RODENT CONTROL ON POULTRY FARMS

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Rodents such as mice and rats are nuisance animals that are a major concern anywhere poultry are grown. The house mouse (*Mus musculus*), Norway rat (*Rattus norvegicus*) and roof rat (*Rattus rattus*) will take up residence on Tennessee poultry farms and in backyard chicken coops unless steps are taken to prevent their presence. These rodents can carry multiple diseases, cause damage to wiring and buildings and consume and contaminate large quantities of feed.

Rodents are known to carry at least 45 different diseases including Salmonellosis, fowl pox, leptospirosis and erysipelas. Poultry houses are attractive homes to these unwanted pests because they provide all three basic requirements that rodents need: shelter, food and water. If one or more of these ingredients is missing, rodent populations usually remain low. However, poultry houses have an abundance of all three requirements and keeping them out can be a challenge. If rats and mice can get their head through an opening, they can get their body through as well. This can be an opening as small as ¼ inch for mice and ½ inch for rats. Preventing access to poultry houses requires permanent bait stations (Figure 1 (homemade) and Figure 2 (commercial)) and rotating rodenticides on a regular basis to prevent resistance development.

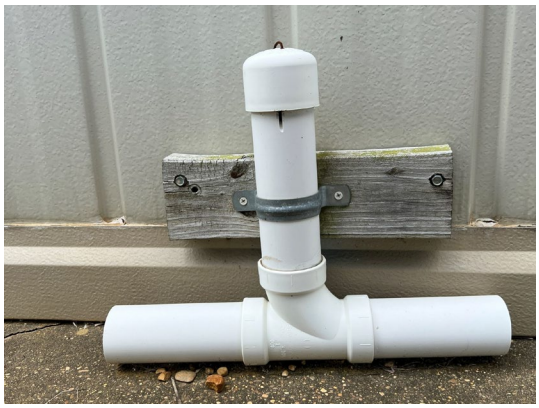

Figure 1. Homemade bait station

Figure 2. Commercial bait station

Feed loss and building damage

Once inside the poultry house, rodent activity may go unnoticed for a time because rodents are most active at night when growers may not be present, and rodents are rarely seen during the day until their numbers reach epidemic proportions. Rodents consume and contaminate huge amounts of poultry feed. They contaminate and ruin much more feed than they eat, and they eat plenty. Adult rats eat about 1 to 2 ounces of feed per day, whereas a mouse eats about 0.1 ounce per day. This may sound insignificant but a large rodent population on a poultry farm may consume several tons of feed each year.

If one rat eats 2 ounces of feed per day, that's 46 pounds per year. If 250 rats are present in a large poultry house (not uncommon in a large infestation), that's 5.75 tons of feed eaten by the rats each year. If feed costs $350 per ton, feed consumed by the rats would cost $2,012.50, or $8.05 per rat! This is only the dollar cost to the integrator; it does not include the cost to the grower in lost feed conversion and lost income as a result of settling lower on the settlement sheet because of a poor feed conversion. Nor does it include feed that is contaminated and ruined by rodents.

Rodents also damage buildings and equipment by gnawing on support structures, insulation, wiring, cool cell pads, egg belts and curtain material. Gnawing on wiring is particularly dangerous as it presents a fire hazard that could destroy the house or cause electrical or mechanical malfunctions that could cost the operation thousands of dollars or the loss of an entire house of chickens in minutes. Therefore, it is important to know how serious the rodent problem is on a farm. A good rule of thumb exists to determine rodent populations:

- Signs seen but no rodents seen — 1-100 on the premises
- Occasional sightings at night — 100-500 on the premises
- Seen every night and occasional daytime sighting — 500-1,000 on the premises
- Several seen during the day — up to 5,000 on the premises

For every rodent seen (Figure 3), it is estimated there are likely 20 to 50 that are unseen. Sanitation, rodent-proofing and baiting are important to prevent an infestation or remove one that may currently exist. Flawless rodent-proofing of a poultry house is unlikely, but growers can make it difficult for rodents to gain entrance.

Figure 3: Rodent on top of roof

Rodenticides

Rodenticides are formulated as concentrates, pellets, bar baits or tracking powders. Concentrates are often powders designed to be mixed with feed or water. Pellets are the poison formulation mixed with grain and a binder that holds the pellet together. Bar baits are formulated with a rodenticide, various grain products and a binder containing a high wax content that allows the product to withstand moisture for long periods. Tracking powders are formulated with talc or some other inert ingredient that are spread along rodent pathways. The rodents pick up the poison on their feet, fur and tails and then ingest it later when grooming. Tracking powder is regulated and may require a restricted use pesticide license to purchase.

Rodenticides are usually classified as either single- or multi-feed poisons. Poultry growers often prefer single-feed poisons because rats and mice receive a lethal dose after only one or two feedings. Rodenticides are also classed into two broad chemical groups: anticoagulants and non-anticoagulants. Anticoagulants were first discovered in the 1940s and are the most widely used toxicants for mice and rat control. Warfarin is the best known and most widely used anticoagulant, although some rodents have developed a genetic resistance to warfarin and its use today is limited due to that fact and the development of newer, more potent anticoagulants. Table 1 list many common rodenticides and their dose requirements.

There are three non-anticoagulants listed in Table 1. Bromethalin is a neurotoxin that works by causing central nervous system shutdown, paralysis and death. The amount needed is about one-third of that used with anticoagulants because an animal ingesting a lethal dose does not feed again. Cholecalciferol is vitamin D3, which is especially toxic to rodents in very large doses. It breaks down bone and causes high blood calcium levels, disrupting body functions. Death results from hypercalcemia (too much calcium in the blood). Zinc phosphide has been used for many years. When ingested, it causes phosphine gas production in the stomach. It is strictly controlled and can only be purchased with a restricted use pesticide license.

Table 1. Common rodenticides used in and around poultry farms.

Generic Name (Active Ingredient)	Type	Formulation	Dose	Trade Names
Brodifacoum	2nd generation anticoagulant	Place packs, bulk pellets, bait blocks	Single dose, death 5-7 days after feeding. Rodent continues feeding after lethal dose ingested.	Attack, Havoc, Jaguar, Talon, Other Brands
Bromadiolone	2nd generation anticoagulant	Place packs, bulk pellets, bait blocks	Single dose, death 5-7 days after feeding. Rodent continues feeding after lethal dose ingested.	Boot Hill, Hawk, Tomcat, Decimax, Other Brands
Chlorophacinone	1st generation anticoagulant	Tracking powder, pellets, blocks, concentrate	Multiple dose, death 5-7 days after feeding. Rodent continues feeding after lethal dose ingested.	RoZol, Microzul, Ramucide, Other Brands
Difethialone	2nd generation anticoagulant	Pellets, place packs, bait blocks	Single dose, death 5-7 days after feeding. Rodent continues feeding after lethal dose ingested.	Generation, Hombre

Generic Name (Active Ingredient)	Type	Formulation	Dose	Trade Names
Diphacinone	1st generation anticoagulant	Pellets, place packs, bait blocks	Multiple dose, death 5-7 days after feeding. Rodent continues feeding after lethal dose ingested.	Ramik Green, Trap-N-A-Sak, Other Brands
Pindone	1st generation anticoagulant	Bait packs and blocks, bulk	Multiple dose, death 5-10 days after feeding. Rodent continues feeding after lethal dose ingested. Some genetic resistance	Pival, Pivalyn
Warfarin	1st generation anticoagulant	Place packs, bulk	Multiple dose, death 5-10 days after feeding. Rodent continues feeding after lethal dose ingested. Some genetic resistance	Ferret, Contrax, Other Brands
Bromethalin	Neurotoxin **(non-anticoagulant)**	Place packs, bulk, bait blocks, soft bait	Single dose, death 2-4 days after feeding. Rodent stops feeding after ingesting lethal dose.	Assualt, Vengeance, Trounce, Cannon, Others
Cholecalciferol	Vitamin D3 **(non-anticoagulant)**	Place packs, Soft bait	Single or multiple dose, death 3-5 days after feeding. Results in too much calcium in the blood	Rampage, Quintox, Selontra
Zinc phosphide	**non-anticoagulant**	Pellets, Mixed grains	Single dose, stomach poisoning, result of toxic phosphine gas formation	Many Brands. Requires restricted use pesticide license

Know your enemy

Placement of bait is important as rodents prefer not to travel far from home to find a meal. Identification is key to planning a successful control strategy. Bait station placement recommendations for mice range 8-15 feet apart, and 15-30 feet for rats. It's important to know and understand what you are up against. The Norway rat has a large thick body that measures 7½-10 inches long with a tail length of 6-8½ inches (slightly shorter than the body). It can climb when necessary but prefers to live in a burrow 8-18 inches below the ground. The roof rat rarely burrows and compared to the Norway rat, has a more slender, graceful, and streamlined body, a more pointed snout, eyes and ears and its tail is longer than its body. Rats gnaw almost constantly to keep their front incisor teeth worn down because these teeth grow an average of 5 inches per year. They usually feed once or twice during the night. Rats reach sexual maturity at 3-4 months of age and have a gestation period of 21-25 days. The young are weaned at three weeks old and the females can breed again one day later. Rats average nine young per litter and can have 4-6 litters per year. Many will die under natural conditions, but one female could wean 50-60 young each year.

The house mouse is a brown to gray rodent with relatively large ears for its size and small eyes. The adult mouse is 5½- 7½ inches long including the 3- to 4-inch tail. Mice have a small home range of less than 25 feet. Mice are very curious and will investigate bait stations and bait placed in their paths. Rats, however, are very suspicious of trying new food sources. Rats are often picky eaters and tend to prefer fresh, high-quality foods and will reject spoiled or poor-quality food sources if they have a choice. Mice can start breeding at about 50 days or age and live 5-12 months. The gestational period is 19-21 days, and they can start breeding again 14-24 hours after giving birth. Mice can have 5-10 litters per year with an average of six young per litter. Like rats, a single mother can produce up to 60 offspring each year.

Sanitation and a good rodent control program are key to managing rodents on a poultry farm. Rodents can carry many diseases so rodent control is key to any biosecurity program. Maintaining a neat operation, keeping the grass cut and limiting harborage and nesting spots will discourage the rodent population. Rotate rodenticides throughout the year to avoid resistance. Rodent control program failure can usually be traced back to human error. Keep in mind that rodenticides are poisons and should be handled responsibly and in accordance with label instructions for the protection of humans, poultry, non-targeted wildlife and the environment.

Disclaimer

This publication contains pesticide recommendations that are subject to change at any time. The recommendations in this publication are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used. The label always takes precedence over the recommendations found in this publication.

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