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COMMENSAL RODENTS

W. W. Dykstra
Bureau of Sport Fisheries and Wildlife

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Research Staff Assistant, Bureau of Sport Fisheries and Wildlife
U. S. Department of the Interior

The Norway rat dominated night life in many cities at the turn of the last century. At that time there was an abundance of food and shelter for these rodents in neighborhood alleys, livery stables, feed stores, corner groceries, taverns, and backyard chicken coops. Some of their progeny were also busy establishing claims on mid-western farms. It was their "golden age."

Early weapons for combating this horde of unwelcome immigrants included several forms of biological control. Nearly every family had a cat, and terrier-type dogs were in great demand. Native predators such as skunks, barn owls, weasels, and snakes likewise found good hunting.

Hardware stores also sold thousands of steel traps. These were later augmented by a wide array of snap traps, gillotine traps, live traps, and automatic self-setting traps. The local druggist likewise built up a thriving business dispensing strychnine, arsenic, phosphorus, and barium carbonate. Some of the ready-to-use formulations contained questionable ingredients such as plaster of Paris, ground glass, and several so-called "rat viruses".

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Red squill made its appearance in the United States during the late 1920's and fortified squill came a few years later. It was widely used during the next decade. This tool, together with advances in community sanitation and the rodent-proofing of structures, turned the tide against the Norway rat. His cousin, the roof rat, continued to increase until the advent of zinc phosphide rodenticides during the late 1930's.

World War II brought about the development of two new rodenticides, antu, and Compound 1080. While highly effective against the Norway rat, antu proved useless for the control of roof rats and house mice. Although restricted to professional operators, the use of Compound 1080 brought about drastic decrease in many commensal rodent populations. It's effectiveness in quickly destroying larger rodent infestations is illustrated by two case histories. One involved a grain elevator where some 5, 000 rats were killed overnight. Another operation was carried out in a public open air market district of a large city where over 100, 000 rats were estimated to be killed in a few days time. However, it should be noted that Compound 1080 also has killed large numbers of dogs and cats and 15-20 humans since its introduction as a rodenticide.

Warfarin, the first anticoagulant, appeared on the market in 1950. It was followed by pival, fumarin, PMP, and diphacinone. These have replaced nearly all of the other rodenticides and probably now represent

over 90 percent of the annual sales volume for commensal rodent poisons. They make up about 30 million pounds of finished baits.

The history of control methods also includes short chapters on electronic rat traps, space fumigants, such as chloropicrin, and a variety of tracking powders. The costly electric traps are no longer popular. However, toxic gasses and tracking powders still have a place in our arsenal of control methods.

The potential utility of chloropicrin for dealing with stubborn rodent infestations in warehouses is illustrated by results from a series of tests at the Denver Wildlife Research Center. When exposed to different concentrations of the gas in a closed chamber, house mice registered discomfort at levels of 1.2 ppm. At 32 ppm. , they attempted to leave the chamber. Death occurred within 1/2 hour at levels of 160 ppm.

The use of 50 percent DDT as a tracking powder for the control of house mice is well established. However, it has little utility against Norway rats. During the past 2 or 3 years there has also been a practice on the part of some pest control operators to substitute dieldrin and other highly toxic chlorinated hydrocarbons for the DDT. While used at lower concentrations (5-10 percent) and highly effective, the latter materials have not been recommended for public use by the Fish and Wildlife Service.

The evolution of effective rodent control has been greater in the past 20 years than during the previous 200 years. Mankind need no longer fear

the "black death," typhus, and other rodent-borne diseases. Likewise, there is no longer any reason why we must bear the cost of serious economic losses because of commensal rodent damage to property. Unfortunately, the latter still totals many millions of dollars each year. Damage and contamination of food products by house mice now probably equals or exceeds that caused by rats.

There are two areas in which improvements can still be made in the conduct of control operations. These are: (1) Greater care in the strategic and systematic placement and maintenance of permanent bait stations; and (2) careful emphasis on the use of fresh, clean, and attractive bait ingredients.

We can look for other equally spectacular improvements in control techniques during the coming decade. Current research at the Denver Wildlife Research Center includes study of a 1080 homologue which may possess a built-in safety feature through detoxification by altering ph of the water bait. Such a development would help to minimize hazards associated with the occasional careless use of Compound 1080. A recent illustration of this practice was a Texas court injunction obtained by the Food and Drug Administration against a pest control operator who exposed 1080 baits in a manner whereby food contamination could have occurred.

Other research underway at Denver involves a process of microencapsulation. This is a technique by which particles of toxic substances may be overcoated with a plastic material. Aside from masking taste of the toxic agent, its speed of action may be altered by changing the thickness of the coating material which is dissolved by digestive juices.

Another promising area of study by the Wisconsin Alumni Research Foundation entails the addition of antibacterial agents (antibiotics and sulfa drugs) to anticoagulant bait formulations. Preliminary data indicate some increase in the speed of action and possible control at lower dosage levels. This technique appears particularly promising against house mice and roof rats. The addition of these substances apparently retards growth of organisms in the digestive tract which manufacture vitamin K, the antidote for anticoagulant rodenticides.

Recent discoveries in the realm of chemosterilants, anti-metabolites and synthetic sex attractants loom on the horizon. They may have application in commensal rodent control. The prospects are thus good that man will win the battle against the creatures that were once regarded as "public enemy number 1."