

RODENTS PREVENTION AND CONTROL



Santa Cruz County Mosquito & Vector Control

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Protecting Public Health Since 1994



RODENT SERVICES

Residents, property managers, and businesses in Santa Cruz County can request a site visit to assist them with rodent issues to protect public health. Our services include an exterior inspection of your home in which a certified technician looks for rodent entry points and gives advice on preventing rodents from getting into your home. Employees do not bait or trap, but provide guidance and recommendations such as blocking openings and reducing food sources and hiding places.

GENERAL INFORMATION

Control strategies may vary depending on pest species.

ROOF RAT *Rattus rattus*

(also known as black rat, fruit rat or ship rat)

- Tail** Longer than head and body combined
- Body** Slender, belly can be white, light gray, or light tan
- Ear** Large
- Eye** Large
- Nose** Pointed
- Habits** Climb
- Feces** Smaller, pointy ends (actual size)



Roof Rat (*Rattus rattus*)**



NORWAY RAT *Rattus norvegicus*

(also known as wharf rat, brown rat, sewer rat, common rat)

- Tail** Shorter than head and body combined
(If you fold tail back, it cannot reach its head)
- Body** Heavy, thick
- Ear** Small
- Eye** Small
- Nose** Blunt
- Habits** Burrow, can enter through a hole the size of a quarter, likes water
- Feces** Rounder, blunt ends (actual size)



Norway Rat (*Rattus norvegicus*)**



HOUSE MOUSE *Mus musculus*

- Feet** Small
Head Small
Habits Common in homes and buildings, can enter through a hole as small as a dime
Feces Small (actual size)



House Mouse (*Mus musculus*)***

DEER MOUSE *Peromyscus maniculatus*

- Feet** White
Ears Large, no fur
Body Grey to brown on top, white belly
Habits Will invade cars and structures in rural areas
Feces Small (actual size)



Deer Mouse (*Peromyscus maniculatus*)****

DUSKY-FOOTED WOODRAT *Neotoma fuscipes*

- Feet** Speckles of dark
Ears Round
Body Tan to dark with white belly
Tail Furred, long (as long as their body)
Habits Found in wooded areas; builds stick mounds; native and protected
Feces Medium (actual size)



Dusky-Footed Woodrat (*Neotoma fuscipes*)*****

WHAT CAN YOU DO?

Tell your neighbors about our service . An effective way to get rid of rats on your block is to work together with your neighbors. If your neighbors have rats, so do you! Santa Cruz County Mosquito & Vector Control (SCCMVC) can provide group talks on rodent control for your neighborhood, home owner's association, or mobile home park community. Contact us for service.

DISEASES

RODENT	DISEASE				
	HANTAVIRUS A viral disease that may be contracted through the direct contact with or inhalation of aerosolized infected rodent urine, saliva, or droppings.	SALMONELLOSIS A bacterial "food poisoning" that may be transmitted when rodents contaminate food by contact with their own feces or urine.	LEPTOSPIROSIS A bacterial disease that may be contracted through contact with water or ingestion of food contaminated with urine of infected rats.	ARENAVIRUS A viral disease that may be contracted through the direct contact with or inhalation of aerosolized infected rodent urine, saliva, or droppings.	PLAGUE Fleas on rodents can host fleas that carry the bacteria that causes plague. People become infected with plague bacteria most commonly through the bite of an infected flea.
House Mouse		✓	✓		
Roof Rat		✓	✓		✓
Norway Rat		✓	✓		✓
Deer Mouse	✓	✓			
Wood Rat		✓		✓	
<p>✓ Indicates rodent is known to vector disease. Rodents are not known to carry rabies.</p>					

MITES

Rat infestations are sometimes paired with mite bites. Bites often occur at night and appear on the torso region. Trapping rodents and keeping them out of the home (basement, attic, walls, etc.) is key to getting rid of mites. Once exclusion is achieved, mites will only exist for one month because they cannot survive on human blood. Mites are the size of a period on a page but are visible when they move.

Our services also include mite identification. You can provide samples for our laboratory by dabbing clear tape around the walls, baseboards, and electrical sockets. Our staff can provide more instruction on mite control depending on your situation.



Tropical Rat Mite
(*Omithonyssus bacoti*)*****

RECOGNIZING RAT ACTIVITY

The homeowner should periodically watch for these things:

- Damaged, partially eaten walnuts, acorns, oranges, avocados, dates, or other fruits and nuts.
- Broken snail shells under bushes, on fences, or near or in nesting sites.
- Signs of gnawing on plastic, wood, or rubber materials.
- Greasy rub marks caused by the rat's oily fur coming in contact with painted surfaces or wooden beams.
- Rat droppings (feces) are usually signs of significant rat activity. The droppings are randomly scattered and will normally be found close to a rat runway, feeding location, or hiding places.
- Droppings found in forced air heaters, swimming pool heater covers, and water heater closets.
- Visual sighting on utility cables, tops of fences, or in trees.
- Sounds (gnawing, scratching) from attics, sub-floor areas, and walls.



*Rats often use the same trails repeatedly.**



*Gnawing on wires can result in fires.**



Droppings on fenceline.

WHERE RATS AND MICE COMMONLY ENTER HOMES

- Broken or missing foundation vent screens.
- Vent screens where foundations are faced with brick (screens may have space at bottom or sides)
- Holes in foundation vents or screens where new piping or wiring was installed.
- Outside foundation crawlspace entry with poorly fitted door or no tight covering.
- During construction, space not closed where two different roof planes meet (called a “birdsnest” by carpenters).
- Spaces between heavy roof shakes (especially along ridge of roof).
- Attic vent screens broken or left off.
- Space between metal flashing for vent pipe from stove fan (also sometimes enters kitchen cabinet along-side vent pipe).
- Enters garage under or on sides of large garage door; under side door to garage where threshold is left off and through doors left open.
- From garage, rats enter attic or under house: between roof boards on shingle roofs; into holes where piping enters walls or through foundation; along rafters, gnawing through common wall sheet rock.
- Holes in exterior walls of house.
- Holes from new construction; “add-ons” around areas where new construction meets old.
- Poorly fitting outside doors, leading to garage, patio, etc.
- Open wooden meter boxes (in older homes).
- Brick chimneys which have settled away from house.
- Tile roof missing end caps.



Check for loose mesh in foundation vents.



Open space at threshold of doors.

HABITAT & FOOD

Rats avoid open spaces. Many plant species in Santa Cruz County can harbor rats. Rats may live or establish nests in the following areas. These plants should be trimmed 10 inches from the ground and away from house if possible.

- Ivy *Hedera spp.*
(thin down to ~5 inches)
- Arbovitae *Thuja orientalis*
- Bamboo *Bambus spp.*
- Palm trees
(use tin sleeve flashing on trunk)
- Blackberries *Rubus spp.*
- Honeysuckle
Lonicera caprifolium
- Italian Cypress
Cupressus sempervirens
- Juniper *Juniperus spp.*
- Lombardy poplar – Italice
Populus nigra
- Pampas grass *Cortaderia selloana*
- Star jasmine
Trachelospermum jasminoides
- Yucca *Yucca spp.*
- Other heavy shrubbery

KEEP CLIMBING PLANTS OFF THE STRUCTURE OF HOUSE

Rats prefer to feed on:

- Avocados
- Berries
- Citrus
- Grass and bird seed
- Ivy
- Nuts
- Pet food and animal feed
- Ripe fruit
- Snails

PICK RIPE FRUIT AS OFTEN AS POSSIBLE

Other shelter can include:

- Storage boxes
- Storage sheds
- Wood and lumber piles
- Your home and deck
- Compost (Enclose compost in a bin and do not put next to house)



Ideal rat nesting area: dark space between fences covered with ivy.



Watch for signs of rats such as hollered-out oranges either on the ground or still attached to the tree.

BIRD FEEDERS

- Bird feeders can attract rodents to your home and disrupt the natural feeding habits of wildlife.
- Feeding wildlife of any kind is not advised as it can have negative effects on their natural habits, and can be considered harrasment according to CA Fish & Wildlife Code of Regulations.
- Rodents will feed directly from bird feeders and from the excess that falls on the ground. Be sure to sweep up fallen seed.
- Know which birds you are trying to feed and look for bird specific seeds.
- Corn and millet in mixtures are too large for most birds. Smaller birds will toss out and scatter these grains, providing food for rodents.
- You can find bird feeders with built-in “baffles” (physical barriers, covers, etc.), or you can add one above and/or below your feeding station.

For detailed instructions and ideas, please refer to: Pennisi, L. and S. M. Vantassel. 2012. *Selective bird feeding: deterring nuisance wildlife from bird feeders*. Extension Circular. University of Nebraska – Lincoln Extension. EC1783. extensionpublications.unl.edu/assets/pdf/ec1783.pdf



Tube Baffle



Tree Flashing



Seed Catcher



Chicken Coop^{††}

CHICKEN COOPS

- Chicken coops can attract rodents to your property.
- Secure chicken feed in a rodent proof container such as a metal garbage can. Ensure your coop’s floor is secured on all sides to prevent rodents burrowing beneath it. You can use 1/4” hardware cloth or cement on the floor.
- Use a rodent-proof feeder with a treadle, or use a feeding tray to prevent food from being strewn around the coop.

ENVIRONMENTAL MANAGEMENT

Rodent survival depends upon the existence of three basic environmental factors.

FOOD, WATER AND HARBORAGE

Good environmental management practice is the most effective approach to rat control. Environmental sanitation and good house keeping are the first steps in a successful rat control program. The homeowner can help control rat populations by practicing the following:

- Harvest fruit and nuts as they ripen.
- Pick up fallen fruit and nuts on a daily basis.
- Never leave uneaten pet food outside overnight.
- Keep palm trees and yucca plants well trimmed. Algerian ivy and other thickly matted plants should be removed or trimmed well away from the roof, walls, fences, utility poles, and trees.
- Repair leaky faucets and eliminate any other unnecessary standing water.
- When renovating the yard or planning new landscaping, avoid buying climbing plants or vegetation that provides shelter for rodents. Keep ground cover and vines thinned.
- Store wood and lumber piles at least 18 inches above the ground and 12 inches away from any structure. The Fire Department recommends storing wood piles 30 ft. from home. In smaller yards, try to store lumber as far from the home structure as you can, and at least use a firewood stand. Storage boxes should be stacked close together and in an orderly fashion.
- Clean up debris piles and sweep up bird feed around feeders.



Pick up fallen fruit.



Firewood stands are practical and easy to use.

RAT PROOF YOUR BUILDING TO PREVENT RAT ENTRY

Rats can enter even small exterior openings of a home. Openings such as these should be screened with $\frac{1}{4}$ inch galvanized hardware screen and inspected at least twice a year.

- Basement windows and ventilation ports.
- Attic and roof vents, open pipes and louvers.
- Close all openings larger than $\frac{1}{4}$ inch to exclude rats and mice. Inspect twice a year.
- Repair or replace damaged vent screens (louvered vents may be a preferred option in areas where raccoons damage screens).
- Screen vents, holes and overlapping roof with 16 or 20 gauge $\frac{1}{4}$ inch hardware screen.
- Use cement fill around pipe in brick, stone, or stucco walls.
- Doors: adjust threshold parts to minimize gaps and prevent entry.
- Tree limbs should be kept well away from the roof and walls of the house.
- Gaps around pipes and electrical conduit should be sealed.
- Use extra-coarse steel wool impregnated with caulk, sealant or expanding spray foam to fill gaps.

MAKE SURE YOU TRAP BEFORE AND AFTER SEALING GAPS TO PREVENT SEALING RODENTS IN WALLS



*Soffit vent hole sealed with screen.**



Step 1: Fill gap with coarse steel wool.



Step 2: Spray foam into steel wool.

MOBILE HOME WILDLIFE EXCLUSION

Prevent rodents, raccoons, and other wildlife from entering and living under your mobile home.

Your first line of defense is to make sure your siding or skirting does not have entry points for animals to enter. The hole or gape in the siding can't be larger than $\frac{1}{4}$ inch. On older mobile homes, metal or vinyl is used for skirting around the base of the unit.

Older mobile homes with vinyl or metal skirting can be repaired by first making sure the bottom track at ground level is in good shape. Having the track set on cement is preferred because it can be secured with concrete anchors. A hard surface under the track will also help stop animals attempting to dig under the skirting. With a good track in place, new skirting can be installed.

Newer mobile homes use wood or composite siding for the skirting around the base of the home. They tend to be sturdier than the metal panels of older homes. The problem with newer skirting usually is at the ground level where animals dig under the wood siding. You can bury wire mesh or pavers to fill the gap of the compromised area.

The second line of defense is to make sure the polyethylene under-belly wrap has no holes in it, and all gaps around pipes are fixed. Duct tape is used to fix these areas and cleaning the surface before taping will ensure that the tape sticks well.



These types of sidings are less conducive to rodent problems, but all vents should still be checked and maintained to prevent rodent entry.



This type of panel skirting around a mobile home unit can become compromised. Fix/patch using methods described in this pamphlet anytime there is damage.

TRAPPING

Trapping rodents is just one part of the overall process. It is extremely important while you are fixing rodent entry points.

TYPES OF TRAPS

Rodent “snap traps” are inexpensive and are available in two sizes. The smaller trap is designed for mice and the larger is designed for rats. It is very important to choose the proper size trap. Several rat traps should be set to maximize trapping effectiveness.

Bait selection is important for trapping success. Peanut butter, nutmeats, bacon, pieces of apple, candy and moistened oatmeal are effective baits. For best results, try several different baits to see which is most acceptable by rodents.



Rat-sized snap trap.



Mouse-sized snap trap.



Trap Box.¹

If trapping around children or animals, traps should be placed in a secure box or covered to prevent accidents. Placement of snap traps is crucial to their effectiveness.

Place traps in areas frequented by rats. Rats establish runways along fence tops and next to walls. Look for the presence of rat droppings when placing snap traps. Place the end of trap containing the trigger against a wall or known runway. Snap traps can also be attached to pipes or studs with wire, nail, or screws.

Mites and fleas, may move from the dead animal and its nesting material to people or pets. It's important to remove the traps daily and to properly clean the area. Refer elsewhere in this booklet for trapping and cleanup information.

Check traps daily and remove carcasses. Dispose of them in a plastic bag immediately to prevent mites and fleas from leaving carcass.

SETTING A SNAP TRAP

To set a snap trap, apply the recommended bait to the trigger. Wear gloves and pull back the bail with your thumbs. Hold the bait in place with one thumb while attaching the bar to the trigger tab. Carefully place the trap as recommended below. Better results are usually obtained if two traps are set side by side.

It is also a good idea to pre-bait, that is, to use a baited, but unset trap so that the rodent can become comfortable with the baited trap. When bait is taken, re-bait and set the trigger. For plastic “no-touch set” traps, pre-bait on top of the jaws with the jaws shut.

Tie or wire down the traps wherever possible. Traps can be re-used. The working parts of the trap should be oiled occasionally using mineral oil - never petroleum based oils. These oils may act as a repellent to rodents. Never store traps near insecticides or other chemicals, or handle domestic animals or pets before setting out traps. This also can cause traps to take on a repellent odor.



Proper trap placement on beams and rafters. Note rub marks on beams indicating rat trails.



Properly placed traps at floor level.

Improperly placed traps at floor level.

CHEMICAL CONTROL RAT BAITS

Santa Cruz County urges residents to avoid the purchase or use of anticoagulant rodenticides. Anticoagulant rodenticides can be harmful to non-target wildlife. Poisoning in rodents if consumed as prey or scavenged can lead to the death of wildlife and pets (Santa Cruz Resolution No. 144-2017).

Rodenticides must be used cautiously and in consideration of non-target wildlife and pets, and **ONLY OUTDOORS**.

All rodenticides must be checked often and replenished immediately when the supply is low. When the job is finished, uneaten rodenticides should be removed and disposed of according to the label.



BEFORE

Open bait station with bait blocks.



AFTER

Closed tamper-proof bait station.

Do not bait until all rodent entry points are fixed within the home, as rodents will die in walls, under home, or in attic. **Always follow label precautions and recommendations.**

Baiting is illegal without a tamper-proof bait station. Tamper-proof bait stations prevent children, pets, and nontarget animals from gaining access to the bait, as well as protect the rodenticide from weathering. **Never use bait indoors or under the house.**

A SCCMVC inspector can advise homeowners on appropriate baiting and/or trapping procedures, and will provide other information on the control and prevention of rodent problems. It is recommended that the homeowner use the services of a licensed pest control operator. The phone directory may be consulted under the heading Pest Control.

CLEAN UP

RODENT FECES AND URINE

Never sweep or vacuum rodent feces, urine and nesting material. When these substances are swept or vacuumed they can break up, allowing virus particles into the air where they can easily be inhaled, infecting the person doing the cleaning. Hantavirus and Arenavirus are transmitted in this manner. Air out sheds and infested enclosures and clean surfaces and contents. Gloves and a respirator or a particulate mask is recommended. You should treat every rodent infestation as if there could be a risk for Hantavirus.

Steps for cleaning:

- a. Make a solution of one-part bleach and nine-parts water in a spray bottle or use a general purpose household disinfectant such as Lysol®.
- b. Wearing rubber or plastic gloves, spray the solution or disinfectant on the dried urine, feces and nesting material until the substances are soaking wet.
- c. Let the wet materials soak for five minutes.
- d. After five minutes, use a damp paper towel or rag to wipe or scrape up urine, droppings, and nesting material.
- e. Place the cleaning and waste materials in a plastic bag.
- f. Then, using the same solution or disinfectant, wet mop or sponge off the area where the rodent evidence was located.
- g. Once finished, put the sponge or mop head into the bag with the rodent evidence.
- h. Wash gloved hands with soap and warm water or spray with disinfectant or solution before removing them. Place them in the plastic bag as well.
- i. Seal the bag and place in a lidded garbage can.
- j. Wash the now un-gloved hands with soap and water.

Once the newly cleaned area is dry (in approximately 30 minutes) it's ready for reuse.



Always wear protective gloves when handling or cleaning rodent evidence.

PREVENTING HANTAVIRUS

Hantavirus Pulmonary Syndrome is a severe respiratory disease and can be fatal, although rare, and has been detected in Santa Cruz County.

Sin Nombre virus (SNV) is the cause of Hantavirus Pulmonary Syndrome in the western United States. In California, the primary carrier of SNV is the deer mouse (no human to human transmission).

Deer mice are present in rural areas of the county and can find shelter in sheds, vehicles, or farming equipment.

Refer to the checklist to seal-up rodent entryways into homes, garages, sheds, campers, and vehicles.

The fresher the rodent feces, urine, or nesting material, the greater the chance of contracting Hantavirus. Once exclusion is achieved and trapping is done (all mice are either excluded or dead), the virus in these materials will start to die after one week. Even if rodent material is not fresh, it is still necessary to use safe cleanup procedures.

Symptoms of Hantavirus Pulmonary Syndrome include:

- Fever
- Fatigue
- Headaches
- Muscle aches
- 4-10 days after exposure: lungs fill with fluid, shortness of breath.



Seldom used closed spaces and storage sheds with multiple rodent entry points should be aired out before entering.



Deer mice can find shelter in cars and farming equipment. If vehicles are used infrequently, they should be aired out and then carefully cleaned out before use.

CHECKLIST FOR RODENT CONTROL

EXTERIOR EXCLUSION

(first line of defense)

- Repair foundation, attic, and gable vent screens with ¼ inch hardware screen, or replace vent screens.
- Repair gaps and breaks in exterior walls.
- Repair voids where roof lines overlap, with ¼ inch hardware screen or suitable materials to prevent rodents from entering attic.
- Seal gaps around pipes and wiring that enter through exterior walls.
- Install, repair, or replace the door or rodent proof screen in foundation crawl space opening.
- Seal gaps (at corners, on sides and under), garage doors and side doors with metal flashing.
- Keep pet doors closed at night (or get an electronic pet collar that only allows your pet in).
- Install “rat guards” on utility lines that allow rodents access to building.
- Screen off all openings around perimeter of decks or spas.
- Keep sheds closed and screen off base of shed.
- Install spark arrester on chimney.
- Repair voids where fireplace/chimney has separated from walls.

- Keep all doors and windows closed at dusk until dawn and/or keep screened.
- Repair lateral sewer lines to prevent rodents from entering the structure (Norway rats).
- Install barriers between home and fence lines, patio covers, or sheds that allow rodents to jump, climb, or travel to roof.
- Seal all holes, gaps and openings in roof.
- Fill holes in and under foundation walls.

INTERIOR EXCLUSION (must always be paired with EXTERIOR EXCLUSION)

- Seal all holes and gaps around pipes located under sinks in kitchen, bathrooms, and utility rooms.
- Seal off all voids/gaps in water heater closet, furnace/AC closet, or any other area where pipes and wiring enter walls, floors, or ceilings.
- Repair heater and air conditioning vents and duct work.
- Seal all gaps and holes between interior garage walls and main house.
- Repair holes in interior walls, floors, or ceiling.
- Seal off voids/gaps behind cabinets, shelves, bookcases, or any other built-ins that create “dead space” where rodents could nest or travel.

CHECKLIST FOR RODENT CONTROL CONTINUED

FOOD

- Keep all garbage cans, recycle bins and dumpsters secured and tightly covered.
- Feed pets amounts of food that will be totally consumed each feeding and bring leftover food inside.
- Harvest all ripe food from trees, gardens, and keep off the ground.
- Minimize snail population.
- Store pet foods in metal containers.
- Remove bird feeders and bird food. Discontinue wildlife feeding.
- Prevent pet food from falling under decks.
- Use proper composting bins and techniques to eliminate food source for rodents. Keep compost away from house.
- Remove stored foods in garage or place in metal containers.
- Repair leaky faucets and eliminate any other unnecessary standing water.

HARBORAGE & VEGETATION

- Remove any trash that has accumulated. Clean up debris.
- Cut back all trees, vines and shrubs 4 feet from roofs and walls.
- Store all firewood or lumber 18 inches above ground and as far away from house structure as possible.
- Thin out or remove ivy or any other ground cover that could harbor rodents. Keep ground cover away from fences, utility poles, walls, and trees.
- Remove any old, unused furniture, appliances, containers, abandoned vehicles, or any other items that could harbor rodents.
- Trim palm trees and/or install rodent barriers to prevent rodents from crawling up tree trunks.

CHECKLIST FOR RODENT CONTROL CONTINUED

TRAPPING

- Place traps in areas frequented by rodents. Follow instructions in this rodent pamphlet and the information provided by the vector control technician.

BAITING (with caution)

- Place tamper resistant bait stations outside. Use only secured rodenticide bait blocks inside bait stations. Read and follow label directions and recommendations.

SAFETY: DROPPINGS

- Wear rubber gloves and dust mask or respirator.
- Do not vacuum, sweep or blow areas that could cause contaminants to become airborne.
- Remove rodent droppings by spraying droppings with a disinfectant and then wiping up with a wet, disposable paper towel. Put droppings in plastic bag, seal, and place in a trash can.

SAFETY: DEAD RODENTS

- Wear rubber gloves. Spray dead rodents with disinfectant. Remove the dead rodent from the trap, or pick up the dead rodent with a shovel, and put it in a double plastic bag. Seal bag and place it in a trash can.



Download the Santa Cruz County *Citizen Connect* app

Santa Cruz County residents can report rodent problems, mosquito breeding, and dead birds through the Citizen Connect app. Other issues like potholes, illegal dumping, and downed street signs can also be submitted. Simply download the **FREE** app, click "Report Issue", and select the problem and location. Available through Google Play or the Apple App Store.



CONSUMER INFORMATION WEBSITES

Santa Cruz County Mosquito & Vector Control

Our Mission is to protect your health through responsible management of mosquitoes and other vectors. Our staff can inspect your property or neighborhood and provide FREE assistance and advice for County residents.



agdept.com/mvc.html

California Structural Pest Control Board

Branch 2 General Pest Control Operators should be licensed to check the entire building for rodent pests. This State regulatory agency oversees licensing of companies that exterminate mice, rats, pigeons, spiders, ants, roaches, and other household pests. A licensee should possess an identification card which shows the expiration date and type of license. This website provides information on current licensing/registration, a company's history of complaints, and how to formally file a complaint.



pestboard.ca.gov

Pest Control Operators of California

This nonprofit trade association provides a list of member companies. This website has consumer information on finding a company and has many links to regulatory agencies and university publications on pest vertebrates and insects.



pcoc.org

Better Business Bureau

This nonprofit organization provides a list of accredited pest control companies that meet certain high standards for their business practices. This website provides information on a company's history of complaints and how to formally file a complaint.



bbb.org

List of consumer websites adapted from San Mateo County MVC website,

- * Photos used with permission courtesy of www.aanimalcontrol.com
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