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COMMENSAL RODENT DAMAGE CONTROL

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Commensal rats and mice are among the only animals about which no good can be said. Each year rats and mice are estimated to cost the American public over \$1 billion. This loss is due to contamination of food stuff, structural damage, etc. To give an idea how these rodents can effect the economic picture, assume a rat will eat about 25 pounds of chicken feed per year and foul another 25 pounds to such extent it cannot be used as feed (some estimates are as much as ten times greater). The house mouse will consume about 5 pounds per year. Feed costs are not constant; they differ from time to time over quite a range. If feed costs \$120 per ton, then each rat costs \$3 a year to feed, a mouse, 30¢. If feed costs \$150 per ton, each rat costs \$3.75, each mouse, 38¢. When feed is \$200 a ton, each rat costs \$5.00 and each mouse \$0.50. To put this in more familiar terms to those in wildlife, in recent years complete trout chows cost about \$400 a ton; that means each rat is costing the fishery manager \$10. There are few enterprises which can afford to raise rats.

Money isn't everything. Rats also pose health problems. Many people are very much aware of recent outbreaks of flea-borne plague. Rats have been implicated in more than 35 other diseases. They have lice, fleas, mites and ticks which are known to carry diseases, among them salmonella, fowl colera, leptospirosis and murine typhus.

Commensal rodents are also objectionable in that they offend our aesthetic sense. There is nothing pretty about their droppings and there's nothing romantic about their smell. The sight of a rat is usually enough to put the lady of the house in the nearest chair.

Species with which we are most concerned are the Norway and Roof rats and the house mouse. These species are found almost everywhere. The senses of all three are keen. In general, vision is best at night but they can move about during daylight. They all show aversion to new objects, but this is least well developed in the house mouse. It is interesting to note that rats and mice living in places such as warehouses where there is a great deal of activity show less new object aversion than those in natural or less hectic conditions.

The Norway rat is largest of the three, weighing 330 grams or approximately $\frac{3}{4}$ of a pound. The snout is blunt. The ears are short, thick and hairy. The tail is noticeably shorter than the body and is dark above and pale below. The body is covered with coarse brownish-gray hair above and is grayish white beneath. The Norway is a burrower and is usually found at ground level. This is the species most often associated with the term "Sewer rat."

The roof rat is a somewhat smaller species, weighing around 250 grams, or $\frac{1}{2}$ pound. It has a sharply pointed snout. The ears are thin and hairless, the tail, slightly longer than the body, is dark above and below. The upper body may be gray, black or brown, the belly is generally white or light gray. Generally roof rats range above the ground. As a rule they do not burrow, in presence of a Norway rat population; where the latter is missing they may.

The house mouse is small. It weighs about 15 grams or less than 1 ounce. The snout is pointed. The ears are large and have some hair. The tail, about the same length as the body or just slightly longer, is dark on all surfaces. The body is brownish gray above and gray below. In the wild, populations of house mouse do burrow.

It isn't enough just to recognize rodents, knowledge of their capabilities is necessary if an effective job of control is to be done.

In the discussion which follows, information deals primarily with Norway and roof rats. Even though they may prefer to live on the ground, all commensal rodents are climbers. In addition, rats have the ability to reach out 12 inches along a vertical surface. They can jump upwards for 2 feet from a standstill and 3 feet with a run. They can jump for a horizontal distance of 8 feet in a 15 foot drop. All will burrow. The Norway rat may burrow as much as 10 feet below the surface in soft earth. However, none will dig around a buried horizontal obstruction which is the reason curtain walls with an outward projecting apron are effective. All are good swimmers. The Norway rat can swim for 60 to 72 hours before drowning and has the ability to stay under water for at least 30 seconds. There are instances of rats coming up drains and through toilet traps. Rodents will gnaw anything that is softer than tooth enamel. Even though these rodents started as seed-eaters, today they will eat almost anything man will. Rats consume approximately 1 ounce of dry food per day, a mouse about a 1/10 of an ounce. A rat drinks about an ounce of water, a mouse about 3/10 of an ounce.

Rats and mice can move through much smaller openings than given credit for. Rats, particularly young rats, can move through any hole which is half inch or greater in diameter. A mouse will get through any hole which is one-quarter inch or greater in diameter. In rat or mouse control, it pays to think small. Any program of control which leaves openings through which rodents can enter will not be effective in eliminating rats and mice.

The best program of rodent control is one which prevents rodents from entering. Although this may be an impossibility much can be done to minimize entry. Whenever possible stoppage should begin when construction starts. On new construction footings should extend 2 feet into the ground with an apron extending outward 8 to 12 inches. On older construction it may be possible to use a curtain wall plus apron. Construct foundations and footings of gnaw-proof material. Eliminate spaces between

neath easily. Small spaces behind appliances and beneath shelving often provide excellent rodent shelter. Examine areas in terms of animal requirements and remove these whenever possible.

Indirect methods for controlling rodent population are not always sufficient. When there is a large population, it must be reduced when requirements are removed. If not, rodents will migrate in search of these requirements. The two principle means of direct reduction are trapping and poisoning.

Traps are relatively ineffective in controlling large populations. However, they can be used to control small populations, and they find use in situations where use of toxicants cannot be condoned. The principle thing to keep in mind when trapping rodents is that animals are not going to come any distance to be trapped. This means traps must be put in places rodents are using; a sufficient number of traps must be used; and when baits are used these must be attractive to rodents. Rodents do not utilize open parts of the area. Travelways will tend to be beneath and against; they will be beneath horizontal structures and against vertical ones.

These are places to put traps. If necessary, construct artificial runways to guide movement and ease trap placement. Place traps so trigger end is against a vertical surface where rats are traveling. Enlarge trigger of the trap utilizing cardboard, tin or other stiff material. Bait traps with material attractive to rats and mice such as jellybeans, gum drops, or slightly scorched bacon. Place traps no more than 10 to 12 feet apart. If these tips are kept in mind, trapping should be successful in removing some part of the rodent population.

Most control situations will require use of toxicants. There are two general classes: acute toxicants which kill upon injection of a single dose and chronic toxicants which must be consumed over a period of time before being effective. For the present I would not recommend anything other than anticoagulants for use inside the home. There are

some relatively safe acute toxicants, but most homeowners are not pest control operators, and I feel every precaution must be taken to make poisoning programs safe.

I am not going to give a running account of various poisons available. The situation is fluid. EPA is in the middle of re-registering rodenticides. I have no idea at present which will and which will not be re-registered; which will and which will not be restricted and so on.

Whether using acute or chronic toxicants there are some general precautions which must be kept in mind. Always beware that non-target animals, livestock, pets, or children will be in the area. The best way to prevent non-target animals from contacting toxicants is to place treated baits in bait stations. In addition, it may be possible to formulate baits which are not attractive to non-target animals that could enter stations. When using acute toxicants in particular, pre-bait. This has two functions: first, it helps in selecting the most preferred bait, and second, it provides time for rodents to overcome new object aversion. Although pre-baiting is not commonly done when utilizing chronic toxicants, it may be helpful in situations when presently available food is highly attractive. For example, it doesn't seem to make much sense to put out a rolled oat or small grain formulation of an anticoagulant when rodents have access to peanuts or soybeans. Sufficient bait must be available to affect a significant portion of the rodents. Bait stations should be placed at all points rodents enter and leave structures. In addition, place stations at 10-15 foot intervals against inside walls. Always formulate treated baits as specified. The use of too much or too little toxicant can cause aversion and lead to bait or toxicant shyness. When using acute toxicants, wait for a time before utilizing the same toxicant again. In many cases it is best to poison with an acute toxicant initially and then follow with an ongoing program using chronic toxicants.

The success of poisoning programs is going to be dependent on the baits. Baits must be of high quality. Their protein and fat content should equal or exceed that of foods normally available. Keep baits fresh; check frequently and replace when they become stale or molded. Believe it or not, rodents are fairly fastidious in this regard. They don't like molded or rotten baits. Again, whenever possible, place treated bait in bait boxes to insure non-target animals don't have access.