



SYNOITA
Our Science ...Your Pest Solution

RODENTICIDE CONTROL PROGRAMME



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Integrated Pest Management (IPM)

Rodent Control

What is IPM?

Integrated Pest Management (IPM) is an effective and environmentally sensitive approach to pest management that relies on a combination of common-sense practices. IPM programmes use current, comprehensive information on the life cycles of pests and their interaction with the environment. This information, in combination with available pest control methods, is used to manage pest damage by the most economical means, and with the least possible hazard to people, animals, property, and the environment.

Problems Associated with Rodents:

Health: Commensal rodents pose serious health risks to people and livestock by transmitting disease such as leptospirosis, lymphocytic choriomeningitis, salmonellosis, rickettsial pox, rat bite fever, trichinosis and murine typhus. They carry endoparasites and ectoparasites such as fleas that transmit bubonic plague.

Consumption: Rodents are thought to consume approximately twenty percent of the world's food supply pre and post harvest.

Destruction: Rodents have adapted their incisor teeth for gnawing, which enables them to keep their teeth sharp at all times. The word rodent is derived from the Latin word "rodere", which means "to gnaw". This continuous gnawing action results in damage to the fabric of buildings including floors, walls, timber doors and windows, electrical and telephone cables and plastic water pipes. Rodents damage crops and contaminate hundreds of thousands of kilograms of stored food commodities by urination, defecation and rodent hairs.

Know Your Enemy

What you should know about rodents

To implement a successful IPM programme for rodent control one needs to have an understanding of the basic biology, characteristics, habitat and distribution of rodents.

Neophobic (New Object Reaction): Rodents in general are neophobic, which means they are afraid or weary of new foreign objects in their environment and therefore may take a few days before they consume newly placed bait or explore a bait station.

Hierarchy: The natural social behavior of the Norway Rat, Black Rat and the House Mouse involves territorial and hierarchical behavior. A high ranking, dominant male governs the colony whilst defending his territory and the top ranking females who are subordinate to the male



dominate all other members of the group. Constant communication between members of the colony in regard to food, water, shelter and danger is ongoing and makes rodents one of the most successful animals in adapting to new situations and environments.

Bait Shyness: Rodents are able to associate negative effects or symptoms resulting from bait consumption. If able to make the association, the dosed rodent may communicate this to the remainder of the colony resulting in no further bait being consumed. This is termed “bait shyness” and is most commonly associated with quicker acting acute poison whereby the rodent may experience pain and is able to link this to a particular bait or food it consumed. It is for this reason that anticoagulants are used as it has a delayed effect and limited discomfort to the rodent. Bait shyness can also exist in colonies where the bait has been contaminated during manufacture or may have been accidentally tainted during bait placement by operators not wearing dedicated baiting gloves.





House Mouse: (*Mus musculus*)

- Colour:** Greyish-brown on top with a light cream underside.
Length: 12 - 19cm. Tail is longer than body and head combined.
Weight: 18 - 28g
Ears: Fairly large ears for its size.
Eyes: Small black eyes that protrude from the head.



Feeding Habits: Omnivorous. Seeds, cereal grains, fruit, vegetables and meat. Frequent many feeding sites (20 - 30) during their active period. Water is not essential if food contains >12% moisture.

Approximate food consumption per day: 3g.

Baiting Method: Place small amounts of bait 2 - 4m apart at numerous sites to combat against their sporadic and erratic feeding patterns. Baiting should be focused in areas where activity is known i.e. where droppings are seen or visual habitation is noticed.

Droppings: <6.5mm in size with pointed ends. Average 50 droppings per day.

Habits: Excellent climbers and are able to swim. They explore their limited home range of less than 10m for any newly introduced objects. They are nocturnal and most of their activity is half an hour before sunrise and half an hour after sunset.

Reproduction: Sexually mature at 5 weeks. Capable of reproducing 8 times in their lifespan and each litter averages 4 - 7 pups, which results in a possible 56 pups per annum.

Interesting Facts: The House Mouse is colour blind and is only capable of recognizing objects <5m away. Mice can survive a vertical fall of 2.5m onto a hard surface and travel at a speed of 3.5m per second.



Roof Rat: (*Rattus rattus*)

Colour: Black to brownish-grey on top with a grey to white underside.

Length: 36 - 45cm. Tail is longer than body and head combined.

Weight: 170 - 340g

Ears: Large ears that is capable of covering the eyes if bent forward.

Eyes: Large prominent eyes that protrude the head.



Feeding Habits: Omnivorous. Seeds, fruit, vegetables, eggs and grain. Rats visit fewer sites than mice but consumes more at each site. Roof Rats are capable of a 25ml intake of water daily if easily available.

Approximate food consumption per day: 25g.

Baiting Method: Place larger amounts of bait 5 - 10m apart at a few selected sites. These sites should be positioned between living area and feeding area to ensure rats are going to find the bait quickly and effectively.

Droppings: +/- 10mm in size with pointed ends. Average 30 -180 droppings per day.

Habits: Excellent climbers and swimmers. They explore their home range of 30 - 100m daily and tend to live and nest in the upper portions of building, hence the name "Roof Rat". It is uncommon for these rats to burrow. They are nocturnal and most of their activity is half an hour before sunrise and half an hour after sunset.

Reproduction: Sexually mature at 8 weeks. Average 4 - 8 pups per litter and 4 - 6 litters per year. This results in a possible 48 pups per annum.

Interesting Facts: The Roof Rat is colour blind, primarily seeing light, shadows and movement. Rats can survive a vertical fall of over 7.5m onto a hard surface and are capable of swimming over 1.5km.



Norway Rat: (*Rattus norvegicus*)

- Colour:** Varies from pure grey or black to blackish-or-reddish brown on top with a grey to yellow-white underside.
- Length:** 33 - 47cm. Tail is shorter than body and head combined.
- Weight:** 285 - 485g
- Ears:** Small ears that will not cover the eyes if bent forward.
- Eyes:** Small eyes in proportion to the head.



Feeding Habits: Omnivorous. Meat, fish, eggs, cereals, grain, fruit and vegetables. Rats visit fewer sites than mice but consumes more at each site. Norway Rats require 12 - 25ml of water per day in order to survive.

Approximate food consumption per day: 28g.

Baiting Method: Place larger amounts of bait 5 - 10m apart at a few selected sites. These sites should be positioned between living area and feeding area to ensure rats are going to find the bait quickly and effectively.

Droppings: +/- 20mm in size with pointed ends. Average 30 -180 droppings per day.

Habits: Excellent burrowers and proficient climbers and swimmers. They explore their home range of 30 - 100m daily and tend to live and nest in the lower portions of buildings such as basements etc. They are nocturnal and most of their activity is half an hour before sunrise and half an hour after sunset. Very strong social hierarchy.

Reproduction: Sexually mature at 8 weeks. Average 8 - 12 pups per litter and 4 - 7 litters per year. This results in a possible 84 pups per annum.

Interesting Facts: The Norway Rat is colour blind, primarily seeing light, shadows and movement. Rats can survive a vertical fall of over 7.5m onto a hard surface and are capable of swimming over 1.5km.

Anticoagulants

What are they and why do we use them?

Anticoagulants disrupt the mechanism that controls blood clotting by inhibiting the action of Vitamin K. This inability to produce essential blood clotting factors in warm-blooded animals results in fatal internal hemorrhaging in the body. Anticoagulant rodenticides may be separated into two categories, the first generation multi-feeds such as Warfarin and Coumatetralyl and the second-generation single-feeds, which include Brodifacoum, Difethialone, Difenacoum, Flocoumafen and Bromadiolone. The action of multi-feed anticoagulants as the name suggests is cumulative and need to be ingested over several days in order to attain a lethal dose whilst single-feed rodenticides on the other hand require just a single intake by the rodent to attain a lethal dose. Anticoagulants possess a number of advantages over acute rodenticides commonly used. First, commensal rodents readily accept them when they are included in bait at low concentrations. Secondly, the delayed effect reduces sub-lethal dosing and bait shyness problems and thirdly, if accidental poisoning of man and animals does occur, an effective antidote, Vitamin K1 is available.

PULSE® Rodenticides - Formulation Characteristics

What measures do we employ to limit non-target poisonings?

Taste Deterrents: All formulations of PULSE® contain a substance called Bitrex (Denatonium benzoate). This harmless substance is the bitterest substance known to man. Should a non-target animal or bird attempt to consume the bait it will be deterred from eating it due to the extreme bitter taste. Rodents are not able to detect Denatonium benzoate at the inclusion rates used in the bait.

Colour: World Health Organisation (WHO) recommends that the colour blue to black is the least attractive colour to the majority of birds and animals, hence is the chosen colour used in our baits.

Education: It is important to educate individuals and companies about planning rodent control operations.

A base-line survey is necessary to identify the species, the extent of the infestation and the environmental conditions in order to plan a programme and select the appropriate rodenticides and equipment to be used. Correct baiting methods and effective bait station positioning is important to the success and can greatly reduce the amount of bait placed in the environment.

How do we ensure our baits are the most palatable baits available?

Contrary to popular belief rodents are selective feeders and prefer to eat uncontaminated foodstuffs. The sense of taste is highly developed in commensal rodents. The taste organs in their mouths are extremely sensitive and all potential foods are screened thoroughly before swallowing. This screening of potential foodstuffs is a survival mechanism as rodents do not possess the gagging reflex and are therefore incapable of regurgitating unwanted items.

Bait Carrier: Our baits are made only from premium grade cereals used specifically for human consumption and are extremely palatable. The use of these cereals eliminates the potential of bait refusals due to unwanted contaminants.

Flavour Attractants: The inclusion of flavour intensifiers ensures that our baits are some of the most palatable and attractive baits in the market. This improved attraction enables rodents to increase their focus on and consumption of our baits, particularly in areas where competing food sources are available.

Dedicated Manufacturing Facility: In order to avoid cross contamination or the inclusion of any foreign inert ingredients or objects, all our baits are made in a dedicated rodenticide manufacturing plant with an accredited ISO 9001 rating.

PULSE® Rat and Mouse Formulation Types:

All formulations are based on Brodifacoum (Single-Feed Rodenticide).

Wax Blocks: A highly palatable cereal based bait that is versatile due to the wax binding. It is designed to withstand areas of high moisture (sewers, drains etc) without degrading and losing palatability in the expected lifetime of the block. They are easy to use and are the preferred formulation type used by Pest Control Operators. This preference is attributed to the following factors:

- **Cylindrical shape:** The shape is clean and compact allowing for an easily accessible edge from which the rodent can consume the bait.
- **Molded hole:** Each block is designed with a hole in the center to allow the block to be secured to a spike within a bait station. This allows multiple rodents to feed from one block ensuring economical and effective use of the blocks.
- **Small block size:** The block size is appropriate to take advantage of brodifacoum's potency. Each 10g block has the capability of dosing numerous rodents.

Pellets: A highly palatable compressed cereal pellet that performs well when there is a high incidence of other foodstuff available to the rodent. The brodifacoum inclusion rate for the pellets is the same as the block at 0.05g/kg.

Liquid Bait: This highly effective and attractive liquid concentrate bait can be used when there is a very high concentration of dry foodstuff available and/or the accessibility or availability of water may be restricted to the rodent. Liquid concentrate bait can also be mixed with a bait carrier of broken wheat, maize meal or other suitable dry bait carrier.

The brodifacoum inclusion rate for the liquid concentrate is 0.75g/kg.

Baiting Methods:

Pre-Baiting Inspection

It is important to understand the habits and habitat of the rodent and their environment before bait placement commences.

Physical Barriers: A thorough survey should be conducted to establish rodent access to buildings. This survey will then identify entry points and allow the implementation of a rodent exclusion plan. All access points once identified will need to be sealed. Metal weather strips should be secured to the base of all external doors to ensure rodents cannot enter. As mice are capable of fitting through holes 8mm in diameter and rats 12mm in diameter it is important to check the integrity of the foundation, brickwork and where high and low level piping passes through exterior walls they should be sealed.

Environmental Sanitation: Commensal rodents are opportunistic and readily take advantage of mans abuse of the environment. Poor sanitation generally results in waste food and harbourage being abundant and easily available to rodents thus creating conditions that enable rapid establishment in the environment.

Maintenance and good housekeeping is essential in denying shelter, food, water, heat, harbourage and breeding conditions to rodents. It is important to ensure that correct storage and handling of food is maintained including pet food, which should not be left out overnight.

All debris including builder's rubble and garden refuse can provide rodents with suitable cover for nesting and breeding and should be removed.



Surplus or Unrestricted Baiting

The traditional method of controlling rodent infestations with multi-feed anticoagulants (Warfarin and Coumatetralyl) is using surplus or unrestricted baiting. Large amounts of bait 200 - 400gm of bait are used per bait point and these bait stations must be checked every two to three days and replenished. This must continue until no further bait is taken, usually four weeks. A lot of the bait will be unconsumed at the end of the control programme.

“Pulse” Baiting

PULSE[®] rodenticides have the potency to kill rats and mice after a single feed. To take full advantage of this outstanding potency, a site is treated with the same number of bait points as in surplus baiting, but the quantity of bait laid is reduced significantly (50 - 70gm). The inspection time and replenishment of bait is extended to seven days. During the first inspection “pulse” many of the bait points will be empty. These should not be replenished until the recommended period of seven days has elapsed between “pulses”. Extending the period between visits ensures that the rodents that fed on the bait during the first “pulse” treatment will either be dead or dying when the second treatment takes place. With the action of brodifacoum, most infestations will be controlled seven to 15 days faster than the classic anticoagulants.



After achieving control the number of bait stations can be reduced and a few well-sited permanent bait stations can be left to combat any new migrants. Check these on a regular bases and replenished if necessary.

“Pulse” baiting significantly reduces the main cost in any rodent control programme, which is labour. As well as being more cost effective, “pulse” baiting helps to minimise the hazard to non-target mammals as less bait is on the site for a shorter period of time. In addition to this PULSE® Wax Blocks are not attractive to birds.

| Product Name | Active Ingredient | Formulation Type | Areas |
|-------------------------------|-------------------------------|---|---------------------------|
| PULSE® Wax Blocks | Brodifacoum 0.05g/Kg (0.005%) | Cylindrical cereal block bait bound by wax. RB (Ready-to-use Bait) | Nesting and or where a |
| PULSE® Pellets | Brodifacoum 0.05g/Kg (0.005%) | Compressed cereal bait in pellet form. RB (Ready-to-use Bait) | Nesting and or where a |
| PULSE® Liquid Bait | Brodifacoum 0.75g/Kg (0.075%) | Concentrated liquid bait to be mixed with water. CB (Concentrate Bait) | Nesting and or where a |





| Uses of Use | Dosage Rate |
|--|--|
| <p>and feeding sites activity is seen.</p> | <p>House Mouse – Place 10 - 20g (1-2 blocks) per bait station spaced 2 - 4m along walls and runways between nesting and feeding sight or where activity is seen. Norway & Roof Rats - Place 50 - 70g (5-7 blocks) per bait station spaced 5-10m along walls and runways between nesting and feeding sites or where activity is seen.</p> |
| <p>and feeding sites activity is seen.</p> | <p>House Mouse – Place 10-20g per bait station spaced 2 - 4m along walls and runways between nesting and feeding sight or where activity is seen. Norway & Roof Rats - Place 50 - 70g per bait station spaced 5 - 10m along walls and runways between nesting and feeding sites or where activity is seen.</p> |
| <p>and feeding sites activity is seen.</p> | <p>Initial Application – Mix 1 part PULSE® Liquid Bait to 15 parts clean water (65ml to 1 Litre) and place in bait station or dispenser along walls and runways between nesting and feeding sight or where activity is seen. Maintenance Application – Mix 1 part PULSE® Liquid Bait to 33 parts clean water (30ml to 1 Litre) and place in bait station or liquid bait dispenser along walls and runways between nesting and feeding sites or where activity is seen.</p> |



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