Roof Rat & Norway Rat

(Rattus rattus) & (Rattus norvegicus)

Important Biological Facts

Habitat

- *Roof rats* are excellent climbers and are usually found in the upper parts of structures. Inside, they prefer to nest in elevated areas such as attics and ceiling voids, but they can also nest on lower floors. Outside, they usually nest above ground in trees, in dense overgrown vegetation, or in piles of wood or debris.

- *Norway rats* do not climb as readily as roof rats and are usually found on the lower floors of structures. Inside, they nest in wall voids and crawl spaces, in storage rooms under seldom-moved materials, or in any cluttered area that is little used. Outside, they nest in the ground in burrows or in unused sewers or storm drains.

- *Mice* and *Norway rats* can infest the same structure with mice in the upper parts of the structure and rats below.

Food Preferences

- *Roof rats* prefer fresh plant material such as fruits, vegetables, nuts, seeds, and tree bark. They are frequently associated with avocado and citrus trees. Garden snails and dog and cat kibble are also favorite foods.

- *Norway rats* prefer foods high in carbohydrates or protein but will eat almost anything including non-food items such as soap.

Habits and Physical Abilities of Rats

- Usually search for food between dusk and dawn.

- Prefer to travel along edges, e.g., the edge of the floor next to the wall, along pipes or rafters, along the outside or inside of a foundation and for *roof rats*, along overhead utility lines.

- Are wary of crossing open spaces that provide no cover. Hedges and other dense vegetation in landscaping or against buildings provide cover for rodent trails.

- Tend to be extremely wary (though temporarily) of new objects in their environment. (Mice readily investigate new objects and changes in their environment.)

- Can fit through openings the size of a nickel. (Mice can pass through openings the diameter of a pencil.)

- Can climb inside vertical pipes measuring 1 1/2" to 4" in diameter and climb the outside of vertical pipes measuring up to 3" in diameter, or the outside of vertical pipes of any size if they are within 3" of a wall.

- Can jump vertically (from a standstill) at least 24" above a flat surface and horizontally at least 4'. Can reach about 13" above a flat surface.

- Will gnaw and leave marks on almost anything, including wood, chip board, lead pipes, cinder blocks, aluminum, sheet metal, sun-dried adobe, and the exposed edge of a piece of glass.

- Excellent swimmers, especially *Norway rats*. Can swim up through the water seal, or trap, of a toilet.

Signs of Rodent Presence

Live or Dead Rodents

- Because they are mainly active at night, seeing live rats in the daytime usually means that either there is a heavy infestation, that their harborage has been disturbed (perhaps by construction), or that new rats are moving into the area and haven't found any harborage yet. It can also mean that a small or medium infestation of rats has developed a daytime feeding pattern in response to periodically available food, e.g. kibble being placed out for pets at a certain time every day.

- Because mice can be active during the day, seeing them during the day does not necessarily indicate any special conditions.

- A freshly dead rodent indicates an infestation, but an old, dried body may merely indicate a previous infestation.

Signs of Rodent Presence, cont.

- Always use safety equipment, including rubber gloves, goggles, a HEPA filter respirator, and a disposable coverall, when removing rodent bodies. Moisten the body with a disinfectant, such as 2 tablespoons of bleach in 2 quarts of water. The moisture will prevent particles from moving through the air and the bleach will destroy any harmful microbes.

Droppings

- Always use the safety equipment described above when inspecting or removing rodent droppings. Moisten droppings with a disinfectant (see above) to prevent particles from becoming airborne and to destroy any harmful microbes in the droppings. If you encounter piles of droppings, be sure to moisten each layer with the disinfectant.

- The greatest number of droppings will be in feeding areas and near harborage.

- Rat droppings are 1/2" to 3/4" long and 1/4" in diameter. Mouse droppings are much smaller, about 1/4" long. Bat droppings closely resemble mouse droppings; however, bat droppings crumble easily and a closer look with a magnifying glass will usually reveal insect parts in the droppings.

- Droppings all of a uniform size can indicate an infestation of a single rat; many different sizes can indicate a breeding population.

- Fresh droppings are moist and soft, and they glisten or look wet. After a few days to a week, the droppings dry, become hard, and appear dull rather than shiny. After a few weeks, rat droppings become gray, dusty, and crumbly. Mouse droppings become hard, dry, and dull or whitish.

- If old droppings are moistened they may look like new ones, but they will still be crumbly instead of soft.

- In order to monitor for current rodent activity, remove the droppings so that fresh droppings are apparent during further inspections.

Damage to Goods & Structures

- Rats gnaw to get at food in packaging or containers, to obtain nesting material, and to keep their incisors from growing too long.

- When they gnaw, rats leave 2 parallel marks about 1/8" across (for mice, about 1/16" across).

Grease Marks or Rub Marks

- These marks on beams, rafters, walls, pipes, and other fixtures are the result of oil and dirt rubbing off rats' fur along frequently traveled routes.

Runs or Burrows

- These may be found outside along foundations, walls, or fences or under bushes or debris.

Tracks

- Footprints and long, thin marks of a tail being dragged or rested can easily be seen on dusty surfaces or in mud.

Noises and Smells

- Sounds of gnawing, clawing, fighting, and scrambling are particularly audible at night when rats are most active.

- Rats impart a distinctive odor to an area over time.

Summary of RAT Management Techniques Compatible with an IPM Program

For rat control to be effective, it must combine eliminating rodents from the structure with excluding them from the structure. Only if this is done systematically, thoroughly, and completely will you achieve success.

Education

Educate principals, teachers, and students about the effects their actions have on pest management and about the relationship between rats and food, garbage, and clutter. If rats invade a building, food must be stored in rat-proof containers (see next page).

Summary of RAT Management Techniques Compatible with an IPM Program, cont.

Inspection

- Make a site plan to record your findings.

- Inspection must be detailed and thorough both inside and out.

- Look for signs of rodent presence (see previous pages).

- Note all possible harborage sites, sources of food and water, and holes that provide access to building.

- Use a non-toxic tracking powder such as chalk dust, talcum powder, diatomaceous earth, etc. on smooth surfaces to gain more information about rodent movements.

- Note bird and bat problems because rats may not be far behind. Rats will feed on bird eggs, chicks, and young bats.

- Inspect vegetation for runways, nesting sites, and possible access to building or roof. Look for fruit- or nut-bearing trees.

- Look for pipes and utility wires that provide access to the building or roof.

- Inspect garbage facilities.

- Inspect all planters, wood piles, portable storage containers, and outbuildings.

- Look for piles of trash, clutter, and other debris both inside and out.

Physical/Mechanical Controls

- Exclusion

  – Make general building repairs.

  – Seal large and small (down to 3/16") holes in structure both inside and out. Seal small holes with steel or copper wool (copper will not rust) and caulk.

  – Seal vents with 1/4" hardware cloth.

  – Seal gaps where pipes and wiring enter the structure.

  – Weather-strip doors and windows, use metal kickplates or raised metal doorsills to prevent rodent entry.

  – Make sure air conditioning units are well-sealed, especially those on the roof.

  – Repair broken sewer pipes.

  – Install threaded caps on drains.

- Trapping

  – Use snap traps or glue boards and record their locations on your site plan.

  – Traps do not need to be cleaned and may be more attractive when dirty.

  – Always use safety equipment including rubber gloves, goggles, a HEPA filter respirator, and a disposable coverall when servicing traps.

  – Monitor traps regularly and frequently, and keep bait fresh. Rats avoid on old or rancid bait.

  – Set snap traps with the trigger end facing the wall and the short edge of the trap flush with the wall. Set two or three traps in a row to prevent rats from jumping over them without being caught.

  – Snap traps can also be set with the long edge parallel to the wall, back to back with their triggers facing away from each other. Set glue boards with the long side touching the wall.

  – Nail traps to walls or rafters; wire them to pipes with the trigger projecting into the runway.

  – Move objects around to funnel rats into traps.

  – For baits, use foods rats are already eating, or try the baits listed below:

    – Baits for Norway rats include pieces of hot dog, bacon, liver, peanut butter, or nut meats.

    – Baits for roof rats include nuts, dried fruit, fresh apples or bananas, candy, marshmallows, raisins, or peanut butter.

    – Baits that don't stick to the trigger can be tied on with string or dental floss or glued on with white glue.

  – It may be necessary to "pre-bait" traps for rats: place traps out with bait, but do not set triggers. Check daily to see if bait is taken. When it is, add new bait and set triggers. At this point, try simply smearing some of the bait on the underside of the trigger. Rats will manipulate the trigger looking for the bait that they were accustomed to finding and that they can now smell.

  – Use plenty of traps.

  – Experiment to find what works best in each situation.

Summary of RAT Management Techniques Compatible with an IPM Program, cont.

Sanitation/Habitat Modification

• Store garbage in garbage cans or dumpsters outside the building. Make sure garbage containers are without holes, have tight-fitting lids, and are cleaned frequently.

• Remove garbage containing food wastes from building before nightfall.

• Store food in rat-proof containers (glass or metal). This includes pet kibble and grass seed.

• Never leave pet food out before or after pets eat.

• Promptly clean up spilled bird seed around feeders.

• Regularly pick up fallen fruit and nuts outside.

• Trim bushes, grass, and weeds at least 18" from all buildings. Thin out dense bushes.

• Trim trees at least 3' to 6' away from buildings. Keep vines off of buildings.

• Break up dense plantings with pathways, stretches of lawn, or very low groundcover to discourage long rodent runs.

Ultrasonic Devices

There is no evidence to show that these devices kill rodents or prevent them from entering buildings.

Biological Controls

• Cats can "prune" a rodent population but will seldom eliminate it, and they cannot be counted on as a deterrent.

• Owls and snakes are predators, so when considering the use of chemical control techniques, remember that, depending on the toxicant used, these predators can be killed by consuming poisoned rats.

Chemical Controls

In general, chemical controls should be used only as a last resort or in emergency situations. Rodenticides can pose hazards to non-target animals, including children and dogs. Poisoned rodents may die in inaccessible places and cause odor and fly problems. Overuse of many rodenticides has led to widespread resistance; however, research has shown that resistance in rats may be overcome if enough time (at least 30 days) is allowed to elapse between exposures. This seems to indicate that it may not be necessary to resort to the newer rodenticides such as brodifacoum and others that can last for months in a dead rodent body and make it a continuing hazard.

For more information on pest management, call the Marin Dept. of Agriculture at 415-499-6700.