FACT SHEET
CONTROL OF RODENTS

Rats and mice can be a major economic threat around pig farms. They consume and contaminate feed, and they have been implicated in maintaining or spreading diseases. Rats and mice thrive in and around farms and rural homes, and sometimes inhabit open fields and crops.

Controlling Rodents

Rats will undermine building foundations and concrete slabs. Mice are particularly destructive to building insulation. Most common types of insulation, including rigid foam and fiberglass batts, are susceptible to rodent damage. A rodent infestation can cause thousands of dollars in damage in a matter of months. Additionally, rodents frequently gnaw on electrical wiring, causing equipment malfunctions, power outages, and fires as a result of short circuits. Rat and mice populations decrease during colder weather, but you may see the pests more often because they tend to move indoors to find warmer nesting sites.

Rodents and Pig Diseases

Rodents and other wildlife can play an important role in the transmission of pig diseases. Pig diseases that rats and mice may harbour or disseminate include Leptospirosis, Salmonellosis, Swine Dysentery, Erysipelas, Intestinal Spirochaetosis and Toxoplasmosis. Rodents can spread or accelerate the spread of diseases from contaminated areas to uncontaminated areas via their droppings, feet, fur, urine, saliva, or blood. As an example, rats may travel through infected manure of sick pigs and then contaminate feed or water several hundred feet away. Rodents, if eaten by pigs, also can directly transmit diseases. When rodents live around farm buildings, they are a food source that can attract predators such as foxes or stray cats, and these, in turn, may contribute to disease problems. An effective disease barrier system cannot be achieved or maintained without good rodent control.

Recognising Rodent Infestations

Droppings, tracks, burrows, pathways, and fresh gnawings indicate areas where rodents are active. Rodent nests, made from fine shredded paper or other fibrous material, are often found in sheltered locations. Insulated walls and ceilings are common nesting locations for rodents, especially mice.

Rats also burrow into the ground inside and outside of pig buildings. When present in relatively high numbers, rats and mice occasionally can be seen during daylight hours, but they are most active at night, particularly just after dusk. Thus, conducting an inspection of the premises at nightfall may help to identify the location, distribution, and severity of a rodent infestation.

Rodent Control

For effective control, use a variety of methods including: (1) sanitation, (2) rodent-proof construction, and (3) population reduction.

The first two are preventive measures. When an infestation already exists, population reduction is typically needed. Reduction techniques include trapping, toxic baits, and fumigation.

It is important to monitor pest populations. Records of trapping success and measures of rodent activity will help to determine the need for additional control efforts.

Sanitation: Although good sanitation will seldom eliminate rodents, it certainly will aid in controlling them. Conversely, poor sanitation is sure to attract rodents and permit them to thrive. The continual presence of a sizable rodent population suggests that too little attention is being given to the proper maintenance of the facilities. Although inadequate sanitation contributes to more serious rodent problems, rodent infestation (particularly house mice) does not necessarily mean that sanitation is inadequate. On pig farms it is generally impossible to exclude rodents from all available food. But, removing shelter that rodents can use for hiding, resting, and nesting is valuable in control. Regular removal of debris and control of weeds around structures will reduce the amount of available shelter. Additionally, a clean, 1 meter weed-free perimeter around structures may make rodents feel more "exposed" and permit easier detection of rodent activity.

It is almost impossible to eliminate house mice through sanitation alone because they can survive in very small areas with limited amounts of food and shelter. Most pig buildings can support a thriving population of house mice. Producers should store feeds in rodent-proof buildings, rooms, or containers whenever possible. Sacked feed should be stacked on pallets with adequate space around and under stored articles.
This will allow easy inspection for evidence of rodent activity, and it will facilitate placement of traps or baits.

**Rodent-proof Construction:** A lasting form of rodent control is to “build them out” by eliminating all openings through which they can enter a structure. Where feasible, rodent-proof all places where feed is stored, processed, or used. By gnawing, rats can gain entry through any opening greater than ½ inch across. Mice can enter a building through any opening larger than ¼ inch across. To prevent rodent entry, seal all such holes with durable materials. Steel wool, packed tightly into openings, is a good temporary plug. To close openings or protect other areas subject to gnawing, use materials like concrete, galvanized sheet metal, wire mesh, aluminium or brick. Plastic sheeting or screen, wood, rubber, or other gnawable materials are not adequate for sealing openings used by rodents. Openings around augers, pipes, and wires where they enter structures should be closed with mortar, masonry, or metal collars. A common entry point for mice into buildings is the unprotected end of corrugated or ribbed metal siding. If not blocked with metal or mortar, these openings provide access into wall spaces and the building's interior. Rubber or vinyl weather stops are quickly gnawed through. Buildings should be designed or modified so that metal siding butts directly against the sill plate or foundation.

Doors, windows, and screens should fit tightly. It might be necessary to cover the edges with metal to prevent gnawing. Depending on the age and type of construction, it might not be feasible to rodent-proof the building. In such instances, more attention must be given to other techniques of rodent control. Rats can be discouraged from burrowing near foundations by laying a strip of coarse gravel around their perimeter. Gravel should be at least one inch in diameter and laid in a band at least two feet wide and six inches deep. Rat burrowing under concrete slabs or foundation walls also can be prevented by installing a buried curtain of 1/2-inch hardware cloth, extending down 12 to 18 inches with a lip at the bottom extending outward 12 inches.

**Trapping:** Trapping is an effective way to control rodents. House mice are relatively easy to trap, but rats require more skill and labor. Try trapping first where rodents are few; severe infestations will likely require additional measures. Trapping has several advantages: (1) it does not rely on potentially hazardous rodenticides; (2) success is easily visible; and (3) it allows for disposal of the rodent carcasses, thereby eliminating dead animal odors which may occur when poisoning is done within buildings.

The simple, inexpensive wooden snap trap is very effective. Set them so the trigger is sensitive and will spring easily.

You can reduce the chance of creating trap-shy rodents by leaving traps baited but unset until the bait has been taken at least once. Multiple-capture live traps for mice are effective and save service time.

Set traps close to walls, behind objects, in dark corners, and in places where rodent activity is evident. Use patches of talc or flour to track where rodents are active.

Traps may be placed on ledges or on top of pallets of stored materials if mice or rats are active there. Where possible, place snap traps so that rodents will pass directly over the trigger as they follow their natural course of travel, usually close to a wall. Some snap traps have enlarged triggers that catch rats or mice when they travel over them. When set correctly, it is possible to catch rodents that are not attracted to baits.

Use enough traps to make the campaign short and decisive. Mice seldom venture far from their shelter and food supply, so space snap traps no more than 10 feet apart in areas where mice are active. When using snap traps, it may be best to trap intensively for two to three weeks and then "rest" for a couple weeks. This may save some labor costs and will help prevent rodents from becoming "trap-shy." Place multiple-catch traps in areas where mice are persistent and where mice are gaining access to the building (for example, on both sides of doorways). Multiple-catch traps should be checked frequently to remove captured mice.

Glue boards are another type of rodent trap. Place glue boards along walls where rodents travel. Do not use them where humans and pigs have access to them, because they stick tenaciously to any object coming in contact with them. Glue boards lose their effectiveness in dusty areas unless covered, and temperature extremes also may affect their tackiness. To protect the glue board from dust and disturbance, place it inside a bait station, or install a special protective cover designed to fit over the glue board. Glue boards are more effective for capturing mice than rats.

**Toxic Baits (Rodenticides):** Rodenticides are pesticides designed to kill rodents. Both anticoagulant and non-anticoagulant rodenticides are available. Some non-anticoagulant rodenticides will give a quicker knockdown of a rodent population than anticoagulants, as they are effective with a single feeding and are relatively rapid in action. They may be preferred where rodents are abundant or where it is difficult to get them to accept a bait for several days in succession (as is necessary with some anticoagulants).

The most common non-anticoagulant rodenticides are bromethalin and cholecalciferol.
Bromethalin results in a decrease in nerve impulses, paralysis, and death. A single dose of bait is usually lethal within two to four days. Rodents stop feeding on bromethalin baits after they have consumed a lethal dose. Thus, only relatively small amounts of this bait need to be available.

Cholecalciferol is actually vitamin D3. In massive doses this compound is toxic and because of their small size, rodents succumb to relatively small amounts. Cholecalciferol will act as a single-dose poison if a sufficient amount is consumed by a rodent in one feeding, but it will act as a multiple-dose poison if consumed in lesser amounts over several days.

Zinc phosphide has been used as a rodenticide for many years and is available in ready-to-use commercial baits. Use of zinc phosphide has declined. However, it is still an effective and useful material, and it can provide an economical and quick knock-down of a rodent population. Because "bait shyness" may develop following a sublethal ingestion of zinc phosphide, it is best not to use this active ingredient more than twice per year at a given location. "Prebaiting" with untreated bait for several days before a zinc phosphide rodenticide is offered will increase bait acceptance.

Anticoagulant rodenticides comprise about 90 per cent of all baits used for rodent control. Anticoagulants cause death by internal bleeding, which occurs as the animal’s blood loses its clotting ability and capillaries are destroyed. The active ingredients are used at very low levels, and bait shyness does not occur. All anticoagulant rodenticides are relatively slow-acting and death usually occurs three to seven days following the ingestion of a lethal amount. Most anticoagulant baits cause death only after they are eaten for several days. Brodifacoum, bromadiolone, and difethialone baits are exceptions. These rodenticides can cause death following a single feeding, although the rodent may continue to feed for several days. All anticoagulants are considered to have good bait acceptance, low human hazard, and moderate to high hazard if directly ingested by swine.

When multiple-dose anticoagulant rodenticides are used, bait must be available continuously until all rodents stop feeding. This usually takes at least two weeks. Complete elimination of rodents is often possible with anticoagulant rodenticides. This is not usually achieved with non-anticoagulant rodenticides, and hence the anticoagulants are often used as a follow-up to other types of control.

**Bait Selection and Placement:** Rodent baits are available in several forms. Grain baits in a loose meal or pelleted form are available in small plastic, cellophane, or paper packets. These sealed "place packs" keep bait fresh and permit easy placement of the baits into burrows, walls, or other locations. Rodents gnaw into the packets to feed on the bait. When baiting, check that packets have not been pushed out of burrows by rats, as this may expose bait to non-target animals. Anticoagulant baits formulated into paraffin or wax blocks are useful, especially in damp locations, where loose grain baits would spoil quickly. As with place packs, avoid placing them where they could be reached and fed on by pigs.

Where ample feed is available to rodents, control can be improved by using baits prepared of highly-preferred foods. A particularly good bait material for house mice is canary grass seed. In many situations, mice prefer such bait to hog feed.

Water or food items of high water content are often attractive to rodents at sites where water is scarce or absent. Some anticoagulant concentrates can be dissolved in water to make a liquid bait. Even though mice require little water to survive, they will quickly accept available water baits. When water sources can be reduced or eliminated, liquid baits will provide excellent control of rats. Liquid baits also can supplement cereal baits, resulting in better control.

Proper placement of baits and the distance between them is very important. Baits must be located where rodents are living, as close to their shelter as is possible and closer than their normal food resources. For house mice, place baits no farther than 10 feet apart (preferably six to eight feet). Since rats will travel farther to feed, baits can be spaced 25 to 50 feet apart. Whenever possible, however, place rat baits directly into, or very close to, rat burrows. Bait boxes or stations provide a secluded feeding area, holding ample toxic bait for nearby rodents. Bait boxes protect the bait from weather and exclude non-target animals. They should be large enough to accommodate several rodents at one time and should have at least two rodent-sized openings (1 ½ inches for mice, 2 ½ inches for rats). Place bait boxes next to walls (with the openings close to the wall), or near burrows and in other places where rodents are active. Clearly label all bait boxes with appropriate warnings as a safety precaution. To prevent bait boxes from being tipped over, fasten them to the floor or wall. Secure the lids to prevent unwanted access to the bait.

**Fumigants:** Fumigants are commonly used to control Norway rats in their burrows in outdoor situations. Compounds such as carbon monoxide and aluminum phosphide have been used to fumigate rat burrows. Fumigation of house mice is usually limited to situations where they occur inside structures such as grain bins or warehouses.

Caution! Fumigants are highly toxic to humans and other animals.
Fumigants must not be used in any situation that might expose people or domestic animals to the gases. Because of inherent potential hazards with fumigants, only licensed structural pest control operators should use fumigants in any situation involving buildings or other structural enclosures.

**Maintaining Control:** Once control is achieved, some pork producers tend to let their guard down and not pay much attention to rodent control for a couple of months. Unfortunately, this habit leads to undoing all the work that it took to control the rodents initially. Keep in mind that a few rodents are likely to survive even the most thorough control effort. Also, rodents from nearby fields or structures may invade swine facilities at any time. These rodents will multiply quickly if not kept in check with an ongoing control program. Therefore, it is important to establish permanent bait stations in farm buildings and around their perimeter. Fresh anticoagulant bait in these stations will control invading rodents before breeding populations become established.

Rodent control should be a regular and continual part of a pork production operation. Take an hour or two each month, after control has been achieved, to check and refill bait stations and inspect facilities for fresh rodent activity. Mark it on the calendar.

**Safety Precautions:** Some general safety precautions should be followed in addition to those appearing on product labels. Consider all rodenticides sufficiently toxic to cause death to pigs. Remember that pigs will often feed on rodent carcasses. Therefore, pick up and properly dispose of any rodent carcasses that result from the use of toxic baits. Handle rodent carcasses with rubber gloves, long tongs, or shovels. Label all bait containers and stations clearly with appropriate warnings, and keep unused bait in its original container. If baits are stored with other chemicals, be sure they are packaged in airtight containers to prevent absorption of foreign chemical odours that will reduce the baits’ acceptance by rodents. Carefully follow label directions. Remove and destroy all uneaten bait at the end of the poisoning program. When using permanent bait stations, properly dispose of any old, spoiled, or contaminated baits.

**Summary**

1. Eliminate or reduce the number of places rodents can use for shelter. Prevent clutter in and around buildings, and keep stored feed in rodent-proof facilities. Where practical, make structures rodent-proof. When rodents have no place to hide or nest, they cannot thrive.
2. If rodents or evidence of rodents are present, begin or increase control efforts.

Use traps or rodenticides to reduce their numbers. Place baits or traps in areas where rodents are active, and maintain control efforts diligently until successful.

3. Once rodent numbers have been reduced, continue a regular program of control to keep rodent numbers to a minimum. Maintain permanent bait stations or traps to control invading rodents and to keep surviving rodents from multiplying.

Modified from an article written by Dr Todd See, Swine Genetics Specialist, North Carolina State University.

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