EXTENSION
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# NON-CHEMICAL RODENT CONTROL

Adapted for Nevada
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From University of Florida Extension Publication "Pigeons" (SSWEC117)
By William H. Kerns

Rats and mice often enter homes, farm buildings, and warehouses in search of food and shelter. Rats and mice have been carried by man to every corner of the earth, where they consume or contaminate large quantities of food and damage structures, stored clothing, and documents. They also serve as reservoirs or vectors of numerous diseases. The most common rodent pests in Nevada are Old World species called the pocket rats that have adapted to live with man. They include roof rats, house mice, escaped lab and pet rats (in Las Vegas), and mice.

In most cases of rodent infestation, the pest animals can be controlled without having to resort to the use of poisons. The practices of good sanitation and exclusion will prevent most problems. If rodents do find their way indoors, small populations can be easily eliminated with various nontoxic methods. Rodenticides (rodent poisons) need only be used in cases of large or inaccessible infestations. The trapping of rodent pests is often preferable to the use of poisons, because traps prevent rodents from dying in inaccessible places and causing an odor problem. There is no chance of an accidental or secondary poisoning of non-target wildlife, pets, or children with the use of traps. Secondary poisoning of pets or wildlife can result from eating poisoned rodents. Traps can be used in situations where poisons are not allowed or recommended such as in food handling establishments.

Nevada has several species of native rodents and it is important to distinguish between native and non-native species. The native rodents, such as pack rats (wood rats), grasshopper mice, deer mice, pocket mice, and kangaroo mice that occasionally invade rural and suburban homes can be released back in the wild.

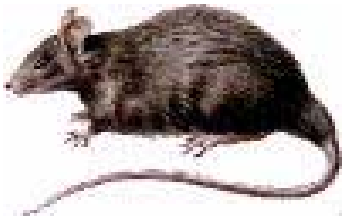

**Figure #1:** **Young rat (6-7"); feet large, head large.** **House mouse (6-7"); feet small, head small.**

# RODENT ECOLOGY – "KNOW YOUR OPPOSITION"

The presence of mice is usually indicated by sightings, damage from gnawing into food containers, or presence of droppings. The house mouse is the most common commensal rodent invading urban homes in Nevada. It is secretive and primarily nocturnal. In the wild, house mice feed primarily on seeds. In the home, they prefer grain products, bird seed, and dry pet food. They tend to nibble on many small meals a night. House mice are good climbers. They have small home ranges and usually stay within 10 to 30 feet of their nest. Therefore, traps for mice should be set 6 to 10 feet apart. Nests are usually in structural voids, in undisturbed stored products or debris, or in outdoor burrows. When food is abundant, nesting material such as a cotton ball attached to a trap trigger can act as an effective lure. Mice and rats are very nervous about moving in the open. The more cover they have, the more comfortable they are. They would prefer running behind an object or along the baseboard of a wall to running across an open area. Therefore, hiding traps in cabinets, closets, and along walls is most effective. Peanut butter or gumdrops stuck to the trap triggers, or peanut butter mixed with rolled oats or birdseed are good baits. Since house mice are inquisitive and actively explore anything new, moving traps and baits into new areas is effective.

**Figure #2. House mouse droppings.**

The roof rat or black rat is the most common rat encountered in urban Nevada. These rats are excellent climbers and often nest in attics, wall voids, hollow trees, and in palm thatch and dead fronds. They prefer to travel off the ground and enter houses from nearby trees or along power lines. Roof rats prefer fruit (they are sometimes called fruit rats), but will eat any type of human, pet, or livestock food. Peanut butter, pieces of fruit or nut meats are the best baits. Different from mice, rats are usually fearful of new items in their environment and avoid them for several days. An exception to this would be the wood rat. This means that traps should be left in place for at least one week before they are moved to a new location. The presence of roof rats can be detected by gnawing damage, the presence of droppings, sightings, scratching sounds, squeaking or gnawing in walls or ceilings, and characteristic dark greasy rub marks along frequented paths such as walls and rafters. Rats have large home ranges and may travel over 50 yards to reach food or water. Concentrating traps along rat runways or favorite routes of travel is most effective.

**Figure #3. Roof rat droppings.**

The Norway rat is the most common rat in the United States. However, it is only occasionally found in Nevada.

**Figure #4. Norway rat droppings.**

**Figure #5**
**Left: Roof rat (12-17"); tail longer than head and body; body light and slender; ears larger.**
**Bottom: Norway rat (12-18"), tail shorter than head and body; body heavy and thick; ears small.**

## SANITATION AND EXCLUSION

Proper sanitation will do a great deal to control rodent pests. All animals have three requirements for life: food, water, and cover. Removal of any one will force an animal to leave. The removal of debris such as piles of waste lumber or trash, used feed sacks, abandoned large appliances, and trimming the dead fronds from palm trees will substantially reduce the harborages for rodent pests. Stacked firewood stored for long periods provides good harborage for all commensal rodents. Proper storage of pet food and seeds, (such as wild birdseed) and rodent proof birdfeeders made of glass or metal will eliminate these food sources. Plastic containers can be chewed through and ought not be used. Collect and remove fallen vegetables in the garden and fruit from backyard trees and orchards. Keeping lids on trashcans and closing dumpsters at night will also make an area less attractive to rats and mice. The drainage holes in dumpsters should be covered with hardware cloth to keep rodents out. Trim tree branches so they are at least six feet away from the roof.

Exclusion is also called rodent-proofing. This involves making your home a fortress that rodents cannot breach. Rodents can squeeze through any opening that their head can fit through. Any opening larger than ¼ inch for mice and larger than ½ inch for young rats allows them to enter. Any opening that a pencil can fit through will admit a mouse. Young rats and mice are the dispersing individuals, so these are the ones most likely to invade new areas, like your home. Below is a list of recommended materials for excluding rats and mice.

1. Galvanized, stainless, or other non-rusting metal.
   Sheet metal, 24 gauge or heavier.
   Expanded metal, 28 gauge or heavier.
   Perforated metal, 24 gauge or heavier.
   Hardware cloth, 19 gauge or heavier, ¼ inch or smaller mesh.

2. Cement mortar with 1 part cement: and 3 parts sand mix or richer.

3. Concrete with 1 part cement, 1 part gravel and 4 parts sand mix or richer. Broken glass added to mortar or concrete may deter rodents from tunneling through a patched hole before the material hardens.

4. Brick, concrete block, tile, or glass will exclude rodents if in good repair.

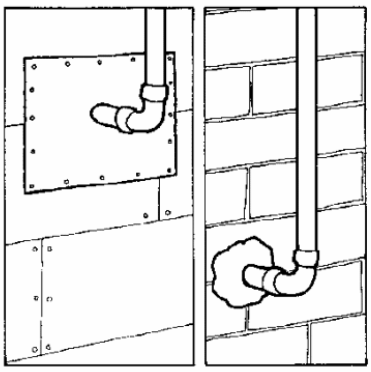

**Figure #6:** Rodentproofing openings around pipes with sheet metal (left) and concrete (right).

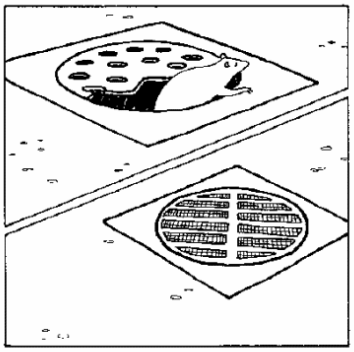

**Figure #7:** Rodentproofing drains with ¼" hardware cloth.

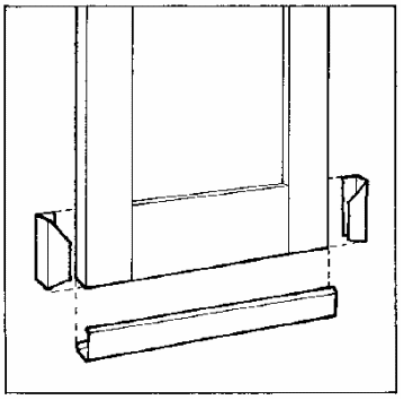

**Figure #8:** Rodentproofing a door, placing sheet metal channel at bottom and cuffs at sides, over channel.

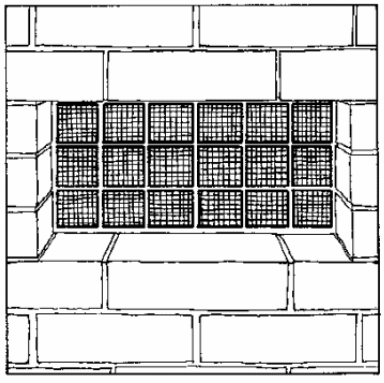

**Figure #9:** Rodentproofing a vent with ¼" hardware cloth.

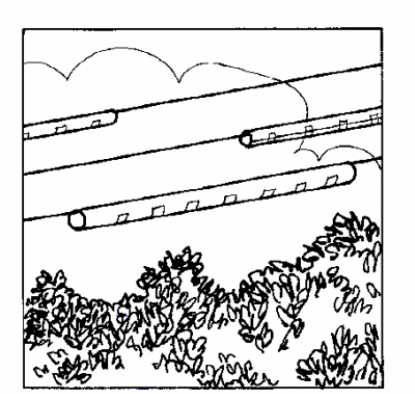

Figure #10: Rodentproofing utility wires to limit access to buildings using rolling plastic tubes made from rectangular sheets of plastic. the tube rolls when the rodent tries to walk over it.

Figure #11: Rodentproofing openings where wires enter buildings.

Figure #12: Rodentproofing air vents and chimneys using ¼" hardware cloth.

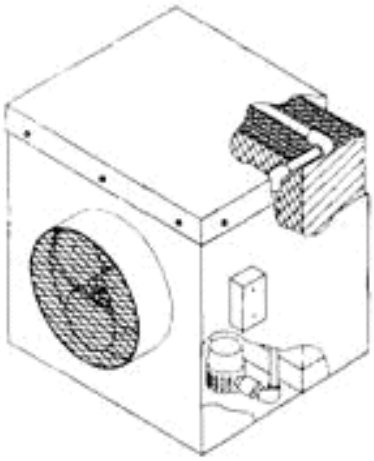

Figure #13: Use steel wool, Koper scouring pads, or hardware cloth to prevent rodents from climbing up the inside of the cover for the air conditioning lines from the outside unit.

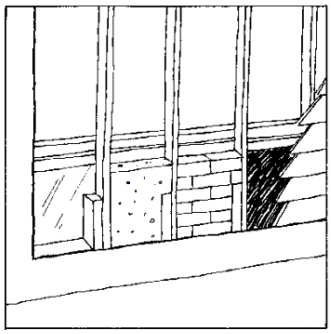

Figure #14: Blocking end spaces of wall void using sheet metal, concrete, brick, or wood.

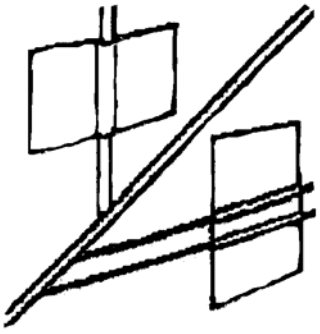

Figure #15: Rat guard over pipes and utility wires against a wall.

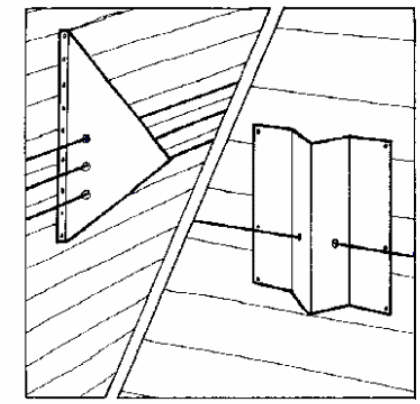

Figure #16: Rat guards for utility wires near a wall.

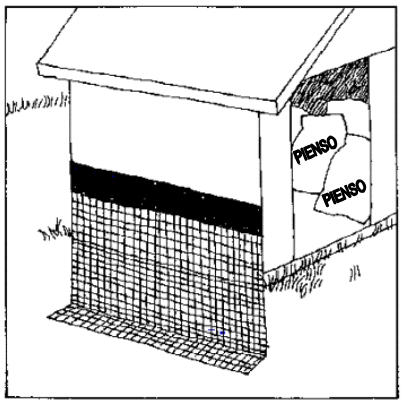


Figure #17: Hardware cloth curtain wall on a storage building. Top edge covered with strip of sheet metal.

## PREVENTING EXPOSURE TO DISEASE

It should be kept in mind that rodents are disease carriers. Care should be taken when handling any rodent. When disposing of deer mice or other rodents suspected of being potential carriers of the Hants virus, contact with their blood, urine, feces, etc. should be avoided by wearing appropriate protective gear such as disposable gloves, coveralls, and respirators or masks.

Fleas leave rodents when they die. These fleas are vectors or carriers of diseases such as the plague. Quick disposal in sealed plastic bags and proper flea control are also important aspects of rodent control.

## TRAPS

There are several types of rodent traps including snap traps, multicatch traps, single catch live traps, and glue boards. Snap traps include the classic rodent traps with wood, plastic, or metal bases, choker loop traps, and clothespin traps.

Traps must be isolated from children and pets by using trap stations made from wood or metal boxes. They are designed to kill the trapped animal quickly and humanely. Snap traps should not be set where children or pets will come in contact with them. There are three different types of triggers: wood/prebaited, metal for holding bait, and expanded trigger, which is used in runways. The expanded trigger is the most versatile trap since it can also be baited.

Traps should be placed where rodents are likely to be found. Rodents are creatures of habit and prefer to follow the same runways. It is important to identify these runways and place traps there. Runways can be identified by sprinkling a fine layer of flour or baby powder in suspected areas and looking for tracks. This is a safe diagnostic method for determining rodent activity. Rodents often run along walls and edges of cabinets and appliances. Traps should be set along walls, especially where objects such as a box or appliance will guide them into the trap. The type of bait used

depends on the species of rodent pest. For example, roof rats prefer to travel above the ground and are easier to trap along these pathways than on the ground.

Multicatch traps are designed to catch more than one animal by resetting. Advantages of these traps are the ability to capture several rats or mice with one setting. The scent from the captured mice may entice others to the trap. The disadvantages are that the captured mice or rats are alive and must be dealt with following capture. These traps are expensive. Methods for dealing with the captive rodents includes euthanasia with dry ice in a sealed container, drowning attachments, or finding someone with a pet snake. Although, wild rodents may harbor parasites that could potentially harm a reptile.

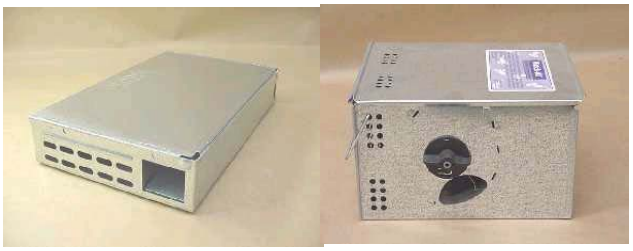

**Figure #18: Multicatch Mouse Traps – (left) Victor Tin Cat: (Right) CNES Ketch-All.**

Single catch live traps are rodent-sized cage traps of various styles. These traps capture the rat or mouse alive and unharmed, but again you have to deal with the captured rodent.

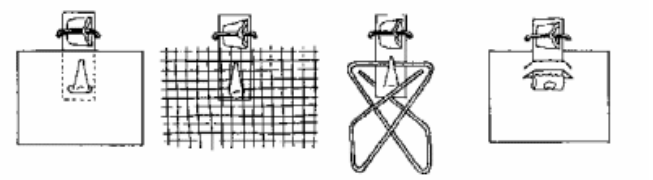

**Figure #19: Methods of converting metal batf-triggers to expanded triggers for runway sets.**

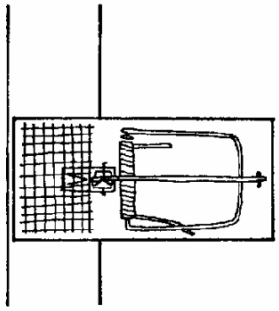

**Figure #20: Snap trap placement on pipes or rafters. Secure trap with duct tape, wire, or small nails.**

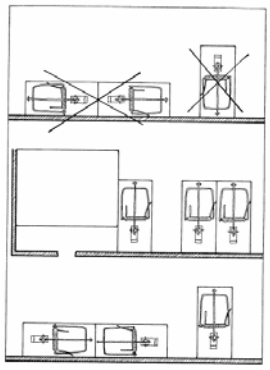

**Figure #21: (Top) Improper placement of snap traps. (Middle) Proper placement of double traps and use of Structure to guide rodents into traps. (Bottom) Proper placement.**

Do not release rodents, roof rats, or mice into the wild since they will quickly find a way back into someone's home. Once caught, they become trap-wise and are more difficult to trap. Like any other trap, multicatch traps must be checked on a regular basis to prevent the captured rodents from starving or dying of thirst and creating an odor problem. Several makes and models of multicatch traps are available.

If possible, native species of rodents should be distinguished from non-native species. Some species are protected under the Clark County Conservation Plan. (See footnote 1). Live traps should be used to capture these protected species. Live-trapped native species should be released far from the place they were trapped. However, if they are causing problems in your home, they can be trapped and killed. Live traps should be placed against walls or in runways. The most effective bait for this type of trap is rolled oats (uncooked oatmeal). Sprinkle the oats inside the trap, with a fine trail leading out. Rat-sized live traps and mouse-sized live traps are produced by several manufacturers.

Glue boards are used like snap traps. Both rat and mouse sized glue boards are made, but they are more effective against mice. Rats are often strong enough to pull themselves free from glue boards. Glue boards should not be set in wet or dusty areas, because these conditions render the traps ineffective. Wet feet and fur will not stick to the glue. These traps should not be set where children or pets will come in contact with them. Glue boards are not hazardous to children or pets, but the encounter will create a frustrating mess. If contact is made with the glue from the boards, wash hands with room temperature cooking oil and clean surfaces with paint thinner or mineral spirits. The best glue boards have at least a 1/8 to 1/4 inch layer of glue. Do not set glue boards near open flames or on carpets. Glue boards should be secured with a tack or small nail, wire, or double-sided tape if they are placed on ledges, pipes, rafters, over food preparation surfaces, or on carpets. Glue boards should be replaced often as native lizards and other non-target animals can get trapped in them. To release a trapped animal, pour a little oil onto the trap as well as to the glued portion of the animal.

## SHOOTING

Shooting rodent pests is not an efficient method of control. If you choose to use this method, observe the following safety rules. Remember that discharging a firearm within city limits is illegal, as is the use of a firearm by a minor without adult supervision. Check with local government if you have questions about what they consider a firearm. A .22 caliber bullet can travel over a mile and can easily penetrate corrugated metal walls and roofs, so always be sure of your backstop when using this weapon or any firearm. The use of shot cartridges is safer than using solid bullets, since each of the smaller pellets possess less energy and it is easier to hit your target with a pattern of shot than a single bullet. When using any projectile weapon, always wear eye protection such as shooting glasses or goggles.

Rats are nocturnal, so the best hunting is at dusk and after dark. A red or amber filter over your flashlight will aid in spotting your targets without alarming them. Rodents do not see in color and do not seem to see in the red or amber wavelengths. Shooting is not a recommended method of rodent control, and is only mentioned here because people often ask about it.

## PREDATORS

Predators are nature's method of controlling rodent populations. There are many native and domestic predators that feed on rats and mice. Snakes such as king snakes, long nose snake, gopher snakes, and coach whips are non-poisonous native reptiles that feed primarily on rodents and may help control outdoor infestations. Hawks and owls, especially barn owls, eat large numbers of rats and mice. Nest boxes of the proper proportion will encourage owls to nest and raise their young in your area. Hawk and owl parents kill many more rodents when they are feeding their hungry broods (See footnote 2). Foxes, coyotes, roadrunners, and feral cats all eat plenty of rodent pests. In some situations, domestic cats, dogs, and ferrets help control rodents.

In general, dogs and cats are more effective at preventing an infestation than eliminating a current population. This is because they are better able to catch and kill an invading rodent that does not know any escape routes. Cats are very effective predators of mice, but usually will not attack an adult rat. They will also kill birds at bird feeders, wild rodents, baby rabbits, and any small animals in your yard, so these factors must also be considered. To prevent cats from becoming a pest themselves, be sure to have any cat that goes outside spayed or neutered. This service is required and provided by most county humane societies at the time of adoption. Feral cats can be as great a problem as rodents.

Pet ferrets will kill rats and mice indoors but should never be released outside. The establishment of wild ferret populations could decimate our native wildlife. Many people propose mongoose for rodent control, but the import, possession, or release of any mongoose is strictly illegal because of the ecological damage they can cause. The

mongoose has repeatedly shown a preference for native birds and mammals over commensal rodent pests, as has been the case in the State of Hawaii.

## ULTRASOUND DEVICES

The principle of ultrasonic devices is to create a loud noise above the range of human hearing (above 18-20 kHz) that is unpleasant to pest species. The problems with ultrasound are numerous. Animals can adapt to most situations, and in a short amount of time they become accustomed to the sound. If the original attractant, such as food, is present, the rodents will return in spite of the sound deterrents. The short wavelengths of ultrasound are easily reflected creating sound shadows, and the rodents simply shift their activity to these low noise shadows.

Ultrasonic devices can be heard by dogs, cats, hamsters, gerbils, and other pet mammals. They have been shown to cause hearing loss in dogs and should not be used around pets.

## FOOTNOTES

1. Clark County Conservation Plan
   Golden-mantled Ground Squirrel, Spermophilus lateralis certus
   Desert Kangaroo Rat, Dipodomys deserti
   Inyo Shrew, Sorex tenellus
   Desert Pocket Mouse, Chaetodipus penicillatus sobrinus

2. There are no studies which document where hawks and owls have controlled a rodent infestation. People should not “count” on them to control a problem. However, there is no question they do consume a large number of rodents.

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“Prevention and Control of Wildlife Damage Manual” produced by the Cooperative Extension Service, University of Nebraska, the Great Plains Agricultural Council, and the USDA.
http://wildlifedamage.unl.edu/handbook/handbook

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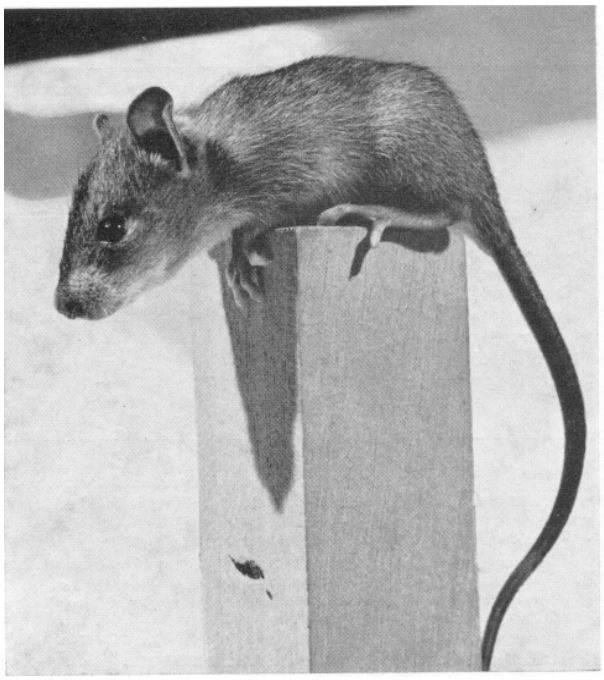
Not recommending any of these control methods but providing information on control methods. It is up to the individual to determine which method will best fit their particular need and situation.



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