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RAT CONTROL

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The limited supplies of certain foods emphasize the importance of rat control. Rats now cost the farmer about \$60 annually and the estimated yearly damage in the United States approximates \$375,000,000. The average farm is said to support about 50 rats. In addition to the food they waste, fifty rats will eat enough to support 16 fowls for a year. They reproduce throughout the season and one pair will raise five or six litters annually. Their normal life is thought to be about three years.

Rats are great travelers, so that a city rat is a community rather than an individual problem. They dig up seeds and bulbs, and even climb corn plants to feed on ears of corn in the garden. Rats do not need to live around buildings in the summer, but may hide in burrows, from which they go to garden and fields for their food. They return to buildings after the first severe frosts. During the late fall and early winter rat control efforts will pay big dividends in saving grain stored on the farm.

RAT-PROOFING AND GARBAGE DISPOSAL

The most permanent protection against rats is secured through rat-proofing buildings. Other control measures afford only temporary relief. Rats will remain only where they can get food. If this is stored so that rats cannot reach it, the problem will not exist. Special attention should be paid to poultry houses, for it is here that rats can do the most damage.

In cities, rats thrive on exposed garbage and on carelessly-stored feeds in warehouses, grocery stores, mills, and in city dumps.

PLANNING DIRECT CONTROL MEASURES

If rat-proofing cannot be done, a well planned program to exterminate the rats is advisable. Such a program should be started with poisoned bait, the use of gas, or, under certain conditions, by blocking as described later. Attempts to exterminate large numbers

of rats should never be started with traps. Plans should be made some time in advance of the effort, and one should endeavor to allay the suspicions of rats if poisoning or blocking is to be attempted. Traps can be used to catch any rats that survive the other methods, or to catch the few that exist before the situation has reached the "problem stage."

POISONING

Where rat-proofing cannot be done, poisoning is the most practical and efficient means of destroying rats. It should not be entered into until adequate preparations are made, including, if necessary, pre-baiting with unpoisoned food. After the rats have been accustomed to feed without fear, more than enough of the poisoned bait must be offered to them the first night to kill every rat on the premises. The chief causes for failure with poisons are: (a) inadequate amount of bait exposed in the beginning, and (b) lack of choice of food to tempt them to eat the poisoned bait.

Rats show a preference for certain types of food, some preferring cereal, others meats, and still others vegetables. Bread crumbs flavored with ground bacon provide an excellent cereal bait. Unrationed meats such as beef tongue, kidney, fresh fish, or waste from slaughter houses are just as attractive to rats as rationed meat. One each of a meat, cereal, and vegetable or fish bait should be exposed at the same location, so that every rat has a choice of food the first night the poisoned bait is exposed. It is desirable to include that type of bait which has not previously been accessible.

Most of the rat poisons on the market contain either red squill, phosphorus, or arsenic. Still another less used but effective poison is barium carbonate. Strychnine has been sold for a rat poison but is not recommended, and arsenic is not a very good raticide. All of the poisons named, except red squill, will kill other animals and *must be used with great caution*. It is for this reason that red squill has been the favorite rat poison.

RED SQUILL.—Red squill is a bulbous plant that grows on the shores of the Mediterranean Sea. Good red squill has been very difficult to obtain during the war, and much of that being sold is of inferior quality. Where a good grade is available, the formula for mixing is at the rate of 1 ounce of ground squill for each 12 ounces of food. Ground meat, fish, salmon, mixed cereal, bread crumbs, and chopped fruits and vegetables all make good baits. If a much higher ratio than 1 to 12 is used, in order to make poor quality squill effective, the rats are not likely to eat the bait.

The toxicity of red squill varies with the source, age, and treatment of the bulbs during the drying process. Bulbs brought to this country in recent shipments have been low in toxicity. Where a good grade of red squill can be purchased, it will constitute an effective and almost ideal poison for rat bait.

PHOSPHORUS.—Commercial phosphorus baits now on the market often are quite effective. This type of bait can be spread on bread with a little peanut butter or bacon grease, and exposed where rats can get it. The chief difficulty with phosphorus baits is that they are poisonous to other animals. In the amounts usually offered at drug stores, the temptation has been to use too little of it to clean up heavily infested farm premises, where baits must be provided in quantity for a high rat population.

ZINC PHOSPHIDE.—Recently zinc phosphide has been used successfully for killing orchard mice and also rats. This is sold through county agents by the Fish and Wildlife Service of the U. S. Department of Interior under the name of "Field Mouse Rodenticide." For poisoning rats, $\frac{1}{2}$ ounce of the Field Mouse Rodenticide should be mixed with each 2 pounds of bait selected. It should be worked into the food moistened with a little water to facilitate mixing. Be accurate in weighing the ingredients and do not get the powder or poisoned bait in contact with the skin. Mix with an old spoon or stick in a vessel *not* to be used for cooking, and wash hands immediately after mixing. Rubber gloves should be worn if available.

With this material, as well as red squill, it is wise to give a selection of foods in order to entice as many rats as possible to eat it the first night.

BIARIUM CARBONATE.—Barium carbonate has long been used successfully as a rat poison. It is a white powder, which can be mixed with food, as suggested under red squill baits, at the rate of one part of barium carbonate to five parts by weight of bait. A little

bacon grease, melted lard or lard substitute added to the cereal product and stirred vigorously enables the barium carbonate to stick to the cereal and adds to its attractiveness. Barium carbonate kills slowly, and many of the rats die in exposed places outside of the building, or on the floor within, where they can be found and removed. This bait also is used to control house mice.

ARSENIC.—Arsenic baits are sold under trade names and the killing agent is white arsenic. The bait is composed of one part of arsenic to 20 parts of food. If preferred, the bait can be made at home. This bait is very toxic and great care must be used that it does not poison other animals.

Whatever bait is used, the uneaten morsels should be picked up after the second night of exposure, and attempts at poisoning should NOT be made again for at least one month. All baits should be placed so that livestock, poultry, and pets cannot possibly get them. The food should be of the type that cannot be carried away and left where other animals would eat it.

GASSING

In certain types of rat harbors, gassing is quite effective and economical. These harbors are: burrows in the soil, narrow space beneath floors, between double walls or granaries, between bales of hay or straw, narrow cribs of corn, and in any place where the gas can be confined in a relatively small area. Places not suitable for gassing are: in stored fodder, loose hay, sheaf-oats, in machinery sheds, in rooms where fruits or vegetables are stored, in large corn cribs, open feed and storage rooms, and in trash piles outdoors where the air currents would blow the gas away rapidly. Gassing is not safe to undertake in basements, or other rooms of occupied buildings.



Dust gun used for gassing rats with calcium cyanide.

The gas used is HCN gas, which is released from calcium cyanide when blown into burrows and runways. Calcium cyanide is a black powder and for rats is sold under the trade name of "Cyanogas A Dust." A special force pump or a good garden duster is required to drive the powder into the burrows and runways. Usually 2 to 3 pounds of the powder are necessary to treat the rat runways on the average farm. Several puffs of the powder are blown into each runway, which is then plugged with earth. In lumber piles and baled hay the dust is blown continuously into the alleyways until the rats are overcome. Such hay or treated corn can be fed safely after two or three days. A rat-dog is a valuable assistant in gassing to catch any rats that run out before being overcome.

Complete elimination of rats by the gassing method is not often possible, because of restricted conditions under which the gas is effective.

Good dust-guns for applying Cyanogas are now difficult to obtain, and the special plunger guns sold for this purpose are no longer on the market. It is useless to attempt to use Cyanogas unless a dust gun is available. We recommend this method especially for use beneath tight floors of poultry houses where poisoning might not be safe, also in burrows under the garage, cement step, or outbuilding to kill the stray rat that has appeared recently on the premises and "dug himself in."

Gassing also can be done with carbon monoxide from the exhaust of a tractor and a portable or automobile motor. The machine is backed up to the place for gassing and, by means of a rubber hose attached to the exhaust, the monoxide gas is forced into the burrows, or under the foundation floor. The motor is run for a few minutes to an hour, depending upon the size of the space to be gassed. Needless to say, the opportunity for gassing with a tractor or automobile is limited, and it consumes much more time than would be required with Cyanogas dust blown into the runways by means of a foot-pump, or duster.

BLOCKING

Blocking can be carried out only within buildings, such as poultry houses, and feed storage rooms where rats have been used to feeding on mash or grain at regular intervals and where the food cannot be carried away to be eaten elsewhere. Poultry houses offer a good place for blocking operations. This is done by closing all exits used by the rats except one or two through which they become accustomed to entering and leaving.

The rats are trained to eat mash or grain exposed regularly at some distance from the walls, and then at a pre-arranged time the openings through which they can escape are closed before any are able to get out. This usually is done about one hour after dark. Sometimes this requires stringing the building with suspended bags of sand, which can be lowered to close the openings without frightening the rats. Men armed with strong flash lights and clubs, with trouser legs tied around the ankles, then enter the room and club the rats to death. Where temporary protection is given the frightened rats for hiding behind a board leaning against the wall, it affords more time for the kill and an excellent opportunity for training a small dog.

Blocking is an excellent method for getting rid of large numbers of rats in one night, especially where the rat population has been high and they have been pre-baited long enough for the rats to gain confidence in their ability to escape.

TRAPPING

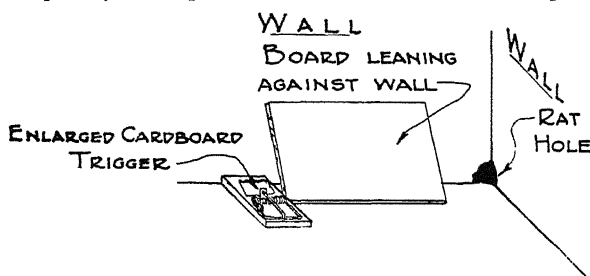
Traps are valuable for catching rats, but where rats are abundant their use should follow other methods, described earlier. Any attempt to trap rats, where the population is high, merely means the few you catch will make others leery and the rat population will gain in spite of the trapping. Where trapping is undertaken, a sufficient number of traps should be provided the first night. Having only a few traps is merely a nuisance, and catches them at too slow a rate to make much impression. Wire cage traps, when properly baited, are valuable and operate best when moved frequently. Steel traps also are useful.

The effectiveness of wooden base snap traps can be increased by enlarging the trigger by means of a piece of corrugated paper fastened to the metal trigger. It should then be carefully placed so that the trigger is directly in the path of the normal rat runway. This is usually next to the wall, as rats do not cut corners. A board leaning against a wall, or a box, barrel, or other obstacle pushed close to the wall with room behind for a rat to travel, offers a good place to set a trap.

It is not often necessary to bait spring traps, but if baiting is done it should be changed frequently to keep the bait fresh. If blood from a previously caught rat is present on the

trap, it is not likely to be effective. Scalding the traps occasionally is desirable. Rats do not object to human odors—for they live among us—but they soon learn to avoid traps that are blood stained.

Traps also are useful to catch rats occupying burrows, or using openings which give them access to space beneath a cement floor, or foundation.



Method of enlarging trigger with cardboard. Traps should be placed behind board in pathway likely to be used by rats.

- ★ Unless the job is complete, the rat population probably will build-up again ★
- ★ in a few months. To get the best possible clean-up, the procedure should be ★
- ★ poisoning followed by trapping, or by gassing and trapping if necessary. All ★
- ★ of these methods are inferior to rat-proofing, which is the only permanent method ★
- ★ of dealing with rats.

NO FOOD—NO RATS!