

CHAPTER 10 d

Vector: Rats and Mice

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Rats and mice can be a severe problem on livestock and poultry farms in South Carolina if the right conditions exist. Not only as they destroy buildings and equipment, but they also spread diseases to livestock and humans. Livestock and poultry farms offer an environment with plenty of hiding places, water and food desirable to rodents.



Rodents are very prolific. Rats can have litters every three weeks with 8-12 offspring, while mice can bear 4-6 offspring. Breeding peaks in spring and fall. Since rodents are sexually mature at 2-3 months, a single pair of rodents can have 15,000 offspring in a year!



Rats and mice can be a major economic threat around confinement livestock. They consume and contaminate feed. One mouse consumes about eight pounds of feed per year and can waste twice that much. Rats undermine foundations and concrete slabs causing damage to structures in a matter of months. They can also cause damage to the insulation and electrical wiring.

In addition, rats and mice are known carriers of at least 35 diseases, such as plague, leptospirosis, swine dysentery and salmonella. Rodents can be significant contributors in the transmission of swine and poultry diseases. Many of these diseases affect humans too. Diseases that can be communicable to man from lower animals are called zoonoses. Rodents are reservoirs of the following:**

Bacterial Zoonoses such as leptospirosis, ratbite fever plague, salmonellosis, salmonella typhimurium, yersiniosis, meliodosis, tularaemia and lyme disease.

Rickettsial Zoonoses such as rickettsial pox, Siberian tick typhus, and flea-borne typhus

Virial zoonoses such as Venezuelan equine encephalitis, haemorrhagic fever with renal syndrome, Argentinian haemorrhagic fever, lymphocytic choriomeningitis, and lassa fever.

Parasitic zoonoses such as leishmaniasis, schistosomiasis, echinococcosis due to E. Multilocularis, Trichinelliosis, toxoplasmosis and angio strongyliasis.

Mycotic Zoonoses such as histoplasmosis.

Rodents can spread or accelerate the spread of established diseases from contaminated areas to other areas through their droppings, urine, feet, fur, saliva or blood. Rats contaminated with feces from sick stock, can contaminate feed or water several hundred feet away by moving from room to room or building to building. This can destroy the management tool of all in - all out.

Rodent Control

Control has three phases. These are sanitation, rodent proof construction, and population reduction. If one of these is neglected then rodent population control will be a constant state of population control. The farm will need to poison to reduce rodent population every few months or stated as a population knock-down situation. Sanitation and habitat modification are practices often overlooked and very much a key to rodent control.

Population monitoring is a key to rodent control. Monitoring should be both visual and checking bait stations. Bait stations should be checked on a regular basis. This should be done at least monthly and if high populations are present, then daily. If there is a population explosion on the farm, then a knock down treatment should be used.

Sanitation

Sanitation includes cleaning up spilled feed, manure, and the accumulation materials that create hiding places. These materials include old equipment, building materials, old feed sacks and many other items that are either storage for later use, abandoned or discarded. Manure packs around feeders and in the walls of buildings provide excellent hiding place for rodents. Allowing weeds to grow around building also encourages of rats and mice. Good sanitation in and around buildings creates an environment that is less suited for rodent populations. Elimination of excess water sources will reduce the ability of rodents to function.

Regular mowing of weeds and removal of debris from around structures reduce the amount of shelter.

Rodent Proofing Construction

Mice can enter through a ¼ inch hole and rats can gain entrance through a ½ inch hole. At a minimum, three and three quarter inches of unreinforced concrete or three and three quarter inch thick bricks with mortar are needed for rodent proofing. Galvanized Sheet metal should be 24 gauge or heavier and hardware cloth (wire mesh) should be 19 gauge ½ x ½ for rats and 24 gauge ¼ x ¼ mesh to exclude mice.

Simple things like patching around pipes and wires where they enter buildings will help exclude rodents. Doors should fit tightly around the jam and the threshold. Softwood doors are also an

invitation for rodents to gain entrance. Metal flashing around wooden doors help exclude rodents. Automatic closure devices also prevent doors from being inadvertently left open.

Maintaining a clean 3-foot wide weed free zone around building foundations and concrete foundations discourages rodent burrowing. A heavy gravel boundary is probably the best solution. If a minimum of 3 feet wide border made of 1 inch rock 6 inches deep is placed around buildings, rats will be discouraged from burrowing / tunnelling under buildings. Regular cutting of weed by mowing is next best.

Population Reduction

Poor sanitation is one of the primary reasons for moderate to high levels of infestations of rodents in urban and suburban areas. Proper sanitation may not eliminate rat populations but often can prevent them from flourishing in high numbers. Repeated increases in rodent population even after the use of poisons, is a good indication habitat modification is needed. In other words, a good sanitation program and clean up of the farm is needed.

Livestock and poultry buildings have many avenues of entrance for rodents. It is virtually impossible to build a rodent-proof livestock and poultry building. Attention to details will help discourage entry into livestock and poultry buildings. See comments under rodent proofing construction. The plan for reduction should incorporate a combinations of control practices. Common practices include the use of poisons (toxicants and anticoagulants) and traps. Traps can be used in an area that is too sensitive for toxicants to be used. **READ, UNDERSTAND AND FOLLOW ALL POISON LABEL PRECAUTIONS.**

Bait stations should be an integral part of any vector control program. They should be serviced on a regular basis. This should be done at least monthly and if high populations are present, then daily. If there is a population explosion on the farm, then a knock down treatment should be used. They should also be clearly marked as a bait station ie. "Rodent Bait - Do Not Touch." The word "Poison" may also be a good addition. Where young children, pets, or livestock may be present, lids should be secured to prevent unintended access to the bait.

Population monitoring is best done by visual observation. This can be done during the normal farm duties. Monitoring should also be done at a night visit with a flashlight. During the day, "rat signs" may be evident. These include droppings, tracks, runs or burrows, and rub marks. Urine may be seen by using a UV light. It will fluoresce under an ultraviolet light. Fresh footprints, dropping and well-used trails are excellent ways to monitor populations.

Estimating numbers is important when deciding whether to go to a knock-down phase or to change the bait type.

<u>No rats or few present:</u>	<u>No signs. If present, only in small number.</u>
<u>Medium numbers present:</u>	<u>Old dropping and gnawing common. One or more rats seen by flashlight at night; no rats seen during daylight.</u>
<u>Large numbers present:</u>	<u>Fresh dropping, tracks and gnawing present. Three or more rats seen at night and/or rats seen during daylight.</u>

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For Additional Information

Controlling Rats and Mice in Swine Facilities PIH-107

Rodent Proof Construction NebGuide Structural G83-656

Rodent-Proof Construction Drain and Feeding Equipment G83-657

Prevention and Control of Wildlife Damage Univ. of Nebraska
Handbook of Pest Control, Mallis, Eighth Edition

Rats, Mice and Human Disease (or what every PCO needs to know) Palmetto pestalk,
November, 1994 Dr. Stan Shuman and Dr. Bill Simpson, M.D. **

*Rat and Mice Images from Encarta 96 Encyclopedia

Mice



Scientific Name	Mus Musculus
Home Range	<u>Prefer approximately 20 feet</u>
Food per day	1/10 oz
Water	Free water is not necessary. They can gain water needs through their food, However they will drink if available.
Weight	Approximately 2/5 to 1 oz,
Length	4-6 inches (head tail and body combined)
Vision	Poor vision 3-4 feet but can see motion up to 30-50 feet
Nest	Above or below ground
Litter	<u>5 to 6 young with 5 to 10 litters per year</u>
Gestation	19-21 days
Maturity	Independent living at 2.5-3 weeks and reproductive maturity 6-10 weeks.
*Mice Facts:	Jump as high as 18 inches from floor to an elevated surface. Travel considerable distance hanging upside down from screen wire. Enter a building through an opening greater than ¼ in across.

* Rodent-proof Construction G83-6756

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Rats



Scientific Name	Rattus norvegicus
Home Range to	<u>Prefer approximately 100 to 150 feet. It is not unusual for individual rats Roam between 328 to 984 feet. Some rat have been captured 4 miles from their point of release.</u>
Food per day	1 oz.
Water	½ to 1 oz daily if eating dry food
Weight	Usually 1 lb, up to 1.5 lbs
Length	12 inches (head tail and body combined); up to 18 inches.
Vision	Poor vision 3-4 feet but can see motion up to 30-50 feet
Nest	Above or below ground
Litter	<u>6 to 12 young with 4 to 6 litters per year</u>
Heat	Every 4 to 5 days
Gestation	21-23 days
Maturity	Independent living at 2.5-3 weeks and reproductive maturity 3 months.
*Rats facts	Climb vertical pipes 3 inches diameter. Climb larger diameter pipes if they can squeeze body between pipe and wall. Climb inside pipes 1.5 to 4 inches in diameter Jump 36 inches vertically and 48 inches horizontally Drop 50 foot without a serious injury. Burrow at least 36 inches vertically in the ground Reach 13 inches high on a vertical wall Enter a building through an opening greater than ½ in across.

* Rodent-proof Construction G83-6756

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