Rats

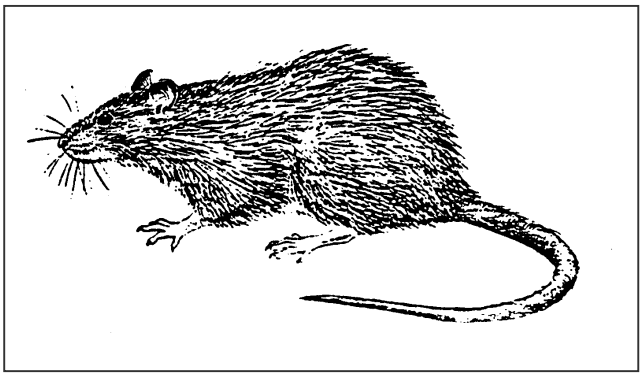
The rat normally found in rural and urban locations is the common or brown rat, *Rattus norvegicus.* This rat can carry a wide range of diseases and parasites that are potentially harmful to both humans and livestock. In addition, rats can cause damage to buildings and property, as well as eating and contaminating stored foodstuffs.

Description and behaviour

Rats live in colonies and have the breeding capability to increase rapidly their numbers. An adult female rat can produce an average litter of seven or eight young every three or four weeks.

Rats live in burrows or within the fabric of buildings and other structures, and they rely on the availability of suitable harbourage, food and water in order to thrive. Rats are capable of exploiting a wide range of different habitats and situations.

Their gnawing behaviour results in damage, they are good climbers and are capable of swimming. These characteristics need to be taken into account when considering measures to exclude these animals.



Disease risk and damage

Of the diseases carried by rats in the United Kingdom, the potentially fatal Leptospirosis or Weils Disease is the most well known, with some 15-30% of rats likely to be carriers. As a result, infested areas should be considered a source of this disease. The bacteria are excreted in rat urine and are passed on when humans come into contact with contaminated surfaces.

Rat contamination of foodstuffs or food contact surfaces is unacceptable. In food business premises, this would result in failure to comply with hygiene requirements such as those contained in the Food Safety (General Food Hygiene) Regulations 1995.

The direct and indirect costs of structural damage by rats can also be high. Containers, packaging, insulation and many other materials are vulnerable to their gnawing activities. There is a significant risk of fire and electrocution as a result of damage to electrical cables and wiring.

Prevention of infestations

Rats may be discouraged and infestations prevented by improving hygiene to make sites less attractive, and by proofing buildings and other structures against access.

It is important to remove rubbish and disused fixtures or equipment that may provide harbourage. Vegetation should be eliminated from around buildings, and materials should not be allowed to accumulate in these areas.

Fewer rats will be attracted to a site if food sources, such as spillages around refuse collection areas, are removed and supplies protected by storing them in secure containers. These actions are also likely to improve the success of rodenticide baiting treatments by removing alternative food.

Where practical, structures should be proofed to prevent rats gaining access. This includes blocking holes in walls and doors; repairing or replacing damaged covers to manholes or drain access chambers, and filling in gaps around entry points of services. Baffles can be fitted to rainwater down pipes and cables. Metal sheeting, crushed wire mesh and

concrete are examples of materials that are likely to resist gnawing by rats.

Control measures

Despite good standards of hygiene and proofing, infestations will sometimes occur. In such circumstances, it will be necessary to take action to eliminate the rats.

Pest control contractors should be competent and adequately instructed in all aspects of rodenticide use. In all cases, the manufacturer's instructions must be carefully followed and, if necessary, further advice sought.

When to control

There is no “season” for rat control. Rats breed all year round, and although migration into buildings or other sheltered areas usually occurs with the onset of winter, it is essential that rat control is undertaken whenever a problem is identified. Leaving a small infestation untreated and allowing it to develop not only increases the risk of damage and disease, but also makes subsequent control more costly and difficult. Regular inspections of premises should be made so that control can be instigated at the earliest opportunity.

How to control

The first step in any control operation is to identify where rats are living, travelling and feeding. During the site survey, inspect for evidence of:

- holes
- runs
- droppings
- damaged materials
- live and dead rats
- footprints
- smears (grease marks left as a result of the use of regular routes)

It is essential to identify all areas of activity; any that are missed may act as a source of re-invasion. Each building and surrounding areas, including adjoining hedgerows and ditches, should be inspected.

During the survey, suitable baiting points should be identified, and the presence of non-target species noted. Any deficiencies in hygiene and proofing should also be recorded. On large sites, a map of the area showing the area of infestation and the location of baiting points should be made.

Which techniques to use

The use of anticoagulant rodenticides is the most efficient and cost effective control technique currently available. These rodenticides are based on a number of compounds. Some products are not permitted for amateur use, and in addition, those containing brodifacoum and flocoumafen **must not be used out of doors**.

A range of ready to use formulations is available as well as some concentrates that can be mixed with a bait base to suit the situation. The supply of concentrates is limited to trained and competent users. Although a variety of bait bases may be used, whole wheat mixed with corn oil (5%) and sugar (5%) has been found to be effective. Mixing the concentrate with the food already being taken by the rats is another possibility. Instructions on the product label give guidance on the formulation and mixing of baits and these should be followed.

Baiting procedures

One of the keys to the success of anticoagulants is their slow mode of action. Most require the rats to feed a number of times before they have eaten enough rodenticide to cause death. Rats react to any changes in their environment and so it may be several days before they start to feed on the bait. Therefore, it is essential to make sure that the bait is available over a period of at least four weeks and even longer if bait is still being consumed. Frequent visits will be necessary during this time to keep the bait points topped up with rodenticide. Bait must be available to the rodents throughout the treatment period. During these visits, any bait spillages should be cleared up and rodent bodies disposed of safely.

The rodenticide bait must be placed in areas where rat activity has been identified during the survey. The closer the bait can be placed to the normal areas of activity, the higher the chances are that it will be taken by the rats. The bait should never be placed in such a

way that other non-target species can gain access, either directly or as a result of spillage. To achieve this, the bait should be placed in a suitable box or container that excludes other animals, An alternative to this is to cover the bait with materials available on the site, or place it in an enclosed area where access can be limited.

Where bait is placed in holes used by rats, this should be covered and regular checks made for signs of bait residues being deposited on the surface. Bait bags and sachets can be moved or displaced by rats and, where appropriate, these should be both protected and secured at their placement site.

If the rats fail to feed on the baits, it may be because they are reluctant to change from their normal food. In all cases, alternative food sources should be removed by placing it out of reach or putting it in rat-proof containers.

The quantity of bait required will vary with the different products and the number of rats present. To ensure safe and effective use, always read the label and follow the instructions. If all the bait is eaten, this is an indication that insufficient bait has been used at each point; it may also be necessary to increase the number of baiting points.

Permanent baiting

In some situations, where continual re-invasion occurs from neighbouring land or where immigration is expected with the onset of winter, permanent baiting can be effective. This involves the placement of bait in weather- and animal-proof containers on routes such as ditches and hedgerows that are likely to be used by rats.

Anticoagulant resistance

Most treatment failures are due to a poor initial survey, inadequate placement of baits or failure to replace eaten baits during the treatment. However, anticoagulant resistance is an increasing cause of treatment failure in a number of areas. Such resistance is a genetic, inherited characteristic and is not acquired during the rat's lifetime.

In England, anticoagulant-resistant rats are found in a large area on the English/Welsh border, including the county of Shropshire as well as significant parts of neighbouring counties. In addition, large areas of resistance are now present in central south and southeast England, particularly in the counties of Berkshire, Hampshire, Wiltshire, Sussex, Kent, Surrey and Essex. However, resistance is not limited to these counties.

Resistance in rodents becomes evident when the rats continue to feed on the bait but the rodenticide no longer kills them. It can be recognised when baits continue to be eaten into the fifth and sixth weeks of the treatment, with no reduction in the population.

If the problem is encountered when using the anticoagulants warfarin, chlorophacinone, diphacinone or coumatetralyl, it is worth switching to a different anticoagulant such as difenacoum or bromadiolone. If problems are encountered when using difenacoum, then bromadiolone should be tried, and if problems occur with bromadiolone, then difenacoum may be effective. The rats are likely to be susceptible to both brodifacoum and flocoumafen, although their restriction to professional and indoor use only makes them unsuitable for many situations.

Other control techniques

Alternative control techniques to the anticoagulant rodenticides include acute rodenticides and traps. Whilst both can be used to kill rats, they require both care and skill in use to be effective. Currently available chemical repellents and physical or electronic deterrents are unlikely to be effective against rat infestations in most situations.

Safety precautions

Anticoagulants and other rodenticides are poisonous to humans, livestock and wildlife as well as to rats. Always read and follow label instructions before use.

When handling any pesticide, use appropriate protective clothing and equipment, as indicated on the product label instructions. If you think that you have become ill as a result of handling rodenticides, seek medical advice immediately. Keeping a record of which rodenticides have been used provides important information for medical and veterinary services. Where appropriate, inform site occupiers or others of

the measures that have been taken and the action required in case of accidental poisoning.

When using rodenticide concentrates do not be tempted to increase the concentrations of rodenticide in baits. This is illegal and is likely to reduce the palatability of baits, and it poses a greater risk to non-target species.

Ensure baits are placed so that they are not accessible to children and animals; all reasonable precautions must be taken to ensure that livestock are kept away from treatment areas. Pigs and dogs are especially prone to poisoning by anticoagulants.

When treatments are completed, all uneaten bait should be disposed of safely according to label instructions, usually by burning or burying. Dead rodents should be disposed of in a similar manner, and care must be taken when handling carcasses.

Rodenticide baits should be kept safely locked away and any equipment used to mix or dispense bait should be washed after use. Empty containers should also be washed out thoroughly and disposed of safely. Avoid contamination of ponds, ditches or waterways.

Legal aspects

Under the Prevention of Damage by Pests Act 1949, local authorities are responsible for ensuring that their districts are kept, as far as is practicable, free of rodents. In addition, the Act requires that occupiers of non-agricultural land must notify the local authority if "substantial numbers" of rodents are living on or resorting to the land. There is no requirement, however, for occupiers of agricultural land to notify the local authority of the presence of rodents. The Act gives local authorities the power to require landowners and occupiers to control rodent infestations on their land. Local authorities can also, where necessary, carry out the control work in default and recover the cost of such action from the landowner or occupier.

The Health and Safety at Work Act 1974 places responsibilities on employers for the health and safety of their employees. This has relevance to the risk of rats transmitting disease and on the safe use of rodenticides. This Act also places a responsibility on employees to work in a safe manner.

Under the Control of Substances Hazardous to Health Regulations 1994 (COSHH), employers must ensure that an assessment is carried out of the risks to human health arising from contact with rodents and from the use of pesticides. Suitable precautions must be taken to prevent or control any risks.

The Food and Environment Protection Act 1985 places a general obligation on all users of pesticides to take all reasonable precautions to protect the health of humans, creatures and plants, to safeguard the environment and, in particular, to avoid the contamination of water.

The Control of Pesticides Regulations 1986, as amended, prohibits the advertisement, sale, supply, storage or use of a pesticide unless it has been approved. All users of pesticides must comply with the statutory conditions of use shown on the product label.

Further information

In England, further advice on dealing with rat problems, as well as problems caused by other mammals and birds can be obtained by contacting the Department for Environment, Food and Rural Affairs (Defra) Wildlife Management Team at:

Address	Wildlife Administration Unit Defra, Burghill Road Westbury-on-Trym Bristol, BS10 6NJ
Telephone	0845 601 4523 (local rate)
E-mail	enquiries.southwest@defra.gsi.gov.uk

A range of leaflets on wildlife topics is available online at: www.defra.gov.uk/wildlife-countryside/vertebrates

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