HOUSE MOUSE

PUBLIC HEALTH IMPORTANCE, BIOLOGY AND CONTROL

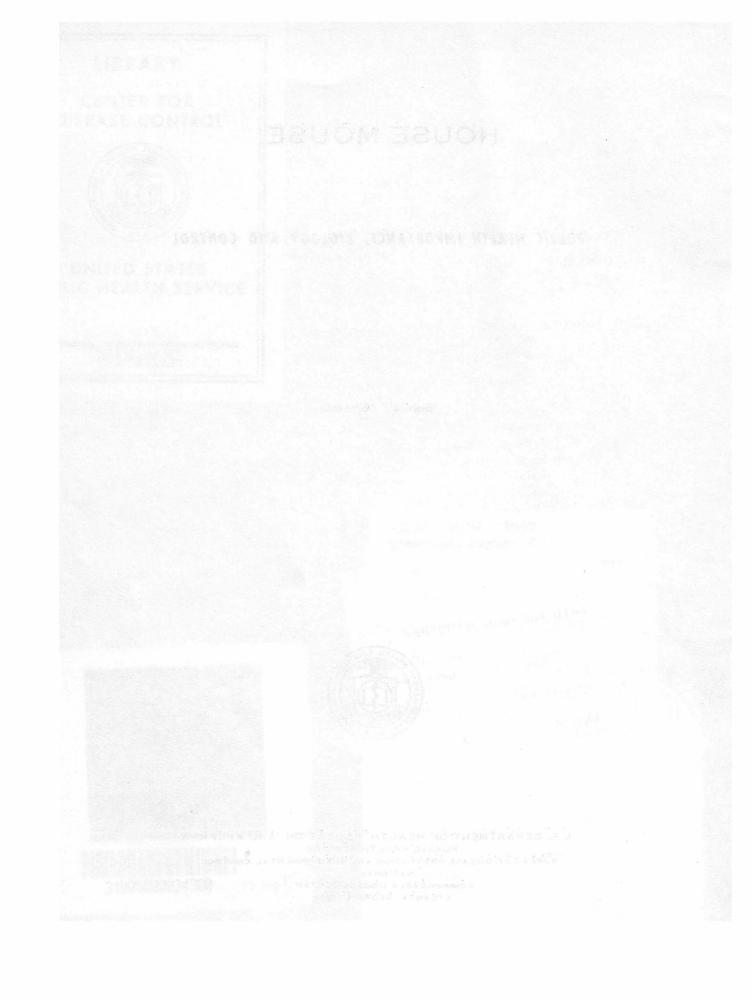
Bayard F. Bjornson



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE PUBLIC HEALTH SERVICE BUREAU OF DISEASE PREVENTION AND ENVIRONMENTAL CONTROL [U.S] NATIONAL COMMUNICABLE DISEASE CENTER] AS IS ATLANTA, GEORGIA 30333

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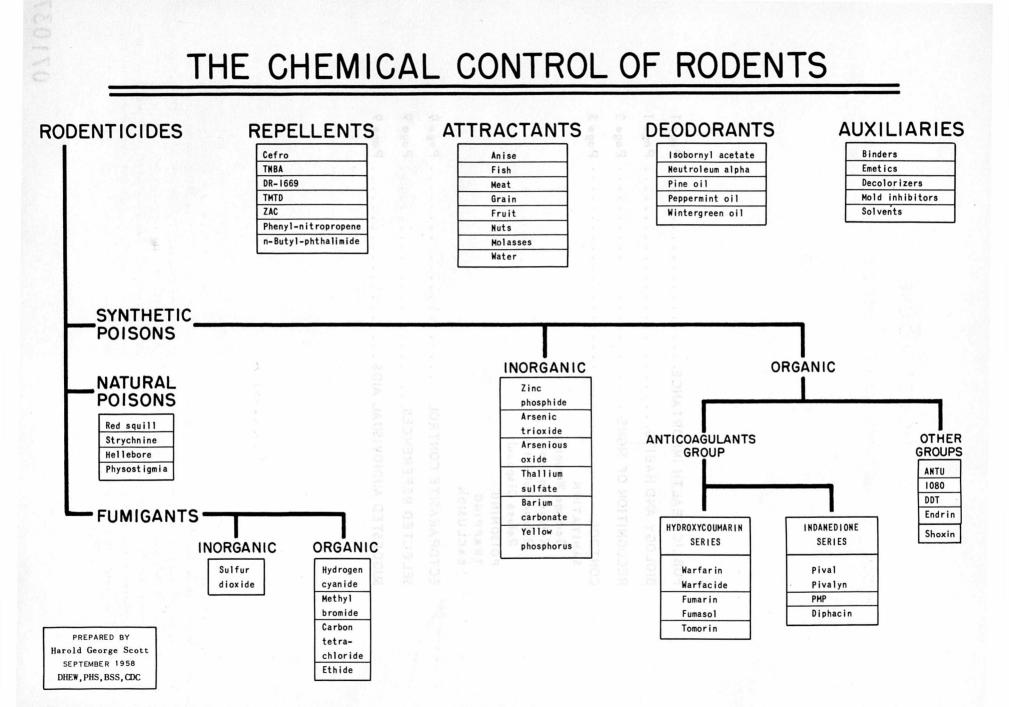


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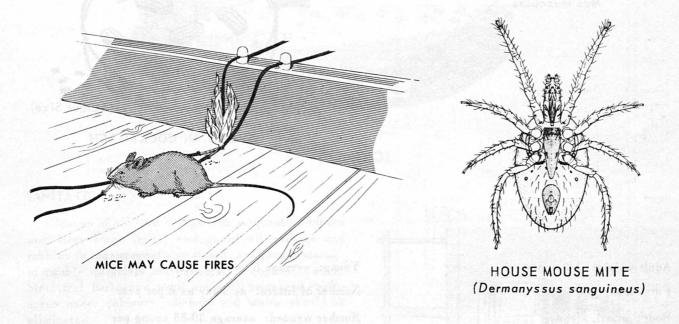


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PUBLIC HEALTH IMPORTANCE

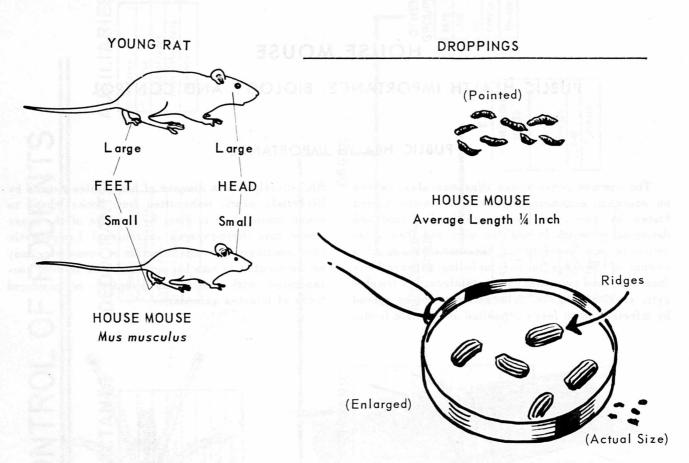
The common house mouse (*Mus musculus*) causes an enormous economic loss annually in the United States by consuming and contaminating food and damaging property. In addition mice and their ectoparasites are involved in the transmission of a number of diseases to man including salmonellosis (bacterial food poisoning), rickettsialpox, and lymphocytic choriomeningitis. Salmonellosis can be spread by infected rodent feces deposited on suitable foods. Rickettsialpox is a disease of house mice caused by Rickettsia akari, transmitted from house mouse to house mouse, and to man, by the bite of the house mouse mite (Dermanyssus sanguineus). Lymphocytic choriomeningitis, a virus infection of house mice, may be transmitted to man by means of food or dust contaminated with respiratory droplets or powdered feces of infected animals.



BIOLOGY AND HABITS

The house mouse, the smallest of the domestic rodents, is widespread and abundant throughout the United States. It is found from the tropics to the Arctic regions throughout the world. Mice live near man anywhere in buildings they can enter but also apart from man in the fields. They tend to leave the fields in numbers in winter and move into heated buildings. They often nest in bales of hay, boxes, crates and household goods, and are frequently moved in them to infest new locations.

Their vision is poor but their senses of smell, taste, hearing and touch are keen. The whiskers (vibrissae) and tactile hairs are vital touch mechanisms used to maintain contact with walls or surfaces in traveling runways between food and harborage.



AMERICAN COCKROACH

Adult weight: 1/2 ounce

Fur: dusky-gray

Body: small, slender

Ears: moderately large, prominent

Tails: semi-naked, about as long as body and head

- Droppings: small (1/8 inch long) rod-shaped
- Sexual maturity: is attained at $1\frac{1}{2}$ months

Gestation period: average 19 days

Young: average 5 to 6 per litter

Number of litters: as many as 8 per year

Number weaned: average 30-35 young per year per female

Length of life: about 1 year

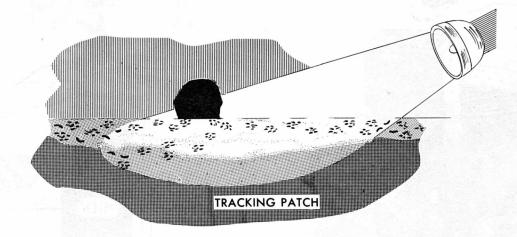
Harborage: any convenient space in walls, cabinets, furniture

Range: frequently 10-30 feet

Food and water: omnivorous; cereal grains preferred; mouse a nibbler, daily requirement 1/10 ounce dry food, requiring little water (1/20 ounce per drink).

RECOGNITION OF SIGNS

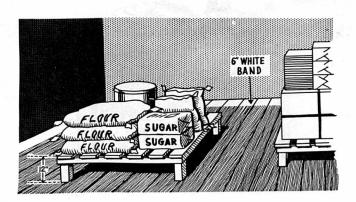
The most commonly observed signs of mice are their droppings which are usually blackish, soft, moist and shiny when fresh. They become dull and hard later. Mouse tracks are often visible in dust or soft dirt. Smooth tracking patches of any dust, such as flour or talc strategically placed along all suspected runways are of value in checking for mouse activity and for evaluating control work. Often holes in walls, grain sacks, or boxes containing food indicate location of harborage or nest. Freshly gnawed wood is light in color and shows distinct teeth marks. Small chips of wood or other gnawed materials indicate recent gnawing. With age, gnawings grow darker. Mice runways and rubmarks are not easily detected.

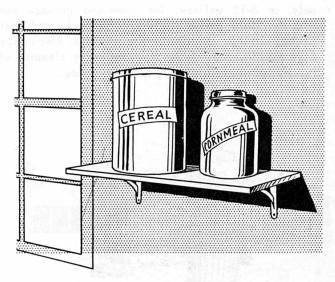


CONTROL

SANITATION

Cleanup of all food scraps from preparation tables and floor areas daily, storage of all garbage and rubbish in rodent proof containers, and proper storage of usable materials are essential to control of mice. Structural harborage such as small protected enclosures under cabinets, shelves and stairs should be eliminated.

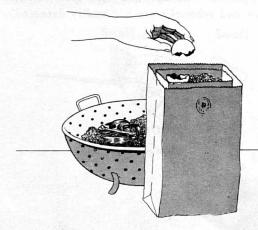


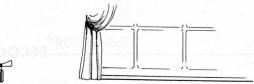


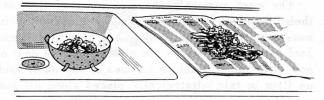
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Garbage Wrapping

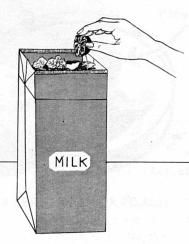
Draining and wrapping garbage in several sheets of newspaper, in paper bags, or empty milk cartons (1) reduces fly breeding (2) reduces odor (3) prevents contents from sticking or freezing to sides of container (4) reduces damage to cans due to banging (5) reduces cleaning frequency and (6) adds to useful life of the container.







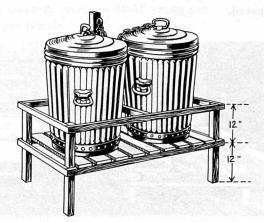




Refuse Storage

Desirable features of a refuse container are: (1) rust-resistance (2) water tightness (3) tightly-fitting cover (4) ease of cleaning (5) two handles or a bail (6) heavy duty construction (7) reinforced recessed bottom. Recommended container capacity, for garbage only, is 5-12 gallons, for combined garbage and rubbish, 20-32 gallons. Garbage can racks and post holders prolong the useful life of cans, discourage dogs from overturning them, permit easy cleaning of the ground beneath and are neat appearing.





Refuse Collection

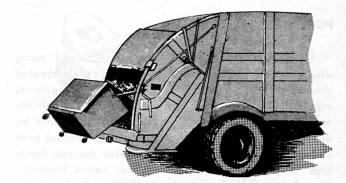
Twice weekly collection of residential garbage or combined garbage and rubbish is recommended to prevent the overloading of individual storage containers. Garbage and rubbish should be collected daily in business sections.

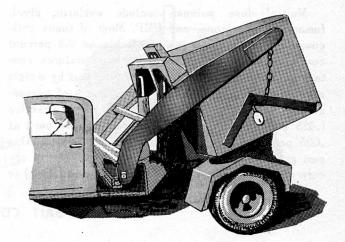


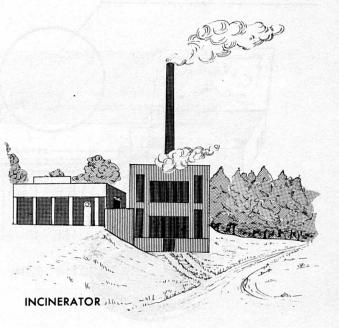
Refuse Disposal

The sanitary landfill method is recommended for most communities under 100,000 population where sufficient land is available within reasonable truck haul distance (one way distance 10 to 15 miles or less). One crawler tractor (equipped with earth moving attachment and one operator, usually can operate a sanitary landfill for a city up to 50,000 population. Modern incinerators are recommended for sanitary refuse disposal when sanitary landfill is not less expensive or otherwise feasible.









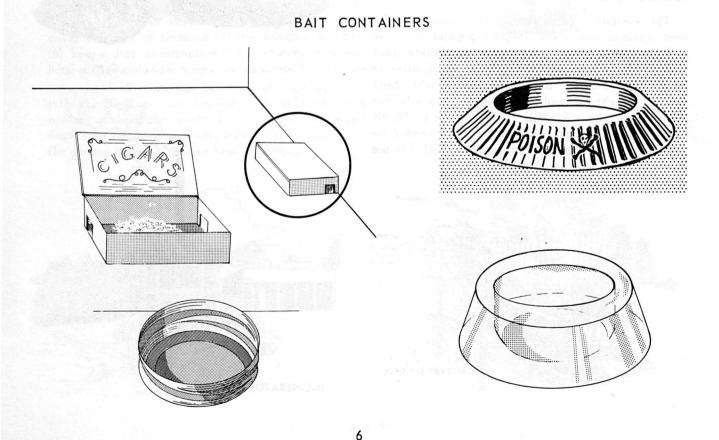
POISONING

Quick poisoning results may be obtained using single-dose poisons such as strychnine-treated grains or seeds. Other effective, but dangerous, single-dose poisons such as zinc phosphide, thallium sulphate and sodium fluoroacetate (1080) should be applied selectively only by bonded professional pest control operators. Good baits for mice include foods high in protein or sugars such as: bacon (singed), ground meat, sweets as gum drops and chocolate, grains and seeds, cake, cookies, doughnuts, bread, peanut butter, cheese, apples, raisins and sweet potatoes.

Multiple-dose poisons include warfarin, pival, fumarin, diphacinone, and PMP. Most of these anticoagulant rodenticides are available as 0.5 percent concentrates or as ready-to-use bait mixtures containing .025 percent of the poison. One part by weight of the concentrate mixed with 19 parts of courseground yellow corn meal makes a safe, effective (.025 percent) bait mixture. Diphacinone is used at .005 percent and PMP at 0.05 percent in bait. One part granulated sugar substituted for one part of the corn meal sometimes increases acceptance. Bread or cake crumbs can be substituted for the corn meal. Anticoagulant baits are slow acting and must be continuously available to all mice for at least two weeks and sometimes for a month or longer for difficult control problems. Mice must feed on anticoagulant baits daily for four to five days, or more, to be killed - single feedings are ineffective.

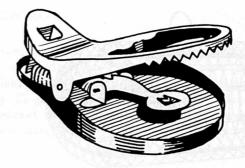
Baits should be distributed liberally at all known or suspected areas of mouse infestation. Many small baits placed at 3 to 10 foot intervals, according to the degree of infestation, are far superior to a few large baits. Mice develop both a tolerance and a bait shyness for some poisons like strychnine. Therefore poisons and baits should be changed frequently for best results.

DDT (10-50 percent of fine particle size) applied to holes, harborage and runways, kills both mice and their flea ectoparasites after about two weeks exposure. Mice inhale or ingest the dust while cleaning themselves. DDT should only be used where there is no danger of contaminating foods. Red squill (700-800 mg/kg) powder applied similarly as a tracking poison has given excellent control of mice.

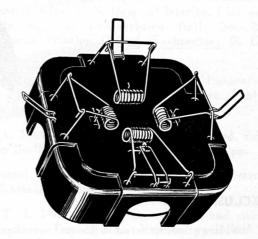


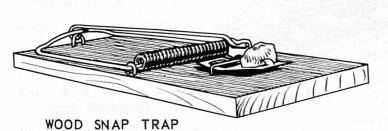
TRAPPING

The snap trap is one of the most effective methods for temporary control of mice. Use plenty of baited traps placed at 3 to 10 foot intervals in all infested areas. Baits were recommended earlier under poisoning. Baitless snap traps with expanded triggers are also effective when placed where mice are likely to run over the trigger mechanism, such as along walls or in runways. Triggers are expanded by fastening small squares of cardboard or screen wire to them. Often, bait shy individuals can be caught by camouflaging traps with a thin layer of flour or rolled oats. Choker loop traps have several holes in a wood base, each opening with a trigger, spring and wire loop choker. When properly baited, they may catch several mice per night.

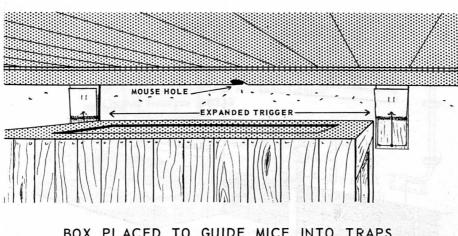


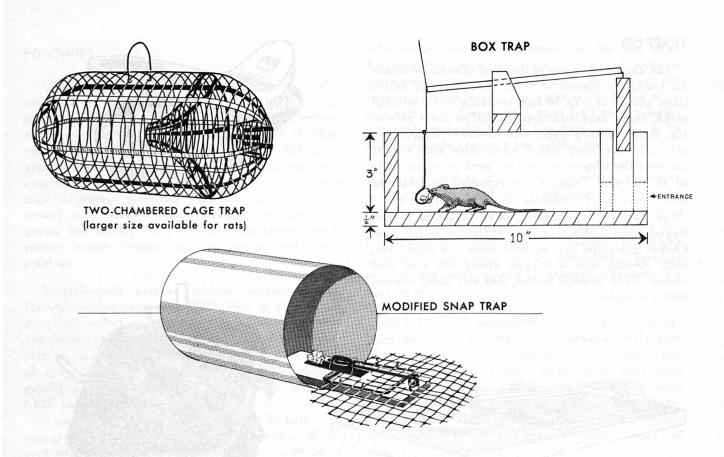
METAL SNAP TRAP





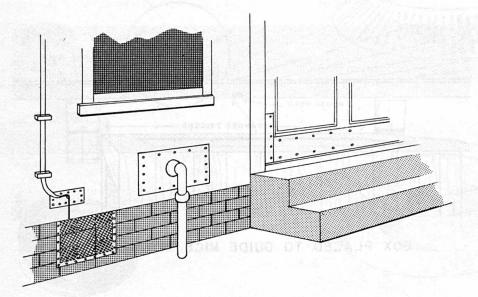
4-HOLE, CHOKER LOOP MOUSE TRAP





EXCLUSION

Buildings constructed with no openings over $\frac{1}{4}$ inch in size will exclude mice other than those entering through open doors or windows or in objects moved into the structure. It is difficult to completely "mouse proof" a building.



ECTOPARASITE CONTROL

In controlling outbreaks of rickettsialpox, it is important that control of the house mouse mite (*Dermanyssus sanguineus*) precede the control of mice. If not, infected mites may leave the dead mice and feed on the next most convenient host, man. These mites may be controlled with sprays or dusts of aramite, dimite, chlordane, lindane, chlorobenzilate and malathion. Three of the better generally available insecticides to use are 2 percent chlordane spray (5 percent dust), 0.5 percent lindane spray (1 percent dust) and 1 percent malathion spray (3 percent dust).

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