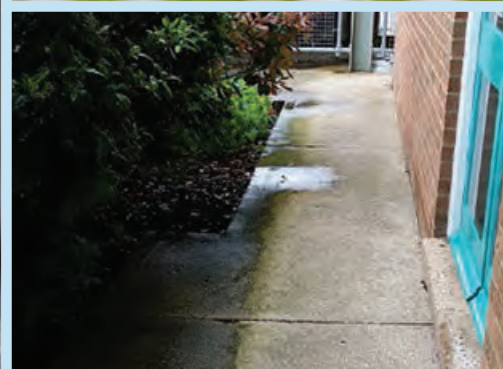


Rodent control on farms

A practical guide to effective
and responsible use of bait rodenticides



Introduction

Controlling rodents

Rodents present a significant risk to human health, animal health and welfare, food hygiene, structural integrity and safety. Some of the diseases, parasites and bacteria that they harbour are transmissible to humans, companion animals and farm livestock, justifying their internationally accepted 'significant public health pest' status from the World Health Organisation (WHO).

Rodents are often present on farms because the local environment can provide access to three of the elements that they need to survive and thrive: food, harbourage (habitat/cover) and water. The more readily available these resources are, the higher the carrying capacity of the farm environment and the larger the rodent populations associated with them. The larger the rodent populations, the greater their potential to carry and spread disease, consume feed and cause damage and contamination.

The use of rodenticides has been seen by many as the only method of controlling rats and mice; however, there is evidence to suggest that rodenticide use can have an unintended impact on non-target species. Surveys conducted by UK scientists have found residues of these compounds in the bodies of significant proportions of predatory and scavenging species of mammals and birds.

This might normally lead to the removal of such products from the market. However, equally effective and safer alternatives are not available and baits continue to be essential for the protection of human and animal health.

The Campaign for Responsible Rodenticide Use (CRRU) has developed the UK Rodenticide Stewardship Regime and will coordinate its implementation. The regime is intended to provide assurance to the Health and Safety Executive (HSE) that anticoagulants are used responsibly in ways that minimise the exposure to wildlife and other non-target animals. Effective stewardship will help ensure these products' long-term availability and efficacy.

From April 2016 onwards, rodenticide products with new 'stewardship conditions' labels for use outside by professionals, including farmers, will be introduced carrying the following statement: "For supply to and use only by professional users holding certification demonstrating compliance with UK rodenticide stewardship regime requirements."

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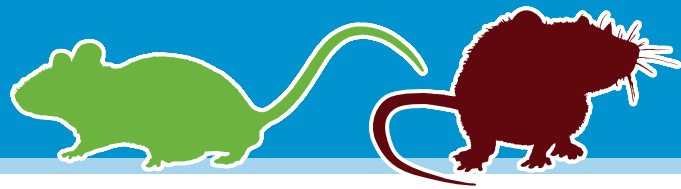
Farmers who have completed an approved training course and obtained a certificate will be permitted to buy and use these products. As an interim measure, membership of an approved farm assurance scheme will also permit purchase and use of these products until the end of December 2017.

For a list of farm assurance schemes approved for UK Rodenticide Stewardship compliance, please visit www.thinkwildlife.org

The progress of the regime will be monitored closely to determine whether anticoagulant rodenticides will be permitted to continue to be bought and applied without further restriction.

More information is available at www.rodentcontrolonfarms.co.uk

Rodents



Rodents in the UK

Of some 2,500 rodent species worldwide, just 14 are present in the UK. Only three species are commensal (associate closely with humans) and only two are considered serious pests: the House mouse and Norway rat. Other small rodents may enter buildings as casual intruders.



The third commensal species is *Rattus rattus*, also known as the black ship rat. It too is a pest, but population levels are very low in the UK and few infestations will be found, particularly on farms.

What is a rodent?

Rodents have curved and deeply embedded incisor teeth on both jaws. The characteristics of rodents' jaws include:

- Continuous growth
- Tremendous biting pressure
- A very sharp cutting edge
- A gap in place of canine teeth to hoard, carry food and spit out unpalatable items.

Serious pests

Characteristic	Norway rat <i>Rattus norvegicus</i> Probably arrived in the 1720s and has replaced the black rat as a major commensal pest; it is present throughout the UK	House mouse <i>Mus domesticus</i> A widespread UK pest
		
Adult weight	Average 250–500g (Max 700g)	Average 17–20g (Max 25g)
Tail	Thick, shorter than head plus body	Thin, about the same length as head plus body
Eyes	Small, in comparison to body size	Large, in comparison to body size
Snout	Blunt	Pointed
Ears	Small and furry	Large, sparsely haired
Colour	Brown-grey above, grey or white below	Brown-grey above with lighter belly
Habitat	Mainly outdoors, except on intensive livestock units	Indoors
Family units	Eight to fifteen: very territorial when food and shelter in short supply	Social groups of four to nine, dominated by single male
Behaviour	Shy and avoids new objects, prefers stable and predictable environments, known as neophobia	Highly inquisitive; investigates, rather than avoids, new objects
Feeding	Feeds at two or three familiar points each night Average daily intake 25–30g Requires free water	Feeds at many, possibly up to 200, feeding points each night but only eats a very small amount at each feed Average daily intake 3–4g Does not require free water, but can utilise moisture in its food
Territory size	Males typically travel 700m, females 350m around farms and farm buildings each night Can travel up to 3.5km	Ranges from one to hundreds of cubic metres, depending on food availability and harbourage
Activity	Very active in familiar areas Able to climb rough walls and pipes but mostly lives on the ground Can jump with ease – vertically to 80cm, horizontally to 120cm Capable swimmer	Particularly good climber, may spend most of its life off the floor of a building Able to squeeze through gaps as small as 5mm and jump vertically to 30cm and more
Annual excrement	15,000 droppings 5 litres urine	30,000 droppings 0.75 litres urine
Reproduction	Can produce around eight young about every 24 days in very favourable conditions	Can produce around eight young about every 21 days in very favourable conditions

Need for control

To prevent feed loss and contamination

A serious threat usually occurs when rodent populations build up in food and feedstuff stores.

Rodents not only eat and damage significant amounts of the stored food but their urine and faeces also contaminate stored produce.

Contaminated food or feed may transmit diseases to humans or livestock and include diseases such as *Salmonella*.

With increasing emphasis on quality assurance, buyers may also reject contaminated produce.



Mice nesting and feeding behind a feed hopper

To prevent disease transmission

Rodents can spread diseases to humans, livestock and pets through bites, faeces and urine.

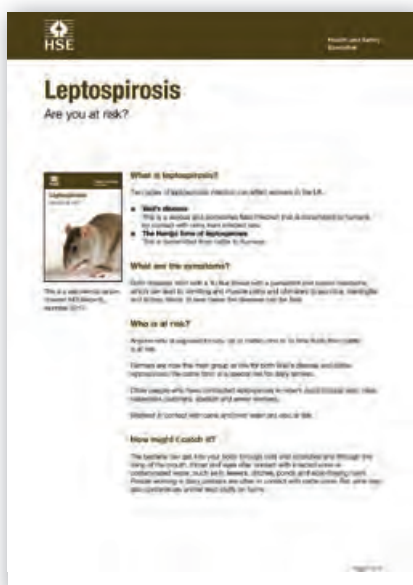
Indirect transmission may be through contaminated mud or dust and parasites carried on feet and fur.

Rats may spread foot and mouth disease, which is why control measures are essential on infected farms.

Because of the threats posed to humans from a range of rodent-borne pests and diseases, good hygiene is important:

- Wear protective clothing when working in rodent-infested areas
- Wash hands after work and before any food or drink is consumed.

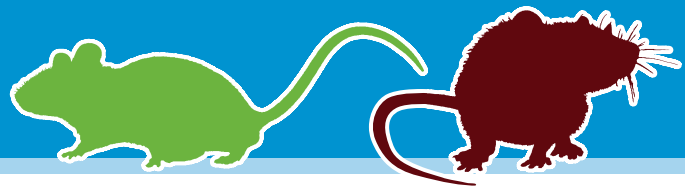
If you regularly work in rodent-infested areas, it may be beneficial to inform your GP and have it added to your medical records. Your employer should provide you with the HSE pocket card, *Leptospirosis: are you at risk?* (available from www.hse.gov.uk/pubns/indg84.pdf).



Percentage of Norway rats carrying various rodent borne diseases on farms, sampled in England and Wales in the 1990's

Disease agent	Disease of humans/animals	% infected/infested rats
Ectoparasites		
Fleas		100
Mites		67
Lice		38
Helminths		
<i>Capillaria</i> spp	Capillariasis	23
<i>Hymenolepis diminuta</i>	Rodent tapeworm	22
<i>Toxocara cati</i>	Toxocariasis	15
<i>Hymenolepis nana</i>	Rodent/human tapeworm	11
Rickettsia		
<i>Coxiella burnetii</i>	Q fever	34
Bacteria		
<i>Leptospira</i> spp	Weil's disease	14
<i>Listeria</i> spp	Listeriosis	11
<i>Yersinia enterocolitica</i>	Yersiniosis	11
<i>Pasteurella</i> spp	Pasteurellosis	6
<i>Pseudomonas</i> spp	Several pathologies	4
Protozoa		
<i>Cryptosporidium parvum</i>	Cryptosporidiosis	63
<i>Toxoplasma gondii</i>	Toxoplasmosis	35
Viruses		
Hanta virus	Hantaan fever	4

Webster & Macdonald, 1995



To comply with legislation

1. **The Health and Safety at Work Act 1974** requires that all employees are provided with safe working environments. Rodent infestation within a working environment clearly places workers' health at risk.
2. **The Food Safety Act 1990** requires that all food sold for humans must be fit for consumption. Any food sold contaminated with rodent urine or faeces will be considered unfit.
3. **The Food Hygiene (England) Regulations 2006** require food businesses to practise high food safety standards and meet specific requirements on ensuring adequate pest control procedures are in place (due diligence).
4. **The Prevention of Damage by Pests Act 1949** gives local authorities powers to require land occupiers to keep their land free from rodents.

To meet assurance standards

Assurance schemes require farmers to demonstrate that they have effective rodent control programmes in place. A good record keeping system should demonstrate that suitable approaches are being undertaken in line with best practice and, where rodenticides are being used, that they are not putting wildlife at risk, are being used in compliance with current label requirements, and that those applying rodenticides have been adequately trained. A plan of baiting strategies should be included.

To reduce animal feed consumption and cost

Rats and mice will readily feed from the same locations as farm animals. In six months, 100 mice can consume over 54Kg of feed and 100 rats could consume around 600Kg. In one case study where photographic images were taken of the rodent activity, it was estimated that mice were eating around £6000 of feed per annum.

To prevent structural damage

As their teeth grow continuously throughout their lives, rats and mice need to gnaw on objects to wear their teeth down. These objects can include items such as:

- Electric cables, which could result in fires starting
- Plastic water pipes, which lead to leaks and supply issues
- Motor cables, especially on tractors, as well as communication cables.

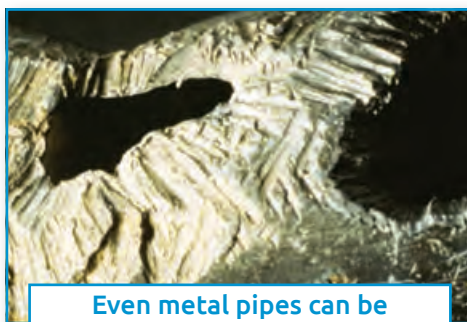
The true cost of the damage caused by rats is unknown. It is believed mice and rats are responsible for around 50% of farm fires in the UK, due to gnawing of electric cables. Rodents are often overlooked as the potential cause of equipment failure.

To avoid damage to growing crops

Norway rats may damage crops grown near livestock units, pheasant release pens or feeding points. In addition, sugar beet, beans and other crops may be damaged by either rats or mice when pest populations are high.



Damaged wiring can lead to fires



Even metal pipes can be gnawed



Building structures can be damaged



Field crops damaged by rodents



Rat smears and damage in livestock unit



Glasshouse crop attacked by rodents

Integrated Rodent Management

Prevent

Integrated Rodent Management (IRM) is a proactive process that should provide a safe, effective, economical and sustainable long-term management strategy within a local environment.

Integrated Rodent Management should focus on:

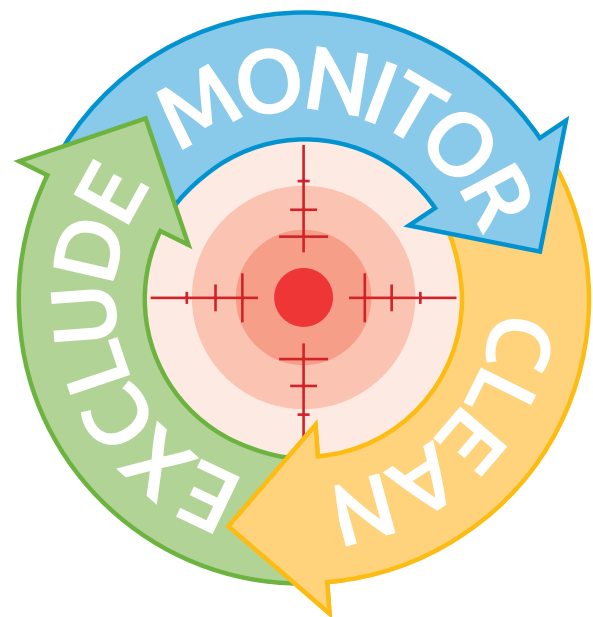
- Continual/frequent monitoring for rodent activity around the site
- Management of local environmental conditions to exclude and reduce rodent activity
- The potential for, or level of any actual rat or mouse activity
- Training and awareness of those who may be involved with or affected by rodent activity
- Consideration and application of effective and environmentally responsible control techniques
- Keeping records.

The primary aim is to try to avoid an infestation and to identify early signs that rats or mice have become active. Once established, rats and mice can be difficult and expensive to eradicate.

Rodent infestations require:

- Food
- Water (less important for house mice)
- Harbourage (somewhere to live and nest).

If any of these factors are not present or have low availability, the site is less likely to attract or sustain a rodent infestation.



Prevention is always preferable to control.

An effective environmental management programme will:

- Reduce the carrying capacity of the environment (in terms of rat and mouse populations)
- Reduce the overall quantity of rodenticide needed and the associated costs

The best long-term and cost-effective control of rat and mouse populations will almost always be achieved by a well-planned preventive programme. Operations that contribute towards making a site less attractive to rodents should form the basis of any proactive IRM programme.

Good storage practice



Restrict access for rodents; they have difficulty climbing smooth surfaces

Bad storage practice

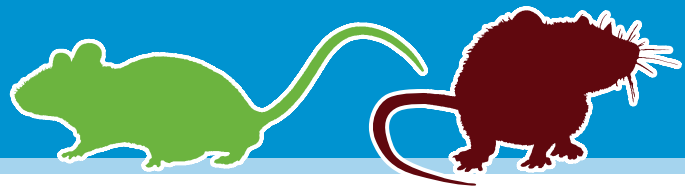


Prevent access into buildings and keep rats outside

Where possible store food and bales from the floor, remember rats and mice can climb walls



Make foods difficult to access



Clean

Environmental management is the first and most important step in the Control Risk Hierarchy (page 12).

Remove sources of food:

- Rodents are much more likely to enter traps or take baits if alternative foods are less available
- Cover grain pits
- Clear spilled feed and grain
- Clean harvest and feeding equipment to avoid providing food and harbourage
- Centralise feeding in contained livestock and make every attempt to prevent rodent access to feed.

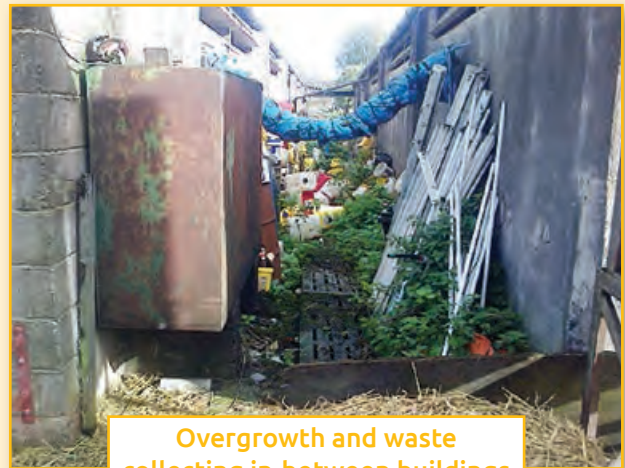
Remove cover and harbourage:

- Remove cover and unnecessary clutter around buildings
- Ideally, there should be a 30m wide clearance or area around buildings, which will help reduce rat access
- Cut or spray back vegetation
- Try to store bedding materials as far away from livestock as possible.

When stores or livestock buildings are empty, always take the opportunity to give them a thorough clean and try to introduce control before re-stocking is undertaken.



Spilled food found under a feed silo at the end of the day allowing rats to feed at night



Overgrowth and waste collecting in-between buildings will provide cover for rats



Spilt food left on floor, under a silo



Clear, clean open spaces around buildings provide a boundary that rats might fear crossing. Make as wide as possible.

Integrated Rodent Management

Exclude

Apply proofing or exclusion measures to prevent rodents gaining access to environments where they can find their requirements and/or where their presence is undesirable.

This can be difficult on a farm because of the size and age of the buildings; however, the aim must be to block gaps under doors, around pipes and other points where rodents, mainly rats, can gain access from outside to access food or make a nest inside.

Young house mice can pass through gaps as small as 6mm diameter, so access points should be proofed to 5mm or less.

Some issues will be easy to resolve, such as blocking a gap around a pipe. Use wire wool, small gauge mesh or sealant to fill gaps that would provide a means of easy entry.

Larger tasks may require a longer term investment, such as fixing kicker plates or replacing doors that are rotten at the base.

In most cases, proofing measures (apart from removing alternative food) should be applied after the infestation has been eliminated or at least significantly reduced. Applying cleaning and proofing measures while trying to control rats can be counterproductive as it may interfere with rat behaviour patterns and may encourage them to move to alternative areas.

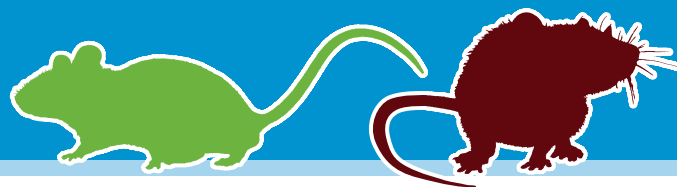
Record any actions and activities undertaken. These are an important part of demonstrating the proactive approach to managing rodent infestations for farm assurance and due diligence.



Rodents living either outside or within the building fabric can use gaps around pipes to migrate in and around a building



The use of simple materials, such as wire wool, can be very effective to prevent rodent access



Monitor

It is important to monitor regularly and routinely, survey the site and gauge both the potential for activity and any opportunities for rats and mice to become established.

Ideally, this would be a specific task, completed on a frequent basis, by a named person over 16 years of age. However, in practice it may be more effective for this practice to become part of other daily tasks, by all those working on site, to save time overall. It is useful if all those who are working on the site are made aware of the potential, the reasons for monitoring, and, ideally they should also understand the signs of rodent activity and be encouraged to act swiftly to report / control such activity.

Continual monitoring of the site and known locations of potential infestation will ensure early identification of fresh activity and the implementation of an eradication campaign to eliminate activity quickly and effectively.

Keep areas next to doors and walls clear to enable access for inspection and monitoring. Look for signs of rodent activity, for example:

- Droppings
- Fresh burrows in banks and around the site
- Footprints/tracks in mud or dust, for example on pipes, muddy ground or wall tops
- Tracks and runs
- Urine pillars
- Damage to feed, fabric of the building, cables and pipes, etc.

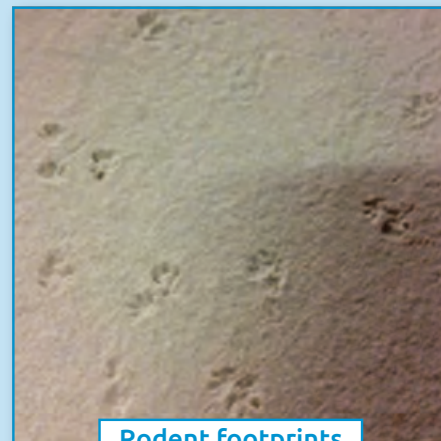


Motion-activated cameras

Ideally, check for signs of rats and mice weekly. Look for rodent activity all year round but particularly at times of the year when rodents will be most active, such as late autumn, when rats may be coming from the fields looking for warmer and drier places to nest or look for food.

Do not underestimate the size of a rodent population or the potential for a rapid increase in their numbers. As rodents are predominantly nocturnal, sightings of live rodents may not occur and this may give a misleading impression that numbers are low.

The use of monitoring equipment, such as motion-activated cameras, can provide a useful source of additional information, especially on population numbers and to confirm the location of activity.



Rodent footprints

Accurately estimating the size of a rodent population is useful when considering the control option(s) that may be most effective and the quantity of traps or bait that will be required for effective control.

Look around the site to identify anything that may have changed since the last time the site was monitored that could contribute to supporting rats or mice, for example:

- A breakdown in a feeding system, resulting in a new source of food
- Equipment being put away for storage or being collected close to a building
- Vegetation growth that could provide cover and possible harbourage for rats.

Identifying changes to the environment as early as possible will mean they can be corrected promptly and, ideally, before a rodent population is attracted and becomes established.



Rat foot prints on pipes

Integrated Rodent Management

Signs of activity

If during routine or day-to-day monitoring activity is noted then the eradication campaign should be implemented as soon as possible. Considering the reproductive capabilities of both rats and mice, the sooner the activity can be controlled and eliminated the better.

Signs of activity may include:

- Droppings
- Damage to feed, fabric of the building, cables and pipes etc
- Fresh burrows in banks around the site
- Runs and tracks
- Footprints in dust/mud
- Urine pillars.

The first step is to complete a full inspection of the site and location where activity has been identified and look to confirm:

- Target pest species or if potential activity is non-targeted species
- Population levels, this could simply be high, medium or low
- Extent of activity, which needs to include vertical harbourages as well as distance around a site
- Risk factors, which may include the degree of public access to the site, the presence of children and non-target animals. These may influence your choice of control strategies for that site
- Source, ie where the rats or mice have originated, and why they are present.

It may be useful to obtain photographic evidence of poor habitat management practices and document this as a base for improvements, especially if others on the farm will be responsible for any remedial works that need to be completed.



Look for droppings

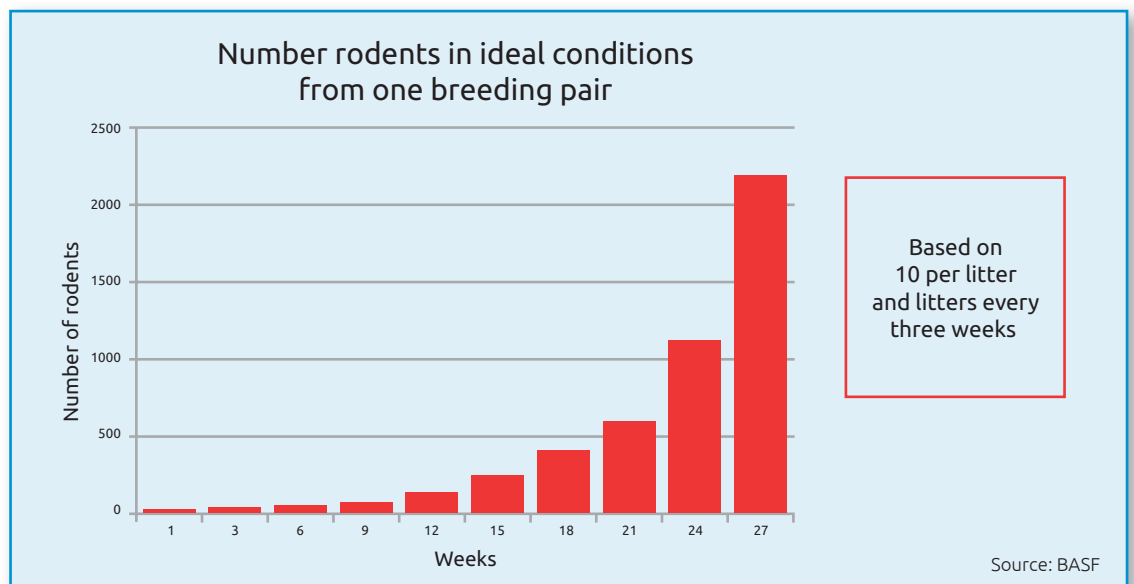


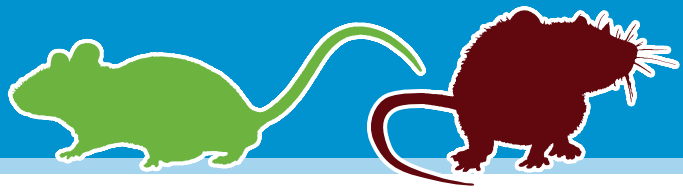
Norway rat burrow underneath building



Norway rat holes in bank

It is important to look for signs of activity as if left unchecked, due to their rapid breeding cycle, rodent populations can quickly and significantly increase.





Examples of non-target species

RODENTICIDE BAITS

NON-TARGET SPECIES



Primary poisoning

Non-target animals eat the rodenticide bait



Wood Mouse
Apodemus sylvaticus



Yellow Necked Mouse
Apodemus flavicollis



Bank Vole
Myodes glareolus



Field Vole
Microtus agrestis



Grey Squirrel
Sciurus carolinensis

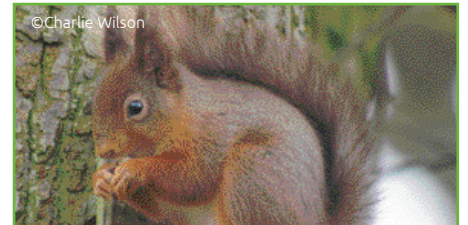


Water Vole (protected)
Arvicola amphibius



Edible/Fat Dormouse
Glis glis

Other small rodents may enter buildings as casual intruders, however control is rarely required. They are generally active around hedgerows and may consume feed if available.



Red Squirrel (protected)
Sciurus vulgaris

Other non-target species include:
Harvest mouse (protected) (*micromys minutus*)
Common dormouse (protected) (*muscardinus avellanarius*)



Common rat



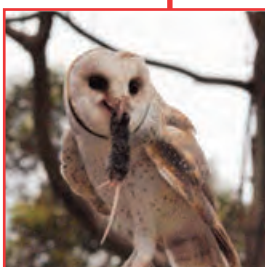
House mouse

PREDATORS AND SCAVENGERS



Secondary poisoning

Predators and scavengers eat animals that are contaminated with rodenticide



Barn Owl



Kestrel



Buzzard



Fox



Weasels/Stoats

Eradication campaign: Assessing risk

The Control Risk Hierarchy is a framework to help identify control options when considering a rodent control campaign.

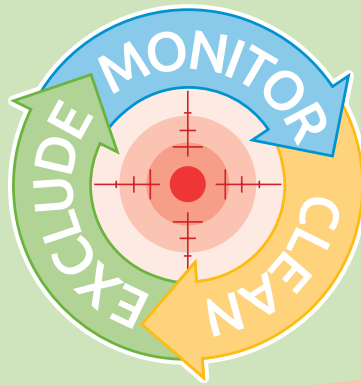
Prevention is the most important aspect in any control plan. However, eradication is not a specific step-by-step process and it is not necessary that all options in the control risk hierarchy should be used on site, and found to fail, before an effective solution is reached. But all should be considered.

The decision on which option to use should be based on the most effective, considering the conditions of the site, but which poses the least severe impact to the local environment. This will also include consideration of rodenticide formulations.

Control Risk Hierarchy – a decision making process

PREVENTION

Managing the local environment is always preferable to control



ERADICATION

If activity is found or reported

Non-Chemical: Lethal

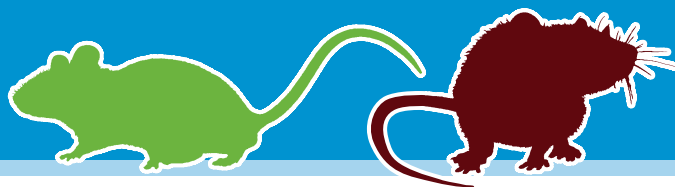
First Generation Anticoagulants (FGARs)

Second Generation Anticoagulants (SGARs)

Alternative Control Options
**In some situations these may be appropriate.*

The decision making process is further explained on page 25.

INTEGRATED RODENT MANAGEMENT



Site survey

If rodent activity is noted during monitoring, an eradication campaign should be implemented as soon as possible. Once established, rats and mice can be difficult and expensive to eradicate.

The first step is to complete a full inspection of the site and the location where activity has been identified to confirm:

- Target pest species, or if the activity could be from a non-target species
- Population level (this could simply be high, medium or low)
- Extent of activity (including vertical harbourages as well as distance around a site)
- Source (where the rodents have originated from) and why they are present
- Risk factors, which may include the degree of public access to the site, the presence of children and non-target animals, etc.

It may be useful to obtain photographs of poor habitat management practices and to document this as a basis for improvements, especially if others on the farm will be responsible for any remedial work that needs to be completed. See page 31 for a recording template.

Considering alternatives to rodenticides

Most rodent control involves rodenticides. This may, however, be combined with other techniques, such as traps, where they are deemed to be appropriate.

The use of rodenticides presents the greatest risk of environmental impact and contamination. Rodenticides should, therefore, be used as a last resort and their use should be minimised as far as possible.

An assessment of the location, the level of pest and non-target species' activity and the conditions that exist on site will help determine which methods are most appropriate for dealing with the infestation. Those solutions that present the least risk to the environment should be applied, where appropriate.

Risk assessment of the immediate surroundings

Before instigating any control programme, it is important to assess the local area and establish any potential risks. The environments in which rodent pest control procedures are to be carried out may be hazardous and it may be necessary to conduct a suitable and sufficient assessment of risk.

COSHH assessment

After considering non-lethal control measures, habitat management and non-chemical approaches (eg traps), you may conclude that the use of a rodenticide is the most appropriate control measure.

The Control of Substances Hazardous to Health (COSHH) Regulations require an assessment to be completed to identify any risks towards those who may be affected by treatments involving hazardous substances. This will help to ensure the rodenticide product and method(s) of application selected will result in the effective control of rodents, while minimising the risk to those who apply it and anyone else who may come into contact with the rodenticide, primarily non-target animals.

There is a requirement to record the findings of the assessment. For more information, visit www.hse.gov.uk/coshh

Environmental risk assessment

It is good practice to conduct an assessment when a risk to the local environment has been identified during the site survey. This could be a risk to non-target animals, such as pests or wildlife, through either directly eating bait (primary poisoning) or eating poisoned rodents (secondary poisoning).

Assessments should consider:

- What the treatment is designed to achieve, what methods of rodent control may be used and how success will be measured
- Which non-target species may be present in or near the treatment site
- What risks to non-target species have been identified
- What steps have been/will be taken to prevent, or adequately control, exposure of wildlife and the environment
- What is expected from the persons responsible for the infested site
- What follow up measures are required
- What the facilities are for the safe disposal of dead rodents and rodenticides
- What environmental management measures are appropriate when the infestation has been removed to make the site subsequently less conducive to rodents

It is good practice to record this assessment in writing.

Always read and follow the product label.

Eradication campaign: Physical control

Trapping

Trapping is a widely used control method. Although labour intensive, it has several advantages over chemical control: the equipment can be re-used multiple times, any animals taken can easily be removed from the site and there are no chemical residues. If not done properly, however, trapping may have a detrimental impact on non-target animals when these are accidentally taken as 'by-catch'. An environmental assessment will indicate the likely extent of this risk.

Traps alone are unlikely to control heavy rodent infestations but they can prove useful in controlling small infestations, or to help to reduce survivors of rodenticide treatments. It may also provide an alternative means of control where the use of rodenticides is unacceptable due to non-target/environmental impact, or where resistance may exist.

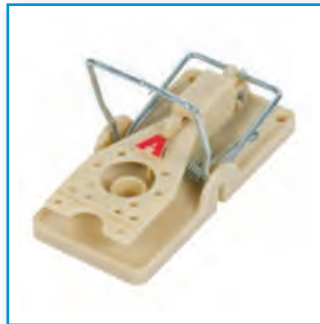
Live capture traps

Live capture traps are rarely used but may be selected where there is concern about non-target species either eating baits or entering kill traps.

Any captured target pest animals must be humanely despatched and in accordance with Wild Mammals Protection Act 2006. Aim to inspect traps twice a day or use electronic monitoring systems. Non-target animals should be released immediately.

Kill traps

It is essential before setting traps, especially those used outdoors for rats, to consider both the target animals and any other animals that may be present and may enter traps accidentally.



Snap Traps

Snap traps are indiscriminate to other small ground mammals that are similar to rats and mice. Spring traps are indiscriminate to other, larger non-target animals, such as cats and dogs.

The use of break-back (snap) traps for both rats and mice is probably the most widespread and successful trapping technique. They are not covered within any legislation, but their use should be assessed for efficacy and closely monitored while in use.

Careful placement is required: the trap should be placed at right angles to the direction of rodent travel with the treadle end of the trap being placed across the rodent run (see image on the next page). When trapping rats, place the trap treadle against a vertical surface to minimise avoidance. Baits or attractants can increase catch rates if placed as instructed on the trap treadle. Use at high density for mice.

Traps should be placed along rat runs or where moving rats may be intercepted, eg along walls or hedgerows, holes in walls, etc.

Outdoors, traps must be placed in natural or artificial tunnels to protect non-target species.

- Use only break-back or approved spring traps
- Place along rodent runs at high density
- Secure traps into place
- Protect against access by non-target species
- Check daily to remove carcasses and reset traps.

Spring traps

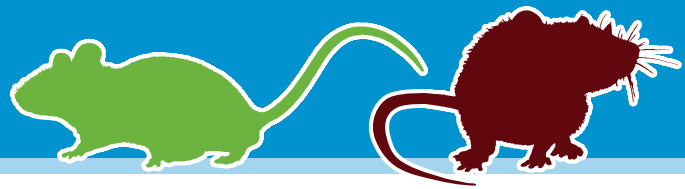
Only spring traps approved under the Spring Traps Approval Order (England) and associated legislation in Wales, Scotland and Northern Ireland, may be used.

This also includes frequent inspection, ideally twice a day (dawn and dusk) and traps can only be placed in either artificial tunnels or in natural burrow entrances where protected against accidental catch of non-target animals.

Follow all conditions of use in accordance with legislation and product instructions.

NOTE: The use of traps can be incorporated into a multiple option campaign. See page 25.





Effective trapping positions

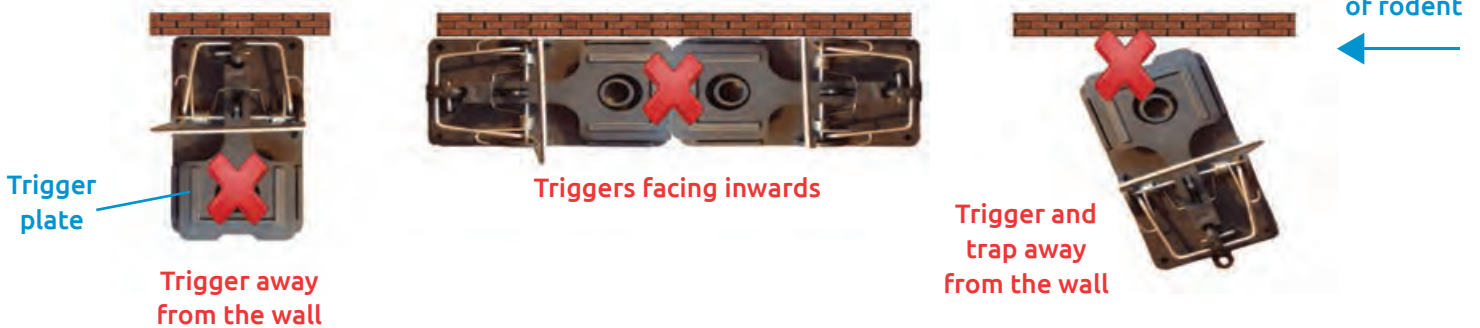


Trap with trigger against the wall

Two traps will increase the chance of success

When placed in a line, have the triggers facing the outside

Non-effective trapping positions



Trigger away from the wall

Triggers facing inwards

Trigger and trap away from the wall

Other non-chemical methods of control

Sticky boards

Glueboards can be an alternative to traps indoors and can be a useful tool, but only if used correctly. The ready-to-use boards catch and hold rodents attempting to cross them, much the same way flypaper catches flies. This can be useful when used as an immediate trapping method, in locations where a quick catch is possible and necessary.

They must be used in accordance with industry code of practice, which also includes a requirement for frequent checking and quick and humane methods of despatching trapped rodents. **Do not** use boards for extended periods of time and ideally be present when boards are being used to ensure correct use, quick and humane despatch and no non-target species access. Follow the Industry Codes of Practice: www.rodentcontrolonfarms.co.uk



Sticky boards

Ultrasonic or electromagnetic devices

Rodents communicate ultrasonically using frequencies inaudible to humans (above ~20kHz). Devices are available that plug into the ring mains and look to drive rodents away. Currently there is little scientific evidence for the effectiveness of these devices.

Dogs and shooting

Often seen as 'a bit of sport' these methods can be useful to control rodents (mainly rats) that are active and accessible at that particular moment in time.

In reality these are not an effective method to control large populations or provide a long-term management option.

Biosecurity aspects must also be considered when using dogs or travelling from farm to farm.

Eradication campaign: Chemical control

Chemical control

Most rodent control involves rodenticide use as part of an integrated programme. It is important to note that **rodenticide baits cannot be used permanently around a site as a 'just in case' measure, nor can they be used to monitor whether rodents are active.**

Before applying rodenticides it is important that all users have a good understanding of:

- The different rodenticides available, this includes active ingredients and formulations
- Rodenticide application and safe use techniques
- The Campaign for Responsible Rodenticide Use Code (CRRU Code)
- Resistance to rodenticides.

Relying on rodenticides alone does not guarantee that the infestation will be eradicated and numbers may quickly recover after treatment. It is important that, following the application of measures to reduce rodent numbers, consideration is given towards ways of improving the site to make it less attractive to rodents. This should provide effective long-term management of rodent infestations and reduce the need and reliance on rodent baits.

The choice of active ingredient (the poison within the baits) or the type of formulation, will be determined by the characteristics of the site, previous treatment history (if available), the conditions set out on product labels, the outcomes of the COSHH and environmental assessments and consideration of the control risk hierarchy.

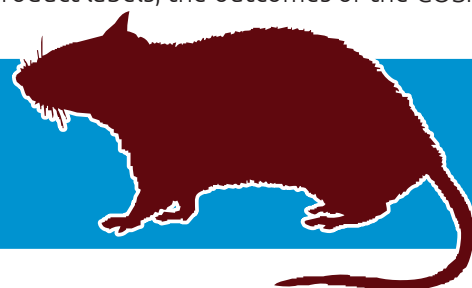
Rodenticides can be split into the following categories:

Anticoagulants

- First Generation Anticoagulants (FGARs)
- Second Generation Anticoagulants (SGARs)

Non-anticoagulants

- Phosphine gas
- Alphachloralose



Anticoagulants

Almost the only rodenticides currently used in the UK are chronic anticoagulants, which cause death by haemorrhage. The slower-acting nature of anticoagulants allows the rodents to keep feeding until a lethal dose has been consumed. Effectiveness depends on regular and continuous feeding over several days – even weeks – and rodenticide feeding must be maintained until control has been achieved, otherwise recovery may occur. Death occurs between two to fourteen days after feeding commences. Average treatment time may extend over four or five weeks before a whole population has eaten a lethal dose.

First Generation Anticoagulants (FGARs)

First generation anticoagulants contain the active ingredient coumatetralyl.

They are less persistent in animal tissues than the second generation compounds and it may be assumed that they present a lower risk of secondary poisoning for non-target animals in most use situations. Their use is, therefore, likely to be preferred when treating against rodents in areas where there is no resistance against them (page 28).

They are not, however, free from risk to non-target species as larger quantities of these baits must be applied to ensure that a surplus is always available for rats to feed upon. It may also take longer to control rat infestations when using them, as it takes longer for the animals to die.



Dead bodies should be removed as soon as possible

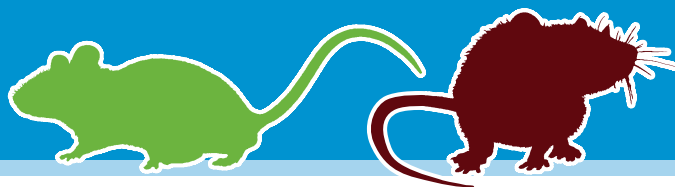
Second Generation Anticoagulants (SGARs)

SGARs contain active ingredients including brodifacoum, bromadiolone, difethiolone, difenacoum and flocoumafen. They generally deliver a higher level of toxicity and are more persistent in body tissues following consumption. As such they present the greatest risk to non-target animals and the local environment, through both primary and secondary poisoning.

In the 'control risk hierarchy' SGARs should be used when other methods of achieving rodent control have been carefully considered and either excluded as ineffective or incorporated as part of an integrated control programme.

Second generation anticoagulants do have the advantage that they require less bait to be eaten for the ingestion of a lethal dose and this needs to be a consideration as part of the baiting techniques. Resistance to bromadiolone and difenacoum, among both Norway rats and mice, should be considered when deciding which of the five compounds to use (page 28).

There is evidence that SGARs may cause the deaths of non-target animals and they are widely present in the environment in the bodies of many non-target species, including some of high conservation value, such as barn owls, red kites, kestrels and peregrine falcons.



Non-anticoagulants

Increasingly referred to as 'alternatives', these are chemicals that control target pests but have a different mode of action. As such, they are lower risk in terms of environmental impact through secondary poisoning. However they could be individually higher in toxicity and so should not be considered as the 'safest' control option. Non-anticoagulants have restrictions in their own conditions of use, which may not make them appropriate in certain circumstances.

If anticoagulants cannot be used because of environmental risks identified at the site or if resistance to them has been confirmed, non-anticoagulants, if their conditions of use are met, may actually be an effective alternative. There may be several products on the market that may fall into the non-anticoagulants list, however, there is little recognised scientific evidence to support their efficacy. The two main active ingredients (outlined below) have their own conditions of use.

Aluminium Phosphide

Phosphine-generating formulations are only registered for use against Norway rats (and rabbits and moles). Phosphide tablets are placed in rat burrows which are then backfilled. The tablets absorb moisture from the air and soil, liberating toxic phosphine gas.

Because of the obvious hazards of such products to human health, certain restrictions apply to where they can be used, (for example no closer than 10 meters to a building or watercourse), who can use them and how they should be applied (for example tablets can only be applied through specific applicator tools). A COSHH assessment is always required when they are used and an environmental assessment is strongly recommended.

Care must be exercised to ensure that burrows only occupied by target rodents are gassed, so it is unlikely to have an impact on non-target species. These tablets are not known to leave long-lived toxic residues in the environment or to have any secondary poisoning toxic effects.

Gassing is variable in its efficacy and unlikely to provide the complete long-term solution to any rat infestation, however it can be a valuable method of reducing the size of a rat population quickly, especially in locations such as hedgerows or soil heaps.

These products carry significant risk to those transporting and applying them and as of November 2015, all users will need to be able to demonstrate professional competence for their use with a recognised Level 2 qualification.

Alphachloralose

The acute, single dose, fast-acting rodenticide, alphachloralose, is a narcotic approved only for use indoors and only against house mice.

Once a lethal dose has been consumed, alphachloralose works through reducing metabolic rate, with subsequent death, which usually occurs quite quickly, resulting from hypothermia. It is most effective at temperatures below 14–15°C.

Unless a lethal dose is consumed at the first feed, the mouse will recover and may even shy away from further feeds. As such, do not apply the bait for more than 24 hours in one campaign, then remove from the treatment location and reassess any potential remaining activity. If required redeploy four or five days later. Even with thorough use, mortality will probably average only 70–80% of an established population.

The product is to be used in the same way as other edible baits, ie place in secure locations, prevent non-target access, remove alternative foods and place bait points at very high density throughout the area of house mouse activity.

Due to the mode of action, it is generally not considered to have secondary toxic effects, in low quantities.

Eradication campaign: Formulations

Formulations

The formulation is the physical make-up of the rodenticide, ie what it looks like and what base mixture or substance is used. Each substance will have an attractant towards rats and mice, often referred to as palatability. All rodenticides are now supplied ready-to-use and must be used (without any added attractants) as they appear. Concentrates are no longer approved for use.

Consideration should be given to the type of bait used and whether it could compromise security by being removed, hoarded or spilled during baiting operations. Check the authorisation conditions granted for each product intended for use.

When selecting the most appropriate formula, consider the game 'rock, paper, scissors': each formulation will have advantages and disadvantages over other types.

For example:

- A loose grain bait has a higher risk of spillage, over a block or pasta/caulking gel; however the typical food type for rats or mice on farms will be grain
- A wax block formulation can be secured within a baiting stations or fixed on retaining wires, however the eating style of rats and mice may make loose grain more preferable
- A contact product does not require the rodents to directly consume the baits, which is valuable when high alternative foods are available; however these products are low in concentration and often cannot be used close to where feeds are present.

Remember:

- Only use a product that is approved/authorised under either the Control of Pesticides Regulations 1986 (as amended 1997) or the Biocidal Products Regulation (BPR) 2013 and Biocidal Products Regulations (Northern Ireland) (BPR NI)
- Comply with the statutory conditions of use, which are given on the product label
- Ensure users are suitably trained and certificated
- Follow directions of use and other information supplied with the product
- Make sure you carry out all precautionary measures identified in your own COSHH assessment and environmental risk assessment
- Follow guidance provided in CRRU codes of best practice (page 26-27).

Failure to do this may result in action by the enforcement authorities.

Storage of bait

Keep all rodenticides secure in a suitable store, preferably away from other pesticides which may taint the bait and make it less attractive to the target animals.

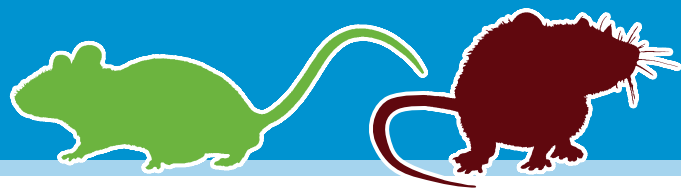
Keep all baits in their original packaging, except if using a new (generally smaller) container for ease of use. In this case, a copy label of the same product, should be attached to the new container. It is illegal to offer such re-labelled bait for sale, or supply it to others.

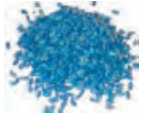







Edible rodenticides have four primary components

1. The base – grain, block, etc
2. The active ingredient – the poison within the product
3. A warning dye
4. A bittering agent

Many formulations include fungicides to prevent moulds and deterioration.





Formulation	Description	Advantages	Disadvantage
Whole wheat 	Loose grain – The most common formulation consisting of whole grain.	These tend to be preferred foods for rural rodents. Difficult for rodents to hoard or relocate into open locations.	Easy to spill. Birds and other non-targets at risk, as these are difficult to secure in place.
Mixed cereals 	A variety of cereals in one formulation. Some mixed with feeding enhancers, others using cut wheat or pellets.	Added food attractant within baits to make it more attractive for rodents to eat and ideally more consumed in one sitting.	Easy to spill. Birds and other non-targets at risk, as these are difficult to secure in place.
Place packs 	Loose grain in a bag, which rodents will chew through to gain access to the baits.	Reduce the operator exposure through contamination; premeasured and capable of lasting longer externally.	Larger quantities of palatable rodenticides are within one pack and may be dragged by rats into exposed areas.
Canary seed bait 	Canary seed base with rodenticide, to control mice.	Activity based feeding allowing mice to pick-up bait. Clear evidence left behind once mice have stripped outer shell.	Easy to spill. Birds and other non-targets at risk, as these are difficult to secure in place.
Wax and extruded blocks 	Rodenticide formulated into a wax or hard food based block.	Often easier to secure in place and prevent movement. Can be more tolerant to damp conditions, so last longer.	Larger quantity of rodenticide in one package.
Pasta or gel sachets (soft block) 	Often higher calorie, soft formulations, applied in ready to use sachets.	Fixed quantity of rodenticide that can be used in most locations.* Higher lard/oil based formulation, useful in drier environments.	Additives make these smell appealing; this can also work on larger non-target species. The sachet formulation may be 'hoarded' by rats.
Caulking gel 	Similar to the soft blocks but applied with a caulking tube.	Variable quantity can be applied, as supplied in 300ml tubes.	In consistently warm weather, the product has been known to leak the oil. However this is being improved.
Contact products  <p>Generally indoor use only</p>	Non-edible gels and foam applied to pinch-points where rodents are active.	Ingested as part of natural grooming; so no requirement for the rodents to digest the baits.	Will dry-up in warm weather and buildings. Cannot be used within two meters of a food surface.

*Always read and follow the directions on the rodenticide label

Eradication campaign: Rodenticide application

Area of use

It is essential to apply rodenticides only in those areas where their use is permitted by the product authorisation and shown on the product label.

All anticoagulant rodenticide authorisations are undergoing renewal. By 31 March 2017, only 'stewardship conditions' labelled products will be available, and only then to those with certified status, meaning those with a CRRU recognised certificate or those that are members of an CRRU recognised farm assurance scheme. Until that date, anticoagulant rodenticides with pre-stewardship labels will remain available for use by non-certified users, stocks allowing.

Environmental risk mitigation measures for second generation anticoagulant rodenticides proposed by the UK Health and Safety Executive (HSE) are available at:

<http://www.hse.gov.uk/biocides/downloads/ermm-sgar.pdf>

Definitions of terms used

'In and around buildings' is a new term on UK rodenticide labels and defined as the building itself, and the area around the building that needs to be treated in order to deal with the infestation of the building. This would cover uses in sewer systems but not in waste dumps or open areas such as farmlands (Source: EC (2009). Risk mitigation measures for anticoagulants used as rodenticides. (European Commission, Directorate-General Environment, B-1049 Brussels, Belgium. Document CA-May09-Doc.6.3c. 8pp.)

While remaining higher in individual toxicity, the previous restrictions for rodenticides containing brodifacoum, flocoumafen and difethialone to indoor use will no longer apply and all anticoagulants will be permitted for use only 'in and around buildings'.

'Open areas' is a new term without a concise definition. As above, European Commission documents describe uses "around farmland, parks and golf courses" as typical of open area applications. The term is also used when "rodenticides are used to reduce impacts on game rearing or outside (ie in field) food stores (potato/sugar beet clamps)". An open area is therefore one that fits neither of the two preceding definitions and is an urban, suburban or rural space that is not directly associated with a building.

In accordance with revised product labels and conditions of use, the only SGAR active ingredients Difenacoum and Bromadiolone, can be used in open areas. There has been no change in the condition of use around FGARs external use.

Applying baits

The principle consideration when applying rodenticide control options is to prevent access by non-target animals, while ensuring that the target rodent can easily and readily consume the bait as necessary.

Long-term baiting of strategic points in and around a building may be necessary when dealing with sites that are at high risk of reinfestation, where they cannot be dealt with at source or the health risk associated with a particular site is considered high. This is not, however, an acceptable routine approach to rodent control and should only be used as a last resort following a detailed programme of cleaning, exclusion and monitoring.

Baiting locations and methods

Depending on the location of the rodent activity, baits may need to be applied:

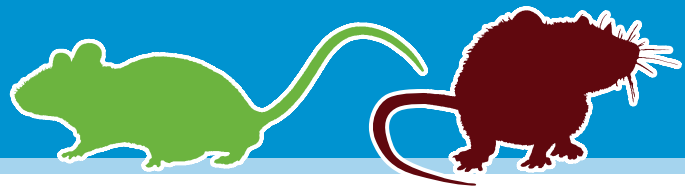
- Below ground level (sub-surface baiting): including control of rats by burrow baiting or in drains/sewers
- At surface level: including wall voids, pipe runs, etc.
- At height: for example, if the rats or mice are living in roof spaces, ceiling insulation, etc.

The COSHH and environmental assessments should result in a 'control measure' (the preferred method of applying baits to make them inaccessible to non-target species). There is no fixed method of application; examples can include direct wall void baiting, baiting stations (cardboard, plastic or homemade, provided they are fit for purpose), burrow baiting or even open trays in locked roof voids.

It is always more effective to use materials that are already in place or are familiar within the local environment. This will minimise neophobia (fear of new objects) within rat populations. During the survey, note any existing features (eg gaps under stored items) that could be utilised to place bait safely. These could also include small diameter pipes against a wall, or empty drum containers mounted on bricks with access holes cut into the base, with the rodenticide safely contained within.

Additionally, rodenticides may cause rodents to die where livestock may have the ability to consume contaminated carcasses or in inaccessible areas where it may be difficult to retrieve the dead bodies, leading to bad smells or fly infestations.

More information and examples are available at:
www.rodentcontrolonfarms.co.uk



Ensure rodenticides are used safely and correctly. Always read the label and follow the instruction.

- Conduct a COSHH assessment and, if required an environmental assessment before using rodenticides
- Ensure operators are correctly trained and certificated
- Observe relevant legislation
- Use products safely, in accordance with label recommendations: safe storage, protective clothing, visit frequency and maximum bait placement
- Seek medical or veterinary advice in the event of accidental poisoning.

House mice

- Generally inquisitive; they enter bait boxes and readily investigate baits and traps
- Tend to eat a small amount from many sites
- Very good climbers and spend much of their time off ground.



Effective baiting is best achieved by having a large number of bait boxes and traps. Vertical activity should be baited as necessary. If trapping or baiting is being used, ideally position them safely at one/two metre intervals throughout the infested areas, both on and off the ground.

Norway rats

- Neophobic; they fear new objects and may avoid baits and bait containers for some time
- To encourage feeding, use natural and familiar materials to protect baits and where possible use baits based on familiar food types
- Loose grain bait will be more difficult for rats to hoard than packs, sachets or blocks; the quantity of rodenticide in a single grain/pellet will also be substantially less, reducing the risk to non-target species if bait is dropped by the rodents.



Control may be best achieved, where the product label permits, by placing bait in burrows, where rats feel safest and are most likely to feed. If more bait is being consumed than expected for the size of the infestation, consider whether hoarding may be a problem. Search for any caches of bait and dispose of it safely.

Burrow baiting

Burrow baiting introduces the bait directly into the area where rats generally prefer to eat. It has the additional advantage that the rats are likely to die underground, so do not need to be collected and are less likely to enter the predator/scavenger food chain.

If bait is placed directly into rat burrows, cover the entrances of the baited burrows to reduce easy non-target access but

still allowing rat access, which will also reduce the risks of bait being ejected or spilled. Visit locations where burrow baiting is used frequently, possibly daily, first thing in the morning. This is necessary because of the likelihood of bait coming out of the burrows and being eaten by non-target animals.

Baiting stations

Baiting stations are generally considered to be a 'safe' way to apply rodenticides, they are manufactured individually for rats and mice, and they are able to retain bait formulations, particularly block and pasta sachets, effectively. Loose grain or seeds can be added, but this would require the station to be fixed/secured to the ground or suitable surfaces.

When applying rodenticides, there is no fixed requirement to use manufactured baiting stations and many experts will argue that rats do not like feeding from them in the first place. As mentioned, using existing materials that are already on site and could be familiar to rodents, especially rats, may have a greater benefit. Open trays of rodenticides may also be effective and increase bait consumption in both rats and mice; however their use should only be retained to secure locations with no access by non-targets.

Stacks of hay and bales

Stored bales and stacks can provide the perfect environment for rats to become established. However the practice of baiting when the bales are being stored is against current label conditions of use.

If baiting for rodents is required, the baits must be presented in secure bait containers, not allowed to spill and not allowed to contaminate the hay, which may become animal feed. As the straw or other material is used up, remove bait stations that have become exposed. Inform anyone likely to dismantle stacks how important it is to ensure that bait remains protected.

If a significant rat infestation occurs and bait is used either within or around the stack, take account of the increased risk of the bait becoming exposed and accessible to non-target animals. For example small song birds may equally nest in pockets within the stacks and they may consume available rodenticides. Consideration of the formulation and the presentation option is required.

Eradication campaign: Presenting baits safely

Presenting baits safely

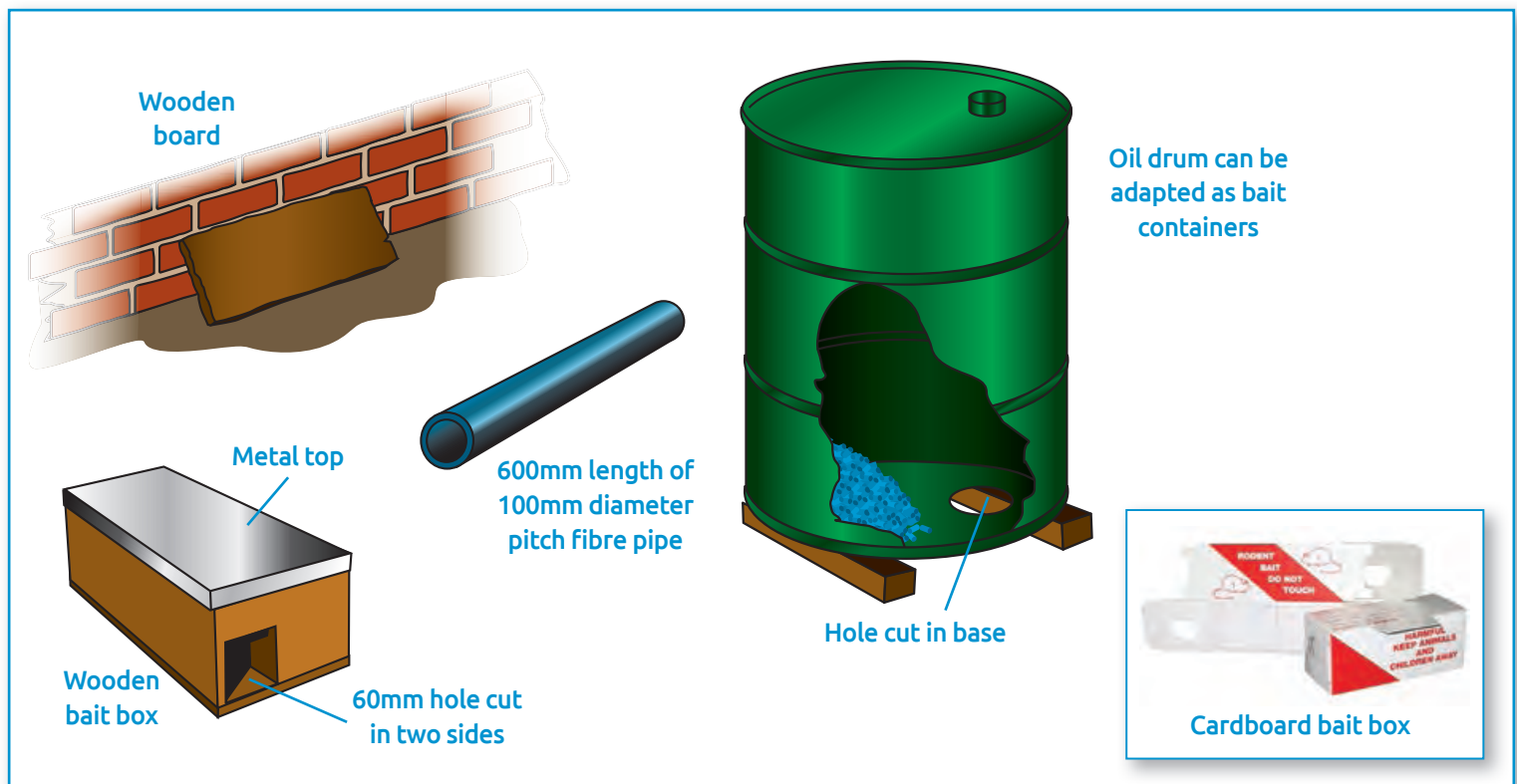
Every effort must be made to prevent both primary poisoning of non-target species and secondary poisoning of the food chain with rodenticides.

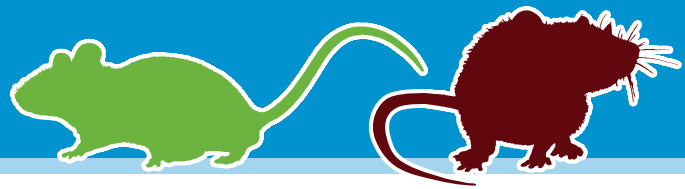
- Do not place baits where non-target animals are likely to be able to gain direct access
- Avoid baiting in areas that could result in rodenticides falling into yards, pens or cages
- Where pigs and poultry are present, it is particularly important to make regular checks for dead pests, because pigs and poultry will eat rodent carcasses
- Take particular care where a public footpath runs close to the treatment areas or where other general access is foreseeable: it may be necessary to put up warning notices
- Do not overfill bait containers
- Do not leave bait boxes open and bait exposed
- Do not allow bait to spill from bait containers
- Do not allow bait to be exposed when burrow baiting
- Bait points should be checked in accordance with the product label, so bait can be replenished as necessary.

Covering baits and tamper-resistant bait stations only protects baits from animals that are larger than the target rodent pest. Therefore baiting should be avoided where an environmental risk assessment indicates that feeding on baits by non-target small mammals is likely, and an alternative control option should be considered.

It is widely recognised that residues of anticoagulants found in wildlife come from baits accidentally taken by non-target small rodents, such as field mice and voles. Generally house mice are not active outside, therefore small droppings found in bait stations outside buildings are usually indicative of non-target exposure.

Baits applied inside should not be placed directly on the floor: these are difficult to remove at the end of the treatment. Use plastic bait trays or other measures to keep bait where it is put and to help with recovery at the end of the campaign. Take account of the risks from bait being disturbed as a result of activities from rodents or other animals or changes to the site as a result of human activities.





Good baiting practice



Rodenticide applied and protected with familiar objects. Ensure a COSHH and environmental assessment have been completed

Bad baiting practice



Overfilled bait box



Loose grain applied in a plastic tray, safely within a floor void



Bait spillage around burrow



Bait. Secure block in plastic external



Spillage from bait box

Eradication campaign: Ongoing strategy

Assessment and follow-ups

If the application of a rodenticide is needed and the treatment phase is underway, it is important to reassess the campaign regularly to monitor progress and its effectiveness.

During follow-ups:

- Search for, remove and safely dispose of any carcasses
- Make sure there is enough bait available
- Check that the baiting points remain secure
- Check for evidence of non-target mice/voles gaining access to baits
- Deal with spillages or other problems as they occur
- Ensure positive progress of the treatment and eradication of the target pest.

Effective assessment needs a reliable recording system which will enable progress, or not, to be identified as the treatment progresses. This includes, for example, a reduction in efficacy of a usually effective rodenticide. Such observations should prompt a review of your treatment strategy.

Replenishing bait

Once laid, baits should be inspected frequently and where bait has been eaten, it should be replenished as necessary according to the schedule on the product label. Bait application should be continued until all feeding activity has stopped, as overcoming the neophobic response in rats may take some time. As a general guide, baits should be inspected and replenished, no later than seven days after they were first laid and thereafter in accordance with the product label ideally at least weekly, until rodent activity has been controlled and baits removed.

More frequent visits will be required at sites with larger infestations to ensure bait remains topped up. Where burrow baiting has been used, daily visits may be necessary to ensure that bait has not been expelled and/or where there are specific risks of bait disturbance by and exposure to non-target animals.

However, if there is little evidence of bait being eaten after two weeks, it is unlikely that the treatment will prove to be effective and you should consider removing the bait and reassessing alternative strategies.

Conversely, if substantial bait takes continue over a long period, consideration should be given to either the consumption of bait by non-target animals or immigration of rodents onto the site from neighbouring infested sites. If neither of these is occurring, the presence of anticoagulant resistance must be suspected (see page 28). It is important to record the amount of bait put down so that a decision can be made whether or not the treatment and eradication process is successful.

Reinvasion

The risks of reinvasion from neighbouring sites must be considered, especially where general environmental management may be poor or where rats are resident in neighbouring hedgerows, banks and ditches. Watercourses and hedgerows often provide a means of concealed movement of rats between sites, however, ensure this is not water vole activity.

During the initial site visit it is essential to discover the full extent of the infestation and any sources of reinvasion, and considering these, take appropriate action. It is advisable to coordinate control strategies between farms/neighbours to reduce the risk of reinvasion. Continual monitoring of the site and known locations of potential infestation will also allow early identification of fresh activity and the implementation of an eradication campaign to eliminate activity quickly and effectively.

Removal of dying/dead rodents

Search for and remove any dying and dead rodents and dispose of them safely, in line with the product label. This is particularly important where pigs and poultry are present and to reduce the risk of secondary poisoning, especially in areas where birds of prey and other predators/scavengers are known to be active and where populations of outdoor rodents are being controlled.

For further advice on the disposal of rodent bodies, redundant rodenticides and their containers, contact the Environment Agency in England and Wales, the Northern Ireland Environment Agency and, in Scotland, the Scottish Environment Protection Agency.

Operations after removal of rodent infestations

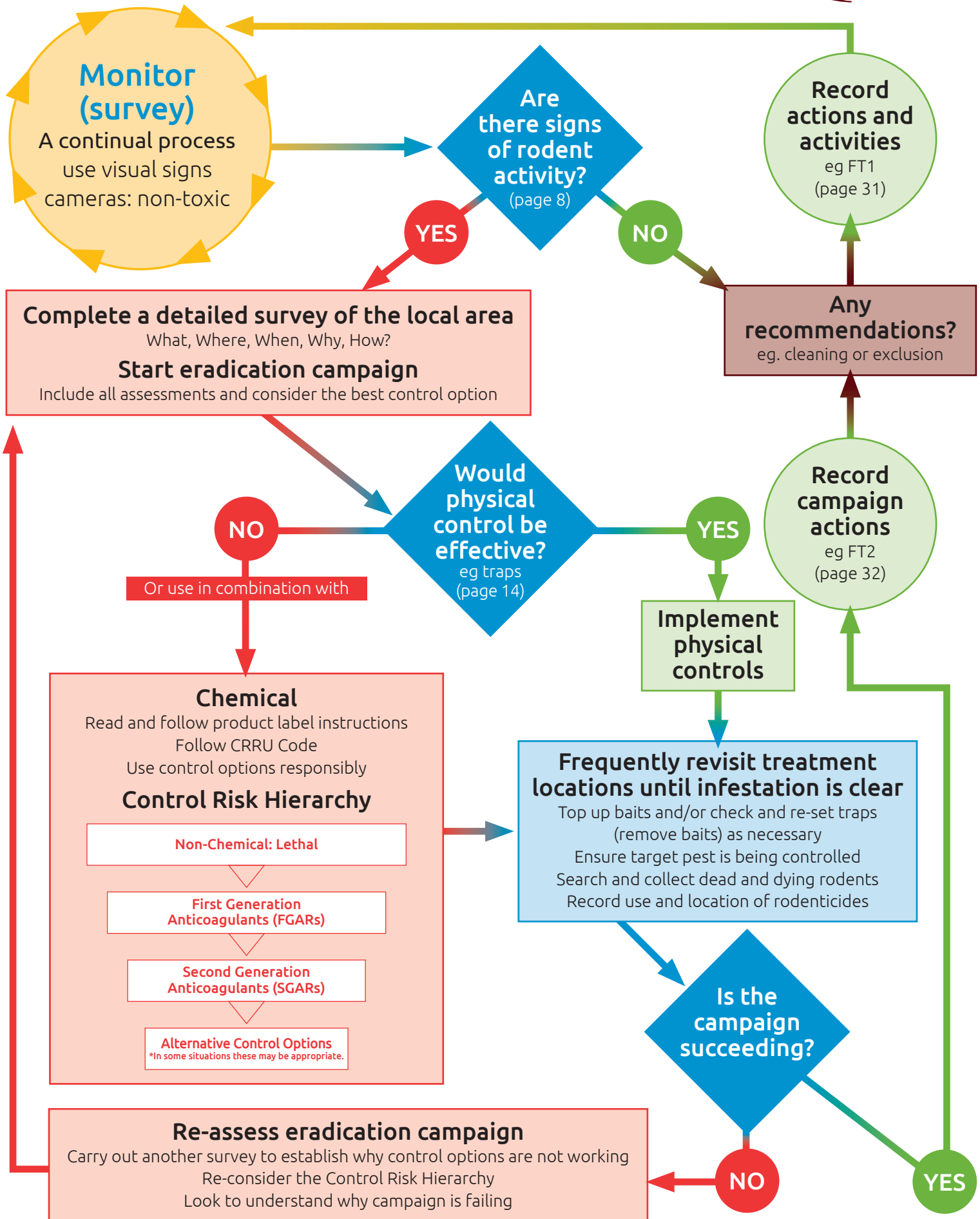
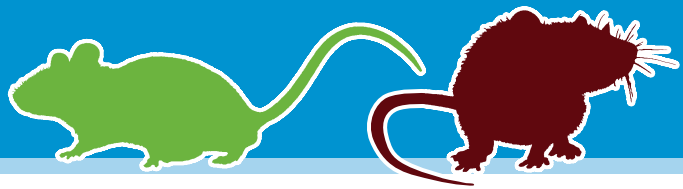
Once control has been achieved, reassess the site as to why the infestation may have occurred and again consider how habitat management measures could be improved and implemented as appropriate:

- Improve hygiene and reduce available food source
- Reduce harbourage and remove clutter
- Proof buildings.

Areas that are prone to infestation and re-infestation should be monitored regularly to prevent chronic infestations becoming established.

Retrieval of bait

At the conclusion of a treatment campaign every effort must be made to ensure all traces of the bait have been removed from the site and, where baits cannot be stored and re-used, are disposed of according to the label instructions.

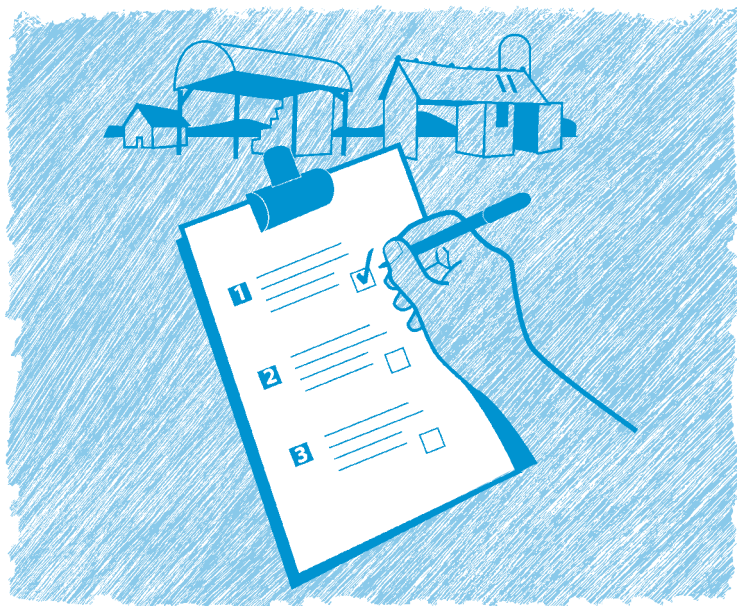


Responsible rodenticide use

The Campaign for Responsible Rodenticide Use (CRRU) Code

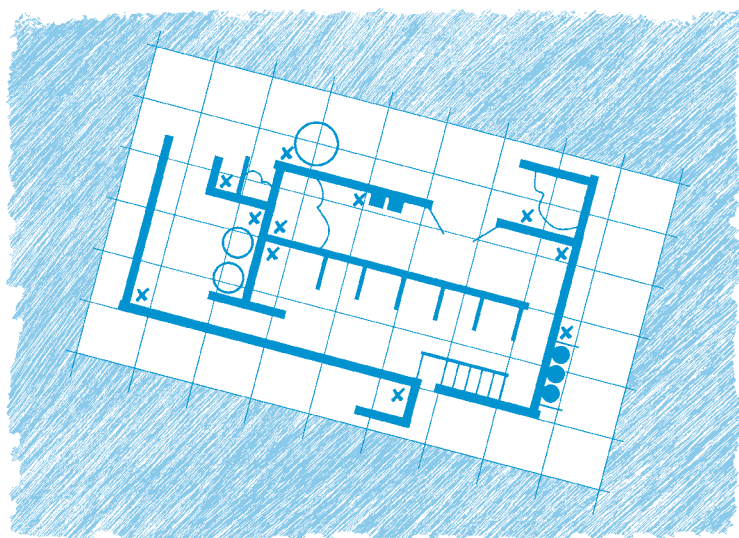
Always have a planned approach

- Before treatment begins, a thorough survey of the infested site is an essential key to success when using any rodenticide
- Environmental changes that could be made to reduce the attractiveness of the site to rodents should be noted for implementing after the treatment. Usually this will involve rodent proofing and removing rubbish and weeds that provide harbourages and cover. However, the site should not be cleared before treatment since this will disturb the rodent population and make bait acceptance more difficult to achieve
- Obvious food, such as spilled grain, should be removed as far as possible and any food sources covered
- Rodenticide baits should only be used for as long as is necessary to achieve satisfactory control
- In most cases, any anticoagulant bait should have achieved control within 35 days. Should activity continue beyond this time, the likely cause should be determined and documented. If bait continues to be consumed without effect, a more potent anticoagulant should be considered. If bait take is poor, relative to the apparent size of the infestation, consideration should be given to re-siting the bait points and possibly changing to another bait base, as well as making other environment changes.



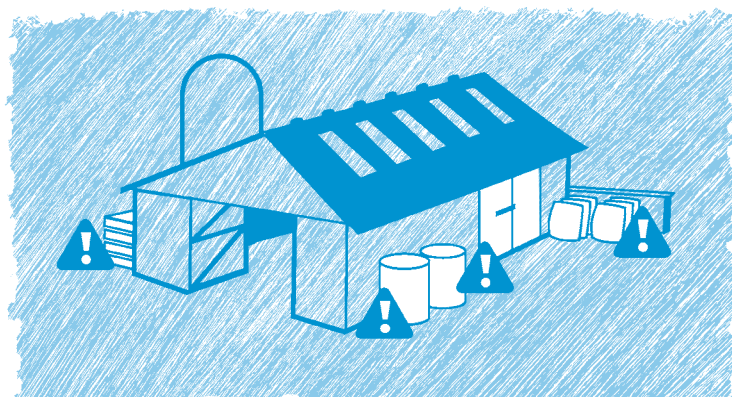
Always record quantity of bait used and where it is placed

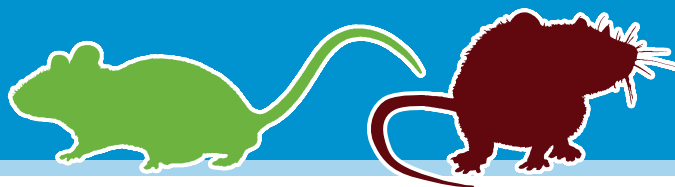
- A simple site plan or location list identifying areas of particular concern pertinent to the site should be drawn up and retained on file
- A record of all bait points and the amount of bait laid should be maintained during the treatment. Activity should be noted at each bait point, including any missing or disturbed baits, as the treatment progresses
- By carefully recording the sites of all bait points, responsible users of rodenticides are able to return to these sites at the end of the treatment and remove uneaten bait so that it does not become available to wildlife.



Always use enough baiting points

- Users should follow the label instructions regarding the size and frequency of bait points and the advice given regarding the frequency and number of visits to the site
- By using enough bait points, the rodent control treatment will be conducted most efficiently and in the shortest possible time. This will restrict the duration of exposure of non-target animals to a minimum.





Always collect and dispose of rodent bodies

- The bodies of dead rodents may carry residues of rodenticides and, if eaten by predators or scavengers, may be a source of wildlife exposure to rodenticides
- It is essential to carry out regular searches for rodent bodies, both during and after the treatment period. Bodies may be found for several days after rats have eaten the bait and rats may die up to 100 metres or more away from the baited site
- Any rodent bodies should be removed from the site and disposed of safely using the methods recommended on the label.



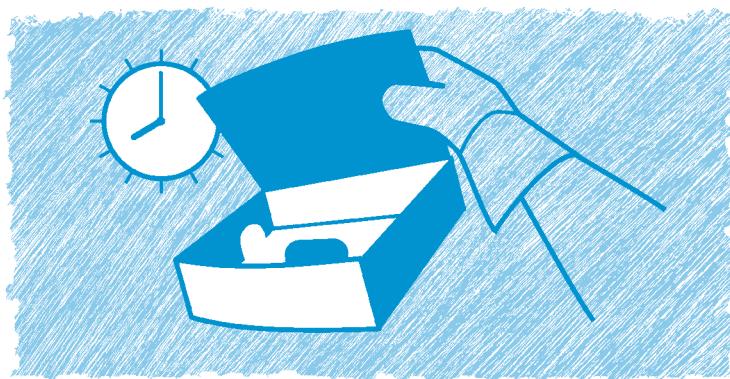
Never leave bait exposed to non-target animals and birds

- Care should be taken to ensure that bait is sufficiently protected to avoid accidentally poisoning other mammals and birds. Natural materials should be used where possible
- Bait stations should be appropriate to the prevailing circumstances. They should provide access to the bait by rodents, while reducing the risks of non-target access and interference by unauthorised persons. They should protect the bait from contamination by dust or rain. Their design, construction and placement should be such that interference is minimised.



Never fail to inspect bait regularly

- Where the risk assessment or treatment records show that multiple visits are required, then those should be made as frequently as is considered necessary. Daily inspection may be required in some circumstances
- At each visit, baits should be replenished according to the product label and a thorough search made to ensure that bodies and any spilled bait are removed and disposed of safely. Records of such visits should be maintained.



Never leave bait down at the end of the treatment

- Bait left out at the end of a treatment is a potential source of contamination of wildlife
- On completion of the treatment, records should be updated to signify that the infestation is controlled and that, as far as reasonably practical, all steps have been taken to ensure that the site is now free of rodenticide bait.



For further information visit: www.thinkwildlife.org.uk

Rodenticide resistance

Identifying instances of rodenticide resistance

Where there is rodenticide resistance, bait consumption continues and may even increase over time. Using good practice, control of Norway rats and house mice should typically be achieved in around five weeks. If bait consumption continues much longer than this, resistance to the anticoagulant used may be present.

Explore all causes of poor control before assuming resistance is an issue. Treatment failures may be due to insufficient quantities of bait against the size of rodent population or inadequate coverage of the infested area. Immigration from adjoining areas may also cause a problem. If these factors have been ruled out and the bait is being eaten without any significant decline in the rate of consumption or continued fresh evidence of rodent activity, it may be a sign of the presence of anticoagulant resistance.

Where resistance is present, environmental management techniques (page 6) remain an essential component of the control strategy. This can be combined with the use of a rodenticide to which the rodents are susceptible and the use of intensive breakback trapping programmes, where appropriate.

Anticoagulant resistance in house mice

In house mice, resistance to first generation anticoagulants has been widespread for many years. However, new formulations of this active ingredient were launched in 2014.

House mice possess a degree of natural resistance to anticoagulant rodenticides, so they are generally less effective against house mice than rats; however, the genetics of resistance in the house mouse is generally not understood.

Anticoagulant resistance in Norway rats

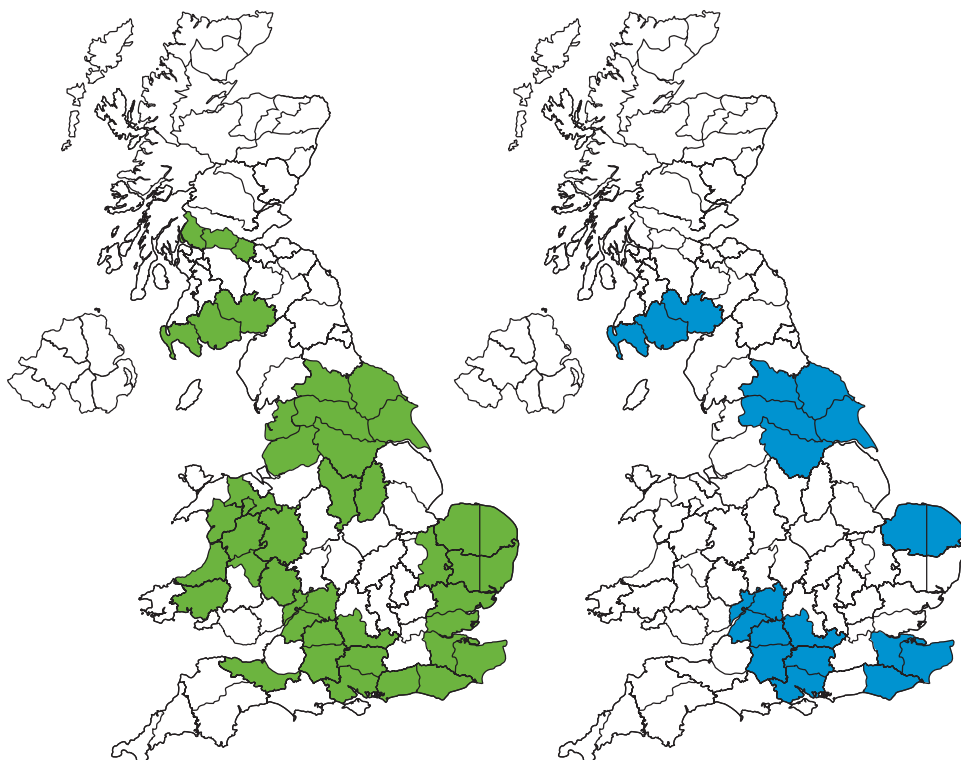
Resistance in Norway rats to first generation anticoagulants was first identified in the late 1950s. Resistance is genetically based and transfers from one generation to the next. Nine different anticoagulant resistance mutations are found in the UK. Understanding of the geographical distribution of resistance is incomplete but increasing. In some parts of the country it is found extensively on farms, especially livestock holdings.

Where, over 40 years of monitoring, resistance has been recorded at some time to:

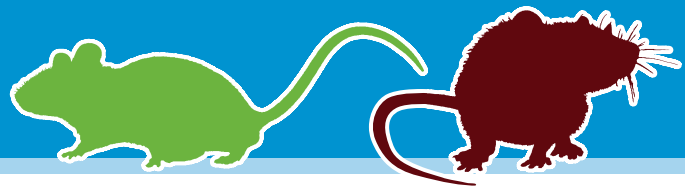
- First generation rodenticides
- Second generation rodenticides difenacoum or bromadiolone

Shading does not imply that all rodents in these areas have resistance, nor does lack of shading imply that there is no resistance, as testing may not have been carried out.

There is no evidence of resistance to brodifacoum, difethialone or flocoumafen.



Continuing evidence emerges that the extent of resistance to first and second generation anticoagulants may be more extensive than illustrated. For the latest information on rodenticide resistance, see www.rodentcontrolonfarms.co.uk



Resistance management

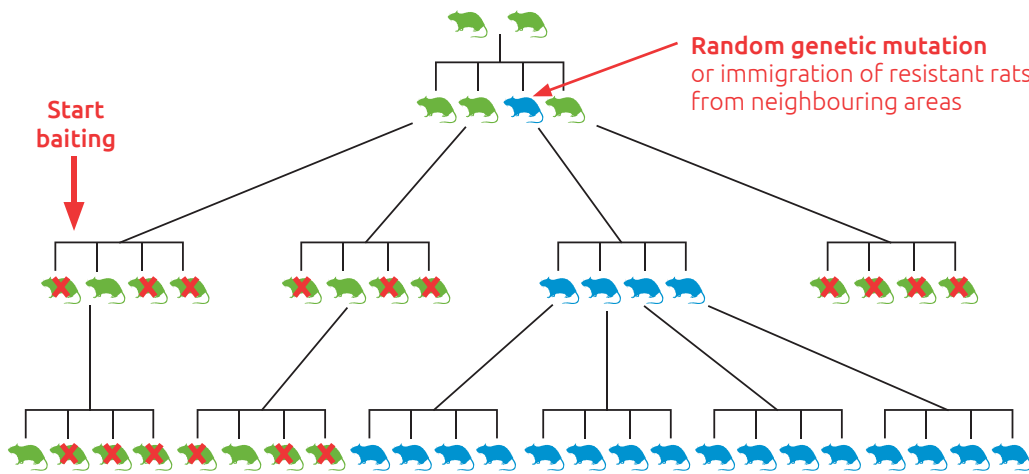
Where resistance is suspected or proven, continued use of the same active ingredient will increase the size of the rodent population and further spread the numbers of resistant rodents.

- Reliance on anticoagulants for rodent control means that improved resistance management strategies are important:
- Use of alternative control methods, particularly environmental management and physical controls, to which there is no potential for resistance
 - Knowledge of the distribution of resistance mutations
 - Use of only fully effective anticoagulants
 - Use of alternative active ingredients, for example phosphide tablets applied into rat burrows more than 10m from a building or alphachloralose used against mice internally.

Record which rodenticide ingredients have been used previously to ensure they are not used on an ongoing basis.

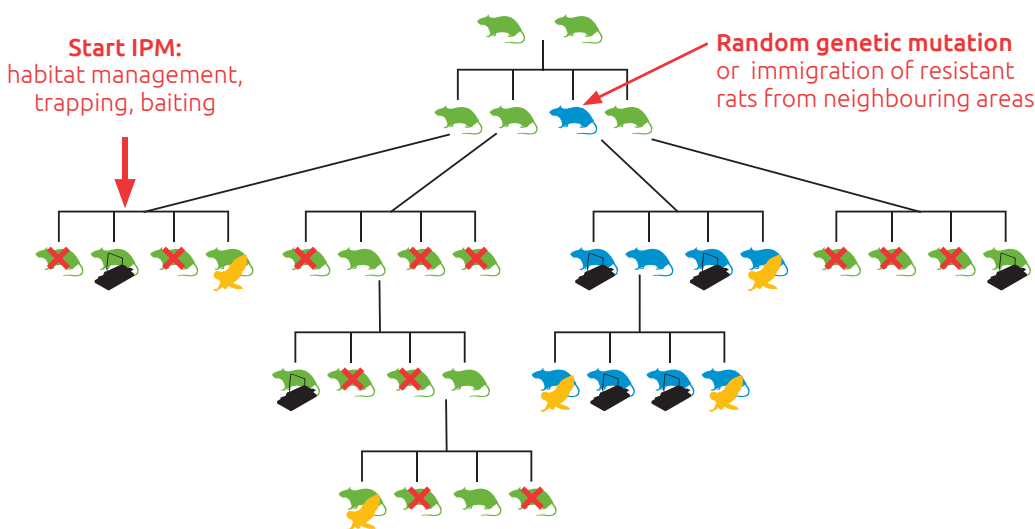
Resistance spread among rats

1. Bait only



Rats with the resistance gene are more likely to survive and produce offspring. Within a few generations, resistance can spread quickly throughout the population, resulting in a large population of rats that will be almost totally unaffected by certain rodenticides.

2. Integrated Rodent Management



Note: Rotate active ingredients if resistance is present. Annual rotation of active ingredients can further reduce the likelihood of resistance developing or spreading.

By the use of an integrated approach, resistant rats are less likely to dominate the population as they can still be controlled by other methods such as environmental management, traps etc.

KEY	Rat killed by bait	Rat with no resistance	Rat with resistance to the anticoagulant
	Rat killed by traps	Rat killed by increased predation, through better habitat management	

Record keeping

Why is record keeping important?

- Maintaining good records helps to demonstrate that a fully integrated rodent management strategy is in place and due diligence is being applied
- Comprehensive records not only help to identify what has happened but also monitor the progress of control and satisfy legislation
- Many farm assurance and registration schemes of buyers and customers and their auditors impose record keeping requirements.

What information should be recorded?

Staff training and safe working practices are required by law:

- Record staff training detail.

All usage should be recorded in accordance with best practice and to ensure others, if required, can take over control programmes with minimum risk. Include:

- Amount purchased and date delivered
- Name of operator
- Amount and date of use
- Number of points baited
- The location (map) of bait points
- The progress of a campaign
- Date of bait points re-inspection/re-baited
- Amount of bait consumed
- Search for dead and dying rodents and if any carcasses found, record the method of disposal.

Bait inspections are an ideal time to observe areas requiring proofing or improved hygiene

- Note issues requiring attention
- Record date when issues addressed.

At the end of a campaign, rodenticide should be collected and product that cannot be re-used should be disposed of safely, in line with current regulations. Record:

- The amount of rodenticide requiring disposal
- The method and location of disposal.

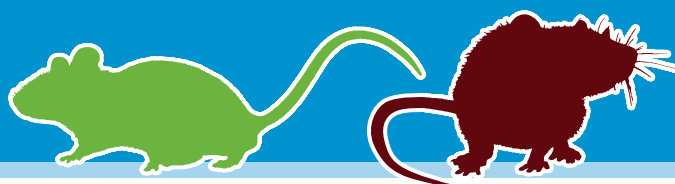
How should records be kept?

- All records should be maintained at a central point for ease of access
- The forms on the following pages may be photocopied to provide a detailed record that will demonstrate due diligence.

Rodenticide use and records must meet the needs of legislation and assurance schemes:

- Ensure you understand legal obligations
- Check requirements of assurance schemes and customers
- Undertake COSHH and risk assessments and keep Safety Data Sheets used for the assessments
- Follow label recommendations.

Rodent survey and treatment record



PHOTOCOPY THIS FORM TO CREATE YOUR OWN RECORDS

Additional copies available at www.rodentcontrolonfarms.co.uk

Business name

Site address

Operator's name

Rodenticide/formulation

How to use		
Bait point	1/01/15	8/01
1. GRAIN STORE DOOR	CT 250g	carcase disposal method PT 100

Inspection record	Inspection date					
Bait point						
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

Key: NT = No take PT = Partial take CT = Complete take
 L = Lost D = Disturbed by non-target animal/bird

Date treatment finished / /

Date bait removed / /

Observations and recommendations

(Sketch area surveyed overleaf. Note signs of activity and proofing/hygiene issues).

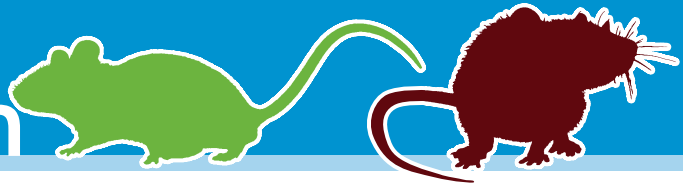
Rodent survey and treatment record

Bait location plan

Sketch area surveyed and note signs of activity and proofing hygiene issues.

The page contains a large area for sketching and notes. It features horizontal dashed lines for writing and a vertical dashed line on the right side, creating a columnar layout for notes.

Further information



AHDB

www.ahdb.org.uk

For guidance on the legislation, consult the Health and Safety Executive (HSE)

Tel: 0300 003 1747

www.hse.gov.uk/index.htm

Campaign for Responsible Rodenticide Use

www.thinkwildlife.org

Natural England (NE)

Tel: 0845 600 3078

www.naturalengland.org.uk

Department for Environment, Food and Rural Affairs (Defra)

Tel: 03459 33 55 77

www.gov.uk/defra

Zoonotic diseases (zoonoses): guidance, data and analysis

www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Zoonoses/GeneralInformation/zoo010ZoonosesFromRats

Other general best practice guidance

www.rodentcontrolonfarms.co.uk

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