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Can mice climb smooth walls

This NebGuide describes techniques for rodent-proofing existing buildings and those that are under construction. Stephen M. Vantassel, Extension Wildlife Damage Project Coordinator Scott E. Hygnstrom, Extension Specialist – Wildlife Damage Dennis M. Ferraro, Extension Educator Richard R. Stowell, Animal Extension Environmental Engineer Figure 1. Mice can quickly destroy the insulation in the walls. Damage to this extensive can happen in as early as three years. Photo: Robert M. Timm. Rodents such as rats (*Rattus norvegicus*) and domestic mice (*Mus musculus*) cause serious damage to the structures and contents of houses, farm buildings and feed storage facilities. Rodents are notorious for their consumption and contamination of feed and stored grain, but few property owners are aware of how the damage to rodent insulation increases heating and cooling bills (Figure 1). Rodents also spread diseases affecting livestock and humans such as brucellosis, leptospirosis, salmonellosis, swine dysentery, toxoplasmosis, trichinosis and tuberculosis. Rodent-resistant construction is the first and most important step in reducing rodent damage. Research shows that rodents will penetrate structures through unsecured holes after rodent control programmes. Effective rodent proofreading will help to stop the cycle of re-infestation, but property owners need to understand that rodent proofreading will not guarantee rodent-free buildings. Rodents can chew new entrances or even be transported to the structure in a box or device. Therefore, the techniques discussed here should be seen as part of the Overall Integrated Pest Management Programme (IPM), which includes monitoring, hygiene and population control. Physical abilities of rats and mice In order to prevent rodent from entering, their abilities must be understood. For example, rats and mice can: run on electric wires, ropes, cables, vines, shrubs and trees to gain access to the building; climb almost any rough vertical surface, such as wood, brick, concrete, and weathered sheet metal; pass horizontally along pipes, augers, conveyors and pipes; and chew through a wide range of materials, including aluminum foil, wood, rubber, vinyl, plastic, and concrete block. In addition, rats can: climb on the outside of vertical pipes and pipes up to 3 inches in diameter, climb on the outside of larger pipes connected to buildings by reinforcing them against the wall, and climb inside 1 1/2- to 4-inch vertical tubes; jump 36 inches vertically and 48 inches horizontally; drop 50 feet without serious injury; rake directly into the ground at least 36 inches; reach up to 13 inches along vertical walls; and swim half a mile in open water, dive through water traps in plumbing, and travel in sewer lines upstream. House of Mice Can: Jump 18 inches travel of up to 11 1/2 miles; hang upside down from the wire screen; and survive to survive reproduced at temperatures up to 24 °F if adequate food and nesting materials are available. Holes and openings Paired front teeth (incises) rats and mice curve slightly inwards, making it difficult for them to bite on round surfaces larger than 7/8-inch, flat, or heavier than iron (such as steel). Thus, when given a rough surface or edge, they can quickly bite into most materials. In particular, ensure that all structural slits are found and secured. Rats need little more than a 1/2-inch gap to enter, Mice need little more than a 1/4-inch space (Figure 2). Do not ignore the smaller slits, as the rodent bite can quickly enlarge them. Common holes occur around augers, pipes and electrical pipes or cables. Mice usually enter farm buildings with the unprotected end of the metal drag (Figure 3). Rats and mice can quickly chew through rubber or vinyl weather stops. Figure 2. Rats can gain entry through holes as small as 1/2 inch in diameter, Mice can use holes as small as 1/4 inch in diameter. (Source: Prevention and control of damage to wildlife in 1994). Figure 3. Mice can enter the wall space where the ends of metal tow panels are opened by dragging them through a weather shield or vinyl seal. Use concrete, angular iron, or heavy flashing to block access to rodents. Photo: Rex O. Baker. Figure 4. Sealing gaps or openings where pipes, wires or other similar objects enter buildings with rodent-resistant materials. Figure 5. Metal flickering or metal channel prevents rodents from biting at the bottom edge of the door. Photo: University of Nebraska-Lincoln Extension. NOTE: The information that follows assumes that the structure is free of unwanted animals. If there are doubts as to whether the animal is using a hole or gap, do not close the hole until the species has been correctly identified and a control programme has been decided. Failure to follow this advice may cause further structural damage and injury. To prevent rodent from entering, First, determine whether the void is suitable for filling curries to stop airflow. If yes, use a suitable curry and substrate to stop or reduce potential airflow through the hole. Avoid using foam in places where it will be exposed to sunlight, as ultraviolet light will degrade the material. Table 1. Recommended materials for rodent proofing. Concrete: reinforced – minimum thickness of 2 inches; not strengthened - 3 3/4 inches. Galvanized sheet: 24 gauge or heavier. Perforated sheet metal grid should be 14 gauge. Brick: 3 3/4-inch thick with mortar-filled joints Hardware cloth (wire mesh): 19 gauge, 1/2 x 1/2-inch mesh to exclude rats; 24 gauge, 1/4 x 1/4-inch mesh to exclude mice. Aluminium: 22 for frames and flashing; 20 gauge for kick boards; 18 gauge for guards. Secondly, install gnaw-resistant gnaw-resistant (Table I) above the space to prevent input (Figure 4). In the case of holes less than 3/4 cm wide which cannot be secured by other means, a wedge of copper or stainless steel wool shall be firmly wedged into the gap. As a temporary measure, a thick steel wool will suffice, but in the end it will be rusty. Vents and Windows Use a galvanized hardware cloth, hail screen, or welded wire mesh to cover air vents and windows. Add panes to support screening for large openings or where the screen can be compromised. Stainless steel screens for fungal-type roof veduches are also available. If the hole is accessible, install the screen on the folding frame. CAUTION: A screen with a mesh size of less than 1/2 x 1/2-inch will significantly reduce airflow. Screens may not be acceptable in livestock buildings where ventilation is no longer less than adequate. In some places, the small mesh screen may become clogged with dust or ice. The use of a 1/2-inch x 1/2-inch screen is a reasonable compromise between ventilation requirements and rodent control. Dryer reducers require special treatment, as improper screening speeds up lint build-up and increases the likelihood of fires. First, make sure that the exhaust pipe complies with the Consumer Product Safety Commission standards. Secondly, properly seal all gaps between the pipe and the structure to prevent the entry of mice. Third, consider installing a dryer ventilation cover that uses a floating ball that secures the hole when the dryer stops. Exterior doors Doors should fit tightly so that the distance between the bottom door and the threshold is less than 1/4-inch. Sometimes it is easier to build a threshold than to adjust the door. Steel pipes make good rodent-resistant thresholds and allow the door to nod freely after opening. Install a flashing or metal channel at the bottom edge of the door, especially a softwood door (Figure 5). The flicker should extend to the 1/8- inch door edge at the sides and at the bottom. Mechanical closing devices save time and reduce the likelihood that they will be supported. Doors that are left open for ventilation should be equipped with rodent-resistant screen doors, or adjusted so that the top half can be left open for ventilation. Foundations and floor gaps or flaws often exist along buildings exteriors where wall framing or towing needs meet the foundation. These gaps or deficiencies provide easy access to rodents. Rats can poach under the floor or foundation of a building that rests on piers or shallow foundation walls. Prevent their entry by extending the foundation walls to at least 36 inches underground. The potential for frost damage will also be reduced. Avoid board-on-grade construction techniques for agricultural buildings, feed baskets, pads, and feed beds. Possible savings in initial construction costs are quickly overcome by the costs caused by rodent damage or by the need for a more costly control measure. Alternative option to place 18 inches of compacted sharp gravel under the plate to deter rodent raking. Rodents are making more efforts to enter buildings where feed is available. They often seek refuge under concrete floors and slabs where they pok to find protection. Ideally, you should install floors, boards and walkways with deep foundations, or curtain walls made of concrete or 1/4-inch wire of netting (Figures 6 and 7). Figure 6. Use concrete curtain walls to prevent rats from raking under the foundations to gain entry to buildings. Curtain walls can be added to existing buildings. Figure 7. Install a hardware cloth, topped with a sheet metal strip, to protect feeding shelters, corn cases and other existing wooden structures. Galvanized hardware fabric can also serve as a curtain to prevent rodents from raking under the boards. Figure 8. For double walls in old buildings, use galvanized sheet metal cut to fit and nailed to a place between nails, beams, sills, and floors (a). Non-combinable concrete stops (b) or bricks (c) are recommended for buildings under construction. The choice between concrete and wire mesh depends on the expected life of the structure. Ungalvanized wire mesh usually lasts 5 to 10 years depending on its exposure to moisture. Galvanized mesh and/or stainless steel wire mesh lasts considerably longer and costs significantly less than concrete. Repair cracks in the foundation with concrete or masonry mortar. If rats have access to the building's crawl area, adjust the floor to nod to the walls (Figure 8). Maintain clean, 3-foot-wide, raking-free space around building foundations, concrete syces and foundations to deter rodents from raking. Keep the buffer solution by mowing vegetation regularly or by using 1 1/2-inch crushed rock to a depth of 3 inches along the 24-inch wide strip (or wider) surrounding the structure. Internal rodent control When rats or mice are present in the building, pay attention to the interior as well as external rodent proofing to remove all sources of shelter. Remove rodent shelters. For example, feeders in livestock establishments should have a flat bottom and should be designed to keep rodents in search of shelter below or behind them. Pay attention to storage rooms, feeding rooms, cabinets and other areas where the building can be poorly completed, allowing rodents access to walls, floors or attics. Poor construction techniques can allow rodents to gain access through materials that are otherwise resistant to rodents. Rodents often bite into the walls at the corners, or where joints in building materials provide an edge. Prevent rodents from climbing walls, especially in corners, by attaching 12- to 18-inch aluminum sheet metal tape at least 36 inches above ground or floor level 9). Sealing holes in walls and floors with sheet metal. Sacks of fodder and miscellaneous impurities rodents and make it more difficult to control rodents. Store basic materials on pallets, shelves or hooks. In addition to rodent-resistant sanitation and construction, use traps and toxicates to remove rodents from indoor areas. Protect perimeter insulation Perimeter insulation is an essential part of energy-efficient construction. However, insulation installed on the outside of the foundation walls is subject to mechanical damage and destruction of rodents. To prevent damage to the insulation of the perimeter, use the design of the sandwich wall, which has insulation placed in the concrete. If you place insulation on the outside of the foundation wall or use moulds made of foam insulation, use protective coverings such as stub, cement slab, high density glass fibre plastics or surface bonding products. Extend the protective covers at least 36 inches below the finished class. If the protective layer is less than 36 inches below the class, add a horizontal ledge similar to that shown in Figure 7. Protect all ends and upper edges with a fitted, heavy metal flicker (Figure 10). Figure 9. Use sheet metal protectors in the inner corners of the rooms to prevent rodent from climbing. Figure 10. Protect the insulation of the perimeter, which is installed on the outside of the foundation, curtain walls, or stem walls. Install metal flashing along the top and to a depth of at least 36 inches below the soil surface. Confirming This NebGuide is a review of one written by Scott E. Hygnstrom; Dallas R. Virchow, former wildlife disease management specialist, USDA-APHIS-Wildlife Services; Dennis M. Ferraro; and Richard R. Stowell. This publication has been reviewed. Visit the University of Nebraska-Lincoln Extensions Publications website for more publications. Index: Wildlife Management Wildlife Damage Control 2003, revised January 2009 2009