New York Strip	14	6.40	89
Ribeye Steak	24	5.33	127
Fajita / Stir Fry	6	3.20	19
Round Roast	67	2.76	184
Ground Beef	170	1.75	297
<b>Totals</b>	<b>293</b>	<b>4.84 (Average price)</b>	<b>812</b>

In this example, ground beef and round roast made up 81% of the total weight sold and contributed to 59% of the total value of the carcass. The majority of the carcass is the lower value cuts.

Several producers of grass-fed beef address this problem by selling split ½ or ½ carcasses. For example, see <http://www.morrisgrassfed.com>  
or  
<http://www.eatwild.com/california.htm>

## **Pricing your Product**

In order to determine a price for your product you need to understand the breakeven price to produce a finished animal and a delivered, cut and wrapped product. You must consider your cost to produce a calf, including the costs to maintain cows and bulls, and forage costs including hay to finish the calf. To those costs you will need to add the costs of processing, storage, transportation, packaging, distribution and marketing. Once you know the breakeven, you can add a profit to make the enterprise sustainable. To get an idea of what other grass-feed beef producers are charging for their product check out:

<http://www.grasslandbeef.com>,  
<http://texasgrassfedbeef.com>,  
<http://www.eatwild.com>.

## **Transporting your Product**

There is an excellent infrastructure in this country for processing, packing, transporting, and distributing beef. Unfortunately, none of it is geared toward the small producer. It will cost almost as much to ship 100 pounds of beef across town as it does to ship one ton across the country. It may take some creativity to be able to get your grass-fed beef to the consumer's table.

## **Providing a Desirable Product Year Around**

Consumers are use to having fresh beef available year around. You will either have to develop multiple breeding seasons or buy from other ranchers over a large geographical area. If you can convince your consumers to accept a frozen product you will have an easier time providing product year around. You might be able to provide a seasonal product, but you will have to educate your consumers about its

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*(Challenges continued from page 5)*

seasonality. Even if you only provide a seasonal product, providing a desirable grass-fed beef product will likely require significant changes to your current operation. For starters, cattle sold as grass-fed should be raised only on forage or hay. They should not be fed grain or grain-based supplemental products. For optimum value and return, they should reach a finished condition on forage at less than 30 months of age. Producing a desirable grass-fed beef product may require different genetics than you currently have in your herd.

### **Educating Consumers About Your Product**

Finally, selling your product direct to a customer will put you directly in touch with any concerns they may have regarding your product. You will need to educate consumers about the different appearance and cooking requirements of grass fed beef. At certain times of year, grass-fed beef's fat will have a yellow color. Consumers who are use to the white fat of grain-fed animals are unaware that the yellow fat is Vitamin A or beta carotene. Grass-fed beef needs cooking instructions. Most customers will also not realize that it needs to be cooked more slowly than you would cook grain-fed beef.

For a comprehensive report on Grass-Fed Beef, including information on consumer acceptability, market development and economics see: <http://www.sarep.ucdavis.edu/grants/reports/nader/>

## **Ground Squirrel Control Products Available for Sale at County Department's of Agriculture**

<b>County</b>	<b>For more information call</b>	<b>Products</b>	<b>Time of Use</b>
Alameda	(925) 245-0853	Anticogulant baits, Smokebomb cartridges	Summer Spring
Contra-Costa	(925) 646-5250	Anticogulant baits, Smokebomb cartridges	Summer Spring
San Mateo		None	
Santa Clara		None	

*(Controlling continued from page 4)*

In one experimental study, 12 California ground squirrels were found to consume about 1,000 pounds of range forage. In another study, it was calculated that 200 ground squirrels consumed the same amount as a 1,000 pound steer. The ground squirrel has caused an estimated 30 to 50 million dollars of agricultural and other damage annually in California alone.



## ANNUAL RANGELAND MANAGEMENT SHORT COURSE

December 10-12, 2002

This short course is designed for range management professionals, agency staff, open space managers and others who manage foothill rangelands. The main objective of this course is to provide an understanding of the ecology and management of annual rangeland ecosystems. The instructors are farm advisors, specialists and faculty from UC Cooperative Extension, UC Davis and UC Berkeley including: Jim Bartolome, Kevin Rice, Randy Dahlgren, Bill Frost, Neil McDougald, Mel George, and Joe DiTomaso.

### ***The short course will cover the following topics:***

#### RANGE ECOLOGY AND MANAGEMENT

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Natural History</li> <li>• Vegetation Dynamics</li> <li>• Nutrient Cycling</li> <li>• Management Goals</li> <li>• Managing Livestock and Grazing</li> </ul> | <ul style="list-style-type: none"> <li>• Managing Vegetation<br/>annuals,<br/>native perennials,<br/>weeds,<br/>habitat,<br/>riparian areas</li> <li>• Vegetation Monitoring</li> </ul> |
|--|---|

Contact Mel George at [mrgeorge@ucdavis.edu](mailto:mrgeorge@ucdavis.edu) or 530-752-1720 with questions and information on group (5 or more) reservations

### REGISTRATION FORM

Organization:	Name:	
	Address:	
Phone:		
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Email:	State:	Zip:
<p><b>Short Course Fee is \$250 before October 1, 2002 and \$300 after October 1 (breaks and lunches included)</b></p> <p>Make checks payable to: UC Regents</p> <p>Send registration and checks to: RANGELAND SHORT COURSE, Agronomy and Range Science, University of California, One Shields Avenue, Davis, CA 95616</p>		

Society for Range Management CEU credits will be available.

**CALIFORNIA RANGELANDS RESEARCH AND INFORMATION CENTER**



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University of California Cooperative Extension  
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Mark your calendars! Look for more details at

[www.casrm.org](http://www.casrm.org)

**Invasive Species:**

**A Comparison of Hawaii and California**

Presented by the California-Pacific Section Society for Range Management

January 4-6, 2003

Kailua-Kona, Hawaii

Invasive species are a critical issue on rangelands throughout the United States. California and Hawaii are on the leading edge of dealing with many of these weed species, with some obvious similarities and surprising contrasts between the two states. This innovative educational program consists of a half day indoor session where cutting edge information on the introduction and control of a number of noxious weed species will be presented.

You will spend the remaining days experiencing Hawaiian rangelands with a hands-on approach to learning about a variety of invasive species on the Big Island. This field portion will be conducted to provide information on the problem in Hawaii and the corresponding situation in California.

The host hotel for the Invasive Species program is King Kamehameha's Kona Beach Hotel in Kailua-Kona. Reservations can be made at the conference rate of \$120.00 by calling the hotel at 1-800-367-6060 and stating that you will be attending the Society for Range Management program. The conference rate will be honored a few days prior to and following the meeting.