

Combatting rodenticide resistance



Adrian Meyer

Rodenticide resistance is an increasing problem. Should the resistant colony be living out-of-doors the problem is compounded as it is possible that the only rodenticides likely to offer control are not approved for such use. In a personal review of the situation, rodenticide expert, Adrian Meyer from Acheta, addresses these issues head-on.

It has been evident for many years that there are an increasing number of field problems with the control of Norway rats. These have occurred over a number of areas in England, Wales and, possibly, Scotland, but are a particular problem in Central Southern England.

No attempt to address this issue has been taken by any central government department. Indeed all resistance monitoring resources were withdrawn in 1996, just as the seriousness of the problem was becoming evident!

Of even more concern is a recent rejection by the Advisory Committee on Pesticides (ACP) of an application to undertake two managed and monitored field trials using brodifacoum 'in and around' infested buildings in the very troublesome Hampshire/Berkshire resistance area.

It would appear from this decision by the ACP that, not only is central government refusing to address this issue, but nobody else is being allowed to investigate the

situation either! This rejection is short-sighted – in practice how are practical pest controllers ever going to achieve control where rats are proven to be resistant, if nobody is going to provide them with the means of doing so. It is hoped that the industry-funded pilot project, which has just begun, to provide data on the distribution of anticoagulant resistance, will go some way towards changing their minds (see page 6).

I was personally involved in a problem situation in Winchester – fortunately as explained in the case study opposite, on this occasion an Emergency Extension for the use of brodifacoum was granted.

Failure to achieve rodent control at such sites raises many significant issues, notably:

- Increased **environmental risk** from the very significant application of enormous quantities of anticoagulant rodenticide which will never work!
- The **costs** associated with the purchase of such rodenticides as well as the very

“Not only is government refusing to address this issue, but nobody else is being allowed to investigate the situation. Simply doing nothing is not acceptable,” says Adrian Meyer.

significant labour costs involved in their application, all to no purpose!

- The failure of central government and local authorities to address this issue raises the question of their willingness to meet their obligations under the **Prevention of Damage by Pests Act 1949**, to 'keep their areas as free as practically possible of rats and mice'.
- The failure to achieve control of significant Norway rat infestations must place both human and livestock populations at risk from **disease transfer** and other hazards. Do we have to wait for someone to die from leptospirosis before anything is done? How do we know that this has not happened already?
- Failure to achieve control of Norway rat infestations must contravene the **Health and Safety at Work etc Act 1974** in terms of employer's responsibilities for the health of their employees.
- Of particular concern recently has been the **amazing rejection by the ACP** to permit even the most competent and experienced organisation to undertake a controlled and managed research programme on the issue.

The current position which hampers our ability to control resistant Norway rat populations in some areas of the UK is not sensible. The restriction on the use of brodifacoum and flocoumafen to 'indoor use' **must** be reviewed.

Simply doing nothing is **not acceptable**.



The Winchester experience

Adrian Meyer gives us an insight into how brodifacoum can be an invaluable tool when faced with resistant rat populations.

In September 2006, I was approached for assistance in relation to a site in the urban area of Winchester in Hampshire. Difficulties had been experienced with the control of a relatively small (12 - 24 burrows) infestation of Norway rats (*Rattus norvegicus*) in an area around a series of flower beds adjacent to buildings used for accommodation. There had been rat activity within the buildings, but this population had been easily controlled using brodifacoum baits.

The outdoor area was being thoroughly baited by a combination of rat bait boxes and burrow baiting. Although there was little evidence of a great deal of bait take from the bait boxes, the bait was being very readily taken from within the burrows.

Over the previous years there had been a number of contractors involved with the site, but none had been able to achieve control in this external area. My review of the records was interesting and, although there was some uncertainty about exact quantities, it appeared that the quantities of bait that had been used over the previous two years were as shown in the table below.

At the time of my involvement the contract had recently been acquired by Chris and Tina Healy of Latham Pest Control from Eastleigh, near Southampton. Following discussions with them, and also the site managers, it was agreed that there was clear evidence that the failure to achieve control was as a result of resistance to the available anticoagulant rodenticides.

We felt brodifacoum or flocoumafen used out-of-doors would offer control. However, their use was 'strictly for inside use only'. If we were to have any chance of receiving approval for the use of these rodenticides 'out-of-doors' and around the buildings, we would have to have clear evidence that the rats were eating quantities of the bait that would normally have killed them and that therefore there was probably resistance on site.

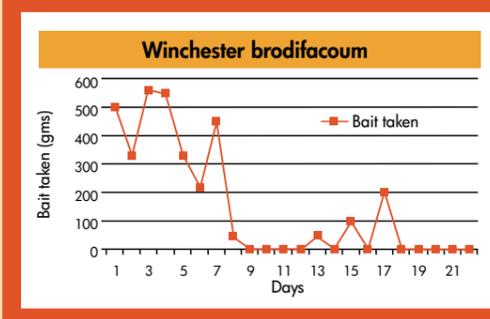
So we started again! Chris and Tina undertook another thorough survey and using bait boxes and burrow baiting, they baited using both difenacoum and bromadiolone baits over the next ten weeks.

At the end of this treatment period there had been no reduction in rodent activity. We, and also the client, were convinced that there was serious resistance on site.

The end result was, on a relatively small Norway rat infestation a total of some 213 kgs of largely second generation anticoagulant bait had been used over a period of 15 months with NO reduction in activity.

Next steps

So, with the client's approval, we approached Sorex to seek their help with an application to use Sorex Brodifacoum Rat and Mouse bait around buildings (i.e. out-of-doors) to solve this problem. Such applications have to be made through the approval holder of the product for which the exceptional use is being sought – it is, after all, their rodenticide.



To cut a long story short, the regulatory and technical staff at Sorex gave their full support and an application was made by Sorex to the Health and Safety Executive for an 'Emergency Extension of an Existing Approval'. Eventually approval was given.

The Emergency Extension permitted the use of a maximum of 25 kgs of Sorex Brodifacoum Rat and Mouse Bait over a six week period. There were additional stipulations relating to the records required, but nothing that a competent pest controller would not have done anyway.

Chris and Tina started work on 2 January 2007, baiting in exactly the same way as they had before and, again, keeping accurate records. The results are presented in the graph above.

Control of the infestation was achieved after 18 days. The total quantity of brodifacoum bait taken was 3.4 kgs from the 5.8 kgs used in the treatment. The bait not taken was recovered and disposed of safely. There was no observed access to the baits by non-target species and no non-target casualties were reported.

In addition, a number of rat carcasses were recovered from the site and the last few inches of tail removed for DNA analysis of the VKORC1 gene. The tails were then sent to Huddersfield University, to determine whether or not the rats had the mutations associated with resistance (see the report in **Pest** issue 3).

To no-one's surprise, the results from Huddersfield indicated that the L120Q substitution, commonly known as Hampshire/Berkshire resistance, was found in all the samples. This mutation imparts field resistance to both difenacoum and bromadiolone, but susceptibility to brodifacoum and flocoumafen remains.

To conclude. Control at this site would never have been achieved using the only second generation rodenticides approved for out-door-use – difenacoum and bromadiolone.

Quantity of rodenticide bait used externally

Bait used	Sept 05 to Mar 06	Mar 06 to Sept 06	Sept 06 to Nov 06
Warfarin	7 kgs	Difenacoum and bromadiolone used - exact quantities unknown	-
Difenacoum	35 kgs		10 kgs
Bromadiolone	40 kgs		21.5 kgs
Total	82 kgs	approx 100 kgs	31.5 kgs

Total of 213 kgs used over 15 months with NO reduction in rodent activity