

BIOLOGY, LEGAL STATUS, CONTROL MATERIALS, AND DIRECTIONS FOR USE

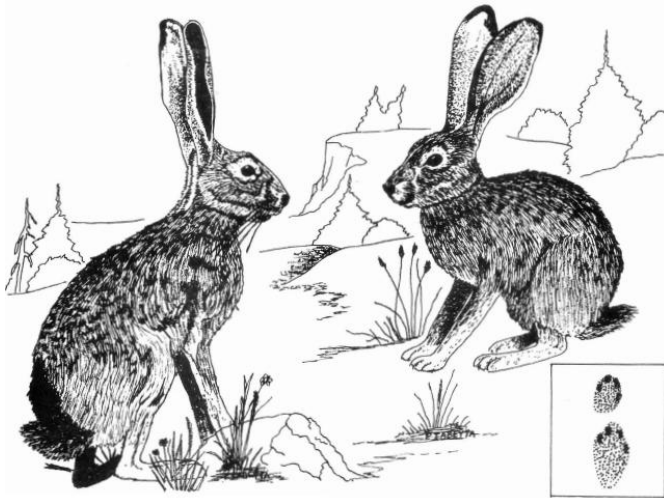
Rabbits - Black-tailed jackrabbit, Cottontail, Brush rabbits

Black-tailed jackrabbit *Lepus californicus*

Cottontail rabbit *Sylvilagus audubonii*

Brush rabbit *Sylvilagus bachmani*

Family: Leporidae



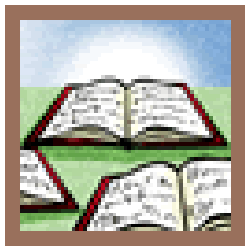
Introduction: Three rabbits are common to California: the black-tailed jackrabbit, the cottontail, and the brush rabbit. Of these, the jackrabbit is the most destructive because of its greater size and occurrence in agricultural areas. Cottontails are common pests in landscaped areas. Hereinafter ‘rabbits’ shall refer to all three species unless distinguished.

Rabbits can be destructive and eat a wide variety of plants, grasses, grains, alfalfa, vegetable, fruit trees, vines, and many ornamentals. They also cause damage to plastic irrigation through their gnawing activities.



Identification: The jackrabbit is about the size of a house cat 17 to 22 inches long. It has long ears, short front legs, and long hind legs. They populate open or semi open lands in valleys and foothills.

Cottontail and Brush rabbits are smaller and have shorter ears. They inhabit bushy areas where cover is dense and landscaped areas provide excellent habitat. They can also be found beneath junipers and other large, low-growing evergreen shrubs.



Legal Status: Black-tailed jackrabbits, cottontails, and brush rabbits, are classed as

game mammals by the California Fish and Game Code.. There is an important distinction between the three species as to when control is permitted. Jackrabbits may be taken (i.e., killed or trapped) anytime or in any legal manner by the owner or tenant of the premises, or employees thereof, if they are damaging growing crops or other property, which includes ornamental plants and irrigation lines.

Cottontails or brush rabbits may be killed or trapped by the owner or tenant of the land, or by any person authorized in writing by such owner or tenant, when the rabbits are damaging crops or forage. If any person other than the owner or tenant transports cottontails or brush rabbits from the property where they were taken, they must carry written authority from the owner or tenant. All three rabbit species cannot be sold i.e. for fur or meat. Recent legislation clarification from the California Attorney General (Opinion 06-109, 2007) makes it lawful to kill cottontail rabbits that are materially harming landscaping, ornamental plants, or gardens. In fact the Attorney General also clarified that the taking could be done by an individual or employee using air powered pellet projectiles (air rifle), at anytime, within 150 yards of an occupied residence, if the rabbits are materially harming landscaping, ornamental plants, or gardens, and such use is in conformity with applicable local ordinances.



Damage: Alfalfa and other forage, hay, grain, various truck and field crops, and the bark and tender shoots of small orchard trees and young grapevines.

Rabbits can be very destructive in nurseries, gardens and landscaped places. This is particularly true where wild or uncultivated lands border residential zones, parks, greenbelts, or other landscaped places. Open lands such as uncultivated, wild areas provide resting and hiding cover during the day within easy travel distances to prime, irrigated food sources.

The cosmopolitan tastes of rabbits are well illustrated by the following partial list of crops and plants they damage: vegetables (beans, beet, broccoli, carrot, lettuce, peas); tree and berry crops (almond, apple, blackberry, cherry, citrus, pistachio, plum, raspberry, strawberry); herbs (cilantro, parsley); and ornamental plantings (various flowers, shrubs, trees, and turf). Rabbits also gnaw and cut plastic irrigation lines.



Most rabbit damage is close to the ground, except where snow allows rabbits to reach higher portions of plants. Rabbits use their incisors to make a characteristic diagonal, 45° cut when clipping off woody twigs, buds from saplings, or flower heads. Twig clipping by rabbits is sometimes confused with deer browsing. Deer damage can be identified easily if it occurs above a height that rabbits can reach (about 2 feet) and by careful examination of the damaged twigs. Deer have no upper front teeth and must twist and pull when browsing, leaving a ragged break on the branch. Rabbits clip twigs off cleanly, as if with a knife.

Rabbits tend to gnaw the smooth, thin bark from young trees. The rough bark of older trees discourages gnawing, although old damage and gnaw marks are often present on old bark along with fresh patches of

gnawing in areas of younger growth. Gnawing can completely girdle a tree, and clipping can remove the terminal shoot and lateral branches from plants. Damage by cottontails and brush rabbits is often concentrated in areas near escape cover. Jackrabbits, however, will feed far into open areas and can eat 1/2 to 1 pound of green vegetation each day. Cottontails have been especially damaging to nursery stock and irrigation systems.

Tularemia, or rabbit fever, may be carried by rabbits. This disease is relatively rare in humans but can be contracted by handling an infected rabbit with bare hands or by eating insufficiently cooked rabbit meat.

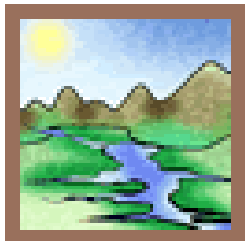


Range: The Black-tailed jackrabbit is found throughout California from below sea level to above 12,000 feet. Elsewhere it ranges throughout the southwestern United States, southern Great Plains, and no further north than central South Dakota. Cottontails and Brush rabbits range throughout most of California except the northern most parts of the State.

[Black-tailed Jackrabbit](#)

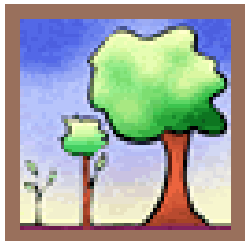
[Cottontail](#)

[Brush rabbits](#)



Habitat: Jackrabbits typically occupy open grasslands and sparsely vegetated deserts in the California valleys and foothills. They do not build nests but make a depression in the soil beneath a bush or other vegetation. They are relatively sparse in the humid coast region and in the higher mountains.

Cottontails and brush rabbits inhabit brushy areas where vegetative cover is dense. Landscaped areas are an excellent example of this. They also find cover under piles of rock, brush or debris.



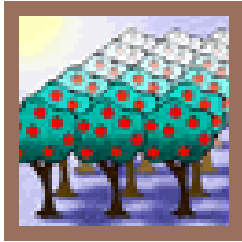
Biology: The jackrabbit is a hare rather than a rabbit, because the young are born full furred and with their eyes open and they can hop about when born. Hares differ from rabbits in anatomy and in the lack of burrowing or nesting; although individual hares often have a more or less regular retreat or "form" at the base of a bush or clump of grass. Jackrabbits rely upon speed and dodging to escape enemies. They live chiefly in open places, seldom inhabiting dense brush or woods. Grazed lands tend to have larger jackrabbit populations than areas with higher grass cover.

Hares are most active from early evening to early morning. Succulent grasses and a wide variety of green vegetation are the principal foods eaten. Arnold (1942) estimated that 12 hares eat as much as one sheep, and about 62 rabbits consume the same equivalent as a 1,000 lb. range cow. Vorhies and Taylor (1933) estimated the equivalents were 30 hares for one sheep and 148 hares for one 750 lb. cow after correcting for the 60% mesquite and cactus browse (Hares eat their own "soft" feces during the daytime when resting,

apparently to satisfy vitamin needs. "Hard" pellets are not eaten.

In general, the breeding season runs from early spring to late summer, although breeding may continue all year where winters are mild. Females may produce more than one brood a year, especially on irrigated land. After a gestation period of about six weeks, a litter of 1 to 8 young, usually 3 or 4, is born; the greatest number of young are produced in spring months. A year old female may produce 14 or more young each year. Some young are apparently born in a "form" which may be a fur-lined depression or a simpler shelter; the young are more nocturnal than adults and are rarely seen until half grown. It is presumed that the mother returns to her young to suckle them at night, but the age of weaning has not been established.

Coyotes, bobcats, and eagles are among the principal natural enemies of hares. Jackrabbit populations build up to cyclic high levels about every seven years followed by a drastic reduction in numbers by disease. The period of the cycle may vary from five to ten years. Crop damage is more severe in years when they are abundant.



Damage Prevention and Control Methods

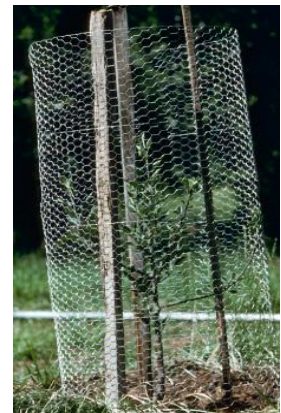
A number of methods can be used to reduce rabbit damage but physical exclusion, trapping, and, to a lesser degree, repellents are recommended for protecting garden and home areas. In cases where these methods are not practical, contact your local farm advisor or agricultural commissioner for further information.

Exclusion: Rabbits cause extensive economic losses to agricultural, horticultural and forestry interests. Landowners and occupiers therefore require cost-effective and humane means of controlling rabbit numbers. One of the most common forms of managing the problems rabbits pose is to deny them access to vulnerable areas. Fencing is currently recommended as a humane and environmentally acceptable means of excluding rabbits and thereby reducing damage to agricultural, horticultural or forestry interests.

Exclusion is most often accomplished by the construction of fences and gates around the area to be protected. Woven wire or poultry netting should exclude all jackrabbits from the area to be protected. To be effective, the fence must be of mesh not greater than 1-1/2 inches, 30 to 36 inches high, with the bottom 6 inches turned outward and buried at least 6 inches below ground level. Rabbits can and will jump, and dig.



However, the aforementioned provisions should negate this. Turf should be placed at intervals on the lapped portion of the netting to hold it firmly in place, vegetation will grow. Frequent fence maintenance checks are recommended. While fence netting can be erected stand alone. If more substantial fencing is required use fence posts. Fence posts should be 5` 6 inches high, 2` 3inches diameter and spaced every 16yds. Two steel wires should be strung between posts and the netting attached using metal rings. End posts should be placed at corners or bends. Include tight fitting



gates with sills for access and to prevent the rabbits from digging below the bottom rails. Trials conducted by the UK Forestry Commission show a 10 year lifespan for steel fencing constructed in the manner discussed.

Electric netting and electric strained wire fences have been used with success. Ideally, fences should be erected to surround fully the area to be protected. If this is not practical a strip fence, which extends at least 150yds beyond either end of the problem area, may be used. Tree Guards and Plant Protectors 2ft high mesh guards or shelters, in a range of diameters, are sufficient for protecting newly planted trees and shrubs from browsing and bark-stripping. Split plastic tubes can be fitted over the stems of whips and standards, and plastic spiral guards used on feathered trees. Spiral guards must be wound between branches and it is important to ensure that no gaps are left between the spirals - rabbits are capable of gnawing bark through a space as little as 5mm wide.

Habitat Modification: Remove hiding cover to discourage cottontails and brush rabbits, especially in suburban habitats where alternate habitats may be limited. Remove brambles, piles of brush, stones, or other debris where rabbits might hide. Control vegetation along fence rows, ditch banks, or brushy areas. Keep in mind vegetation management may affect other wildlife, notably songbirds. Removing cover will probably have little effect on jackrabbits because they can use cover that is often great distances from the feeding sites. Conversely, to guard against jackrabbit damage, you should encourage taller and denser vegetation. It is not recommended to supply alternate food sources for rabbits as a method to reduce damage to specific plants. One exception may be for short-term control until other direct methods of control can be used. However, the availability of alternate foods may attract more rabbits and lead to further damage. Although rabbits eat most plants when food is in short supply, some plants are preferred. A list of plants most often preferred is:

Most Often Eaten:

- Annuals and Perennials
- Asters
- Hostas
- Hybrid lilies-Asiatic, Oriental
- Impatiens-young flowers on young plants
- Pansies
- Tulips
- Shrubs and Young Trees
- *Amelanchier* spp. (serviceberry, juneberry)
- *Aronia* spp. (black chokeberry, red chokeberry)
- Baldcypress
- Eastern white pine
- *Euonymus* spp.(burning bush, wahoo)
- Honeylocust
- *Hydrangea quercifolia* (oakleaf hydrangea)
- *Malus* spp., (apples, flowering crabapples) *Prunus* spp. (plum, cherry, almond, peach)

Frightening: devices, such as noisemakers and flashing lights, are generally not effective. Ultrasonic units, which rely on sound waves to repel rabbits, are not effective. A dog loose within the area to be protected can be somewhat effective, depending on the dog, in keeping rabbits away.

Fumigants: Not recommended. The rabbit species do not create burrows sufficient to make fumigants effective.

Repellents:

Various chemical repellents are registered to prevent rabbit damage. They may be useful when applied to trees, vines, or ornamentals. Repellents can be classified as area (odor), taste, or contact (sticky) repellents. Research has shown that repellents with putrescent whole-egg solids can reduce browsing by rabbits.

Apply repellents before damage occurs and reapply them frequently, especially after a rain, heavy dew, or sprinkler irrigation, or when new growth occurs. In all cases, follow the label directions for the repellent you are using.

The usefulness of repellents is limited. They work best to protect woody plants during the early years before they bear fruit or during winter. Most cannot be used on plants or plant parts to be eaten by humans. Repellents usually fail when used in a vegetable garden, which contains highly preferred rabbit foods, even if the repellents are registered for use on edible crops.

Toxic baits:

CDFR labels

Jackrabbits: 0.005% Chlorophacinone grain bait

0.005% Diphacinone grain bait

Cottontail Rabbits: 0.005% diphacinone grain bait (Orange County only).

These are registered for use in certain agricultural situations to resolve crop damage problems where jackrabbits are numerous, but their use in urban and suburban situations is not practical. Rabbits killed by toxic baits should be collected and disposed of in a sanitary landfill or by deep burying to comply with label instructions. Because the rabbits are likely to die outside the baited property, carcass recovery is almost impossible.

Predators:

Rabbits serve as food for a number of predators, including hawks and coyotes, but in urban and suburban situations, the greatest threat is from cats and dogs. Although relatively vulnerable to predation, rabbits generally cope well and maintain their populations in spite of this threat.

Trapping:

Cottontail and brush rabbits are relatively easy to trap alive. However, jackrabbits are very difficult to capture in this manner as they are often reluctant to enter confining spaces. Live trapping of cottontails and brush rabbits is not recommended because it creates the dilemma of what to do with the trapped animal. Rabbits can carry certain diseases such as tularemia and are considered agricultural pests. The California Fish and Game Code, makes it illegal to relocate and release without a written permit. Handling a live rabbit also creates the possible hazard of disease transmission to the trapper. They can be dispatched by quickly breaking their necks, although experience is necessary. Euthanasia with carbon dioxide (CO₂) gas is considered humane.

A number of kill traps are effective for cottontails and brush rabbits. They can be trapped with a Conibear trap (No. 110), which kills the animal outright. The Conibear trap can be placed inside a covered box constructed out of 3/4-inch (1.9cm) exterior plywood with a 4-inch (10.2cm) wide entrance. To further reduce hazards to children, pets, and poultry, position the trap back from the entrance. Slots at the back end of the box help in positioning the trap, as does the hinged lid. The hole cut in the top of the hinged portion and covered with 1/4-inch (0.64cm) mesh hardware cloth serves as a means to check the trap or bait. Other kill-type traps, such as a tunnel trap, are also available.

Place traps near cover where the rabbits feed or rest. For bait, use whatever the rabbits are feeding on; carrots, cabbage, fresh green vegetables, or apples. Place the bait at the back of the trap; some placed just outside the trap is helpful too. Be aware that rarely is one trap enough. In a garden type setting three to six traps are recommended. Check traps daily to replenish bait or remove the catch. Trapping rabbits requires a trapping license issued by the Department of Fish and Game.

Other Methods

Shooting: can be an effective means of eliminating small numbers of rabbits where it is safe to do so in rural locations, but it is prohibited in urban and suburban locations. Best results are achieved in early morning or around dusk when rabbits are more active. Check both local and game regulations for license requirements and any restrictions on shooting in your area.

REFERENCES AND ADDITIONAL READING

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