



Guideline on Best Practice in the Use of Rodenticide Baits as Biocides in the European Union

Contents

1. Introduction
2. Rodent behaviour in relation to the use of rodenticides
3. Rodenticide Treatment Scenarios
4. Before rodenticide application begins
5. Documentation and Records for Professionals
6. Baiting Practice Using Rodenticides
7. Alternatives to Rodenticides
8. Types of Rodenticide Active Substances
9. Resistance to Anticoagulant Rodenticides
10. Training and Certification Requirements for Rodenticides Used as Biocides in the EU
11. Definitions and Glossary of Terms Used
12. Find Out More

The European Biocidal Products Forum – spokesman for the European biocides industry

Concerned with many aspects of the biocide regulatory regime currently in place in Europe, Cefic has set up an industry platform where all industry stakeholders involved in the biocides sector can exchange views and give input in the ongoing debates. The European Biocidal Products Forum (EBPF) currently comprises more than 60 companies plus affiliated trade associations representing the industry that places a wide range of biocidal products on the market for the benefit of EU citizens.

The objective of EBPF is primarily to act as a spokesman for the biocide business community at Union level. The Forum also provides an opportunity for its members to exchange views on regulatory and technical issues relating to active substances evaluation and biocidal product authorisation.

In 2002, EBPF established its Rodenticides Working Group with the objective of identifying, promoting, and improving existing good practice initiatives across the rodenticides industry in Europe, and initiating further guidance to advocate the responsible use of these biocidal products.

Raf Bruyndonckx

Cefic – European Biocidal Products Forum

Tel: +32 2 676 7366

Email: rbr@cefic.be

1. Introduction

Rodenticides are essential throughout the European Union (EU) for the protection of human and animal health and well-being, for the protection of food stocks from consumption and soiling by rodents, for the prevention of damage to installations, structures and possessions and for the removal of alien invasive species for the protection of vulnerable wildlife populations.

Because of their broad benefits rodenticides are applied as biocides in a wide range of use scenarios, including in and around buildings, in sewers, at waste dumps and in open areas, and by several different categories of users, including professional pest controllers (see definitions for clarification).

This guideline is aimed primarily at professional people working in rodent control in urban and rural areas. However, the document may be helpful to other user groups. It is intended to give guidance on rodent control in the EU to those using rodenticides as biocides. Sensible precautions to ensure safe and effective use of rodenticides are given. The document is intended to be applicable to all rodenticides in common use in the EU as biocides (i.e. Product Type 14 in the parlance of the Biocidal Products Regulation).

The document is not intended to be exhaustive but to give outline guidance in a comprehensible way according to current knowledge of the active substances and products placed on the European market and current Best Practice in rodent control. The focus is on the control of the main rodent target species: rats (*Rattus norvegicus*, *Rattus rattus*) and house mice (*Mus* spp.), under biocidal products conditions of use.

Control of the field mice (*Apodemus* spp.), and voles (*Arvicola* spp., *Microtus* spp.), where these are controlled using rodenticides as biocides in commensal situations, is similar to that of the species described within this document and the same principles may apply, although they are not detailed in this guidance.

No attempt is made in this document to describe any use of rodenticides for the protection of growing crops, either in the open field or in horticultural green-houses.

The main purpose of the document is to provide Best Practice guidance to those using rodenticides in the EU as professional pest control technicians. The document will:

- describe what to do before, during and after rodenticide applications;
- give practical guidance that should be followed in the many varied situations of rodenticide use;
- describe how to monitor for the presence of rodent infestations without the permanent application of rodenticide baits;
- discuss alternatives to rodenticides;
- provide advice on where to obtain information about anticoagulant resistance and the best way to manage it;
- give definitions of useful terms and,
- provide web-site links and further reading which will help the professional to find more specific information on rodent control. In this last respect, important additional guidance is available on product labels and from pest control trade associations, regulatory bodies and training agencies.

The document is NOT intended to provide general guidance on rodent control. It is primarily concerned with the effective and safe application of rodenticide baits. However, it should always be remembered that the removal of rodent infestations with rodenticides is likely to achieve only temporary success unless other measures are subsequently taken.

These measures must invariably include, as far as practicable, actions to prevent access to food and water and the denial to rodents of places to burrow, nest and move about the site concealed from predation. Such measures will make sites less prone to rodent infestations in the first place, will support smaller infestations when they become established and will permit quicker and more effective applications of rodenticides when these become necessary.

General advice about rodent pest management is available from the additional reading material shown at the end of this document.

IMPORTANT NOTE: The advice given in this document about the application of rodenticides should be considered in conjunction with local regulations in EU Member States which may differ from it in certain technical details. Local regulations and product labels take precedence over any contrary advice given herein.



2. Rodent behaviour in relation to the use of rodenticides

Those who attempt to control rodents with rodenticides should do so with appropriate knowledge of their behaviour. More comprehensive information about rodent behaviour in relation to rodent pest management is given in other documents (find out more). However, a few traits of rodent behaviour are particularly important and will be outlined here.

Rodents, particularly rats, are shy and suspicious animals especially with regard to new objects which appear in their territories, such as traps, baits and bait boxes. Rodents need time to become familiar with new objects, especially new foods. Therefore it is normal for some time to elapse after rodenticide baits have been put out before rodents begin to feed on them. This suspicion of new objects is called 'neophobia'. If time permits, bait points may be established some time prior to the commencement of the rodenticide treatment and filled with some food attractive to rats. This may help to overcome the initial reluctance of rats to enter bait boxes and feed from the bait within them.

Those who apply rodenticide baits must always minimise the access of non-target animals to these baits. Proprietary tamper-resistant bait boxes are often used for this purpose. However, it has been found that rodents, especially Norway rats, are reluctant to enter these bait boxes and this may substantially extend the duration of rodenticide treatments. Therefore, it is a good approach to protect and secure baits using natural materials found at treatment sites, provided suitable and properly secure placements can be made in this way. This approach is likely to be more effective, will reduce the period of baiting and minimise the risk of primary poisoning (i.e. other animals finding and eating the bait) and secondary poisoning (i.e. other animals eating poisoned rodents) to non-target species. In many circumstances, when appropriate natural and safe cover for baits cannot be found, proprietary bait stations will have to be used. Some infestations of house mice have also become established which are reluctant to enter bait boxes to take conventional rodenticide baits.

In most circumstances Norway rats do not live within buildings but instead travel from nearby burrows to find the resources they need within buildings, such as food and water. Consequently, it is important to search an infested site thoroughly, both within buildings and around them, for signs of rodent infestation and to place baits near where rodents are living. In that way, rodents will take baits more readily, and once again treatments may be concluded more quickly, than if baits are placed only beside or within infested buildings. The introduction of an appropriate rodenticide directly to the burrow system of rats can be a fast and effective control measure, where appropriate. Fast and effective elimination of rat infestations will rarely be provided by the placement of baits only indoors.

House mice, on the contrary, live almost exclusively within buildings and can generally be treated with baits positioned entirely inside buildings. This means that, in most circumstances, mouse control operations carry less risk to non-target wildlife than do rodenticide applications against rats. Mice are more curious and less suspicious than rats and do not exhibit neophobia. They feed readily from palatable baits but do not feed consistently in one place. Therefore it is recommended to use small amounts of bait when conducting mouse control and to place a large number of bait points in infested areas.

It should be kept in mind that rats and mice are very prolific breeders which can increase their populations very quickly. So regular monitoring of sites for signs of rodent infestation is required to prevent the build-up of large populations. It is easier to control small infestations than large and established ones, and less rodenticide bait is used.

More information about the biology and behaviour of rodents in relation to their role as pests of human habitation and commercial activities is provided in some of the publications shown in the 'Find Out More' section of this document.

3. Rodenticide Treatment Scenarios

It is always preferable to avoid rodent infestations by the thorough application of measures to prevent the access of rodents to food and water and to exclude them from premises where that may cause damage and present a risk to animal hygiene, human health and well-being. However, treatments using rodenticides as biocides may be required where rodent infestations become established. Rodent infestations arise in a wide variety of situations. Each is different and requires a different approach to obtain satisfactory rodent control.

Four main scenarios were examined during the review of rodenticides conducted by the European Commission (EC) for the Biocidal Products Directive (BPD) and the consequent Regulation (BPR). These scenarios encompass the majority of rodent control operations involving rodenticide active substances. Other definitions of rodenticide use patterns may apply in certain Member States.

“In and around buildings”

The most common use scenario for both rat and mouse control is ‘in and around buildings’. This involves the application of rodenticides to control rodent pests infesting buildings. Rodent infestations of buildings, by their definition, pose a significant risk to the health and well-being of those who live and work in them. Such buildings may include domestic properties, commercial premises, farm buildings, store-houses, municipal buildings such as schools, hospitals and offices, restaurants, etc. Those applying rodenticides ‘in and around buildings’ include professional pest control technicians, non-professionals and amateurs (i.e. the general public).

House mice usually restrict their activity to within the buildings they infest and, therefore, rodenticide applications within infested buildings are normally effective for their control. Usually, such applications can be conducted with little risk to non-target wildlife. Conversely, infestations of Norway rats are very rarely restricted to the buildings that they infest. Therefore, rodenticide applications aimed at the removal of rat infestations in the built environment usually involve a major element in which rodenticides are applied around the infested building. The permitted use of a rodenticide in this way is defined by the EC as follows:

‘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.

Rodents are often serious pests at facilities used in animal husbandry for the production of milk, meat and eggs. This is because the animals housed in these facilities are provided with constant access to food and water and these resources are also available to rodents. The threat of transmission to humans and livestock of rodent-borne diseases is severe and rodent control is imposed by legal requirement and often regularly applied in and around such facilities.

The use of rodenticides in the ‘in and around buildings’ scenario is typical of most other applications and the advice contained in this document is aimed primarily at such use. The use of rodenticides ‘in and around buildings’ requires particular consideration of risk to human bystanders and non-target companion animals.





Sewers

As urban sewer systems are ideal habitats for Norway rats, with a nearly perfect environment (incl. foodstuff), particular attention should be given to these systems for the control of rats within the scope of the general urban hygiene. Generally, applications of rodenticides in sewers are made by specialist teams either from professional pest control contractors or from municipal authority's employees.

As these systems are permanent reservoirs and breeding places for large rat infestations, which repeatedly occur above ground; in some Member States they are subject to regular control measures, especially in pre-determined critical infestation areas.

Due to the special spatial structure of the sewer systems, a risk for primary and secondary poisoning of humans and non-target organisms is unlikely. Because of the high humidity level in these systems, it is useful to apply moisture-resistant wax blocks or similar formulations containing a rodenticide which provide long palatability. Nevertheless the sewer systems in which such baits should be checked regularly and baits should be replaced or replenished if necessary in order to achieve an effective control of rats.

Other considerations are to put baits in places where they are accessible to rodents (i.e. not higher than 20cm above the sewer benching) and, when blocks are used, fixed in place with a wire. It is advisable not to apply rodenticides in sewers when heavy rainfall is expected. A document with specific and detailed guidance for the control of rodents in sewers is provided in the 'Find Out More' section.

Open Areas

Rodenticides are applied away from buildings for many reasons. They may be used to control rat infestations to protect human health in public areas within the built environment, such areas as parks and playgrounds. Another use is for the protection of game-bird eggs and chicks in hedgerows and at game rearing-pens. Rodenticides are also used for the protection of wildlife, in particular ground nesting seabirds on islands, and this is also an 'open area' use.

Use away from buildings in open areas is generally considered to bring with it greater risk to wildlife because of the greater abundance of wildlife in these places. Therefore, it is particularly important that an environmental risk assessment should be done when rodenticides are applied in open areas. More detailed advice on responsible use of rodenticides in certain open area use scenarios, for example applications by gamekeepers, is provided in the 'Find Out More' section of this document.

Waste Dumps

Waste dumps provide good habitats for the development of rodent infestations because of the abundant food available. They are a special type of 'open area' which may attract a wide range of wildlife species, and large numbers of individuals of these species, because of the plentiful food.

Usually, access to waste dumps by humans is limited because of safety considerations and there are few risks to human bystanders. However, they are considered to pose a greater risk to wildlife than other open areas. Where waste dumps occur in close proximity to human habitation their rodent infestations may pose a significant threat to human health and well-being.

4. Before rodenticide application begins

4.1 Preliminary information

Some important preliminary information should be obtained when notification of an infestation is received by a company offering a professional service of pest control or a local government agency. This information should include:

- The name, address and contact details of the person reporting the infestation;
- The name, address and contact details of the owner/occupier/site manager of the premises;
- Basic details of the infestation such as what rodents have been seen, when and where, and
- Suitable times and appropriate permissions to access all areas of the site.

Before the first site visit, records of previous infestations and previous control strategies should be obtained if possible. These records need to be reviewed to identify any reasons for previous control failures and identify any potential problems in treating the current infestation. It is most important that appropriate permission to access the site and treat the infestation is obtained in writing.

The owner/occupier/site manager should be informed of the intended treatment strategies and informed of the basic precautions to be taken and what action is to be taken in case of accidents or incidents. They need to be advised of procedures to be followed in case of bait spillage and the need to search for rodent bodies and the most appropriate means of their disposal. The need to prevent interference with bait points by family members, staff and visitors must also be emphasised.

4.2 Importance of the site survey

A thorough survey of the infested area is an absolute prerequisite before any rodenticide treatments are considered. This survey needs to establish the pest species present, their apparent activity within the site, such as nesting and feeding places, and the extent of the infestation. It may be that the infestation extends beyond the boundaries of the site, so preferably the owners and occupiers of neighbouring premises should be consulted about undertaking control measures at the same time as the infested site is treated.

Typical indications of rodent activity are presented by the presence of burrows and holes, runs and grease marks, fresh droppings, signs of damage and footprints in dust or muddy areas. Rodent signs may extend beyond the boundaries of the site. It is important to remember that although mouse colonies may be of a limited extent there may be a number of colonies in different nearby buildings which comprise an infestation. It is also important to keep in mind that rats can move long distances from areas of shelter to sites which provide

them with the resources they require such as food. It is not uncommon for them to travel 500 metres but greater distances are possible.

Signs of rodent activity typically indicate the extent of the infestation and consequently also indicate the extent of the area that should be treated.

The survey should also include indications of the presence of non-target animals including humans, children, domestic animals and wildlife.

It is advisable to draw a sketch map of the site indicating such things as:

- the presence of rodent activity, any obvious food sources such as stored food and feedstuff,
- potential water sources in the case of rat infestations,
- intended positions of bait placements,
- places where rodents are gaining access to buildings,
- areas where there is activity of non-targets and special care is needed,
- areas that need to be cleaned, or otherwise modified, when the infestation has been removed to prevent re-infestation, and
- areas of rough ground and scrub where non-target small mammals may be living.

It may be useful to include photographic evidence of these observations for the file on the rodenticide treatment.

The site survey will provide information on the places where rodents are living and feeding. Obvious food resources, such as spilled grain, should be removed where possible before the treatment. Other food sources should be securely covered to prevent rodent access. This will make it more likely that rodenticide baits will be taken. However, in many instances it is unfeasible to remove all foodstuffs that may be available to rodents.

Do not significantly modify the site before treatment, for example by removing rodent harbourage, as this will disturb the infestation, making bait acceptance more difficult to achieve and perhaps displacing rodents into areas where they are less easy to treat. Of course, all routine procedures to maintain hygiene and cleanliness at treated sites should continue as normal.

4.3 Risk assessments

Risk presented to human health of chemicals to be used

The implementation of various EU Directives on the protection of the health and safety of workers from risks related to chemical agents at work requires that a

risk assessment is undertaken prior to any work using rodenticides. The assessment is intended to identify any risks to operators and others who may be affected by the treatment. The assessment must be recorded in writing.

The assessment should identify the substances to be used, who could be exposed to them and their potential to cause harm. The manufacturer's Material Safety Data Sheet contains important information on the potential adverse effects of the substance and means of controlling exposures when the product is used and stored.

It is important to consider how potential exposures can be controlled or prevented, for example, the use of tamper-resistant bait boxes, placing baits in locked or otherwise secure locations to prevent access by humans will control or prevent exposure to rodenticidal baits. The importance of the inclusion of a taste deterrent in most rodenticidal baits to help prevent accidental human exposure via ingestion should not be overlooked.

The assessment may conclude that the manner of use of the product is unlikely to cause harmful exposures in normal day-to-day situations but should also include procedures in case of emergencies.

The assessment should also include a justification for the chosen control method, i.e. the use of a particular anticoagulant rodenticide in preference to other anticoagulants and methods and also why a particular type of bait will be used.

A generic risk assessment for an active substance and biocidal product may not be adequate if there are particular risks at a specific site, such as areas where children might gain access to bait or where spilled baits could contaminate food.

Many suppliers, trade associations and government agencies provide detailed guidance on how to undertake such risk assessments to fulfill legal obligations.

Risk presented to the environment of chemicals to be used

An environmental risk assessment on the site to be treated should be undertaken and recorded. This can be in conjunction with the site survey and should also use the sketch map of the site. The purpose of the assessment is to determine potential environmental effects and identify the necessary precautions to protect non-target wildlife and the wider environment. When

conducted in conjunction with the site survey, the environmental risk assessment should additionally identify:

- What risks to non-target species have been identified?
- Which protected species may be present in or near the treatment site?
- 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 environmental management measures are appropriate in order to make the site less attractive to rodent infestations?

Non-target wildlife to be considered include domestic and companion animals, other small mammals such as field mice and voles, weasels and stoats, and raptors such as red kites, owls, kestrels and hawks. Primary poisoning is the most likely route of exposure of domestic and companion animals and small mammals. To help prevent this, place bait securely in inaccessible locations to reduce as far as possible access by these non-target species.

Where permissible, the placement of bait in rat burrows should be considered and specific advice is provided later on this procedure. To help prevent the risk of secondary poisoning of raptors, dead and moribund rodents should be searched for frequently, removed and disposed of according to local regulations.

Consideration should be given to the potential impact of spilled bait or bait removed from bait points especially near watercourses.

4.4 Importance of biocidal product labels

Only products that have been approved or authorised for use as rodenticides should be used to control rats and mice. The product label includes directions for the safe use of the product and these must always be followed. For example, information on the maximum amount of bait to be placed at each bait point, together with the application rate and the frequency of site visits is stated.

Risk mitigation measures to ensure the safe use of the product must always be followed and failure to do so may result in enforcement action. Statutory instructions on product labels take precedence over any Best Practice guidance available from other sources.

A generic risk assessment for an active substance and biocidal product may not be adequate if there are particular risks at a specific site, such as areas where children might gain access to bait or where spilled baits could contaminate food.

5. Documentation and Records for Professionals

Safe and effective use of rodenticides always requires an organised approach. Those who apply rodenticides as a part of their job are expected to keep adequate records of their activities. These records will normally be in a written form, either stored on paper or electronically, with copies held both at the treated site and with the technician. Such records will include the following documents:

- A human health risk assessment to determine the risks of working at the site and the measures taken to prevent accidents, including accidental exposure of human bystanders to the rodenticide active substances used.
- An environmental risk assessment to determine the risks to the environment of the rodenticide treatment. The assessment would include risks to wildlife and exposure of rodenticides to soil and water. Also included in this assessment might be risk of exposure of domesticated animals, livestock and companion animals (pets) because these risks are similar to risks to wildlife and measures to prevent exposure are also similar.
- A plan or sketch map of the treated site showing, among other things, where rodents are living, moving and feeding, places where bait points are put out, areas where risks to non-targets are especially prevalent, points where there may be access to the public, etc.
- A schedule of visits to the site, showing what actions were taken at each visit. For example, this document would have a list of all places where bait is put and permit records to be kept of rodent baits taken from each point. Also recorded would be places and times where poisoned rodents were found and how their bodies were disposed of.



6. Baiting Practice Using Rodenticides

6.1 Baiting Programmes

Most rodenticide baiting programmes are implemented because of an existing rodent infestation with the objective of its complete removal. These Best Practice guidelines are principally aimed at this type of application. In such cases, a rodent infestation is identified and considered to be an unacceptable risk to human or animal health and well-being or to the integrity of installations and infrastructure.

The purpose of the treatment applied is the removal of the infestation as quickly as possible, while minimising risk to human health, non-target animals and potential adverse impact on the environment. The latter normally involves using the minimum quantity of the selected rodenticide needed to achieve the required objective.

However, some sites are subjected to repeated infestations and work is carried out by professional pest controllers to prevent the establishment and build-up of rodents. Such work often takes place at vulnerable sites which are important for human health and hygiene, such as those involved in the storage, preparation and sale of food, as well as hospitals, waste dumps, schools, public parks etc.

Professional pest controllers may deploy long-term preventative baiting, sometimes erroneously called 'permanent baiting', using rodenticides in tamper-resistant bait boxes at such sites. This practice may be applied with very little risk to non-target animals and the environment for the control of house mice indoors. When applied outdoors, technicians may use disguised boxes or the boxes may be otherwise designed and robustly constructed and anchored to the substrate to prevent accidental damage, theft and vandalism.

The use of rodenticides at sites where no rodents are currently present should never be used as a routine pest control practice. It should only be employed in unusual circumstances where other methods, such as the discovery and treatment of the potential source of infestation, is impractical.

This is because long-term application of rodenticides increases the likelihood of primary and secondary poisoning of non-target species. It is also likely to result in residues of rodenticides in wildlife and may also lead to the development of anticoagulant resistance. Where long-term baiting is carried out it is necessary to:

- Conduct an appropriate risk assessment.
- Document the reasons why long-term baiting is needed.
- Record the reasons that the increased risk posed by long-term baiting is outweighed by the potential benefits to human and/or animal health on that particular site.

- Re-visit the site at intervals appropriate to the degree of risk posed by the application.
- Monitor the effectiveness of the rodenticides in use so as to be able to take corrective measures if resistance occurs.

6.2 Bait Types

There are many different types of rodenticide formulations, among them are grains, meals (milled grains), pellets, blocks and pastes. The formulation should be chosen as appropriate for the site and the type of rodent infestation. You should:

- Only use a product that has been authorised for the use for which you will apply it. All such products will be sold ready-for-use and nothing should be added to the bait.
- Read the label and comply with all recommendations for correct use printed on it.

6.3 Starting the treatment

Once you have completed your visual assessment of the site and confirmed the presence of current rodent activity you must decide on the most appropriate course of action. If you decide that you will use a rodenticide bait on site then you should start with the site details you have taken down when notified about the rodent infestation. Add to these details a written record of the rodenticide product(s) you will use and a sketch map of the site showing the locations of all baiting points.

A decision is required about what needs to be done to provide an adequate level of rodent control at the site. Rodents may be completely intolerable at some sites and, therefore, the aim of the treatment will be their complete eradication.

At other sites it may be recognised that eradication is an unreasonable objective, perhaps because of the proximity of another infested site that cannot be treated. At such sites it may be necessary to work towards a permanently reduced level of infestation and an acceptable level of risk to human or animal health.

However, it should always be recognised that if rodents are not eradicated, and nothing more is done, their ability to breed quickly will mean that numbers will soon build up to intolerable levels.

Most rodenticide treatments rely on the application of baits which must be taken as food by rodents. It is sensible, therefore, to remove as much alternative food as possible or to cover it so that it is inaccessible to the rodents.

Other than this, as mentioned above, it is not recommended to clean up the site as drastic habitat changes will disturb the rodents and may cause them

to be wary of the bait and, perhaps, move away to neighbouring buildings. The site may be cleaned when the rodent infestation has been eliminated.

6.4 Putting out Baits

As long as it is safe to do so, all areas where rodents are living, feeding and moving should be baited. The quantity of bait to be put out at each bait point is very important. You should never exceed the maximum quantity permitted on the product label. The labels of different products differ in the recommended bait quantities for application. Therefore, care is essential on this point.

Labels may provide a range of bait point sizes to permit the user to judge infestation size and bait different infestations appropriately. The label also gives guidance about how many bait points to use and how close to each other they should be. Once again, this advice should be carefully followed.

Rodenticide applications often fail to eradicate rodent infestations quickly because too little bait and/or too few bait points are used. Bait applications are done most safely when they are efficient and quick. Poorly applied bait left out for long periods is both ineffective and creates a long-term risk to non-target animals and the wider environment.

It is essential to deny access to bait to non-target animals. There are many ways to achieve this important aim. It may be that bait applications are made behind locked doors, such as in municipal buildings, in warehouses and at other secure commercial sites. In such cases it may be possible to put out certain rodenticide baits which are permitted for such use without cover.

Bait points that are open in this way are likely to be readily visited by rats, with little reluctance to feed. This will permit rapid and effective treatments. Even in these circumstances, however, bait should not be laid directly onto the ground but should be put instead on bait trays or on boards. This will help to prevent the bait from being spilled and will allow the uneaten bait to be easily removed at the end of the treatment.

Other methods for protecting bait points must be used when it is not possible to prevent access to treated sites. Often, at infested sites, it may be possible to use natural material and cover to protect baiting points.

However, such bait points should only be used when a risk assessment shows that they will provide an adequate level of protection. Some non-target animals, such as large dogs and other wildlife, may require such bait points to be very robust indeed to prevent access to the bait.

Wax block baits and paste bait sachets should be fixed, for example using wire or a nail, in order to prevent them being carried away by rats. Within tamper-resistant bait boxes they should be secured using the metal bars and strips provided within them.

The most reliable method to prevent non-target access to bait is the use of tamper-resistant bait boxes. There are many different designs and different materials are used in their construction. In many circumstances, particularly during applications by pest control professionals, the use of such equipment is unavoidable.

Bait boxes may be fixed to the substrate using special fixings to prevent loose bait spilling from the boxes when disturbed. However, there is evidence, from both practical experience and from scientific research that, on some occasions rodents, particularly Norway rats, are reluctant to enter bait boxes to feed on bait. It is the view of one experienced researcher that bait blocks fixed in tamper-resistant bait boxes, although the most secure form of baiting, is unlikely to provide a satisfactory method of controlling rats.

In general, boxes should be as large as possible to permit rats to enter them and feed without restraint. There is anecdotal evidence that 'old' bait boxes, which have become impregnated with natural aromas from infested sites, are more readily used by rats than those that are newly manufactured.

It is recommended to put bait stations in place sometime before the treatment in order to allow the rats to get habituated to them. Such baiting points may be baited with palatable non-toxic food (e.g. rolled oats, wheat, monitoring bait) to make them more attractive to the rats, and for the pest controller to determine whether these baiting points and bait boxes are visited or avoided by the rats.

It is Best Practice to place baits and bait boxes in concealed positions. Rodents feed more freely at such locations and baits are less likely to be tampered with by the general public. However, where tamper-resistant bait boxes are set out in areas of public access they should be labelled with such words as: "Poison", or "Do Not Disturb", or "Rodenticide Bait".

It remains a common practice to place rodenticide baits directly into rat burrows. This may result in rapid bait uptake and efficient treatments. It is also considered unlikely that small non-target animals would venture readily into occupied rat burrows. The bait is normally put as deep into the burrow as possible with a long-handled spoon. The burrow is then lightly blocked with grass, paper or foliage. It is almost inevitable, however, that such baiting results in some spillage outside the treated burrow. It is, therefore, important to inspect sites treated in this way very frequently, preferably early each morning.

Where appropriate, and where respective products are authorised, the application of baits may be supported by the use of contact poisons or liquid baits. As the availability of these products is very limited, no further recommendations on their use are given here. The labels of such products should be followed carefully.

Personal protective equipment (PPE) should be used by technicians applying rodenticides that is appropriate to the circumstances of the application and the product(s) being applied. Product labels and local health and safety regulations should be referred to for further details.

6.5 Uses of rodenticides “in and around buildings” and in “open areas”

There is a clear distinction in the use scenarios for rodenticides given in the EUBEES PT14 Emission Scenario Document (see section 12) between use “in and around buildings” and in “open areas”. The former is expected to present less risk to non-target wildlife because it is reasonable to anticipate that less wildlife is present in the “in and around buildings” scenario.

The permitted uses of different active substances, and the products containing them, may vary between EU Member States, presumably, dependent on different interpretations among Member States of the balance between risk and benefit of rodenticide applications. Nevertheless, the practical interpretation of these two scenarios is the same.

Where baits are applied in the “in and around buildings” scenario which are not permitted for use in “open areas”, the user must be able to demonstrate, beyond doubt, that the baits placed are likely to be consumed only by rodents infesting the treated building. It is well known that rats (but not mice) may travel over a considerable distance to gain access to food resources. Therefore, it is Best Practice to place baits appropriately to intercept rats as they approach the building.

It is also essential to be able to use all natural cover around the building, which will be used by rodents for harbourage, for the placement of baits. However, in

most circumstances it will not be necessary to place baits far from the treated building.

The baiting of rodent burrows may be effective to achieve rapid consumption of baits by the animals that occupy them. It is unlikely that non-target animals utilise active rodent burrows. However, frequent checking is needed when burrow baiting is employed because baits may be ejected from the baited burrows. Also, in spite of best efforts, it may be difficult to retrieve uneaten baits from baited burrows. More detailed advice on the safe use of burrow baiting is provided in the ‘Find Out More’ section of this document.

6.6 Access of Bait to Non-target Small Mammals

No matter how carefully the positions of bait points are chosen, and how well the bait points are protected from non-target animals, animals that are the same size or smaller than target rodents will have access to bait. We know that some contamination of wildlife with rodenticides occurs when wild small rodents, such as mice and voles, take baits from baiting points and are in turn taken as food by predators such as owls, hawks, stoats and weasels.

The only way to prevent this type of wildlife exposure is to remove baits from areas where wild small rodents feed on them. House mice, which are a common target rodent very rarely live and feed outside. That means that, when the small droppings of mice and voles are found in rodenticide bait boxes outside buildings it is most likely that these are the droppings of wild small mammals and not those of target rodents.

6.7 At the end of the first treatment round

Inform the supervisor of the site, or some other responsible person such as the land-owner or home-



owner, of the positions of each baiting point. It will be helpful to give them an annotated copy of the sketch map.

- Tell them what to do if a dead rodent is found during the treatment.
- Tell them what to do if a bait point is exposed and what to do in an emergency, for example if a non-target animal or human bystander gains access to a bait point and consumes some bait. Leave with them a document containing this information.
- Ask them to sign and date a document showing that they have received this information.

6.8 Subsequent Treatment Visits

There are two main reasons for re-visits to treated sites. The first is to replace bait that has been consumed or is in poor condition. The second is to make sure that the bait and bait points are secure and undisturbed, and to carry out other activities, such as collection and removal of rodent bodies.

Treated sites may be the subject of change between visits. For example, stacks of stored commodities may be removed, vehicles may move and livestock may be introduced into areas where they were not previously present. All such changes may affect the security of baiting points.

Frequency of checking visits

Recommendations on product labels and regulatory requirements vary about the frequency of checking visits. This variation is appropriate because different treated sites vary in their characteristics, particularly in relation to the pest species and the size of the infestation present at the site. Therefore, there is no 'one size fits all' in relation to re-visiting treated sites.

When a treatment site is heavily infested, it will be necessary to visit the site more frequently than in the case of lightly infested sites so that bait points can be topped up as the bait is consumed. Another important consideration is the level of security of the site. Sites which are frequently accessed either by the public or by other personnel not involved in the treatment will require more frequent visits than those which are remote and secure. Sites where burrow baiting is used will require very frequent visits, preferably daily.

As a general rule, it will be necessary to visit a treated site no later than one week after the first bait application. However, some acute materials such as alphachloralose may require a visit the next day. Thereafter, subsequent visits should be no less frequent than every 14 days when using anticoagulants.

However, at sites where the public is present, or where there is a high likelihood of disturbance of baits by other agencies, for example the presence of non-target animals, daily visits to treated sites may be required. Sites treated with acute materials, such as alphachloralose, may also require daily visits.

Replenishing Bait

It is necessary to check and replenish baiting points to conduct efficient rodenticide treatments. As noted above, the frequency of these checking rounds is dependent on the size of the infestation and pest species being treated and the bait used. Once again, advice on this important aspect of Best Practice is provided on product labels.

Every bait point should be visited and checked at each visit. The quantity of consumed bait should be noted in the treatment records. Consumption of bait by animals other than target rodents should be noted and appropriate action taken.

The bait may either be weighed, and the quantity consumed calculated by subtraction, or number of consumed units (e.g. individual wax blocks) may be documented, or alternatively the records may be annotated to indicate either that there was no bait take, the take was partial or was complete.

The bait should be replenished where necessary as recommended on product labels. Bait that is spoiled by becoming wet or soiled should be replaced with fresh bait. Bait points should be cleaned of rodent signs, such as faecal pellets, so that fresh signs of rodent activity are readily observed at the next visit.

Where bait has been taken, but is not replenished, it is helpful to smooth over the surface of the bait so that further takes can be recorded at subsequent visits.

Bait points should be replaced with as little disturbance as possible and, as when originally set out, the security of the placement from non-target animals should be checked.

Bait points from which there has been no consumption by rodents or where consumption has ceased should be either repositioned or removed.

Written records of the actions taken at each checking visit should be made.

Checking the security of bait points

As well as replenishing baits that have been consumed by rodents, several other important actions are necessary during visits. The security of each bait point should be checked to ensure that bait has not spilled from it and the bait point has not been disturbed by activities at the site.

Disposing of rodent bodies

A careful search should be conducted for dead rodent bodies. The bodies of rodents must be treated with caution. Appropriate personal protective clothing should be worn when handling dead rodents. Their carcasses may carry diseases, and live vectors of diseases such as ticks and fleas, that may be transmissible to humans. Dead rodent bodies are also likely to contain

residues of rodenticides which may be harmful to scavenging animals. Local regulations will determine legal routes of disposal and these may include:

- On-site burial with mind for local statutes about the contamination of water.
- On-site incineration in an appropriate appliance.
- Disposal via a qualified waste disposal contractor.
- Disposal (where permitted) in the municipal waste stream.

Progress of the Treatment

The continuing level of rodent activity at the site should be noted at each checking visit. This can be judged from the quantity of bait being eaten and the distribution and frequency of other rodent signs around the site. If large quantities of bait are consumed without a concomitant reduction in rodent activity this may indicate:

- Rodenticide resistance.
- Underestimation of the number of rodents at the site and therefore insufficient bait and/or bait points being put out.
- Significant and continuing ingress of rodents from a neighbouring untreated site.
- Feeding on the bait by non-target animals.
- Theft or other interference by humans.

Conversely, if only small quantities of bait are eaten and rodent activity remains at a high level this may indicate:

- Baits put in the wrong places.
- Rodents taking alternative food in preference to bait.
- Aversion to the bait caused by bait boxes or other apparatus.

In all these circumstances it is necessary to take appropriate remedial action, for example to move baits to more appropriate locations, to change to a different type of bait and/or bait container and removing bait from areas where bait takes are no longer likely to occur.

6.9 At the End of the Treatment

Removal of all baits and bait stations

During treatment visits, and with the expected gradual reduction in bait takes and the frequency of rodent signs, it will become apparent that the infestation is being controlled. Eventually, it will be found that no further bait is consumed by rodents and there are no fresh signs of rodents between visits.

Field trials of the second-generation anticoagulants used according to best practice guidelines and in practical circumstances against rat and mouse infestations have shown that, under most normal circumstances, this point will be reached within about 25 days. However, at difficult sites, for example those with very heavy infestations, with rodents that are slow to take baits and where resistance is encountered unexpectedly, a longer treatment may

be required. Generally, it is considered that rodent infestations will be cleared up in 35 days, or less, when rodenticides are used effectively against susceptible populations.

If this is not the case, and the infestation remains after 35 days of treatment, it is necessary to conduct a re-evaluation of the treatment using the same considerations given in the previous section. The treatment may also need to be prolonged where rodents were initially reluctant to take bait, i.e. they began take adequate amounts of bait only after several weeks. This is sometimes the case where large quantities of alternative food is available that cannot be removed and where tamper-resistant bait stations are employed.

When it is decided to terminate the treatment, all poisoned bait should be removed from the site. There is often a temptation on the part of professional pest controllers, and this is often supported by customers for their services, to leave bait boxes containing bait down at the site 'just in case' of future infestation. This should not be done routinely because bait left in position, in the absence of a pest rodent infestation, is a continuing risk to non-target wildlife, especially in rural situations to non-target small mammals, and is the source of residues of rodenticides in a wide variety of non-target wildlife. It may be helpful, however, to leave bait receptacles in place for use in future applications either of placebo (i.e. unpoisoned) baits or poisoned baits.

Once again, a search should be conducted during this final visit for the bodies of dead rodents. These should be disposed of safely as described above. It should be noted that rodents may continue to die as a result of bait consumption for up to 14 days after the removal of bait from the site. Therefore, it may be necessary to conduct further carcase searches if this is the case.

Clean-up operations

When the treatment has been successfully concluded it is time to consider further measures to prevent the establishment of future rodent infestations.

Habitat modification is an essential part of all balanced rodent control strategies. However, each treated site is different and no attempt will be made here to provide detailed guidance on this subject. The principal actions that must be carried out to prevent future infestation are:

- Removal of all foodstuffs that might sustain rodent infestations, or the use of rodent-proof containers for foodstuffs to prevent rodent access to them.
- Prevention of ingress into structures by use of proofing measures.
- Denial of all harbourage by removing all materials under which rodents can shelter, the removal of vegetation close to the site and the use of hard surface aprons around buildings to prevent rodent burrowing.

It is fundamental to all those involved in rodent pest management that chemical solutions to pest problems, on their own, seldom offer effective long-term solutions to rodent problems. A combined approach to rodent control is essential to minimise the use of rodenticides, including the use of the anticoagulants, and this is sometimes called Integrated Pest Management (IPM).

'Sustainable' is also a watch-word much used now in the regulation of pesticides and a strategy for the sustainable use of rodenticides has been recently put forward by the Sustainable Use Working Group of Cefic (see Find Out More).

Alternatives to permanent baiting and use of rodenticide baits for monitoring

Many professional pest controllers in the EU use permanent baiting with anticoagulant rodenticides as a standard procedure. In this practice, a service is sold to a customer that involves the setting out of tamper-resistant bait stations, filling the bait stations with rodenticide baits, and a programme of return visits to check the bait stations and to replace eaten bait. Such permanent baiting, or long-term baiting, is carried out for two main purposes:

- To intercept rodents as they come on to sites, or into premises, to try to prevent the initiation and subsequent development of rodent infestations.
- As a tool for monitoring for the presence of rodent infestations which, when they are found, warrant further remedial action.

Routine use of permanent baiting for these purposes, particularly outdoors, is not Best Practice because permanent baiting presents significant risks to non-target animals and, in some circumstances, is likely to result in the contamination of wildlife with residues of rodenticides.

There is now comprehensive evidence of the presence of anticoagulant residues in wildlife populations in several EU Member States. The main source of these residues is not thought to be the consumption of target rodents but the consumption of non-target small mammals, which readily enter permanent bait stations and take rodenticide baits.

However, if the practice of permanent baiting is to be avoided alternative procedures are needed. The following processes are valuable in reducing the need for permanent rodenticide baiting:

- An essential preliminary action is to conduct a thorough audit of the site to determine what changes are needed to prevent the initiation and build-up of rodent infestations. This will result in recommendations for the prevention of access by rodents to foodstuffs, the removal and/or

appropriate modification of areas that may provide rodent harbourage and the implementation of measures to prevent rodent ingress to buildings and other sensitive areas (i.e. proofing).

- Treatment records should be carefully examined. Where records show that no pest rodents have been detected in permanent bait stations for some time, it is appropriate to remove baits containing rodenticides. It may be that certain bait points show frequent signs of pest rodent activity while others rarely do, and baits may be removed without compromising the security of the site.
- Rodenticide baits in tamper resistant bait stations may be replaced with proprietary placebo baits or with other durable non-toxic rodent foods.
- Rodenticide baits may be replaced by appropriate break-back traps, depending on the risk of infestation of rats or mice. Due care is required to ensure that non-target animals, such as small mammals, birds, reptiles and amphibians are not taken in the traps. Bait stations with traps require frequent checks.
- Staff working at the site should be made aware of the signs indicating a rodent infestation and should report these signs promptly to responsible personnel when seen.
- The professional pest controller responsible for the site should implement more frequent monitoring visits when rodenticide baits have been removed from bait stations.
- Use of electronic monitoring devices, such as motion detectors with remote messaging.

Occasionally, there are circumstances when long-term baiting is necessary but these circumstances are unusual and not routine. Some vulnerable sites are frequently infested from areas that are either incapable of treatment or are themselves an inevitable source of rodent infestation. Certain livestock farming enterprises are an example of this where, without continuing rodent control operations, farm animals may be at a high risk of the transmission of disease, such as salmonellosis.

Another circumstance in which long-term baiting may be justifiable is in the protection against house mouse infestation of commercial premises involved in the storage, preparation, distribution and sale of food. In this case, the high risk posed by such infestation is likely to outweigh the relatively small risk of exposure and contamination of non-target animals, particularly wildlife, when rodenticides are deployed indoors for house mouse control in suitable tamper-resistant bait stations.



7. Alternatives to Rodenticides

Some alternative techniques to biocides exist for the management of rodent infestations, although none of these is likely to be as cost-effective as the use of an efficacious rodenticide. However, alternatives fall into two broad categories; those aimed at killing rodents (e.g. traps, glue-/sticky-boards) and those that aim to restrict either their population size (habitat modification) or access of populations to vulnerable areas (proofing/exclusion). The use of these methods is essential in IPM rodent control strategies and they provide useful complementary techniques to the use of biocides for controlling rodents but are not considered to be replacements for them.

Rodent Trapping

Traps, either spring traps or break-back traps, designed to capture and kill rodents are useful in some circumstances. However, their effective and humane use requires a high degree of skill and when necessary they should be set in tunnels to avoid adverse impacts on non-target wildlife, pets and children. They may not kill cleanly and therefore should be checked daily so that animals captured, but not killed, may be humanely despatched. Such traps may be effective in situations where infestations are small but are unlikely to be cost-effective against large and dispersed rodent infestations.

Live-capture traps have the advantage that, if they are checked frequently, captured non-target animals can be released unharmed. Some authorities recommend that these traps are checked twice daily. Captured target animals must be despatched humanely, because in some Member States it is illegal to translocate and release them. Once again, these traps may provide effective control of small infestations, particularly of mice.

Glue Boards

Glue- or sticky-boards are available in some countries and may provide effective control in some circumstances. Like traps, they may capture non-target animals and birds and must be checked at least twice

daily. Untrained users of glue-traps are unlikely to know how to despatch humanely the rodents caught on the adhesive surface.

Habitat modification

Rodents require food, harbourage and, in the case of rats, water in order to establish troublesome infestations. Such infestations will either not establish at all, or will be limited in size, if any of these requirements is denied. A sustainable IPM rodent control strategy for any building or premise will always include the requirement to prevent access to food and water and to minimise areas where rodents may make burrows and take refuge.

Rodent Proofing

Preventing the access of rodents to vulnerable buildings by proofing is an important requirement in IPM. First of all, it is essential to store any potential food for rodents in a way that it is inaccessible to them. Buildings, or certain rooms within buildings, can be made rodent-proof by tight-fitting doors and windows, grids at windows and over air-vents, sealed apertures where wires and pipes run through walls, the maintenance of areas surrounding buildings free from ornamental plantings and other vegetation, clear aprons of deep gravel or concrete around buildings, carefully mounted wire-meshes to prevent rodent access to the layers of insulation between inner and outer walls of buildings. Also, proofing techniques should be used to store food securely in structures inaccessible to rodents.

The use of biocides is minimised if these engineering solutions are utilised. They are, however, costly, require frequent maintenance and may be impractical in areas where there is frequent human and animal activity, particularly on livestock farms. Proofing is particularly difficult to implement and maintain in respect of house mouse infestations.

8. Types of Rodenticide Active Substances

Rodenticide active substances permitted today for use in the EU under the rules of the BPD are of two types, those used in baits and those applied as fumigants. Among the former, the majority are anticoagulant rodenticides, which are used very widely in rodent control in the EU.

Two other substances are less widely used as baits; these are alphachloralose and powdered corn cob. The specialised fumigant active substances, aluminium phosphide, carbon dioxide and hydrogen cyanide, require specific training and safety measures safety measures and apparatus for effective and safe use as biocides. Measures for their sustainable use are different in many respects to those applied to rodenticide baits and are not further discussed here.

The review of the PT 14 active substances carried out by the European Commission has resulted in the removal from the market of three non-anticoagulant rodenticides that were previously used, zinc phosphide, calciferol and bromethalin. This has resulted in a significant increase in reliance upon the anticoagulant rodenticides.

Sustainable use of biocides is supported by the availability of active substances with a range of different modes of action. However, only five non-anticoagulant PT14 active substances have been fully reviewed within the European arena or remain in review at the time of publication of this document. They are alphachloralose, aluminium phosphide, carbon dioxide, hydrogen cyanide and powdered corn cob.

Since concern about rodenticides has focussed on the anticoagulants it may be considered appropriate to replace them with non-anticoagulants. This is not considered to be a viable general strategy because each of these active substances possesses specific characteristics which make it unsuitable as a replacement for anticoagulants.

Alphachloralose. This substance is a fast-acting acute rodenticide only for mouse control indoors and is not approved for the control of rats.

Aluminium phosphide. This fumigant is used only by specially-trained professional pest control technicians. It cannot be used in close proximity to buildings because it works by the evolution of a toxic gas which cannot be fully directed when it has been produced.

Although valuable in some circumstances, this property makes aluminium phosphide inappropriate for rodent control situations inside buildings and in close proximity to them. It is only used indoors by trained operators against stored product insect pests, in such places as in grain silos and stores, using special equipment.

Hydrogen cyanide. Like the previous active substance this is used only by specially-trained and equipped professionals as a fumigant in hermetically-closed structures.

Carbon dioxide. This substance is currently restricted for use only against mice indoors. It is dispensed using a proprietary automatic application device which is appropriate only in limited practical situations, such as specific mouse traps in food handling areas.

Powdered corn cob. In comparison with other PT 14 active substances, powdered corn is relatively new to the market. Practical experience of its use is limited and information from published, peer-reviewed literature on its efficacy is lacking.

As a result of these limitations, the vast majority of rodent control operations in the EU are conducted using the anticoagulant rodenticides, and will be so for the foreseeable future.

The anticoagulants are widely used because they are generally efficacious, practical in use and, in comparison with the acute rodenticides that preceded them, have valuable safety characteristics, such as the availability of an antidote (vitamin^{K1}). They fall into two classes:

First-generation anticoagulants. Namely chlorophacinone, coumatetralyl, sodium warfarin and warfarin, have the better environmental profile because they are less acutely toxic and persistent in the environment but they suffer from the fact that resistance to them is present in some populations of rats and mice in many EU Member States.

Second-generation anticoagulants. Which include the active substances brodifacoum, bromadiolone, difenacoum, difethialone and flocoumafen, are capable of controlling rodents that are resistant to some other anticoagulants, but are more acutely toxic and persistent in the environment than the first-generation anticoagulants.

9. Resistance to Anticoagulant Rodenticides

Resistance to the anticoagulant rodenticides is a growing problem in the EU. There is now evidence of resistance to anticoagulants in Belgium, Denmark, France, Germany, The Netherlands, Hungary and the UK. In several countries there are multiple resistance genotypes and some of these confer resistance to some of the less-potent second-generation anticoagulants.

Resistance to anticoagulants in house mice is also likely to be widespread in many Member States, both to the first-generation active substances and to some of the second-generation. The fact that resistance has not been found in some Member States does not mean that it does not exist in them.

However, in many areas of all Member States rodents, particularly rats, remain fully susceptible to all anticoagulants. In all EU Member States, the more potent anticoagulants remain effective against rodent populations that are resistant to some other compounds.



Given our reliance on the anticoagulants for rodent pest management for the foreseeable future in the EU, and the increasing incidence of resistance in some Member States, the adoption and implementation of resistance management strategies is of vital importance in all EU Member States.

An international guideline on the management of anticoagulant resistance has been published by the Rodenticide Resistance Action Committee of CropLife International.

Other Guidelines are available in certain Member States, such as those for the management of resistant Norway rats and house mice published by the Rodenticide Resistance Action Group in the UK, and resistance guidelines published in Germany by the Expert Group on Rodenticide Resistance, at the Julius-Kühn-Institute.

These guidelines should be read and implemented by all those who conduct professional pest control operations.

Two essential actions should be carried out when faced with a rodent infestation that is resistant to anticoagulants that will prevent the spread of resistance and result in effective rodent control:

1. Immediately stop using the active substances that are resisted.
2. Use alternative methods of rodent control. This will involve both using rodenticides that are not resisted and carrying out all other appropriate actions to prevent rodent infestation of the site, such as removal of available foods and environmental improvements so that there are fewer places where rodents can harbour.

Resistance to the anticoagulant rodenticides is a growing problem in the EU. There is now evidence of resistance to anticoagulants in Belgium, Denmark, France, Germany, the Netherlands, Hungary and the UK

10. Training and Certification Requirements for Rodenticides Used as Biocides in the EU

Training is essential to the application of Best Practice. Training programmes are in place in many EU Member States for those who offer a commercial service of pest control to third parties (i.e. professional pest controllers). However, many other user groups may be considered 'professional' users under some definitions of the word, including farmers, smallholders, janitors, storage facility and food outlet managers, gamekeepers, etc. Often the training of these so-called 'professionals' is either inadequate or non-existent.

Requirements for the training of professional pest control technicians differ greatly in the countries of the EU. In some countries training is a required prerequisite within a formal process of certification and licensing of pest control practitioners. In other countries no statutory requirement for licensing exists and formal training is voluntary, where it occurs at all.

Clearly, those who apply rodenticides on a professional basis should be required to be competent in their use and this may or may not be a statutory requirement in EU Member States. Therefore, in all situations adequate training in the use of rodenticides is always required for professional users, and this training should cover all of the elements necessary to deliver safe, effective and legal control of rodent pests. The licensing of professional pest controllers is a helpful step towards ensuring proper training and competence among those who provide a commercial service of pest management.

A project is in progress, operated by the European Committee for Standardisation (CEN) and the Confederation of European Pest Management Associations (CEPA), in which the standards of service provided by pest control technicians in the EU are defined. The CEPA/CEN Standard will specify the requirements, recommendations and basic competences under which pest management servicing companies must operate to meet the needs of their customers, be they private companies, public authorities or the general public.

All European national associations who are CEPA members will require their member organisations to uphold this standard once it is in place. This Standard will contribute to controlling unprofessional use of biocidal products, facilitate the availability of a labour force working at an agreed industry standard across the EU and ensure the implementation of Best Practice in all aspects of pest management, including the application of rodenticides.

It is the intention of CEPA to begin implementation the CEPA/CEN Standard in early 2014.



11. Definitions and Glossary of Terms Used

Active Substance: A substance or micro-organism including a virus or a fungus having general or specific action on or against harmful organisms.

Under the Biocidal Products Directive (BPD) (see below) those substances must be listed on the annex I or IA of the BPD in order to be authorised to be used in biocidal products for rodent control purposes in EU.

Under Biocidal Products Regulation (BPR) (see below) those substances shall be placed on a Union list of active substances for use in biocidal products.

Anticoagulants: Anticoagulants prevent the manufacture of clotting agents inside the body, leading to a fatal haemorrhage in 4-10 days. Several anticoagulants have been developed and all have the same mode of action. The anticoagulants authorised for use in rodent control in EU under the Biocidal Products Directive are: brodifacoum, bromadiolone, chlorophacinone, coumatetralyl, difenacoum, difethialone, flocoumafen, warfarin and sodium warfarin.

Authorisation: An administrative act by which the Competent Authority of a Member State authorises the placing on the market of a biocidal product in its territory or in a part thereof.

Biocidal Products Directive (BPD): Directive 98/8/EC of the European Parliament and of the Council of 16 February 1998 concerning the placing of biocidal products on the market. This will be superseded by the Biocidal Products Regulation which enters into force on 1 September 2013.

Biocidal Products Regulation (BPR): Regulation 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products. This comes into force on 1 September 2013.

Biocidal product: Active substances and preparations containing one or more active substance, put up in the form in which they are supplied to the user, intended to destroy, deter, render harmless, prevent the action of, or otherwise exert a controlling effect on any harmful organism by chemical or biological means.

Rodenticides are part of the Product Type 14 (PT 14).

Low-risk biocidal product: A biocidal product which contains as active substance(s) only one or more of those listed in Annex I A and which does not contain any substance(s) of concern. Under the conditions of use, the biocidal product shall pose only a low risk to humans, animals and the environment. The term low risk biocidal product will no longer exist when the BPR repeals the BPD.

Borderline uses: Uses that may be covered by two EC Directives (here Plant Protection Products Directive and Biocidal Products Directive) and by subsequent Regulations (Plant Protection Products Regulation 1107/2009 and Biocidal Products Regulation 528/2012). Products used to control rodents outside plant growing areas, for example in farms, cities, industrial premises, and in plant growing areas not to protect plants or plant products, are considered as biocidal products.

Preparation (formulation): A mixture of components (co-formulants) and an active substance put up in a form in which they are supplied to the user to control rodents. For rodent control the main formulation/preparation types are: blocks, gels, grains, pastes, pellets (non-exclusive list).

First-generation anticoagulant: describes the compounds that act by disturbing blood-clotting and were the first discovered. They are part of the chemical families named indane-diones (chlorophacinone) and hydroxycoumarins (warfarin, sodium warfarin and coumatetralyl).

Integrated pest management (IPM) is an ecological approach to agricultural or urban pest control that integrates pesticides/biocides into a management system incorporating a range of practices for economic control of a pest.

Monitoring: Use of physical tools or placebo baits (without any active ingredient) to monitor the presence of rodents on a site and prevent the development of substantial infestations.

Pattern of use: Authorisation acts and labelling of each biocidal product reflects the use pattern of the products. User must follow the instructions in order to comply with the law.

Permanent baiting: Maintaining quantities of rodenticide bait at one or more locations around a site at all times whether or not rats are present. Permanent baiting may occur (by default) if uneaten bait is not retrieved at the end of a treatment. This way of rodent control is not Best Practice. - see monitoring or preventative rodent control.

Physical treatments: Treatments that involves physical means, such as traps, proofing, sticky boards, etc. As opposed to chemical or biological treatments which involves biological or chemical products such as defined by the Plant Protection Products or Biocidal Products Directives.

Preventative baiting: Placing quantities of rodenticide bait at one or more locations in or around a site when rodents are not present at the site, in order to prevent rodent infestations. This method of rodent control is prohibited in some Member States. - see permanent baiting and preventive rodent control.

Preventative rodent control: Using physical tools and monitoring tools in order to prevent infestation of a site.

Primary poisoning: A risk associated with all rodenticides treatments, when non-target animals eat the bait directly and are poisoned. Primary poisoning can be prevented by adequate protection of bait points, and when possible limiting access of domestic animals from the treatment areas.

Registration: An administrative act by which the Competent Authority of a European Union Member State, following an application submitted by an applicant, after verification that the active substance dossier meets the relevant requirements of the Directive, allows the placing on the market of a low-risk biocidal product in its territory or part thereof. This term applies to registrations granted under BPD and is not relevant to BPR. Any registration granted under BPD will remain valid until the expiry date of the registration or its cancellation.

Resistance: The term rodenticide resistance has several interpretations. "Anticoagulant resistance is a major loss of efficacy in practical conditions where the anticoagulant has been applied correctly, the loss of efficacy being due to the presence of a strain of rodent with a heritable and commensurately reduced sensitivity to the anticoagulant."

Second-generation (anticoagulant): Introduced primarily to counter resistance to first-generation anticoagulants. They retain the same mode of action as the previous compounds. They are brodifacoum, bromadiolone, difenacoum, difethialone, and flocoumafen.

Secondary poisoning: A risk associated with anticoagulant rodenticides treatments, when predators, such as foxes, stoats and weasels, and scavengers, such as red kites and corvids eat rodents that have eaten poison bait and then become casualties as well. While primary poisoning (non-target animals eating the bait directly) can be largely prevented by adequate protection of bait points, the risk of secondary poisoning can be reduced by regularly searching for and disposing of dead or dying rodents. It can also be prevented by ensuring that non-target small rodents do not consume baits.

Acute / Sub-acute rodenticides: Rodenticides which act within a day after exposure to the product (gassing agents, fumigants, baits containing active substances non-anticoagulant such as alphachloralose.), in contrast to the slow-acting rodenticides (i.e. anticoagulants).

Slow-acting (rodenticides): A description of the rodenticidal process, in which symptoms of poisoning appear some time (delayed action) after a rodent, has fed on bait, so that it is unable to associate its illness with a particular food type or its taste. A characteristic of anticoagulants that has undoubtedly been responsible for their success, as it minimises the likelihood of the development of learned aversions.

Vitamin K: Vitamin that interferes with the action of the anticoagulant rodenticides. Natural foods containing vitamin K1 and manufactured animal feeds enriched with vitamin K3 help resistant rats to thrive in the absence of anticoagulants. Some strains of resistant rat require additional vitamin K in order to maintain normal blood clotting activity. Vitamin K3 may also protect resistant rats from small doses of second-generation anticoagulants.

Vitamin K1: The antidote to anticoagulant poisoning.

12. Find Out More

General

Larsen, J. (2003). Emission scenario document for biocides used as rodenticides. Supplement to the methodology for risk evaluation of biocides. EUBEEES 2. Institute for Health and Consumer Protection. European Commission Document CA-Jun03-Doc8.2-PT14. 74 pp.

Available at: ihcp.jrc.ec.europa.eu/our_activities/.../PT_14/PT_14.../file

Cefic (2011). Sustainable use of rodenticides as biocides in the EU. European Biocides Producers Forum, Cefic, Brussels, 20 pp.

Available at: <http://www.cefic.org/Documents/Other/EBPF%20Sustainable%20use%20of%20rodenticides%20as%20biocides.pdf>

Rodent behaviour in relation to use of rodenticides

Central Science Laboratory (2002). The control of rats with rodenticides: A complete guide to best practice. Central Science Laboratory (now Food and Environment Research Agency), Sand Hutton, UK. 67 pp.

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

Quy (2011). Review of the use of bait boxes during operations to control Norway rats, *Rattus norvegicus* – a report to CIEH. Food and Environment Research Agency, Sand Hutton, UK. 12 pp.

Available at: http://www.urbanpestsbook.com/downloads/CIEH_Rodent_Procedures.pdf

Other Best Practice Guidance

AENOR (2008). UNE 171210:2008 Calidad ambiental en interiores. Buenas prácticas en los planes de desinfección, desinsectación y desratización. (Indoor air quality. Best practice for the planning of disinfection, insect and rodent control.) Spanish Association for Standardisation and Certification (AENOR).

Available at: <http://www.en.aenor.es/aenor/normas/normas/fichanorma.asp?tipo=N&codigo=N0041497&PDF=Si#.UNBZ7eTWgm->

BPCA (2001). BPCA Guidelines for the safe use of anticoagulant rodenticides by professional users. British Pest Control Association, Derby, UK. 8 pp.

Available at: http://www.bpca.org.uk/pages/index.cfm?page_id=1&home

Campaign for Responsible Rodenticide Use (2013). Rodent control and game management. 16 pp. Available at: <http://www.thinkwildlife.org>

Central Science Laboratory (2002). The control of rats with rodenticides: A complete guide to best practice. Central Science Laboratory (now Food and Environment Research Agency), Sand Hutton, UK. 67 pp.

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

HSE (2004). Urban rodent control and the safe use of rodenticides by professional users. HSE Information Sheet MISC515. Health and Safety Executive, Bootle, UK. 7 pp. **Available at:** <http://www.hse.gov.uk/pubns/misc515.pdf>

Julius Kühn-Institut (2012). Ratten erfolgreich bekämpfen - Resistenz erkennen. Informationsblatt erstellt vom Fachausschuss „Rodentizidresistenz“ beim Julius Kühn-Institut, Munster, Germany. 6 pp. Available at: http://www.jki.bund.de/fileadmin/dam_uploads/_veroeff/faltblaetter/Ratten%20erfolgreich%20bekaempfen.pdf

NPAP (2009). Pest control procedures manual – rodents. National Pest Advisory Panel (NPAP), Chartered Institute of Environmental Health, London, UK. 31 pp. **Available at:** www.cieh-npap.org

NPAP (2013). National Sewer Baiting Protocol – Best Practice & Guidance Document. National Pest Advisory Panel (NPAP), Chartered Institute of Environmental Health, London, UK. 21 pp. **Available at:** www.cieh-npap.org

Risk Assessments

Killgerm Chemicals (2008). The Killgerm guide to environmental assessments when using rodenticides. Killgerm Chemicals Limited, Ossett, UK. 23 pp.

Available at: http://www.killgerm.com/be/downloads/work_study/Environmental_Assessments.pdf

CRRU (2012). Environmental assessment when using anticoagulant rodenticides. Campaign for Responsible Rodenticide Use, UK. 6 pp.

Available at: http://www.thinkwildlife.org.uk/downloads/Environmental_Assessment_When_Using_Anticoagulant_Rodenticides.pdf

HSE (2011). Five steps to risk assessment. INDG163(rev3), revised 06/11. Health and Safety Executive, Bole, UK. 8 pp.
[Available at: http://www.hse.gov.uk/pubns/indg163.pdf](http://www.hse.gov.uk/pubns/indg163.pdf).
HSE (2012). Working with substances hazardous to health: a brief guide to COSHH. Health and Safety Executive, Bole, UK. 10 pp.
[Available at: http://www.hse.gov.uk/pubns/indg136.pdf](http://www.hse.gov.uk/pubns/indg136.pdf).

Anticoagulant Resistance

RRAC (2003). Anticoagulant resistance management strategy for pest management professionals, central and local government and other competent users of rodenticides. Rodenticide Resistance Action Committee, CropLife International, Brussels, Belgium. 16 pp.
[Available at: http://www.rrac.info/downloads/technical_monograph_2003_ARM.pdf](http://www.rrac.info/downloads/technical_monograph_2003_ARM.pdf)

RRAG (2010). Anticoagulant resistance in the Norway rat and Guidelines for the management of resistant rat infestations in the UK. Rodenticide Resistance Action Group, Derby, UK. 8 pp.
[Available at: http://www.bpca.org.uk/assets/RRAG_Resistance_Guideline.pdf](http://www.bpca.org.uk/assets/RRAG_Resistance_Guideline.pdf).

RRAG (2012). RRAG house mouse resistance guideline. Rodenticide Resistance Action Group, Derby, UK. 11 pp.
[Available at: http://www.bpca.org.uk/assets/RRAG-Housemouseresistanceguideline1.pdf](http://www.bpca.org.uk/assets/RRAG-Housemouseresistanceguideline1.pdf).

Julius Kühn-Institut (2012). Expert Committee on Pesticide Resistance - Working Group Rodenticides, ECPR – R (Fachausschuss Rodentizidresistenz), Julius Kühn-Institut (2012).
[Available at: http://www.jki.bund.de/fileadmin/dam_uploads/_GF/pdf/2012%20Strategie%20des%20FARR%20zum%20Schadnagermanagement%20bei%20Antikoagulanzen-Resistenz.pdf](http://www.jki.bund.de/fileadmin/dam_uploads/_GF/pdf/2012%20Strategie%20des%20FARR%20zum%20Schadnagermanagement%20bei%20Antikoagulanzen-Resistenz.pdf)

Certification and Training of Professional Pest Control Technicians

European Committee for Standardization (CEN) (2013) Pest management services - Requirements and competences. Document: prEN 16636:2013 (E). Consultation Draft. European Committee for Standardization, Management Centre, Avenue Marnix 17, B-1000 Brussels. 34 pp.

Cefic - The European Chemical Industry Council

Chemistry making a world of difference

Cefic is the Brussels-based organisation representing national chemical federations and chemical companies in Europe. Cefic represents, directly or indirectly, around 27,000 large, medium and small companies in Europe, which employ about 1.2 million people and account for more than 29% of world chemicals production.

September 2013



Cefic
Avenue E. van Nieuwenhuysse 4
B - 1160 Brussels
tel +32 2 676 72 11
fax +32 2 676 73 00
mail@cefic.be
www.cefic.org