

CRRU UK CODE OF BEST PRACTICE

Best Practice and Guidance for Rodent Control and the Safe Use of Rodenticides



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Products containing the second-generation anticoagulants (SGARs) have been on the market for nearly forty years and we have learned much about their characteristics in that time. They are an efficient and practical solution to rodent infestations in many urban and rural situations, bringing substantial benefits in food hygiene, public health and animal husbandry. However, they are also hazardous to non-target animals and persistent in the environment. Indeed, surveys conducted by UK scientists have found residues of these compounds in the bodies of many predatory and scavenging species of mammals and birds. Often high proportions of populations are exposed and some individuals are killed. These properties might normally lead to the removal of such products from the market, but equally effective and safer alternatives are not available and the SGARs continue to be essential. If anything, they are becoming more widely used as resistance to the first-generation anticoagulants spreads in UK rodent populations.

This situation makes the implementation of risk mitigation measures, and the application of best practice, an absolute imperative for all users. This Code of Best Practice defines measures which, if thoroughly and effectively applied, will permit the continued use of anticoagulants with the minimum adverse impacts on non-targets.

The Campaign for Responsible Rodenticide Use (CRRU) has been given the task of developing the UK SGAR Stewardship Regime, with assistance from a wide range of stakeholder organisations, and will co-ordinate implementation. The Regime is intended to provide assurance to the Health and Safety Executive, the UK government body responsible for the regulation of rodenticides, that anticoagulants can continue to be used and their risks brought down to an acceptable level. This Code of Best Practice provides a foundation for the Stewardship Regime. It will be used as the basis for training and certification of all who carry out rodent control as a part of their professional duties and must be applied in practice by all professionals who use anticoagulants.

The progress of the Stewardship Regime will be closely monitored towards reducing wildlife exposure and improving user practices, with annual surveys of anticoagulant residues in wildlife and periodic assessment of the knowledge, attitudes and practices of those who apply these compounds as professionals. Only if significant beneficial changes in these measures are seen will users be permitted to continue to buy and apply anticoagulants without further restriction. So, the future of these products, so important in food hygiene, public health and animal husbandry, is now more than ever in the hands of their users.

Dr Alan Buckle



**Chairman, Campaign for Responsible Rodenticide Use
University of Reading**

BACKGROUND

The publication of a new code of practice, which gives rodent control guidance for professionals, might reasonably give rise to the question ‘why do we need another one?’

The CRRU Code of Best Practice brings together our most recent understanding of the safe and effective use of rodenticides, acknowledging their risks and providing practical advice so that risks are minimised. Much of the material in the document is, indeed, not new because it is based on two Health and Safety Executive (HSE) Information Sheets.^{1,2} These are now withdrawn but for many years provided necessary basic information about safe and effective rodent control, in both rural and urban environments, and particularly about the application of rodenticides.

Anticoagulant rodenticides are essential in food hygiene and for the protection of human and animal health, but the fact is that the way we currently use them results in widespread contamination of non-target wildlife in the UK. Some of the exposed species are of high conservation value. This contamination may be happening either because current guidelines are inadequate or because they are not properly followed. Whatever the cause, a new approach is evidently needed. This new approach will be provided by the UK SGAR³ Stewardship Regime, which will be co-ordinated by CRRU UK. The new Code of Best Practice is fundamental to the delivery of the Stewardship Regime.

The CRRU Code of Best Practice is more about changing emphasis than it is about changing practice. In the past, rodent control practitioners may have considered rodenticide application as their primary intervention. Now it must be seen to be a temporary solution that becomes necessary only until other procedures have been fully considered and implemented, where appropriate, to make sites less conducive to rodent infestation. It is no longer acceptable to bait sites repeatedly, entailing well-known risks to wildlife, while obvious measures to make them less amenable to infestation are ignored.

For some time, tamper-resistant bait boxes have provided a false impression that it is safe to deploy such equipment on sites and to apply anticoagulant rodenticide baits permanently in them. We now know that some of the contamination seen in UK wildlife is the result of non-target small mammals entering bait boxes and feeding on bait. We understand this pathway of exposure because some of the most contaminated non-target species, such as barn owls and kestrels, feed almost exclusively on small mammals and hardly at all on target rodents. Long-term baiting may sometimes be required but it must become the exception and not a routine business model through which a service of rodent control is provided to clients.

The concept of ‘risk hierarchy’ should be at the forefront when deciding a rodent control strategy for any site. The key here is that any intervention conducted must be potentially effective but, in the risk hierarchy, the least severe methods must always be used. It is not necessary that all options in the risk hierarchy should be employed, and found to fail, before an effective solution is reached. But all should be considered.

The Code of Best Practice, and the advice it contains, will be integrated into existing and new training courses for those who conduct rodent pest management in all user sectors, including professional pest control, local authorities, agriculture and gamekeeping. Those with existing qualifications will be brought up to date with the new concepts and advice.

The *status quo* is not an option. Practitioners must become better acquainted with the risks inherent in the use of anticoagulant rodenticides, especially when they are applied outdoors, and implement all appropriate risk mitigation measures. The strategies and methods described in this document will promote effective rodent pest management and result in reduced risk of accidental exposure of humans and non-target animals.

¹ HSE (1999). Safe use of rodenticides on farms and holdings. HSE Agriculture Information Sheet No 31. August 1999. 4 pp.

² HSE (2004). Urban rodent control and the safe use of rodenticides by professional users. HSE Information Sheet MISC515. November 2004. 7 pp.

³ Second-generation Anticoagulant Rodenticide

AGRICULTURE



PROFESSIONAL PEST CONTROL & LOCAL AUTHORITIES



GAMEKEEPING



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1 INTRODUCTION

- 1.1 Rodents pose a threat to people's health and to health and hygiene in animal husbandry. They may cause significant damage to commodities, especially stored food and animal feeds, and to the fabric of buildings and infrastructure, such as electrical cables, drains and sewers. In particular, rodents pose a risk to food safety and food hygiene because they are attracted to areas where food is stored, prepared and sold and because many food-borne pathogens are carried by rodents and transmitted to humans, companion animals (pets) and to farm livestock.
- 1.2 A range of statutory obligations with regard to pest infestation is imposed on local authorities, employers, land-owners, householders and those involved in the food industry. A wide range of quality standards make necessary the management of rodent infestations throughout the food industry, including on many agricultural enterprises. In some cases these require a pest-free status as a contractual obligation. Many other legal instruments refer to rodent infestation in different situations and impose a requirement to take the necessary steps to control and remove rodents.
- 1.3 This document gives guidance on the strategies to employ to avoid rodent infestation and on the precautions you need to consider when carrying out treatments to control the two main pest species in the United Kingdom, the Norway rat (*Rattus norvegicus*) and the house mouse (*Mus musculus domesticus*). It assumes that those who use the guidance in it are competent and have been adequately trained, and assessed as competent, to a standard whereby they are capable of using rodenticide products that are intended for application only by professional users.

- 1.4 This guideline is aimed at all those who conduct rodent control operations as professional users of rodenticides. That is those who conduct rodent control as a part of their professional and/or occupational duties. A wide range of users fall into this category including those working as professional pest control technicians, both in the public and private sectors, agricultural workers who conduct rodent control as a part of their duties on farms and holdings, those who carry out rodent pest management in the gamekeeping industry and those, such as store-keepers and janitors, who need to control rodents to protect property, installations and produce.

2 RODENT CONTROL STRATEGY

- 2.1 It is important to review approaches to control holistically and to integrate a range of control measures into your treatment strategy. Consider all available controls – not just the use of rodenticides – including simple measures such as clearing away rubbish and proofing of buildings. Relying on rodenticides alone does not guarantee that the infestation will always be eradicated and numbers may quickly recover after treatment. It is important that following the application of measures to reduce rodent numbers you should consider ways of improving environmental management at the site. This should provide effective long-term control of rodent infestations. You should concentrate particularly on improving hygiene and proofing, maintenance and repair of buildings.
- 2.2 The primary aim is to avoid infestation, as once established, rats and mice can be difficult to control. Operations that are intended to prevent rodent access to food and water and to remove places of rodent harbourage for shelter and breeding rarely have significant impacts on non-target animals. All necessary

operations that would contribute towards making sites less attractive to rodents should be implemented by those who are responsible for them.

- 2.3 In contrast, all interventions aimed at the removal of rodents, including the use of traps and sticky (glue) boards, and the application of rodenticides, such as gases, contact gels, dusts, liquids, foam and poisoned baits, have the potential to harm non-target animals and the environment. Although these risks can be mitigated by following best practice, they cannot be entirely avoided. Therefore, the principle strategy when choosing methods for the control of rodents is to employ methods that have the least risk of adverse impact (i.e. are the least severe) but which will be effective in the prevailing circumstances. This is the concept of “risk hierarchy”.

3 THE ‘RISK HIERARCHY’

3.1 General

Each site is different and will require a different set of measures, either to prevent rodent infestation or to remove an infestation when it has become established. Any measure you may consider could present a lower risk at one site and a higher risk at another. An important procedure in the determination of risk is an environmental risk assessment (section 5.4.3). However, the rodent carrying capacity of the site should always be reduced through improvements in environmental management. Beyond that, no hard and fast guidance can be given about the ‘risk hierarchy’. You should consider the following general points when making decisions about which methods to use.



3.2 Efficacy

In many situations in which rodents present a risk of harm to humans and animals there are statutory responsibilities for their removal. Therefore, a principal consideration must be the

suitability of measures selected efficiently to achieve the results required to reduce or remove rodents.

Control measures based on the use of rodenticides must be proven to be sufficiently effective by those who seek authorisation to sell them. Efficacy data may be available in the public domain or obtained from manufacturers. All other methods, including the use of traps and sticky (glue) boards, are not regulated with respect to efficacy. Their efficiency is uncertain and dependent on the competence, perseverance and (often) the ingenuity of those employing them.

It should be noted that killing rodents can only provide short-term control of populations. Sustainable control can only be achieved by reducing the rodent carrying capacity of the environment (see sections 3.3-3.5).

There is evidence to suggest that resistance to rodenticides in some areas of the country is spreading. Professional users should be alert to this phenomenon and be prepared to adjust their control strategy if anticoagulant resistance is encountered (section 7).

3.3 Proofing

Although they may be costly and require frequent maintenance, measures to prevent the ingress of rodents into buildings provide a long-term solution to rodent problems and are usually without adverse impacts. These measures should always be implemented. Proofing also needs to take account of the presence of bird species as these are protected under the Wildlife and Countryside Act 1981. Care is also required where a building is to be rodent-proofed and may provide a roost for bats (see Further Reading).

3.4 Denial of food and water

Operations intended to prevent rodent access to foodstuffs, such as the use of rodent-proof bins and close-fitting doors, are also likely to be substantially free from non-target impacts, although of course such action will also prevent access to any other animals, such as wild birds, that may be relying on these food and water sources.

3.5 Removal of harbourage

In order to deter rodent infestations, sites should be cleared of all debris, rubbish, old machinery and equipment, unwanted stores of straw and hay, etc. Vegetation should be cleared around buildings to provide an open perimeter and immediate surroundings, so that natural predators can take rodents. If possible, areas around buildings may be laid to concrete, or other hard surfaces, to prevent rodent burrowing. Once again, the only non-target impacts of such operations will be on the other animals that rely on the materials taken away for cover and harbourage. For example, straw and hay bales are best removed during winter because they often provide breeding sites for barn owls.

3.6 Trapping

Trapping has several advantages. Any animals taken can be removed from the site and obviously there are no chemical residues. However, if not done properly trapping may have a detrimental impact on non-target animals, when these are

accidentally taken as 'by-catch'. An environmental assessment will permit the likely extent of this risk to be determined. Several statutory instruments apply to the process of trapping vertebrates. It is essential before setting rodent 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. Only spring traps approved under the Spring Traps Approval Order (England) 1995 (and associated legislation in Wales, Scotland and Northern Ireland) may be used, although break back traps commonly used against rats and mice are exempt from this requirement. To minimise the risk to non-target animals, where possible, livestock and pets should be excluded from the trapping area and the traps must be set in natural or artificial tunnels. Purpose-made boxes designed to accept both traps for rats and mice are available.

3.7 Glue (sticky) boards

Glue (or sticky) boards present few non-target risks when they are used indoors for rat and mouse control, although there are occasional records of little owls being caught on them. However, many authorities, such as the Department for Food and Rural Affairs (Defra), the Chartered Institute of Environmental Health (CIEH), the British Pest Control Association (BPCA) and the National Pest Technicians Association (NPTA), consider that these devices should be used only as a 'last resort' due to animal welfare considerations (see Further Reading, Code of Practice for the Humane Use of Glue Boards).

3.8 Alphachloralose

The acute rodenticide alphachloralose may be used only indoors for the control of house mice. Among chemical methods of rodent control, and when applied correctly, it may be considered to present few risks to humans and non-target animals.

3.9 Phosphine gas

Provided care is exercised to ensure that fumigated burrows are only occupied by target rodents, the use of products that emit the toxic gas phosphine are unlikely to have primary non-target impacts. There is also no likelihood of secondary toxicity. However, these products carry significant risk to those transporting and applying them and current advice to users is as follows:

- Assess the risk to yourself, others and the environment prior to commencing work and adopt the necessary operational and engineering controls appropriate for the work or substitute the control measure for a physical or less toxic method (COSHH/risk assessment).

Other stringent requirements are also applied to ensure the safe use of these products including restrictions on how close to buildings they can be used, the use of special application equipment and personal protective equipment, prevailing weather conditions, the training and competence of users and disposal of used containers (see Further Reading, The RAMPS UK Code of Good Practice. Register of Accredited Metallic Phosphide Standards in the UK).

3.10 First-generation anticoagulants

First-generation anticoagulants, warfarin, chlorophacinone and coumatetralyl, are less acutely toxic and are less persistent in animal tissues than the second-generation compounds. It may

be assumed that they present a lower risk of both primary and secondary poisoning for non-target animals in most use situations. Therefore, their use is to be preferred over the use of the second-generation compounds against Norway rats in those areas where there is no resistance to them. First-generation anticoagulants should not be used against mice because resistance in this species is widespread. However, they are not free from risk to non-targets and larger quantities of these baits must be applied to ensure that surplus is always available for rats to feed upon. It may also take longer to control rat infestations when using them. The application of first-generation anticoagulants where there is resistance to them is not best practice and presents a risk to non-target animals, especially when ineffective treatments are prolonged.



3.11 Second-generation anticoagulants

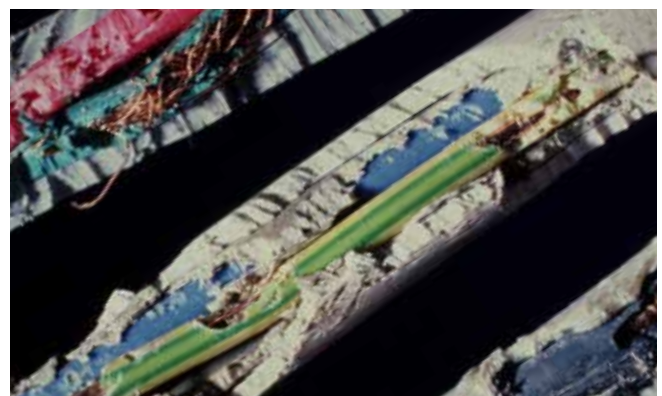
The second-generation anticoagulants, brodifacoum, bromadiolone, difethialone, difenacoum and flocoumafen, are acutely toxic and have long biological half-lives. Therefore, in the 'risk hierarchy' they present the greatest risk to non-target animals and the environment. There is evidence that they may cause the deaths of non-target animals and they are widely present in the environment in the bodies of many non-target species, some of high conservation value such as barn owls, red kites, kestrels and peregrine falcons. They should be used only when other methods of achieving rodent control have been carefully considered and found to be unable to provide an effective solution to the rodent pest problem present at the site. It is not possible to rank these compounds in respect of risk. However, resistance to bromadiolone and difenacoum, among both Norway rats and mice, should be considered when deciding which of the five compounds to use.

4

AVOIDING RODENT INFESTATIONS

The best way to deal with rodent infestations is not to have them in the first place. There are two main approaches.

Exclusion - The aim is to keep rodents out of vulnerable buildings. This objective needs to be realistic and practical and take account



of the physical capabilities of rats and mice. In rural environments, buildings offering an attractive environment and a source of food are most vulnerable to rats during autumn and winter when they are likely to exploit weaknesses or faults in the structures or associated areas. Mice are less responsive to seasonal changes mainly because they live within the fabric of buildings. Their small size means that they can be easily introduced into otherwise secure buildings via the delivery and movement of materials such as feedstuffs, wood shavings and any other bulk items that are capable of providing a temporary refuge. Effective proofing of buildings or other structures against mouse entry is often extremely difficult due to their ability to get through very small gaps but efforts to limit entry will have some beneficial effect.

Routine inspections and repair to identified faults or damage should be implemented. In most situations it is best to control the rodent infestation before carrying out any proofing work. Although there may be some additional cost, the improvements will benefit the rodent control and prevention programme in the long term. Metal baffles around services such as cables and pipes and kick plates on the lower edges of doors will prevent them being gnawed by rodents. Door access that is only required occasionally can be temporarily proofed by adding a concrete fillet or wire mesh to the vulnerable ground level sections. Depending on the circumstances, drainage pipes or gullies should be proofed by fitting grilles, flaps, crushed wire mesh or other suitable materials.

The staff on site should be made aware of the importance of avoiding the creation of rodent access routes and harbourages when undertaking building works, modifying existing structures and when making changes to the management of the building. In the course of structural work it may be appropriate to incorporate access points to allow checks to be made for rodent activity and permit the placement of rodenticide baits.

Hygiene – Two main areas require attention.

a) Feedstuffs

It is essential, wherever possible, to prevent rodent access to food. Food storage structures should be proofed against rodent ingress. Shortcomings in the storage and handling of food and feedstuffs, particularly where spillages occur and are allowed to remain, can be a significant factor in providing attraction for rodents and reducing the uptake and acceptability of rodenticide



baits. Spoiled foodstuffs should be disposed of in a way so that they are inaccessible to rodents. Rats also require a source of free water, while mice in general do not. Water sources should be removed where this is possible.

However, both rats and mice have unrestricted access to feed present in many situations – particularly in some animal-rearing systems, such as free-range poultry and pigs and gamekeeping, where game-birds receive supplementary feeding in hedgerows and coverts. In these systems, every effort should be made to prevent access to foodstuffs by rodents. If this is not done, long-term problems with rodents will remain.

b) Harbourage

Within and around buildings the availability of a wide range of materials will provide habitat for rodents. The following will encourage the presence of rodents:

- a build-up of rubbish around and within buildings;
- suspended ceilings and uncapped block walls;
- wall and ceiling insulation materials with direct access to them for rodents;
- the long-term storage of materials such as wood shavings, straw/hay bales and packaging in areas accessible to rodents;
- stores containing equipment and spare parts;
- natural vegetation cover;
- ditches, hedges and banks, especially when poorly maintained;
- rubbish dumps, bins for fallen stock, and incinerator sites;
- drainage systems and elevators or gantries that may provide a link between buildings.

All these areas require attention if sites are to be made less attractive to rodents as places to live and breed.

5

WHAT TO DO BEFORE TREATMENT

5.1 General

Much can be done prior to the establishment of rodent infestations to make their occurrence less likely. If precautionary measures such as proofing and hygiene, discussed in the previous sections, are rigorously implemented rodent infestations will be infrequent, small and easy to deal with when they occur.

Small infestations of rats and mice can often be removed using physical means, such as traps. Small infestations of mice are particularly amenable to this approach. However, sometimes rodent infestations become established that require the application of rodenticides. The choice of rodenticide to use should be made after consideration of the 'risk hierarchy' described above (section 3), having completed a thorough inspection of the site to be treated and after the performance of any necessary risk assessments.

The sections that follow in this document describe best practice in the application of rodenticides for the control of infestations of rats and mice.

5.2 Details of the site

In commercial premises, public buildings or on agricultural land, it is important to establish who to report to on site and if there are parts of the site where pest control technicians may have restricted/no access.

If the site has been treated before, it is good practice to review the previous strategies, advice and potential problems associated with the site before visiting. It is important to involve any persons responsible for the site when considering the range of rodent control measures you intend to adopt. If previous advice has not been followed, then this will need to be revisited, underlining the importance of environmental management in the successful control of rodent populations. It is unacceptable to treat sites repeatedly with rodenticides when the rodent problem could have been solved by proper maintenance of buildings and carrying out a thorough programme of hygiene and removal of food and harbourage.

Where applicable, it is also important to explain to those who have responsibility for the site that you will need regular access to the site during any treatment phase and at the end to remove bait that has not been eaten. Convenient times for revisits should be agreed.

5.3 Areas 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.

“Indoors” is defined as:

Situations where the bait is placed within a building or other enclosed structure and where the target is living or feeding predominantly within that building or structure; and behind closed doors. If rodents living outside a building can move freely to where the bait is laid within the building, then products restricted to use indoors should NOT be used. Open barns or buildings and tamper-resistant bait stations placed in open areas are not classified as indoors. However, sewers or closed drains are considered to be ‘indoors situations’.

(Source: HSE (2012). Environmental risk mitigation measures for second-generation anticoagulant rodenticides proposed by the UK. Health and Safety Executive. Available at URL: <http://www.hse.gov.uk/biocides/downloads/ermm-sgar.pdf>. 30 pp.)

“In and around buildings” is a new term on UK rodenticide labels and defined as:

‘In and around buildings’ shall be understood 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 system or ships but not in waste dumps or open areas such as farmlands, parks or golf courses.

(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.)

“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 (i.e. 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.

“Outdoors” was used in the UK as a regulatory term for places where baits could be applied that were not restricted to “indoors” (see above definition) but is no longer used on rodenticide labels. Continued use may cause confusion, especially if it is employed in association with the term ‘in and around buildings’, from which it differs significantly.

5.4 Site Survey

You should carry out a site survey to establish the type, level and extent of the infestation. The survey will help you to identify important factors (e.g. the degree of public access to the site; the presence of children and non-target animals, such as pets, farm livestock and wildlife) that will influence your choice of control strategies for that site. Evidence of poor housekeeping and hygiene, alternative sources of food and water, and obvious building/drain defects should be noted on the site plan. It may be useful to obtain photographic evidence of poor environmental management practices.

During the survey, try to establish the rodents’ food and water sources. This will be particularly important if you intend to use rodenticide baits as a part of the treatment strategy. Reducing the availability of alternative food and water at the start of the treatment, or shortly afterwards, can encourage rodents to feed on your bait. Where there are rats present you should note obvious defects such as broken pipes, defective sewer chamber covers, bad brickwork, half channels inside brickwork, stoppers missing from the rodding eye or surface water gullies and bring them to the attention of the responsible person, where applicable.

Where there is an obvious risk that may allow rat invasion from neighbouring properties, it is good practice to tell the responsible person of the risk that this may pose and where appropriate report it to the local authority, who may be able to take appropriate action.

5.5 Risk Assessments

5.5.1 General

The information gathered during the survey should enable you to identify hazards on the site and determine the risks posed to:

- human health (e.g. through accidentally eating bait, particularly by children);
- non-target animals present such as pets, farm livestock and wildlife (e.g. through eating bait and/or poisoned rodents and/or other wildlife, such as field mice and voles);
- the environment through contamination of soil and water courses.

Consideration of these risks will determine which methods are most appropriate for dealing with the rodent infestation. After considering control measures, such as proofing, improvements in hygiene environmental management and non-chemical approaches to control (e.g. traps), you may conclude that you still need to use a rodenticide. Before carrying out any treatment involving rodenticide you should conduct appropriate risk assessments.

The environments in which rodent pest control procedures are to be carried out, for example on farms, in factories and in other commercial premises, may be intrinsically hazardous and it may be necessary to conduct a general assessment of risk in the workplace (see Further Reading).

5.5.2 COSHH assessment

Control of Substances Hazardous to Health Regulations 2002 (the COSHH assessment) and the Management of Health and Safety at Work Regulations 1999 require assessments are carried out to identify any risks to operators and others who may be affected by treatments involving hazardous substances. There is a

requirement to record the findings of the assessment unless they are so simple that they can be easily recalled and the conclusions explained at any time. However, small companies with fewer than five employees are not required to keep a written record, although it is good practice to do so.

The COSHH assessment will help ensure that any rodenticide product you select, and its method of application, will result in effective pest control with least risk to yourself and anyone else who may come into contact with the rodenticide (see Further Reading).

5.5.3 Environmental risk assessment

It is good practice to conduct an environmental risk assessment when a risk to the environment has been identified during the site survey. This assessment will consider the following:

- what is the treatment designed to achieve, what methods of rodent control may be used and how will success be measured,
- which protected species may be present in or near the treatment site,
- what risks to non-target species have been identified,
- summarise the steps taken to prevent, or adequately control, exposure of wildlife and the environment,
- what are the facilities for the safe disposal of dead rodents and rodenticides,
- what is expected from the persons responsible for the infested site,
- what follow up measures are required,
- 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. (See Further Reading).

5.6 Active ingredients

Active ingredients used in baits are divided into three main groups, reflecting the way they work. Acute rodenticides act rapidly (within 24 hours), but may induce bait shyness if a sub-lethal dose is taken. Sub-acute rodenticides may not cause death for several days, even though a lethal dose may be consumed during the first 24 hours and feeding may continue during this period. Chronic rodenticides are slow-acting and the anticoagulants belong to this group. They cause death in a minimum of 2-3 days, but on average it takes 5-7 days.

Anticoagulants can be sub-divided into first- and second-generation anticoagulants (respectively FGARs and SGARs), based on their potency, or into multi-feed and single-feed anticoagulants, depending on the number of feeds required for a lethal dose. All anticoagulants have the advantage that a specific antidote (vitamin K₁) is available in the case of accidental ingestion. The first-generation anticoagulants have the advantage that they are less acutely toxic to non-target animals and are less persistent in the environment. However, they are not recommended for use against house mice because of the prevalence of anticoagulant resistance in that species. The second-generation anticoagulants have the advantage that they require less bait to be eaten for the ingestion of a lethal dose and because resistance to them is less prevalent. However, they are more highly toxic to non-target animals and are more persistent in the environment.

Your choice of active ingredient 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 'hierarchy of risk' described above. Another important consideration in the selection of active ingredient is the presence or absence of anticoagulant resistance. It exacerbates resistance problems and is an unnecessary risk to non-targets to use any active ingredient against rodents that are resistant to it.

5.7 Bait formulations

The bait formulation should be appropriate to the conditions and circumstances of the infestation. A wide range of ready-to-use products is 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). A wide range of products is available for you to choose from including:

- meals,
- cut or whole grain;
- pellets;
- wax blocks;
- edible lards/gels/pastes;
- contact gels and foam;
- gases.



Once again, your choice of bait formulation will be determined by the characteristics of the site, previous treatment history (if available), the conditions of the product labels, the outcomes of the COSHH and environmental assessment. Generally, particulate baits may be more palatable to rodents than wax blocks but blocks may be better in adverse environmental conditions, such as sewers. When baiting burrows, treated grain is less likely to be kicked out of burrows by rats than wax blocks.

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.

You must check the authorisation conditions granted for each product you intend to use.

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;
- 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 relevant codes of best practice such as this.

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

5.8 Toxic gases

Several rodenticide products are authorised for use which are applied to rodent burrows where they evolve a toxic gas (phosphine) to exert a fumigant effect. Because of the obvious hazards of such products to human health, certain regulations apply to where they can be used, who can use them and how they should be applied. A COSHH assessment is always required when they are used and an environmental assessment is recommended. Only those with the necessary proof of professional competence for their use can purchase and use these formulations. The risks to non-target animals is small so long as every effort is made to ensure that only target rodents inhabit treated burrows. They are not known to leave long-lived toxic residues in the environment or to have any secondary toxic effects. Whilst gassing is unlikely to provide the complete solution to any rat infestation, it can be a valuable method of reducing the size of a rat population quickly, and following which rodenticide baits can be used more effectively to control the remaining population. More information on the safe use of products that evolve phosphine gas and on training courses for their safe and effect use is available (see Further Reading).

6

GUIDANCE FOR TREATMENTS

6.1 Use a variety of control methods

It is important that you do not rely solely on the use of rodenticides to control rodents. Programmes that integrate a range of methods, including physical and/or biological control, will be more successful in the long term than those that rely solely on chemical means. While trapping is labour intensive, it can prove useful in controlling small infestations and may provide an alternative means of control where the use of rodenticides is unacceptable. Break-back traps for use against mice and rats are available. If you intend to use live-traps, they should be inspected regularly, at least once a day, and any captured animals humanely despatched. Further advice about the use of kill and live-capture traps is available from the National Pest Advisory Panel (NPAP) (see Further Reading).

Although the use of rodent glue boards is still permitted, this method does raise concerns about humaneness. You should consider all other options before adopting this method of control and clearly justify its use for each treatment. When using rodent glue boards, the frequency of inspection and dispatch of captured animals follows that recommended in the Pest Management Alliance code of practice for the use of glue boards (see Further Reading).

6.2 Rodent behaviour

Rats are particularly shy animals and nervous of strange objects that appear in their territories. It may be better to protect and secure bait points using existing materials, rather than introduce bait containers. During the survey, note any general features (such as gaps under paving flags) that you could use to place bait safely. This may eliminate the need for bait boxes and be more effective in bringing the rodents into contact with the bait. It may also reduce the total length of time bait needs to be laid and therefore reduce the likelihood of non-target animals coming across it.

House mice are generally more inquisitive, and so are less likely to avoid new objects in their environment. As a general rule, mouse control is more likely to be successful if small amounts of bait are placed at a large number of locations.

These general descriptions of rat and mouse behaviour hold true in the majority of situations. However, eccentric behaviours by rodents are increasingly reported including the refusal of rats to take baits in the presence of established, long-term sources of alternative foods and mice which refuse to approach any apparatus of rodent control including bait boxes, traps and sticky boards.

Remember that rats may carry bait away and hoard it, or drop it in areas where children or non-target animals can come into contact with it. If more bait is being consumed than expected for the size of the infestation, consider whether hoarding may be a problem. If you think it is, search for any caches of bait and dispose of it safely. You should secure any place pack/sachets or blocks at the placement site or reconsider the bait formulation being used. It will be more difficult for rats to hoard large quantities of loose grain bait and the quantity of rodenticide in single pellets or grains will be substantially less than in intact packs/sachets or blocks, reducing the potential risk to non-targets if bait is dropped by rodents.

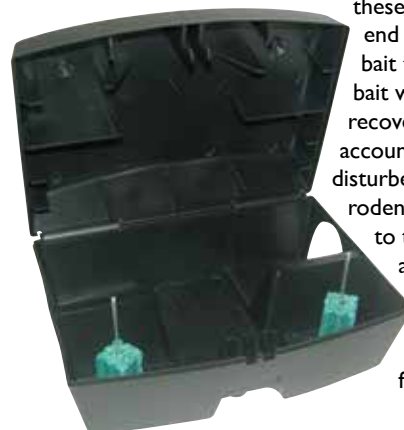
Remember that rats may carry bait away and hoard it, or drop it in areas where children or non-target animals can come into contact with it.

6.3 Placing the bait

Outside buildings you may find rats in burrows, piles of rubbish, vegetation or other materials, sheds and garages or other buildings, compost heap/bins, drains, ditches and hedgerows.

In all these places you must make sure bait is adequately protected from children and, as far as possible, non-target animals. If you place bait in rat burrows treated grain is less likely to be re-exposed by rats than are wax blocks. Either cover the entrances of baited burrows to reduce the risks of bait being ejected and spilled or lightly block the burrow with a twist of straw or grass. Sites where burrow baiting is used should be visited more frequently than those where secure bait boxes are employed because of the greater likelihood of bait coming out of the burrows and being taken by non-target animals.

Baits applied inside should not be placed directly on the floor as 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 facilitate recovery. You also need to take account of the risks from bait being disturbed as a result of activities of rodents or other animals or changes to the site as a result of human activities. You should consider the size and the likely reactions of the rodent population (i.e. identify areas where rats may feel uncomfortable).



If you cannot find suitable cover to protect baits, you will have to use other measures unless (for indoor baiting) you can control or restrict access to the areas where bait is laid. You can make your own boxes for this, as long as they are fit for this purpose, or you can buy commercially available tamper-resistant bait stations. Where your COSHH assessment identifies it as necessary, you should ensure bait stations are secured in position (e.g. when the bait is of a type that could be shaken out), and that you have followed the instructions to prevent the container being opened.

An important point to note is that covering baits and tamper-resistant bait stations only protect baits from non-target animals that are larger than the target rodents. It is increasingly recognised that residues of anticoagulants found in wildlife are derived from baits accidentally taken by non-target small rodents, such as field mice and voles. Baiting should be avoided where an environmental risk assessment indicates that feeding on baits by non-target small mammals is likely. Mouse droppings found in bait stations outside buildings will almost certainly be from these animals and are indicative of wildlife exposure to the rodenticide in use.

Rodenticides may cause rodents to die in inaccessible areas, where it will be difficult to retrieve the dead bodies. This could cause problems with odours and in such locations it may be appropriate to consider alternative control methods, such as the use of traps, to help retrieve the dead bodies.

6.4 Records

Make a written record of where you have placed the bait, which rodenticide was used and how much bait has been laid. For complex and/or large sites ask the client for a site map or if not available make one yourself. Record the positions where bait has been laid.

Inform employees and others with regular access to the site that a rodenticide treatment is in place and of the products involved and any precautionary actions they should take. Where applicable, make those with responsibility for the site aware of the risks involved and the action they should take in an emergency. Leave with them a copy of your written record, including the site map showing the locations of baiting points. If possible, obtain their signature to confirm that they have received and understood the details of the work that has been carried out.

There may be instances where the treatment is carried out at a site where English is not the first language of many of those who work there. So, it may be difficult to ensure that the details of the treatment have been understood. Take reasonable steps to make sure that the hazards and risks associated with the treatment have been understood.

Photographs may be useful records of many aspects of rodent management programmes.

6.5 Monitoring

If you have decided that the application of a rodenticide is needed and the treatment phase is underway, it is important to monitor it regularly to track its progress. During revisits you should:

- 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, and
- observe progress of the treatment.

Effective monitoring needs a reliable recording system which will enable you to identify problems 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.

6.6 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. Determine how frequently you need to inspect baits from the label instructions and the characteristics of the infestation. As a general guide, baits should be inspected and replenished (if necessary) no later than seven days after they were first laid and at least fortnightly thereafter. More frequent visits will be required at sites with larger infestations, where burrow baiting has been used and where there are specific risks of bait disturbance and exposure to humans and non-target animals.

It is important to record the amount of bait put down, so you can decide whether larger amounts are needed. Continue baiting as instructed on the product label until all feeding activity has stopped, as overcoming the neophobic response in rats may take some time. However, if there is little evidence of bait takes after two weeks, it is unlikely that the treatment will prove to be effective and you should remove the bait and consider an alternative strategy. Some populations of rats and mice are known to exhibit behavioural aversion to the apparatus used in rodent control, including rodenticide baits, bait boxes and traps. Conversely, if substantial bait takes continue over a long period, consideration should be given to the consumption of bait by non-target animals, immigration of rodents onto the site from neighbouring infested sites and, if neither of these is occurring, the presence of anticoagulant resistance must be suspected.

Some populations of rats and mice are known to exhibit behavioural aversion to the apparatus used in rodent control

6.7 Using non-anticoagulant rodenticides

While anticoagulants provide an effective and efficient method of removing rodents, if they are not available, if they cannot be used because of risks you have identified at the site or if resistance to them has been confirmed, you may need to consider the alternatives. For example, in the case of house mice, alphachloralose is authorised for use indoors.

6.8 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 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 contact the Environment Agency in England and Wales, the Northern Ireland Environment Agency and, in Scotland, the Scottish Environment Protection Agency (see Further Reading).

6.9 Reinvasion

The risks of reinvasion from neighbouring sites must be considered, especially in urban areas where general environmental management may be poor. It is good practice to liaise with other rodent control practitioners, local authorities, regulatory agencies and the general public to coordinate control strategies and reduce risk of reinvasion. Where members of the public wish to feed wild birds, they should be encouraged to use RSPB-approved bird feeders and made aware that throwing bread and other food on the ground may, in addition to feeding the wild bird population, provide a food source for rats in the area. General advice on the storage of refuse and the use of rodent-proof bins should be provided where appropriate.

On farms, the risk of reinvasion may come from rats that are resident in neighbouring hedgerows, banks and ditches. Watercourses and hedgerows often provide a means of concealed movement of rats between sites. It is essential during the initial site survey to discover the full extent of the infestation and any sources of reinvasion and to take appropriate action.

6.10 Long-term baiting

Long-term baiting in and around buildings may be necessary at sites where there is a constant source of reinvading rats that cannot be dealt with at source. However, long-term perimeter baiting should never be used as a routine rodent control measure. Long-term baiting of strategic points in and around a building may be justified when dealing with sites that are at high risk of re-infestation or the health risk associated with a particular site is considered high, such as a food manufacturing facility or hospital. Bait stations positioned outdoors may be visited by non-target small mammals, such as field mice and voles, and present a significant risk of exposure for a wide variety of non-target wildlife that takes these animals as a food source. Remove rodenticide baits from outdoor bait points that show significant feeding by small mammals. This is recognisable by the size and colour of droppings found in bait stations.

Consider any long-term baiting programme carefully and be justified in your risk assessments for each location where this strategy is used. The preferred approach is to use either traps or non-toxic baits as a guide to the presence of an infestation of pest rodents that may then trigger the use of a rodenticide. Check baits regularly to establish whether rodents are present. It is not best practice to visit long-term bait points less frequently than recommended on product labels.

Bait stations should be established on likely runs by vulnerable buildings and premises. Where possible, these should be camouflaged. As well as being secure the bait should be protected from the effects of moisture. Baits based on whole grain and wax blocks are usually the most suitable for this purpose. Wax blocks and sachets should, where necessary, be secured inside bait stations. Bait stations containing loose bait should be secured to the substrate to prevent the bait being shaken out.

6.11 Retrieval of bait

After you have finished the treatment, you must make every effort to ensure all traces of the bait have been removed from the site and disposed of according to the label instructions. You cannot rely on others to carry out these tasks. If you are denied access to properties to do this, it is best practice to record when you attempted to retrieve the bait and to explain to the client in writing that the responsibility for disposal has now been transferred to them. You may wish to leave details of the requirements for disposal of the rodenticide(s) that have been used. If a previous practitioner has not removed the bait they laid, you should give them the opportunity to do so. If they do not do this in the time frame specified, they will have no further claim on it, but you will have a duty of care to dispose of this rodenticide safely. Rodenticide that you have retrieved from a treatment you have undertaken may be reused if it is clean that it has not been contaminated or marked by rodents, providing it can be stored in line with the approval conditions of the product.



6.12 Storage of bait

Keep all rodenticides secure in a suitable store, preferably away from other pesticides which may taint the bait and make it unpalatable. You should keep bait in its original packaging, except when put into a new container for use, when a current copy of the product label should be attached. It is illegal to offer such relabelled bait for sale, or supply it to others. Equipment used during treatments should be cleaned after use.

6.13 Operations after removal of rodent infestations

Once adequate control has been achieved the following environmental management measures should be considered and implemented as appropriate:

- improving hygiene and clearing away rubbish,
- reducing harbourage,
- preventing the access of rodents to food sources,
- proofing buildings.

Areas that are prone to infestation and reinfestation should be monitored regularly to prevent chronic infestations becoming established. Where you suspect fly-tipping or accumulations of rubbish may be contributing to the persistence of an infestation, the local authority environmental health department may be able to help remove such accumulations.

6.14 Rodent-borne diseases

Rodents carry diseases that may be serious or even life-threatening to people and animals. These may be caught by contact with surfaces or water contaminated with rodent urine. You should wear waterproof gloves when working in areas that may be infested. Cover cuts and abrasions on exposed parts of the body with waterproof dressings. Some rodent pathogens can also be inhaled as fine particles derived from dry rodent excrement. Use an appropriate device for respiratory protection when working in dry and dusty environments that contain rodent debris.

Remove overalls and gloves and wash exposed skin thoroughly before eating, drinking or smoking and after completing work. If you cut yourself, clean and dress the wound immediately. If you regularly work in rodent-infested areas, your employer should provide you with the HSE pocket card, *Leptospirosis: are you at Risk?* Alternatively, you may obtain it on-line (<http://www.hse.gov.uk/pubns/indg84.pdf>).

Rodents carry diseases that may be serious or even life-threatening to people and animals.

7 RESISTANCE

Treatment failures may be due to inappropriate, poor quality/old bait, inadequate quantities of bait, poor bait placement, bait shyness and reinvasion from surrounding areas. But, if these factors have been ruled out and the bait is being eaten without any significant decline in the rate of consumption, it may be a sign of the presence of anticoagulant resistance. Resistance to anticoagulants has been confirmed in many rat populations in England, Scotland and Wales. There is confirmed resistance in Norway rats to the available first-generation anticoagulants warfarin, chlorophacinone and coumatetralyl and, in some areas, to the second-generation anticoagulants bromadiolone and difenacoum.

Anticoagulant resistance in mouse populations is so widespread, that no first-generation anticoagulant baits are approved for use against them. Resistance has been found in some mouse strains to the second-generation anticoagulants bromadiolone and difenacoum.

If you have ruled out all other possible explanations for the persistence of rodent populations and suspect you may be dealing with a resistant population, you should inform RRAG (the Rodenticide Resistance Action Group: RRAG, c/o BPCA Offices, 4A Mallard Way, Pride Park, Derby DE24 8GX. Website: http://www.bpca.org.uk/pages/index.cfm?page_id=53&title=rrag). This

information could identify areas of anticoagulant resistance and will complement the information that already exists about the distribution of resistant rats and mice in the UK. RRAG also provides advice about dealing with resistant infestations of rats and mice.

Behavioural resistance in mice and rats has also been reported and if you suspect that you are dealing with such a population, you will need to consider alternative treatment regime/control methods (e.g. placing bait directly on the floor rather than in bait boxes if it is safe to do so), alternative formulations (e.g. contact gels and foam) or alternative bait bases (e.g. baits based on ingredients that are similar to those the rodents are eating at the site).

8 SPECIFIC CONSIDERATIONS FOR SITES

8. Specific considerations for different sites of rodent infestation

8.1 General

Each rodent-infested site presents a different set of circumstances for professionals who are required to apply control measures. Some sites, such as those in urban areas with little or no public access, will present few non-target risks. Sites with mouse infestations which are restricted to indoor locations will carry little risk of non-target exposure to wildlife but there may be risks to human bystanders and to companion animals. At more rural sites, which are accessible to wildlife, there may be significant risk of non-target exposure. As a rule of thumb, the further the site is from areas of human occupation and/or habitation the more likely there is to be a risk of wildlife exposure, either directly from consuming baits or indirectly from consuming poisoned target rodents and non-target small mammals, such as field mice and voles.

8.2 Domestic premises

Dealing with rodent infestations in and around domestic premises poses particular problems with placement and protection of bait. It is important to explain to the householder the risk associated with the use of rodenticides. Once baits have been laid, make sure the householder knows their location and is aware that they must not be moved or disturbed. Children and non-target animals, such as pets, may not be present at the time of your survey and/or treatment, but may be there at other times. If this is the case, it is important to place baits in such a way to prevent contact. If adults with learning difficulties are present, you must ensure that a responsible person has been informed of the treatment regime and the risks associated with the use of rodenticides. It is good practice to leave details about the products you have used, the appearance of the bait, the number and position of baits laid and the actions needed if bait is disturbed or consumed accidentally, and obtain where practicable the occupier's signature confirming full understanding of the treatment programme and the inherent risks to non-targets.

Unprotected stores of pet food may attract rodents and householders with pets should be advised to store such food in sealed containers. Poorly constructed compost heaps and compost bins placed directly onto soil may provide harbourage for rats and should be inspected during your survey. To

discourage such infestations, give householders advice on their construction (placing them on hard flat surfaces such as concrete or stone paving flags) and measures to exclude rats (e.g. by surrounding the base with fine chicken netting). General advice on the importance of sound structural maintenance of the property (e.g. sealing gaps under doors and around service pipes) should be given where appropriate.

The practice of feeding garden birds is common in domestic premises and food left available on bird tables and in bird feeders is highly attractive to rats. If rats become established around bird feeders the food should be removed to prevent access to it. Bird food should be stored safely in the same way as pet foods.

8.3 Block treatments

Effective control of rodents in the urban environment may be difficult in premises with multiple uses and/or occupiers. There may be several agencies involved in controlling rodents. Where possible it is good practice to co-ordinate control measures to make sure all premises on that site are inspected and, where necessary, treated. This will reduce the chances of rodents surviving the treatment by avoiding control measures and reinvading the areas you have treated.



8.4 Commercial (non-food) premises

The risk of infestation within commercial, non-food premises will be influenced by the work that takes place in them. A thorough survey should establish the areas that may be prone to infestation. Where catering facilities and food waste are on site these may be important areas to examine in detail.

8.5 Commercial (food) premises

Under food safety legislation, owners of food premises must periodically visually check for signs of pests and have a pest control reporting system in place. This should provide you with information on any recent sightings and may provide details of previous treatments. Where you are concerned about general standards of hygiene, you may wish to discuss this with the local authority environmental health department's food safety enforcement staff.

8.6 Large institutions (e.g. hospitals, prisons, schools etc.)

Large institutions may have several locations that are prone to infestation. The presence of vulnerable individuals and restricted or limited access to particular areas will need to be considered when deciding your control strategy. On-site kitchens may be an

important focus of rodent activity. If waste disposal systems for food discharge directly into the drainage/sewer system, this could act as a rich source of food for rodents. So it is essential that you do a thorough survey and the methods and routes for disposal of food waste are established. Rodents may also invade other parts of the building when food is transported from the kitchen to where it is eaten. Service ducts may provide a route for the rapid spread of rodents through the complex and should be examined for evidence of rodent activity. If the ducting is classified as an enclosed space, then those undertaking inspections and treatments must be adequately trained to work in confined spaces.

Access restrictions to particular areas of the site may mean that it is not feasible to place traps and rodenticide baits in all parts. Integrating a range of control methods, combined with close monitoring of the progress of the control programme, is essential.

8.7 Parks, gardens and other open areas

Dealing with rodent problems in open situations, both in rural and urban areas, creates particular problems regarding the protection of bait points, particularly where rats may be associated with lakes and ponds. Place baits directly into active burrows, especially in areas where the public has restricted access, such as islands on a lake. Loose grain and pelleted formulations may be suitable for such purposes. Cover all treated holes, and regularly monitor for evidence of bait consumption, spillage or disturbance. Record the position of all baits laid on a sketch plan, or via Geographical Positioning System (GPS) coordinates (mobile working), as appropriate. Where bait is placed in areas of public access it is now a regulatory requirement that areas treated must be marked during the treatment period and a notice explaining the risk of primary and secondary poisoning must be made available alongside the baits.

Other open areas with public access where similar considerations would apply are railways (embankments, cuttings etc.), canals and the banks of natural water courses, reservoirs, footpaths, bridleways, cycle paths, allotments and airports/air-fields.



8.8 Sewers

Sewers of all kinds provide an ideal environment for rats, especially if the structure is in poor repair. A protocol agreed between the Local Government Association and Water UK, in liaison with water authorities and water companies in England and Wales was issued in November 2000, and subsequently revised and updated in 2012, to ensure better coordination of rodent control in public sewers.

The treatment of rodent infestations of sewers inevitably involves the application of rodenticide. This is a specialist operation and is usually conducted by teams that are specially trained and equipped for such work. A guidance document on the treatment of rat infestations in sewers is available from the website of the National Pest Advisory Panel of the Chartered Institute of Environmental Health (see Further Reading).

8.9 Farm buildings

The average farm has a range of buildings, including grain storage facilities and animal-rearing accommodation. You may find infestations in all these places as well as outdoor locations in the immediate vicinity. It is also likely that livestock, domestic animals, including cats and dogs, along with wildlife such as birds and mammals, will be using or visiting various parts of the holding. Children may also be present.



Your site survey should have identified where the rats are living, travelling and feeding and the scope for the removal of food and harbourage to reduce the rodent carrying capacity of the site. The COSHH assessment should have helped you to decide on the most suitable methods of controlling rodents including, if rodenticides are to be used, the rodenticide active ingredient and formulation, and the best method of presenting the bait to achieve rodent control with the least risk to children and animals.

8.10 Livestock Units

Do not place baits where animals are likely to be able to gain direct access. Avoid baiting in areas which could result in rodenticides falling into yards, pens or cages. Where pigs are present, it is particularly important that you make regular checks, because they will eat rodent carcasses and are particularly sensitive to warfarin.

8.11 Straw stacks and other stored commodities

Stored feeding stuff and bedding, such as stacks of bales outdoors or in Dutch barns, are particularly attractive to rodents, especially during winter. The incorporation of rodenticides as 'place packs' during the construction of stacks of hay and straw bales presents unacceptable risk to non-target animals and livestock because the packs cannot be reliably recovered.

If a significant rat infestation occurs, and bait is used either within or around the stack, take account of the possibility that baits may become exposed or disturbed as the stored material is used and that children or non-target animals may have unrestricted access

to the site. In such circumstances, bait placed in plastic bags or applied loose may be particularly hazardous to wildlife and other animals, and may also contaminate the stored product. You need to tell anyone likely to dismantle stacks how important it is to ensure that bait remains protected.

Use suitable bait containers such as tamper-resistant bait boxes. Lengths of drainpipe may also be used for protecting baits, but do not use pipes of excessively large diameter and ensure they are long enough to stop long-necked birds reaching the bait. Consider using pipes with baffles or restricted entrance sizes to reduce the risk of spillage of bait. These points may be in position for several months, so consider the placement position carefully.

Take particular care where a public footpath runs close to the treatment areas or other general access is foreseeable. In such circumstances it is necessary to put up warning notices.

Monitor such treatments frequently and check for evidence of displaced bait points, spillage or interference. As the straw or other material is used up, remove bait stations that have become exposed. Dispose of uneaten bait and any dead rodents you may find by following the label advice, or using the services of a specialist waste contractor.

8.12 Ditches, hedgerows and woodland

Significant rat infestations in open countryside only occur in places where food availability is high. It is always necessary, in terms of the 'risk hierarchy', to remove sources of food for rodents rather than to apply rodenticides (see section 5.2).

If baiting is required, dealing with rodent problems in open rural situations creates additional problems regarding the protection of bait points, particularly where rats are living in burrows excavated in soil.

Place baits directly into active burrows or use suitable boxes or containers. Loose grain, pelleted or sachet/pack formulations may be suitable for such purposes. Cover all treated holes, and regularly monitor for evidence of bait spillage or disturbance.

Baits placed in open areas far from human habitation are the most likely to be encountered by wildlife because of its greater abundance in these remote areas. Special care is required in the use of rodenticides, especially the second-generation anticoagulants, in these situations. Where mouse droppings are found in bait containers in open areas they are likely to be from non-target small mammals, such as field mice and voles. The contamination of these animals by rodenticides is an important source of wildlife exposure.

8.13 Railways (embankments, cuttings etc.), canals and natural water courses, reservoirs

The open areas addressed in the previous section present a number of challenges, as they are open to the public, domestic and wild non-target species, so appropriate risk mitigation measures should always be undertaken and rodenticides applied according to label requirements, environmental risk assessments and the general principles of best practice.

Railway embankments are well known as sites of rat harbourage and infestation. Rats damage cables in these areas, leading to signalling and power failures in the railway industry and causing significant economic damage and risk to human safety. A considerable amount of litter and undergrowth can be found along railways, which is an attraction for rats. Rabbits are an example of a typical non-target species (in terms of rodenticide use) that

are found along railway embankments and care should be taken to identify rabbit burrows (as well as the burrows of other non-target species) versus rat burrows before applying rodenticide.

Natural water courses provide a habitat for water voles, which are protected under the Wildlife and Countryside Act 1981. The Wildlife Trusts give pest control operators guidance on rodent control in areas of water vole activity (see Further Reading).

8.14 Footpaths, bridleways, cycle paths

These areas are open to the public, domestic animals and non-target wildlife. The general principles of control in this document are also relevant here. Litter left by the public can be an attraction to rodents in these areas.

8.15 Allotments

Compost bins used on allotments in open areas attract rats, providing a food source and harbourage. Correct use and maintenance of compost bins should be advised, in accordance with the CIEH guidance on composting (see Further Reading). Following this guidance can help to limit rat activity and therefore reduce rodenticide use at allotments, leading to a reduction in the risks posed to non-target species. Foodstuffs grown on allotments also attract rodents, along with chicken feed and other domestic animal feed frequently found on such sites.

8.16 Airports

A number of features of airports provide harbourage for rats and be conducive to rat activity in the open areas of such sites. For example, areas of long grass cultivated at airports to reduce habitats for flocking birds, and therefore to reduce bird-strikes of aircraft, may provide rat harbourage. Natural predation of rats is also limited at airports due to the discouragement of raptors by various means and exclusion of other carnivores by fencing. Although non-target species are discouraged at airports, they may still be present, as can airport workers, so the presence of these non-targets should be considered when compiling a control strategy.

Areas around airport perimeter fences are subject to fly-tipping, thus providing harbourage and food sources for rats. Perimeters should be inspected for rodent activity.

Regarding control of rats at the open area sites relevant to public health that are described in 8.8 to 8.16, the principles of control given in section 8.7 (Parks and Gardens) are particularly relevant and should be adhered to, as well as the principles described throughout this document.

9

FURTHER ADVICE

You can get further advice on dealing with rodent infestations from rodenticide manufacturers and distributors and also from:

- **British Pest Control Association (BPCA)**
(Tel: 01 332 294288 website: <http://www.bpca.org.uk>)
- **National Pest Technicians Association (NPTA)**
(Tel: 01773 717 716 website: <http://www.npta.org.uk/>)
- **Chartered Institute of Environmental Health (CIEH)**
(Tel: 020 7928 6006 website: <http://www.cieh.org/>)
- **Environment Agency (EA)**
(Tel: 03708 506 506 website: <https://www.gov.uk/government/organisations/environment-agency>)
- **Natural England (NE)**
(Tel: 0845 600 3078 website: http://www.naturalengland.org.uk/about_us/contact_us/default.aspx)
- **Department for Environment, Food and Rural Affairs (Defra)**
(Tel: 03459 33 55 77 website: <https://www.gov.uk/government/organisations/department-for-environment-food-rural-affairs>).

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

(Infoline: 0300 003 1747 website: <http://www.hse.gov.uk/index.htm>).

For guidance on environmental risk assessment, go to:

<http://www.thinkwildlife.org/?wpdmact=process&did=OC5ob3RsaW5r>

10

FURTHER READING

Rodents and disease:

Zoonoses that can be acquired from rats: England and Wales. Public Health England.
URL: <http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/Zoonoses/GeneralInformation/zoo010ZoonosesFromRats/>.

Wildlife management policy:

Wildlife management in England. A policy making framework for resolving human-wildlife conflicts. February 2010. Department for Environment, Food and Rural Affairs, Nobel House, London, UK. 40 pp.
URL: <http://archive.defra.gov.uk/wildlife-pets/wildlife/management/documents/policy-making-framework.pdf>.

Environmental management – guidance. Bats: protection, surveys and licences. Her Majesty's Government.
URL: <https://www.gov.uk/bats-protection-surveys-and-licences>

10 FURTHER READING CONTINUED

Other general best practice guidance:

The control of rats with rodenticides: a complete guide to best practice. Natural England, UK. 67 pp.

URL: http://www.naturalengland.org.uk/Images/ratcontrolguidelines_tcm6-11216.pdf.

Pest Control Procedures Manual. Chartered Institute of Environmental Health, Hatfields, London. 32pp.

URL: http://www.cieh.org/policy/pest_control_rats.html.

Guideline on Best Practice in the Use of Rodenticide Baits as Biocides in the European Union. The European Chemical Industry Council, European Biocidal Products Forum, Rodenticides Working Group. Brussels, Belgium. 23 pp.

URL: <http://www.cefic.org/About-us/How-Cefic-is-organised/Fine-Speciality-and-Consumer-Chemicals/European-Biocidal-Products-Forum-EBPF>.

Campaign for Responsible Rodenticide Use.

URL: <http://www.thinkwildlife.org/>.

BRC Global Standard for Food Safety: Issue 6. The British Retail Consortium. The Stationery Office. ISBN 978011706971.

The British Pest Management Manual. Royal Society for Public Health. ISBN 978-0-9563690-2-2.

Available at: http://www.bpca.org.uk/pages/index.cfm?page_id=81.

Best practice for specific sectors:

Pest control procedures in the food industry. Chartered Institute of Environmental Health, Hatfields, London, October 2009. 52 pp.

URL: http://www.cieh.org/uploadedFiles/Core/Policy/Publications_and_information_services/Policy_publications/Publications/Pest_control_food_industry.pdf.

Rats: Control on livestock Units. Natural England Technical Information Note TIN058. 6pp.

URL: <http://publications.naturalengland.org.uk/publication/34014?category=30010>.

Code of Practice for the Control of Rats on Poultry Farms. Department for Environment, Food and Rural Affairs, Nobel House, London, UK.

URL: <http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/zoonoses/documents/reports/salrodent.pdf>.

Rat Control and Game Management. Campaign for Responsible Rodenticide Use. 16 pp.

URL: <http://www.thinkwildlife.org/crru-guideline-on-responsible-rat-control-by-gamekeepers>.

National Sewer Baiting Protocol Best Practice and Guidance Document. Chartered Institute of Environmental Health, Hatfields, London.

<http://www.cieh.org/WorkArea/showcontent.aspx?id=46452>. 22 pp.

Know your vole. Learn to tell the difference between water voles and rats. The Wildlife Trusts. 1 p.

URL: <http://www.wildlifetrusts.org/knowyourvole>.

Risk Assessments

Risk assessment. A brief guide to controlling risks in the workplace. Health and Safety Executive 08/14 INDG163(rev4). 5 pp.

URL: <http://www.hse.gov.uk/pubns/indg163.pdf>.

Working with substances hazardous to health: A brief guide to COSHH. Health and Safety Executive INDG136(rev5) 10/12. 10 pp.

URL: <http://www.onlinehealthandsafety.co.uk/info/free-documents.asp>.

Environmental assessment when using anticoagulant rodenticides in the United Kingdom. Campaign for Responsible Use UK. 6 pp.

URL: <http://www.thinkwildlife.org/>.

Disposal of Rodent Bodies

Regulatory Position Statement – Burial of rodent poisoned on farmland. Environment Agency. March 2011. 2 pp.

URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297849/RPS_014_Burial_of_rodents.pdf.

SEPA Position Statement - Burial of small quantities of rodent carcasses poisoned on farmland. National Waste Policy Unit.

Scottish Environment Protection Agency. March 2009. 2 pp.

URL: http://www.sepa.org.uk/system_pages/search.aspx?q=disposal%20of%20rodent%20bodies.

Traps and sticky (glue boards)

Code of Practice for Use of Vertebrate Traps. Chartered Institute of Environmental Health, Hatfields, London. 20 pp. In press.

Code of Best Practice Humane Use of Rodent Glue Boards. Pest Management Alliance.

URL: http://www.cieh.org/uploadedFiles/Core/Policy/Environmental_protection/Pest_management/NPAP/COP_Glue_Boards.pdf. 2 pp.

Application of toxic gases:

The RAMPs UK Code of Good Practice. Register of Accredited Metallic Phosphide Standards in the UK. December 2013.

URL: <http://www.ramps-uk.org/wp-content/uploads/2014/02/RAMPS-Code-of-Practice.pdf>. 8 pp.

Guidance on anticoagulant resistance:

RRAG mouse resistance guideline. 11 pp. Rodenticide Resistance Action Group.

URL: <http://www.bpca.org.uk/assets/RRAG-Housemouse-resistance-guideline1.pdf>.

Anticoagulant resistance in the Norway rat and Guidelines for the management of resistant rat infestations in the UK. Rodenticide Resistance Action Group.

URL: http://www.bpca.org.uk/assets/RRAG_Resistance_Guideline.pdf.

The rodenticide industry, acting as a whole, has recognised the need to address the concerns surrounding the responsible use of rodenticides and the need to ensure that rodenticides are used correctly and in ways that will minimise the exposure of wildlife. The industry has therefore initiated the Campaign for Responsible Rodenticide Use (CRRU).

Key to the campaign is a code of good practice for the responsible use of rodenticides in rural areas.

This stresses the need to adhere to the following good practice. It has adopted the logo 'Think Wildlife' to build recognition of the code and the overall campaign aims.

CRRU CODE IS:

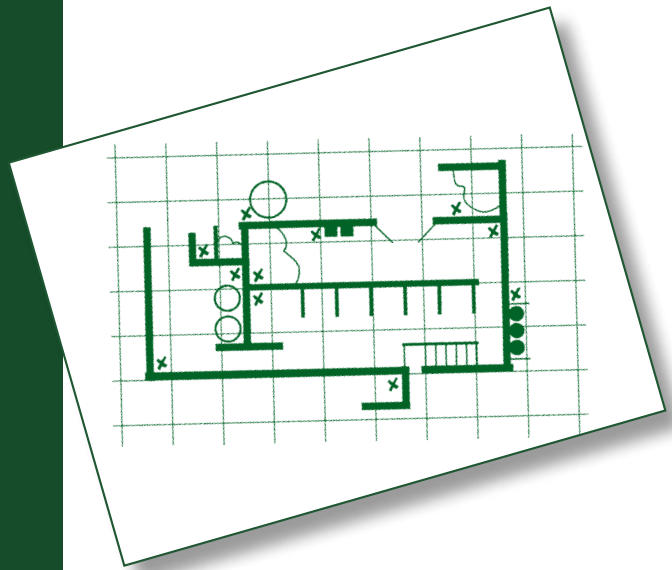
Always have a planned approach

- Before treatment begins, a thorough survey of the infested site is an essential key to success when using any rodenticide.
- Environmental changes which 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 details on CRRU see:

www.thinkwildlife.org

info@thinkwildlife.org

CRRU is supported by the following companies:

Antec International Ltd

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Killgerm Group Ltd

LiphaTech S.A.S.

LODI UK Ltd

Pelsis Ltd

PelGar International Ltd

Rentokil Initial plc

Syngenta Crop Protection AG

Unichem d.o.o.

Zapi SpA



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