

# Pesticide poisoning of animals in 2004

Investigations of suspected incidents  
in the United Kingdom



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### A Report of the Environmental Panel of the Advisory Committee on Pesticides 2005

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# Preface

The Wildlife Incident Investigation Scheme (WIS) is invaluable in monitoring the unwanted effects pesticides have on wildlife. Detailed investigations of reported incidents result in the incidents being classed as arising from approved use, misuse or deliberate abuse.

In 2004, there were fewer suspected pesticide incidents, and of those suspected incidents, a slightly smaller proportion was actually found to have been caused by pesticides (29% compared with 32% in 2003). For the very first time since the WIS began none of the incidents investigated was the result of approved use. The number of misuse incidents (usually careless use) increased from 17 to 19, while the number of incidents of deliberate abuse fell from 85 to 56 (54% of all pesticide incidents, compared with 68% in 2003).

These figures suggest a general improvement, in the sense that the number of cases of deliberate abuse have dropped, although the scheme does depend on incidents being reported by the public and we never know how many pesticide incidents are not reported. So we are cautiously optimistic about the success of the Campaign Against Illegal Poisoning of Wildlife.

This is the last year that we will present the report in this format. In future, we will summarise information in a shorter, more accessible format, although we will report on the individual incidents in an appendix. We are also looking into making fuller details available through the PSD website.

As always, I am grateful for the dedicated work of everyone involved with the scheme. I receive regular updates through the year and staff are always ready to provide more information when necessary.

A handwritten signature in black ink that reads "Robert Smith". The signature is written in a cursive style and is underlined with a single horizontal stroke.

**Professor Robert Smith**

Chairman  
Environmental Panel of the Advisory Committee on Pesticides

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# Summary

In the UK, the Wildlife Incident Investigation Scheme investigates deaths of wildlife (including companion animals such as pets and working dogs, some livestock and 'beneficial' insects) where there is strong evidence to suggest that they may have been poisoned by pesticides.

The scheme provides a unique way of monitoring pesticide use, so that a pesticide's approval can be altered if necessary. It also measures the success of the pesticide-approval process and helps to check and improve risk assessments. Evidence from the scheme may also be used to enforce laws on the safe use of pesticides and laws which protect food, the environment and animals.

- In 2004, 355 suspected poisoning incidents were reported under the scheme. The causes were found in 168 incidents, of which 104 (29% of all incidents reported) were pesticide poisoning. In the remaining incidents, there was either too little information, not enough suitable tissues for analysis, or no pesticide residues found (see table 1 on page 20). In 2003, there were 397 suspected poisoning incidents reported under the scheme and the causes were found in 203 incidents, of which 126 (32% of all incidents reported) were pesticide poisoning.
- In 2004, no incidents were caused by pesticides used in line with the conditions of their approval (approved use), but there were four incidents (including one bee incident) in 2003. 2004 is the first year that no approved use incidents have been reported under the scheme. Table 23 on page 42 shows the numbers reported in previous years.
- In 2004, the number of misuse incidents, often the result of pesticides being used carelessly, was 19 (18% of confirmed poisonings). One of these incidents involved bees. In 2003, there were 17 incidents (13% of confirmed poisonings). Again, one of these incidents involved bees.
- In 2004, deliberate abuse of pesticides was identified in 56 incidents (54% of confirmed poisonings), one of which involved bees. In 2003 there were 85 incidents (68% of confirmed poisonings), none involving bees.
- In 2004, there were 25 incidents (24% of confirmed poisonings), including two involving bees, where there was not enough information available to identify the source of the poisoning, or where the other categories (approved use, misuse or deliberate abuse) did not apply to the incident. We class incidents like this as unspecified use. In 2003, there were 19 unspecified use incidents (15% of confirmed poisonings), including six involving bees.

# Summary

- In 2004, there were four incidents of honeybees being poisoned by pesticides, out of 23 incidents reported under the scheme (see table 17 on page 36). In 2003, there were eight pesticide poisoning incidents confirmed out of 24 investigated.
- In 2004, there were four incidents where veterinary products were thought to be involved (see table 4 on page 21) compared to one incident in 2003.

As in previous years, all incidents where pesticides were thought to be involved were thoroughly investigated. Where appropriate, and where we had enough evidence, Defra and other agencies (see 'Enforcement action' on pages 17 to 19) brought forward prosecutions for the illegal use of pesticides. Misuse or approved use incidents can highlight problems with a product's approval or the label instructions, and can provide valuable feedback.

Of the 355 suspected poisoning incidents reported under the scheme:

- vertebrates (animals with a backbone or spinal column) were involved in 289 incidents;
- bees were involved in 23 incidents; and
- suspicious materials or substances were found, but there were no dead animals, in 43 incidents.
- In England, 145 incidents were reported and 59 (41%) were found to be caused by pesticides (see table 2 on page 20).
- In Scotland, 121 incidents were reported and 34 (28%) were found to be caused by pesticides (see table 2 on page 20).
- In Wales, 38 incidents were reported and seven (18%) were found to be caused by pesticides (see table 2 on page 20).
- In Northern Ireland, 51 incidents were reported and four (8%) were found to be caused by pesticides (see table 2 on page 20).

In these 104 poisoning incidents caused by pesticides in England, Scotland and Wales and Northern Ireland, 28 pesticides were identified (see table 4 on page 21). In 2003, 24 pesticides were found.

# Introduction

Before a pesticide can be approved for use in the United Kingdom, the effect it may have on wildlife must be assessed. If the assessment identifies an unacceptable risk, then its use will be restricted (to protect wildlife and other animals) by conditions being set on the pesticide's approval.

In the United Kingdom, the Wildlife Incident Investigation Scheme is split into four sections which investigate reports of possible pesticide poisoning.

- The Department for Environment, Food and Rural Affairs (Defra) and the Welsh Assembly's Agricultural Rural Affairs Department (ARAD) examine cases of suspected pesticide poisoning of vertebrates in England and Wales. Over the years this part of the scheme has widened its scope and can now detect most of the pesticides thought likely to poison animals (see reference 19 on page 48).
- Defra and ARAD investigate suspected pesticide poisonings of beneficial insects (mainly honeybees reported by beekeepers), in England and Wales. This part of the scheme has been running since 1981 (see reference 11 on page 48).
- In Scotland, the Scottish Executive Environment and Rural Affairs Department (SEERAD) investigates vertebrate and beneficial insect incidents.
- In Northern Ireland, the Department of Agriculture, Food and Rural Development (DARD) investigates incidents involving vertebrates and beneficial insects, and has done so formally since 1992.
- Fish are not usually covered by the scheme.

The monitoring of approved pesticides, as carried out by government departments, is funded mainly by the agrochemical industry, under the Food and Environmental Protection Act 1985.

All pesticide incidents reported under the scheme are classed as being in one of the following four categories.

- **Approved use** – the product has been used according to the conditions of its approval.
- **Misuse** – the product has not been used according to the conditions of its approval, but without the intention of harming animals.

# Introduction

- **Abuse** – a pesticide has been deliberately and illegally used to poison, or to try to poison, animals.
- **Unspecified use** – the source of the pesticide is uncertain, or the incident could not be classed as being in one of the other categories.

There is also a 'veterinary use' category if products have been involved in incidents. Veterinary use incidents may arise from abuse, misuse, approved use or unspecified use of veterinary products. These incidents are not formally included in the scheme. If a veterinary medicine is suspected of being involved it should be reported to the Veterinary Medicines Directorate (phone: 01932 338427).

There are some animal deaths that are found to be the result of other causes, which are unrelated to pesticides (for example, disease, starvation, trauma and other poisonings).

The results of investigations carried out under the scheme are reported to us. The information reported may result in a pesticide's approval being reassessed and altered, or may mean that a product with provisional approval cannot be approved for commercial use. Information from incidents also helps to monitor and improve the procedures for new and existing compounds.

If there is evidence of misuse or deliberate abuse of a pesticide, this may also result in legal action. All aspects of advertising, selling, supplying, storing and using pesticides are fully regulated under the Food and Environmental Protection Act 1985 and the Control of Pesticides Regulations. If incidents reveal that these or any other laws (such as the Wildlife and Countryside Act 1981, the Wildlife (Northern Ireland) Order 1985, the Protection of Animals Act 1911 or the Welfare of Animals Act (Northern Ireland) 1972) have been broken, a prosecution or other legal action may follow. Any investigations carried out to enforce the law are paid for by the Home Departments.

The procedures for carrying out investigations under the scheme are described in Appendix 1.

## **The Campaign Against the Illegal Poisoning of Animals**

Interested government departments, led by Defra, continued the long-term Campaign Against the Illegal Poisoning of Animals. The campaign has had a lot of press and media coverage over the years. As a result, the campaign and the scheme are now becoming much more widely known and the Freephone number (0800 321600) for reporting incidents has had a good response. As part of the campaign, there have been recent activities to highlight the buzzard, which is often

# Introduction

the target of abuse incidents. However, there are places in the UK where the abuse of pesticides continues. This will be tackled in future years.

The scheme applies only to incidents:

- that involve the illness or death of animals or beneficial insects and where pesticides are believed to be involved; or
- where pesticides intended or likely to kill animals, including those applied to food items (for example, rabbit or bird carcasses, meat, bread) used as bait, have been found.

The scheme does not investigate incidents where the animal has obviously suffered an injury, or has a disease. A long delay in an incident being reported, or the relevant animal's carcass not being available, may also lead to the scheme rejecting the incident. If there are special circumstances associated with an incident, and the circumstances may provide valuable information to regulators, the scheme may still investigate the matter even if the relevant conditions have not been met.

# Part A. Incidents in 2004

## 1 Number of incidents in 2004

- a This report covers all of the 355 incidents that occurred in 2004 and were investigated under the scheme. The cause of death or illness was found in 168 incidents (47% of those accepted). Pesticide poisoning was the cause in 104 of these incidents (29% of all incidents reported). In the remaining incidents, there was either not enough information, a lack of suitable tissues for analysis or no pesticide residues found. Details of the animals and pesticides involved in all of the incidents investigated by the scheme are given in part C of this report. For information on previous incidents, see references 4 to 8 on page 47 and 12 to 17 on page 48.
  
- b None of the incidents were a result of approved use, 19 were a result of misuse, 56 were a result of abuse, 25 were a result of unspecified use, and four incidents involved pesticides formulated as veterinary products. Positive enforcement continued to be a priority in 2004, which can ultimately lead to offenders being prosecuted. These incidents, together with any regulatory or enforcement activities, are reported in part B of this report.

# Part B: Incidents in 2004 where regulatory or enforcement action was considered

## 1 Approved use incidents

- a Information on incidents suspected to have resulted from approved use is very important, and is fed into the process of regulating pesticide use (see reference 10 on page 47). Where there are significant concerns about the approved use of a pesticide, we will consider what action could be taken to prevent further incidents. The approval holder of the pesticide product involved is always contacted so they can provide comments. Farmers, growers and members of the public are strongly encouraged to report any poisoning which may have resulted from the approved use of a pesticide to their local Defra Rural Development Service office or by calling Freephone 0800 321600. During 2004, no incidents arising from approved use were reported under the scheme.
- b Extra information on all the incidents reported in this part are given in appendix 2. Details relating to specific species are also included in part C of this report.

## 2 Misuse incidents

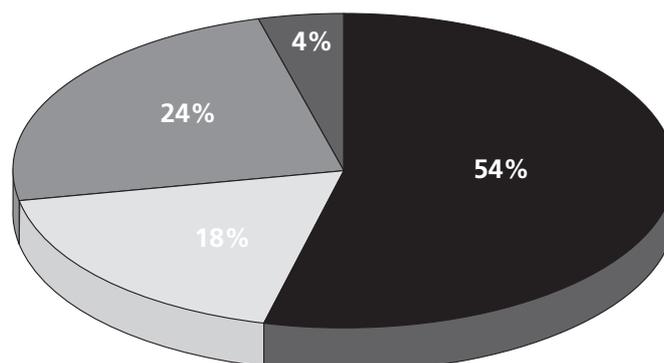
- a There was a number of incidents arising from the misuse of pesticides. These often result from spillages, products not being used or stored in the approved way, or pesticides being disposed of in an inappropriate way (see reference 3 on page 47). The pesticides found in these incidents are mainly rodenticides (products to kill some rodents, such as rats) and molluscicides (products to kill slugs and snails). In 2004, there were 19 misuse incidents (including one honeybee incident) and eight different compounds were involved. In 2003, there were 17 misuse incidents (including one honeybee incident) and 12 different compounds were involved.

**Figure 1: causes of all incidents involving pesticides in 2004 (All pesticide incidents in Northern Ireland were abuse)**

### UK (104 pesticide incidents)

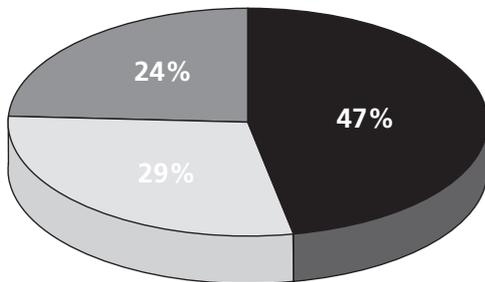
Key

- Abuse
- Misuse
- Unspecified Use
- Veterinary Use

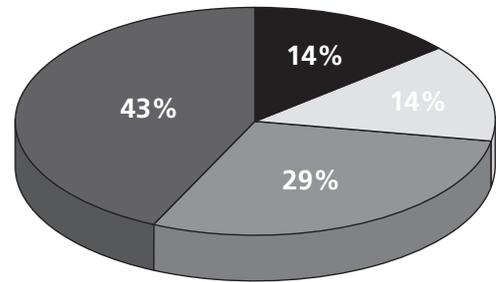


## Part B: Incidents in 2004 where regulatory or enforcement action was considered

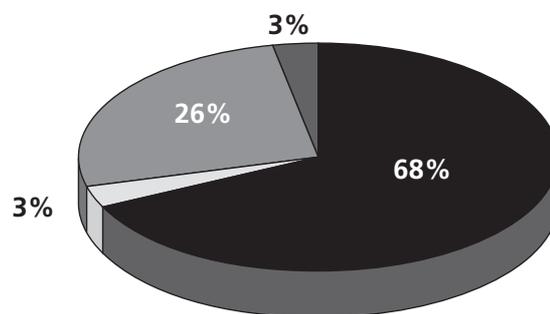
**England (59 pesticide incidents)**



**Wales (7 pesticide incidents)**



Key



**Scotland (34 pesticide incidents)**

- b There were eight misuse incidents which involved metaldehyde slug pellets.
- In one incident (number 60 in Appendix 2), pellets were applied to a field and this left some pellets near an entrance to a badger sett at the edge of the field. An advisory letter was sent to those responsible.
  - In six incidents, (numbers 106, 112, 114, 129, 144 and 155) dogs were poisoned (four of these incidents were associated with spillages left in fields). Wild animals, such as badgers and foxes, are likely to eat slug pellets and so are at risk when spillages are left in an area. The fact that they are likely to remain out of sight once affected means that they are less likely than dogs to be found and reported to the scheme.
  - In another incident (number 75), a large amount of metaldehyde slug pellets had been used on an allotment. Although no casualties were found, some coloured bird droppings were reported in the area. It was claimed that an allotment association had supplied the product in an unlabelled bag and with no product instructions. Trading Standards interviewed those responsible and were satisfied that no further action was necessary.
  - In one incident (number 114), pellets may have been left as a slug trap used to monitor the number of slugs present and so assess when treatment is needed. A decision was made not to prosecute for this incident. Using slug pellets in slug-monitoring traps has caused many incidents

## Part B: Incidents in 2004 where regulatory or enforcement action was considered

of poisoning and is not an approved use of the products. Appropriate methods for assessing the number of slugs are described in "Integrated control of slugs in arable farms – LK0925" (see [www.defra.gov.uk/science/project\\_data/DocumentLibrary/LK0925/LK0925\\_33\\_ABS.pdf](http://www.defra.gov.uk/science/project_data/DocumentLibrary/LK0925/LK0925_33_ABS.pdf)).

- In another incident (number 155) relating to slug pellets, a labrador chewed through a container of slug pellets that had been left on a garden table. It was estimated to have eaten around 100g to 200g of slug pellets. Within two hours, the previously healthy two-year-old dog began shaking and passed a normal motion with blue pellets. That was followed by blue-stained diarrhoea. After about four hours, a vet arrived and treated the dog, but it died shortly after this. The vet decided that the death was caused by the dog eating slug pellets. Unfortunately, the matter was not reported to the scheme until after several months, so no samples were available to test. The product involved contained 3% metaldehyde and Bitrex (a chemical used in pesticide products that acts as a repellent, so animals should not eat them). The dog owner had arranged for an independent laboratory to confirm that the pellets contained the correct amount of Bitrex (300ppm), and it appeared that they contained about half the expected amount (150ppm). So, the owner considered that if the product had contained the correct amount of Bitrex, the dog may not have eaten the pellets and would not have died. However, dogs are considered to be more sensitive than humans to Bitrex, and a level of between 10ppm and 100ppm is effective in humans. So, even half the recommended rate should have prevented the dog from eating the pellets, although it did not in this incident. Also, given the estimated amount of product eaten (100g to 200g), this would be consistent with the lowest amount considered to affect dogs. A dog would normally have needed to eat between 400g to 667g of the product, significantly more than was actually eaten, to have died. This incident was classed as misuse, as the garden table was not a safe storage area for the remaining product. This incident also highlights how different dogs have different reactions to eating metaldehyde – some will die and some survive – and raises questions on the effectiveness of repellants, such as Bitrex, particularly when a product is not stored and used as directed.
- c Six incidents involved anticoagulant rodenticides (poison that prevents blood from clotting). In four of these (numbers 74, 107, 140 and 4111) the problem arose from uncovered bait or bait boxes which were not secured properly. The chemicals involved were difenacoum and bromadiolone, which affected hedgehogs, house sparrows and a dog.
- There was one incident (number 128), where a formulation of warfarin for rat control had been used to treat a squirrel problem. An advice letter was sent to the Pest Control Contractor.
  - Grain samples were tested in another incident (number 98) where the products used

## Part B: Incidents in 2004 where regulatory or enforcement action was considered

contained several active substances. Difenacoum, warfarin, brodifacoum and bromadiolone were found in the samples analysed. The Health and Safety Executive (HSE) will take follow-up action for this incident.

- d There were two incidents of misuse of aluminium phosphide.
- In one incident (number 43), a badger sett had been gassed when a rabbit-control treatment had been undertaken. Enforcement notices were issued and the person responsible had to go on a training course. In a prosecution led by the police, the person responsible pleaded guilty and paid fines and costs totalling £1443.
  - In the other incident (number 62), aluminium phosphide had been used to control rats in a barn, and appropriate precautions had not been taken. Some employees working in the barn were unwell and needed hospital treatment. A smell of garlic had been noted in the barn and when this disappeared, it was assumed to be safe to enter the area. However, phosphine gas does not smell of anything, except when it comes from an aluminium phosphide product (when a smell of garlic may be present). Because of the effects on employees and the Health and Safety at Work Act being broken, the Health and Safety Executive (HSE) prosecuted the employers, and they had to pay fines and costs totalling £52,320.
- e A misuse incident relating to honeybees involved bendiocarb (number B14), which had been used to treat a bee colony in the wild close to the site of the affected apiary. The treated colony had not been sealed off adequately. The beekeeper did not provide any honeybees for analysis, so no enforcement action was taken.
- f Another incident (number 113) involved bendiocarb and several other pesticides, which were found during a search of a gamekeeper's premises. The gamekeeper first claimed that there were no pesticides on the site, but a range of products found in his garage included an unmarked pot full of white powder, allegedly Ficam (bendiocarb). The garage had no lock on the door, no warning signs and no method of containing possible spillages. There were animal feed containers, paints, solvents and gas bottles stored alongside pesticides. The gamekeeper claimed that the pesticides were not for use on the estate. He was issued with an enforcement notice, which he kept to. Products that were not currently approved for use were disposed of correctly and remaining pesticides were stored in their original containers and in a locked cabinet.
- g There was another incident (number 41) confirmed as misuse because of the way pesticides were stored. A gamekeeper's store was easily accessible and various pesticides were stored on

## Part B: Incidents in 2004 where regulatory or enforcement action was considered

the floor, with contents spilt or the containers leaking. Items found on a first-floor loft area suggested that this building was used by children. Of most concern was the presence of Cymag (sodium cyanide), as this fumigant should be held in a locked store (this product is no longer approved and all products should have been used up by December 2004). Although the charges against the gamekeeper were dropped, this search had started as a result of evidence from the RSPB that a buzzard had been killed illegally. The two keepers involved in this incident were prosecuted and each had to pay fines and costs of £2500.

### 3 Abuse incidents

- a As in previous years, a large number of incidents involved the deliberate abuse of pesticides. During 2004, 56 incidents were the result of abuse. There were 85 abuse incidents reported in 2003.
- b These abuse incidents involved 14 different chemicals, compared with 20 in 2003. Nearly half of the abuse incidents involved carbamate compounds, mostly carbofuran. Another compound often associated with abuse incidents was alphachloralose. The number of incidents involving these compounds was as follows.
- Carbofuran – 22 (39%) in 2004, 32 (38%) in 2003.
  - Alphachloralose – 12 (21%) in 2004, 12 (14%) in 2003.
  - Aldicarb – 1 (2%) in 2004, 8 (9%) in 2003.

The incidents were as follows.

- In Scotland, in 2004, birds of prey were involved in most of the carbofuran incidents (numbers 4009, 4015, 4021, 4026, 4029, 4031, 4032, 4034, 4048, 4061, 4062, 4074, 4105, 4117, 4122 and 4133), and some of these incidents also involved birds in the crow family (corvids) and seized chemicals.
  - The remaining incidents (numbers 8, 26, 108, 109, 125 and 131) involved a dog, a fox, seized chemicals, a badger and birds of prey.
  - The incidents involving alphachloralose (numbers 33, 51, 53, 66, 2338, 4025, 4035, 4044, 4051, 4115, 4127 and 8751) related to birds of prey, seized samples and cats.
  - The aldicarb-abuse incident (number 141) involved a dog.
  - Four of the abuse incidents involved more than one chemical (numbers 92, 2338, 4015 and 4035).
- c Three more incidents involved the abuse of carbamate compounds.
- In one incident (number 5), two cats died after being exposed to carbosulfan.

## Part B: Incidents in 2004 where regulatory or enforcement action was considered

- In an incident where methomyl formulations had been abused (number 1), a police dog died during a search of an allotment area. The formulations involved were not approved for use in the UK and may have been imported from Greece. There were also some rodenticide samples seized during the search of the allotments.
- Another methomyl abuse incident (number 36) involved a buzzard.
- There were three incidents (numbers 16, 150 and 4043) that involved the abuse of strychnine, and dogs and foxes were affected.
- There were also four incidents (numbers 37, 61, 156 and 5178) that were associated with the abuse of metaldehyde and that involved cats, a dog and a bait.

The abuse of organophosphates is still discovered occasionally.

- Mevinphos was found in two incidents (numbers 49 and 63) where baits, crows or magpies were involved.
- Another incident (number B1) involved honeybees where pirimiphos-methyl was intentionally placed in a hive.
- Finally, several permethrin smoke generators were found near a badger sett (number 111). However, it was not certain whether they had been lit and they may have been left at the sett some time ago and recently dug up by the badgers.

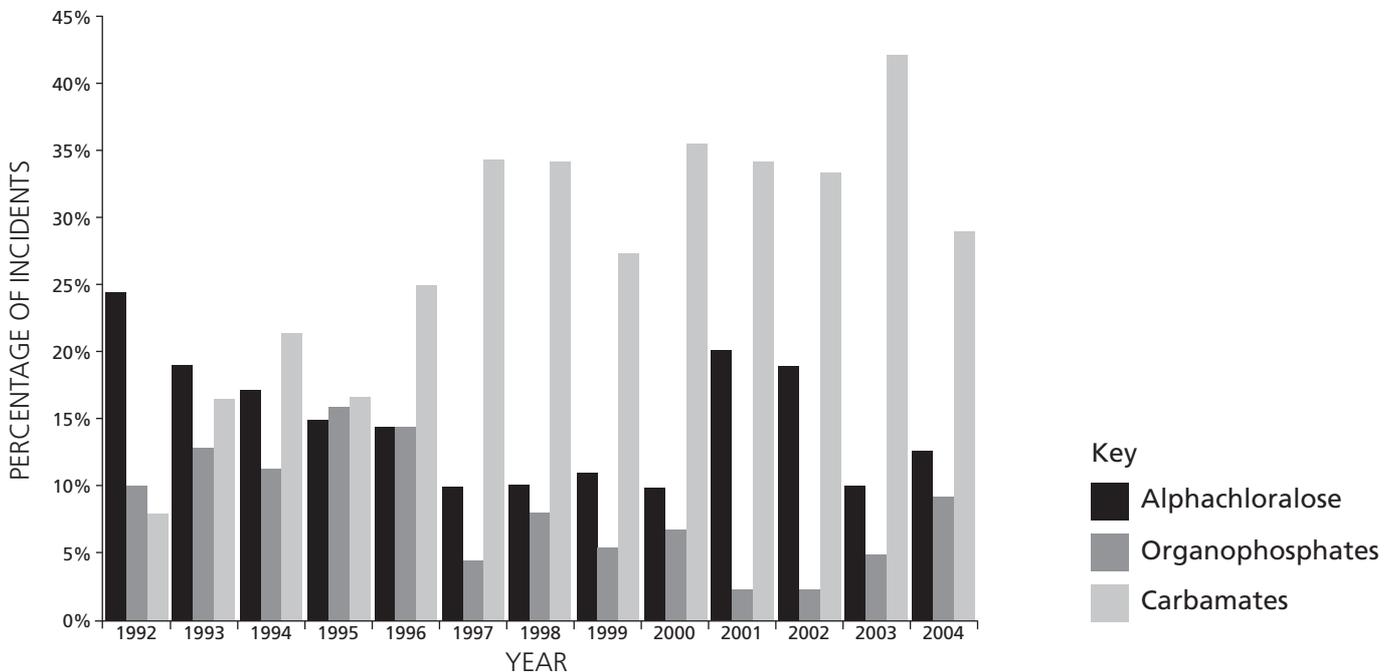
d In 2004, anticoagulant rodenticides accounted for 8 (14%) abuse incidents and were found in 13 (15%) incidents during 2003.

- One incident (number 4066) involved bromadiolone, one incident (number 32) involved coumatetralyl, and four incidents (numbers 4, 21, 38 and 76) involved difenacoum.
- There were also two incidents (numbers 92, 2338) that involved more than one chemical.

The bromadiolone incidents involved grain baits, and in the coumatetralyl incident, a product had been poured into a garden pond where there were newts. The difenacoum incidents involved grain, a blackbird and a cat.

## Part B: Incidents in 2004 where regulatory or enforcement action was considered

Figure 2: Changing trends in the types of pesticide found in vertebrate incidents



### 4 Unspecified use incidents

- a There are always a number of incidents where the source of the pesticide is not known, despite detailed investigations. This may occur when animals travel some distance from where they were exposed to the pesticide, which is possible with incidents involving anticoagulant rodenticides. In 2004, there were 25 incidents of unspecified use (two involving bees), and eight different chemicals were found. In 2003 there were 18 incidents, with six involving bees. Seven chemicals were found.
- b Two unspecified use incidents involved metaldehyde.
- In one of these (number 126), badger faeces were confirmed as containing metaldehyde, but the source of the pesticide was unknown.
  - In the other incident (number 123), a dog was poisoned, and again the source of the pesticide was uncertain.
- c There were two incidents (numbers 73 and 79) where corvids were poisoned by triazophos. This pesticide has not been found to have killed birds for 10 years, and it is not usually associated with abuse. Earlier incidents involving this chemical were associated with honeybee deaths.

## Part B: Incidents in 2004 where regulatory or enforcement action was considered

- d There were two incidents (numbers B2 and B10) where treatments to control bees living in the wild were the likely source of the bendiocarb, but no treatments were known of in the relevant area.

### **Anticoagulant rodenticide incidents**

- e Incidents where exposure to anticoagulant rodenticides cause the deaths of animals are of increasing concern, particularly where red kites are killed. Anticoagulant rodenticides take some time to poison animals (the onset of symptoms is delayed to prevent target rodents from being put off bait). So, it can be difficult to identify all the sources of anticoagulant rodenticide, particularly as the species involved may hunt over a large area. Birds of prey are exposed to anticoagulant rodenticides through secondary poisoning (by eating poisoned animals), and this emphasises the need for thorough searches for carcasses after bait has been left. However, it is not only the carcasses of targeted rodents that may be eaten by other animals. It is also likely, particularly where baits are in use for a long time and are not placed in appropriate positions, that other small mammals and birds could be poisoned and so have the potential to contaminate other animals. There have been some training initiatives undertaken by MAFF (now Defra), and English Nature has produced advice leaflets to highlight the risks to red kites. English Nature and the RSPB produced a leaflet 'Rat poison and the threat to birds of prey', which was issued in 2003. The RSPB also produced a leaflet for Scotland, in partnership with Scottish Natural Heritage, Scottish Executive and Partnership for Action Against Wildlife Crime. Key companies involved in making and marketing rodenticides have also launched a Campaign for Responsible Rodenticide Use. Details are available at [www.thinkwildlife.org.uk](http://www.thinkwildlife.org.uk).
- f During 2004, there were 19 unspecified use incidents that involved one or more anticoagulant rodenticides – eight incidents in England, two incidents in Wales and nine incidents in Scotland. (In 2003, there were 11 incidents – eight incidents in England and three incidents in Wales). Red kites were the only bird of prey involved in 2003, but several species were involved in 2004. Nearly half of the incidents in 2004 involved buzzards and all five of these incidents involved the pesticide difenacoum.
- In one incident of the five incidents (number 2-05), only difenacoum was found. In two of the incidents (numbers 4022 and 4068), bromadiolone was also found in the buzzards. In the other two incidents (numbers 4023 and 4045), bromadiolone and brodifacoum were also found in the buzzards.
  - A sparrowhawk and tawny owl were involved in one incident (number 24), and both had residues of bromadiolone, although a small residue of brodifacoum was also found in the sparrowhawk.

## Part B: Incidents in 2004 where regulatory or enforcement action was considered

- Difenacoum was confirmed in another sparrowhawk incident (number 4138) and brodifacoum was confirmed in an incident (number 4079) with a tawny owl.
- There were two incidents that involved red kites – brodifacoum was confirmed in one incident (number 58) and difenacoum was confirmed in the other (68).
- Finally, bromadiolone was identified in a barn owl (number 4128).

Although rodent-control treatments were known of in areas surrounding these incidents, they did not always account for the range of residues found in the victims. So, all the sources of anticoagulant rodenticide in the relevant areas were not identified.

- g The remaining anticoagulant rodenticide incidents involved dogs (three incidents), foxes (three incidents) and badgers (one incident).
- In two of the incidents involving dogs (numbers 4006 and 4132), brodifacoum was found, although number 4132 also had bromadiolone present. Difenacoum was involved in the third incident (number 124) with a dog.
  - The incidents with foxes (numbers 6, 85 and 132) all involved bromadiolone, but two incidents had other residues present – difenacoum in one incident and brodifacoum in the other.
  - The incident involving badgers (number 117) affected two animals and residues of difenacoum were confirmed.
- h One incident (number 9), was recorded as unspecified use even though the source of the rodenticide was known. Those responsible for rat control on an island had taken great care to design bait stations which prevented non-target species from taking the poisoned bait. However, a pony had kicked at the bait stations and spilled the contents. The pony ate some of the bait and died. The post-mortem showed signs of internal bleeding and a blood sample failed to clot after 48 hours. The residue in a sample of liver was mainly difenacoum, but brodifacoum and flocoumafen were also found. After the Rural Development Service (RDS) visited the island, four dead crows and four samples of bait were collected. Two crows had liver residues of difenacoum only and another bromadiolone only. One crow had similar residues of both difenacoum and bromadiolone, but a small residue of flocoumafen was also found. A bromadiolone product had also been used on the island at the end of 2003, but during January and February, a difenacoum product had been used. Given the incident reported from this island in 2003, a certificate of purity had been received for the bromadiolone product, but not for the difenacoum product. The bait samples provided were analysed and one was confirmed to be bromadiolone only. However, two of the samples contained difenacoum and a small residue of flocoumafen, and the other contained difenacoum and small residues of brodifacoum and warfarin.

## Part B: Incidents in 2004 where regulatory or enforcement action was considered

The products used were in the form of blocks and investigations showed that these blocks were contaminated with other rodenticides. This meant that these products were not approved formulations, and the incident has been classed as unspecified use and not misuse.

### **‘Sub-lethal exposure’ to anticoagulant rodenticide**

- i During 2004, birds of prey and some other species were screened for anticoagulant rodenticides, even when death was from another cause. We have summarised the results of this work here to show the range of species affected and which anticoagulant rodenticides are most often found. In all these incidents, the rodenticide is not considered to be the cause of death of the animal, so it is classified as ‘sub-lethal exposure’. These incidents are also included in appendix 2, under the categories shown below.
- In 2004, there were 38 incidents of sub-lethal exposure – six were in England (numbers 8, 33 and 36, abuse; 139, shot; 15 and 22, unknown), three were in Wales (numbers 34 and 48, veterinary; 39, trauma) and 29 were in Scotland (numbers 4009, 4015, 4021, 4031, 4032, 4034, 4043, 4044, 4048, 4051, 4062, 4074 and 4133, abuse; 4082, veterinary; 4037, starvation; 4014 and 4124, trauma; 4001, 4003, 4008, 4033, 4042, 4052, 4063, 4064, 4075, 4095, 4118 and 4125, unknown).
  - In 2003, there were 44 incidents of sub-lethal exposure – five were in England, three were in Wales and 36 were in Scotland.

The animals involved in these incidents were as follows.

- Buzzard, 61 birds analysed and 23 were positive.
- Golden eagle, two birds analysed and one was positive.
- Kestrel, three birds analysed and one was positive.
- Peregrine, two birds analysed and one was positive.
- Red kite, 16 birds analysed and six were positive.
- Sparrowhawk, four birds analysed and one was positive.
- Barn owl, seven birds were analysed and three were positive.
- Tawny owl, two birds analysed and one was positive.
- Badger, one analysed positive.
- Mink, one analysed positive.
- Otter, one analysed positive.
- Fox, seven animals analysed and four were positive.
- Stoat, three animals analysed and two were positive.

## Part B: Incidents in 2004 where regulatory or enforcement action was considered

### 5 Enforcement action

- a Government departments are still committed to using all available enforcement methods to help stamp out illegal poisoning. If the information collected on an incident indicates that pesticide laws may have been broken, a range of regulatory action is considered.
- b If there seems to be enough evidence of illegal activity, cases are referred for formal investigation and court action may be taken. Any fines and costs that have to be paid, together with the publicity such cases attract, encourage others to use pesticides safely.
- c Even where there is not enough cause or evidence for a formal investigation or prosecution, other regulatory action (for example, using enforcement notices or warning letters) may be taken. Also, it may sometimes be appropriate to transfer a case to another regulatory authority, such as the police. In these circumstances, Defra will remain on hand to offer help and advice.
- d In 2004, enforcement action was considered for 145 cases. A variety of regulatory action was taken in a number of cases. A lot of this action involved helping the police by producing witness statements, giving advice on matters relating to pesticides and providing information on the approval of products. Several incidents were referred to Defra's Investigations Branch. Of these, two cases were dealt with by issuing advice letters, one case was taken to court and resulted in a guilty verdict, and one investigation is still going on. A total of 10 enforcement notices, advice letters or warning letters were issued and six cases were transferred to other enforcement authorities.
- e One case (number 16) dealt with a man who pleaded guilty to causing unnecessary suffering and not using strychnine hydrochloride legally to control moles. The defendant was fined £2000 and ordered to pay £1000 in compensation and costs. The prosecution arose after two Border collies were poisoned by strychnine which was sprayed onto a dead hen on the defendant's field as bait for foxes. One of the dogs died a short time later.
- f One of the enforcement notices was issued to the secretary of an allotment association who had been storing unapproved pesticides. The offences came to light when the Rural Development Service (RDS) and the police were investigating the death of a police dog which had died after eating the pesticide methomyl (number 1). Under the enforcement notice, the

## Part B: Incidents in 2004 where regulatory or enforcement action was considered

secretary had to hire a licensed waste-disposal contractor to dispose of a number of unapproved products found in the store. During a prosecution led by the police, another person pleaded guilty to various pesticide offences (not the actual poisoning of the dog) and had to pay fines and costs of £305. Another person was only cautioned, due to their age and ill-health, for three charges.

- g In Wales, there was an incident which has not been included in the 2004 statistics as there were no carcasses or samples analysed. Following a tip-off, in August 2004 the police, helped by the National Assembly for Wales and the RSPB, searched an estate in North Wales. They found a shed that was being used to store a number of pesticides. These included an unapproved brand of Cymag and several herbicides. The storage conditions were poor, with products stored without appropriate signs and alongside flammable items and feed. The police interviewed the headkeeper and it became clear that he had little understanding of how to use and store pesticides safely. In March 2005, he accepted a caution from the North Wales Police for storing unapproved Cymag, and for storing other pesticides without proper regard for the safety of humans and wildlife.
- h Positive enforcement action continues to be a priority to counteract pesticide abuse. The Scottish Executive Environment and Rural Affairs Department (SEERAD) officials frequently work with wildlife crime officers from the various police forces in Scotland, as well as staff from other organisations. Where possible, cases are referred to the Procurator Fiscal Service for prosecution. In circumstances where there is not enough evidence to support a prosecution, the fact that an investigation has been carried out may prevent people from reoffending. Where poisoning or the risk of poisoning arises from misuse, and enforcement action is not possible or appropriate, those involved receive advice on how to use and store pesticides safely.
- i Three incidents were reported to the Procurator Fiscal Service for possible prosecution. In one (number 4031), the defendant pleaded guilty to charges made under the Wildlife and Countryside Act, 1981. He was fined £2500 for intentionally poisoning a goshawk and a number of buzzards, £2500 for placing poisonous baits containing carbofuran on an open hillside, and £500 for recklessly placing poison on an open hillside where the public and wildlife were at risk. He was 'admonished' on a fourth charge of being in possession of carbofuran. In a second case (number 4035), the defendant pleaded guilty to charges of unlawful storage of chloralose and Cymag and was fined £1200. The court accepted a not guilty plea to a charge of possessing chloralose capable of committing an offence. The third case (number 4105), involving charges relating to contraventions of the Control of Pesticides Regulations, the Wildlife and Countryside Act and reckless conduct, was heard in the Jedburgh Sheriff Court in

## Part B: Incidents in 2004 where regulatory or enforcement action was considered

June 2005. The defendant was found guilty of three charges of improper storage of three pesticides found in a vehicle, and was fined £30 for each charge. Seven other incidents are being investigated by the police, supported as necessary by SEERAD officials. A prosecution relating to poisoning birds in Strathclyde in 2003 was heard in 2005. The defendant was found guilty of charges including the improper storage of chloralose and admonished.

- j SEERAD officials carried out 20 field investigations during 2004, 15 of which were joint operations with the police. Many also involved RSPB Investigation Officers. The police investigated seven incidents independently.

# Part C: Incidents in 2004: species, samples and the pesticides involved

## 1 Species and samples involved

a In 2004 the scheme investigated 355 incidents (see table 1 on page 20). Vertebrates were involved in 289 incidents, bees were involved in 23 incidents, and 43 incidents were suspected baits or seized materials and substances. The cause of death or illness (whether or not linked to pesticide use) was found in 168 (47%) of all incidents. A further 27 (8%) incidents were classed as 'not applicable'. These incidents involve suspected baits where no dead animals have been found, and analysis or other information has failed to show that pesticides were involved. Pesticides were implicated in 104 (29%) of the incidents (compared with 126 (32%) in 2003) – 62 incidents (32%) with vertebrate wildlife, 4 incidents (17%) with bees, 26 incidents (27%) with companion animals and 16 incidents (37%) with suspected baits only. See table 2 on page 20 for a breakdown of the areas involved.

**Table 1:** numbers of incidents reported under the scheme in 2004

	<b>Incidents investigated</b>	<b>Pesticide poisoning incidents</b>	<b>Other cause of death found</b>
Vertebrate wildlife	193	62 (32%)	46 (24%)
Companion animals	95	26 (27%)	14 (15%)
Livestock	7	1 (14%)	2 (29%)
Exotic animals	2	0	0
Bees	23	4 (17%)	2 (9%)
Suspected baits and suspicious samples	43	16 (37%)	not applicable
<b>Total</b>	<b>355</b>	<b>104 (29%)</b>	<b>64 (18%)</b>

(Animals from more than one category may be involved in a single incident.)

**Table 2:** incidents investigated by country in 2004 (percentage confirmed as pesticide poisoning)

	<b>England</b>	<b>Wales</b>	<b>Scotland</b>	<b>Northern Ireland</b>
Vertebrate wildlife	69 (38%)	30 (23%)	80 (35%)	14 (7%)
Companion animals	35 (54%)	4 (0%)	22 (14%)	34 (12%)
Livestock	4 (25%)	0	2 (0%)	1 (0%)
Exotic animals	1 (0%)	0	1 (0%)	0
Bees	15 (27%)	2 (0%)	6 (0%)	0
Suspected baits and suspicious samples	28 (46%)	2 (0%)	10 (30%)	3 (0%)
<b>Total</b>	<b>145 (41%)</b>	<b>38 (18%)</b>	<b>121 (28%)</b>	<b>51 (8%)</b>

(Animals from more than one category may be involved in a single incident.)

b The number of poisoning incidents for each animal category from 1995 to 2004 is shown in table 3 on page 21.

## Part C: Incidents in 2004: species, samples and the pesticides involved

**Table 3:** number of incidents in which pesticides were identified as a likely cause of poisoning (1995-2004)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Vertebrate wildlife	62	77	54	49	57	68	55	63	63	62
Livestock	2	2	1	4	2	0	0	1	0	1
Companion animals	91	97	86	90	48	58	34	45	42	26
Exotic animals	0	0	0	2	0	0	0	0	0	0
Fish	0	2	0	0	0	0	0	0	0	0
Earthworms	0	0	0	1	1	0	0	0	0	0
Bees	33	8	15	12	9	13	5	5	8	4
Suspected baits and suspicious samples	28	29	32	29	22	28	16	20	14	16
<b>Total</b>	<b>208</b>	<b>204</b>	<b>185</b>	<b>185</b>	<b>139</b>	<b>162</b>	<b>109</b>	<b>131</b>	<b>126</b>	<b>104</b>

*(Four of the incidents involving bees in 2000 are likely to be associated with one pesticide application.)  
(Animals from more than one category may be involved in a single incident.)*

- c The pesticides detected in all the incidents reported under the scheme during 2004 are shown in table 4 on page 21, which also lists the species involved. Residues of pesticides, mainly anticoagulant rodenticides (see earlier section), are sometimes found at sub-lethal levels in the tissues of animals.

**Table 4:** the number of incidents attributed to a pesticide in 2004 and the species or bait involved

<b>Organochlorine compounds</b>		
aldrin	1	sample
<b>Organophosphorus compounds</b>		
chlorpyrifos	1	sample
diazinon (veterinary product)	2	red kite
dimethoate	1	sample
disulfoton	1	sample
fenthion (veterinary product)	2	buzzard, magpie, raven, red kite, bait
fonofos	1	sample
mevinphos	2	crow, magpie, bait
pirimiphos-methyl	1	honeybee
triazophos	2	blackbird, crow, jackdaw, magpie, rook
<b>Carbamate compounds</b>		
aldicarb	1	dog
bendiocarb	4	feral bee, honeybee, sample
carbofuran	22	buzzard, crow, goshawk, peregrine, red kite, badger, fox, dog, bait, sample
carbosulfan	2	cat, sample
methomyl	2	dog, fox, buzzard, sample

# Part C: Incidents in 2004: species, samples and the pesticides involved

**Table 4:** the number of incidents attributed to a pesticide in 2004 and the species or bait involved

<b>Rodenticides</b>		
brodifacoum	8	buzzard, crow, red kite, tawny owl, fox, dog, pony, grain bait
bromadiolone	17	barn owl, buzzard, crow, sparrowhawk, tawny owl, fox, hedgehog, cat, dog, grain bait
coumatetralyl	2	buzzard, great crested, palmate and smooth newts, cat, sample
difenacoum	20	blackbird, buzzard, crow, house sparrow, red kite, sparrowhawk, badger, fox, pony, cat, dog, bait, grain, wax block
flocoumafen	1	pony, crow, wax block
warfarin	2	grain

There were also 38 incidents where residues of one or more of these pesticides were found and were considered to be at sub-lethal levels. There were three incidents where baits had low-level residues of other rodenticides.

### **Pyrethroid compounds**

permethrin	1	badger sett, sample.
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Small residues of fluvalinate were also found in eight honeybee incidents. These were probably associated with varroa mite treatments.

### **Other compounds**

alphachloralose	12	buzzard, crow, marsh harrier, peregrine, red kite, cat, bait, powder, sample
aluminium phosphide	2	badger sett, rat hole
metaldehyde	15	badger, badger sett, cat, dog, bait, pellets
sodium cyanide	3	sample, bait
strychnine	3	fox, dog, bait

### **Causes of death other than pesticides**

disease	19	o-cresol and plant poison	2
starvation	8	not applicable	27
trauma	33	unknown	163

d Appendix 2 lists all incidents from 2004 where pesticide poisoning was confirmed and also includes incidents where sub-lethal exposure to pesticides was identified.

## **2 Wildlife: mammals**

a In 2004, there were 49 incidents involving wild mammals and the cause of death was found in 22 of these incidents, with 10 confirmed as pesticide poisoning (see table 5 on page 23). Table 6 on page 23 shows the number and percentage of pesticide poisonings for the past 10 years.

# Part C: Incidents in 2004: species, samples and the pesticides involved

**Table 5:** numbers of incidents involving wild mammals in 2004

		Number of incidents investigated	Number in which pesticide poisoning was identified	Number in which another cause of death was identified
<b>Badger</b>	England	8	3 (38%)	2 (25%)
	Wales	3	0	2 (67%)
	Scotland	1	0	0
		<b>12</b>	<b>3 (25%)</b>	<b>4 (33%)</b>
<b>Bat</b>	England	1	0	0
	Wales	1	0	0
	Scotland	1	0	0
		<b>3</b>	<b>0</b>	<b>0</b>
<b>Fox</b>	England	11	3 (27 %)	5 (45%)
	Wales	2	1 (50%)	0
	Scotland	2	1 (50%)	0
		<b>15</b>	<b>5 (33%)</b>	<b>5 (33%)</b>
<b>Otter</b>	England	1	0	0
	Wales	1	0	0
	Scotland	1	0	0
		<b>3</b>	<b>0</b>	<b>0</b>
<b>Rabbit and hare</b>	England	1	0	1 (100%)
	Wales	1	0	0
	Scotland	1	0	0
	Northern Ireland	3	0	0
		<b>6</b>	<b>0</b>	<b>1 (17%)</b>
<b>Stoat</b>	England	1	0	1 (100%)
	Scotland	1	0	0
		<b>2</b>	<b>0</b>	<b>1 (50%)</b>
<b>Field mouse</b>	Scotland	<b>1</b>	<b>0</b>	<b>0</b>
<b>Hedgehog</b>	England	<b>2</b>	<b>1 (50%)</b>	<b>1 (50%)</b>
<b>Mink</b>	Scotland	<b>1</b>	<b>0</b>	<b>0</b>
<b>Seal</b>	Scotland	<b>1</b>	<b>0</b>	<b>0</b>
<b>Squirrel</b>	Scotland	<b>3</b>	<b>0</b>	<b>0</b>
<b>Total</b>	England	25	8 (33%)	10 (42%)
	Wales	8	1 (13%)	2 (25%)
	Scotland	13	1 (8%)	0
	Northern Ireland	3	0	0
		<b>49</b>	<b>10 (20%)</b>	<b>12 (24%)</b>

(Mammals from more than one category may be involved in a single incident.)

**Table 6:** incidents involving wild mammals (1995-2004)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Incidents investigated	104	77	85	68	54	56	30	52	44	49
Percentage of pesticide incidents	13%	26%	19%	12%	31%	16%	23%	21%	23%	20%

## Badger

- b The scheme investigated 12 incidents involving badgers and the cause of death was found in seven of these, with three confirmed as pesticide poisoning.
- One incident (number 26), where carbofuran was found, was classed as abuse even though there were injuries consistent with a road traffic accident. This is because the injuries found were unusually severe, and it was suspected that the carcass had been left on the road to conceal evidence of poisoning.

## Part C: Incidents in 2004: species, samples and the pesticides involved

- Two badgers appeared to have eaten a large amount of a difenacoum formulation, the intestine in both badgers was stained green and a significant amount of residue was found in their livers. However, the source of the difenacoum was not found (incident number 117).
  - In the other incident, the badger recovered and a residue of metaldehyde was confirmed in a faeces sample, but the source of the pesticide was not found (incident number 126).
  - There was also one badger (incident number 4118, unknown) with a sub-lethal residue of an anticoagulant rodenticide.
- c Badger setts were involved in three incidents, two of misuse and one abuse.
- In one incident (number 43), a treatment of aluminium phosphide intended to control rabbits included a badger sett.
  - Slug pellets were applied to a field and there were badger sett entrances at the edges of the field. Pellets were applied outside these entrances and a sample of pellets was confirmed as metaldehyde (incident number 60).
  - In the abuse incident (number 111), permethrin smoke generators were found near a badger sett. It was uncertain if they had been lit and they may have been left in the sett some time ago and recently dug out by the badgers.

### Fox

- d Foxes are considered to be a pest species and so they are often the target of illegal poisoning. Table 7 on page 24 shows the number and percentage of pesticide poisonings for the past 10 years.

**Table 7:** incidents involving foxes (1995-2004)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Incidents investigated	54	41	33	27	24	28	9	24	11	15
Percentage of pesticide incidents	17%	34%	33%	15%	42%	25%	33%	29%	45%	33%

- e In 2004, 15 incidents with foxes were investigated. The cause of death was found in 10 of these incidents, with five confirmed as pesticide poisoning.
- Three of these poisoning incidents (numbers 6, 85 and 132) were recorded as unspecified use of anticoagulant rodenticides.
  - There were two incidents of pesticide abuse, one (number 4043) involved strychnine and the other (number 8) carbofuran.
  - There were also four foxes with sub-lethal residues of anticoagulant rodenticides (8 and 4043, abuse; 139, shot).

# Part C: Incidents in 2004: species, samples and the pesticides involved

## Other mammals

- f The other mammals reported to the scheme in 2004 are shown in table 5 on page 23. The cause of death was found in four of these incidents, and one was confirmed as pesticide poisoning.
- g In one incident (number 107), two hedgehogs were poisoned after being exposed to bromadiolone and some difenacoum was also found. Baiting points in a residential area were not protected properly.
- h There were also two stoats (incident number 4052, unknown), a mink (incident number 4015, abuse) and an otter (incident number 4003, unknown) with sub-lethal residues of anticoagulant rodenticides.

## 3 Wildlife: birds

- a A total of 147 incidents involving wild birds were investigated in 2004, and the cause of death was found in 86 of these incidents, with 51 identified as pesticide poisonings (see table 8 on page 25). Table 9 on page 26 shows the number and percentage of pesticide poisonings for the past 10 years.

**Table 8:** number of incidents involving wild birds in 2004

		<b>Number of incidents investigated</b>	<b>Number in which pesticide poisoning was identified</b>	<b>Number in which another cause of death was identified</b>
<b>Birds of prey</b>	England	28	10 (36%)	9 (32%)
<b>including</b>	Wales	16	5 (31%)	5 (31%)
<b>owls</b>	Scotland	58	26 (45%)	11 (19%)
	Northern Ireland	7	1 (14%)	0
		<b>109</b>	<b>42 (39%)</b>	<b>25 (23%)</b>
<b>Corvids</b>	England	7	4 (57%)	3 (43%)
	Wales	2	1 (50%)	0
	Scotland	6	5 (83%)	0
		<b>15</b>	<b>10 (67%)</b>	<b>3 (20%)</b>
<b>Game birds</b>	Scotland	<b>1</b>	<b>0</b>	<b>0</b>
<b>Gulls and waders</b>	Scotland	<b>4</b>	<b>0</b>	<b>0</b>
<b>Pigeon and doves</b>	England	5	1 (20%)	2 (40%)
	Wales	2	0	0
	Northern Ireland	1	0	1 (100%)
		<b>8</b>	<b>1 (13%)</b>	<b>3 (38%)</b>

## Part C: Incidents in 2004: species, samples and the pesticides involved

**Table 8:** number of incidents involving wild birds in 2004

<b>Wildfowl and waterbirds</b>	England	3	0	1 (33%)
	Scotland	4	0	0
	Northern Ireland	1	0	0
		<b>8</b>	<b>0</b>	<b>1 (13%)</b>
<b>Other birds</b>	England	8	4 (50%)	2 (25%)
	Wales	4	1 (25%)	2 (50%)
	Northern Ireland	2	0	1 (50%)
		<b>14</b>	<b>5 (36%)</b>	<b>5 (36%)</b>
<b>Total</b>	England	46	17 (37%)	14 (30%)
	Wales	23	6 (26%)	7 (30%)
	Scotland	67	27 (40%)	11 (16%)
	Northern Ireland	11	1 (9%)	3 (27%)
		<b>147</b>	<b>51 (35%)</b>	<b>35 (24%)</b>

*(Birds from more than one category may be involved in a single incident.)*

**Table 9:** incidents involving wild birds (1995-2004)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Incidents investigated	232	199	155	192	151	178	150	184	167	147
Percentage of pesticide incidents	22%	30%	26%	22%	28%	33%	32%	30%	33%	35%

### Birds of prey (including owls)

- b Birds of prey were involved in 109 incidents in 2004 (see tables 8 and 10 on pages 25 and 27). The cause of death was found in 67 of these incidents, with 42 identified as pesticide poisonings. Table 11 on page 27 shows the number and percentage of pesticide poisonings for the past 10 years.

### Common buzzard

- c In 2004, there were 59 reported incidents involving common buzzards. In 36 of the incidents, the cause of death was found, and 27 of these were recorded as pesticide poisoning.
- d Deliberate abuse of pesticides accounted for 20 incidents.
- Carbofuran abuse was involved in 16 incidents (numbers 108, 109, 131, 4021, 4026, 4029, 4031, 4032, 4034, 4048, 4061, 4062, 4105, 4117, 4122 and 4133), alphachloralose abuse

## Part C: Incidents in 2004: species, samples and the pesticides involved

**Table 10:** number of incidents involving birds of prey (except owls) in 2004

		Number of incidents investigated	Number in which pesticide poisoning was identified	Number in which another cause of death was identified
<b>Buzzard</b>	England	12	5 (42%)	3 (25%)
	Wales	8	3 (38%)	2 (25%)
	Scotland	37	18 (49%)	3 (8%)
	Northern Ireland	2	1 (50%)	1 (50%)
		<b>59</b>	<b>27 (46%)</b>	<b>9 (15%)</b>
<b>Eagle</b>	Scotland	<b>2</b>	<b>0</b>	<b>2 (100%)</b>
<b>Goshawk</b>	England	1	0	0
	Wales	1	0	1 (100%)
	Scotland	1	1 (100%)	0
		<b>3</b>	<b>1 (33%)</b>	<b>1 (33%)</b>
<b>Hen harrier</b>	England	1	0	0
	Scotland	1	0	0
		<b>2</b>	<b>0</b>	<b>0</b>
<b>Kestrel</b>	England	4	0	3 (75%)
	Scotland	3	0	0
	Northern Ireland	1	0	0
		<b>8</b>	<b>0</b>	<b>3 (38%)</b>
<b>Marsh harrier</b>	England	<b>1</b>	<b>1 (100%)</b>	<b>0</b>
<b>Peregrine</b>	England	1	1 (100%)	0
	Wales	1	0	0
	Scotland	2	2 (100%)	0
	Northern Ireland	3	0	0
		<b>7</b>	<b>3 (43%)</b>	<b>0</b>
<b>Red kite</b>	England	5	2 (40%)	1 (20%)
	Wales	4	3 (75%)	1 (25%)
	Scotland	9	4 (44%)	3 (33%)
		<b>18</b>	<b>9 (50%)</b>	<b>5 (28%)</b>
<b>Sparrowhawk</b>	England	3	1 (33%)	0
	Wales	1	0	0
	Scotland	2	1 (50%)	1 (50%)
	Northern Ireland	1	0	0
		<b>7</b>	<b>2 (29%)</b>	<b>1 (14%)</b>

**Table 11:** incidents involving birds of prey (including owls) (1995-2004)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Incidents investigated	131	122	84	97	98	136	111	129	136	109
Percentage of pesticide incidents	24%	34%	25%	30%	34%	38%	37%	31%	33%	39%

## Part C: Incidents in 2004: species, samples and the pesticides involved

was involved in three incidents (numbers 33, 2338 and 4051), and there was one incident (number 36) of methomyl abuse.

- There were two incidents (numbers 34 and 55) where the veterinary compound fenthion was involved.
- There were five incidents (numbers 4022, 4023, 4045, 4068 and 2-05) that were recorded as unspecified use of anticoagulant rodenticides. (All of these incidents involved difenacoum, and bromadiolone was also involved in four of them. Two incidents involved a third rodenticide – brodifacoum.)
- There were also 23 buzzards with residues of anticoagulant rodenticide, but this was not considered to be the cause of their death (incident numbers 33, 36, 4021, 4031, 4032, 4034, 4048, 4051 and 4062, abuse; 34, veterinary; 22, 4001, 4008, 4033, 4042, 4064, 4095 and 4125, unknown).

### Red kite

e In 2004, there were 18 reported incidents with red kites, some of which were birds from the programme to reintroduce red kites to the UK. The cause of death was identified in 14 incidents, with nine being caused by pesticide poisoning.

- There were four incidents arising from pesticide abuse. Three of these involved carbofuran (numbers 125, 4009 and 4133) and one involved alphachloralose (number 4044).
- Two incidents involved the unspecified use of anticoagulant rodenticides – brodifacoum in one (number 58) and difenacoum in the other (number 68).
- There were three incidents where veterinary products were involved – diazinon in two (numbers 48 and 4082) and fenthion in the other (number 55).

f There were six red kites with residues of anticoagulant rodenticide, but this was not considered to be the cause of their death (incident numbers 4009, 4044 and 4133, abuse; 48 and 4082, veterinary; 4124, trauma).

### Eagle

g Two incidents involving golden eagles were reported in 2004. The cause of death was found in both, but neither was caused by pesticide poisoning. However, a sub-lethal residue of bromadiolone was confirmed in one golden eagle (incident number 4037, starvation).

## Part C: Incidents in 2004: species, samples and the pesticides involved

### Peregrine falcon

- h Seven incidents involving peregrine falcons were reported under the scheme during 2004. The cause of death was found in three incidents, and all were the result of pesticide abuse.
- Two incidents (numbers 66 and 4127) involved alphachloralose and one (number 4074) involved carbofuran.
  - A sub-lethal residue of bromadiolone was found in one bird (incident number 4074, abuse).

### Other birds of prey

- i Other birds of prey were reported as possible pesticide poisoning victims. These included eight kestrels, seven sparrowhawks, three goshawks, two hen harriers and one marsh harrier. The cause of death was found in three of the kestrels, three of the sparrowhawks, one goshawk and one marsh harrier.
- The goshawk's death (incident number 4031) was caused by carbofuran abuse and the marsh harrier's death (incident number 53) was caused by alphachloralose abuse.
  - Two sparrowhawks were killed by the unspecified use of anticoagulant rodenticides – difenacoum in one incident (number 4138) and bromadiolone in the other (number 24).
  - There was a kestrel (incident number 4063, unknown) and a sparrowhawk (number 15, unknown) with sub-lethal residues of anticoagulant rodenticides.

### Owls

- j In 2004, there were 13 incidents involving owls. Seven incidents involved barn owls, five incidents involved tawny owls and one incident involved a little owl. The cause of death of the birds was identified in six of the incidents, and three were confirmed as pesticide poisoning. All of the poisoning incidents involved the unspecified use of anticoagulant rodenticides.
- A tawny owl had a significant residue of bromadiolone (incident number 24) and another had a residue of brodifacoum (incident number 4079).
  - Mainly bromadiolone was also found in a barn owl (incident number 4128).
  - There were three barn owls (incident numbers 39 and 4014, trauma; 4075, unknown) and a tawny owl (incident number 4021, abuse) with sub-lethal residues of anticoagulant rodenticides.

# Part C: Incidents in 2004: species, samples and the pesticides involved

## Corvids

k In 2004, there were 15 incidents involving corvids (for example, crows, magpies, jackdaws and rooks). The cause of death was found in 13 incidents, with 10 of them confirmed as pesticide poisoning. Abuse of pesticides caused six of these incidents and many involved other species, particularly birds of prey. There were three incidents of unspecified use, and one of veterinary use. Table 12 on page 30 shows the number and percentage of pesticide poisonings for the past 10 years.

**Table 12:** incidents involving corvids (1995-2004)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Incidents investigated	29	30	22	26	19	13	12	22	22	15
Percentage of pesticide incidents	28%	57%	41%	15%	47%	31%	33%	36%	45%	67%

- Carbofuran was found in four of the abuse incidents (numbers 4031, 4034, 4062 and 4074), and these all involved crows and some other species, mainly buzzards.
- There was an incident (number 4025) where two crows were poisoned with alphachloralose.
- One incident (number 49), relating to the abuse of mevinphos involved several magpies and at least five crows.
- There were two incidents of the unspecified use of triazophos (numbers 73 and 79). These incidents affected several species including jackdaws, rooks, magpies and a crow. A blackbird may also have been involved in one of these incidents.
- The other unspecified use incident involved four crows analysed as part of an investigation into an anticoagulant rodenticide incident (number 9). Two birds had significant residues of difenacoum only and one had significant residues of bromadiolone only. There was another crow where various residues were found in the liver and gizzard, and these were mainly difenacoum and bromadiolone, but a small flocoumafen residue was also found.
- Magpies, ravens and a buzzard were poisoned after being exposed to a veterinary product, containing fenthion, which may have been applied to a lamb bait (number 34).

## Game birds

l There was only one incident involving a game bird, which involved a pheasant. No cause of death was found.

## Part C: Incidents in 2004: species, samples and the pesticides involved

### Gulls and waders

m In 2004, there were four incidents involving gulls and waders. The cause of death was not found in these incidents.

### Pigeons and doves

n Pigeons and doves were involved in nine incidents in 2004. The cause of death was found in four incidents, one of which involved pesticides.

- One incident (number 92) involved a fantail dove, woodpigeon, blackbird and greenfinch. It appeared that food items laced with metaldehyde and bromadiolone were left in an area to attract birds. A small residue of difenacoum was identified in the dove.

### Wildfowl and water birds

o In 2004, there were eight incidents that involved wildfowl and water birds. The cause of death was found in one incident, which did not involve a pesticide.

### Other birds

p This category covers garden birds and other birds not dealt with in earlier sections. There were 14 incidents reported and the cause of death was found in 10 of the incidents, five of which involved pesticides. Three incidents were recorded as abuse, one as misuse and one as unspecified use.

- Difenacoum was abused in one incident (number 21) involving a blackbird. A small residue of brodifacoum was also found in one of the bait samples in this incident.
- The two other abuse incidents involved difenacoum (number 76) and metaldehyde and bromadiolone (number 92), although the birds involved in these incidents may not have been poisoned.
- About 30 house sparrows died in a residential area where difenacoum bait was left (incident number 74). A small amount of warfarin was also found in the sparrows.
- Finally, a triazophos incident (number 73) involved corvids and a blackbird, but the source of the pesticide was not found.

# Part C: Incidents in 2004: species, samples and the pesticides involved

## 4 Companion animals

a In 2004, there were 95 incidents involving companion animals (see table 13 on page 32).

The cause of death was found in 39 incidents, and 25 of these incidents involved pesticides.

**Table 13:** number of incidents involving companion and other animals in 2004

		Number of incidents investigated	Number in which pesticide poisoning was identified	Number in which another cause of death was identified
<b>Cat</b>	England	11	4 (36%)	3 (27%)
	Wales	1	0	1 (100%)
	Scotland	7	0	0
	Northern Ireland	13	3 (23%)	4 (31%)
		<b>32</b>	<b>7 (22%)</b>	<b>8 (25%)</b>
<b>Dog</b>	England	22	14 (64%)	1 (5%)
	Wales	1	0	0
	Scotland	13	3 (23%)	0
	Northern Ireland	19	1 (5%)	3 (16%)
		<b>55</b>	<b>18 (33%)</b>	<b>4 (7%)</b>
<b>Guinea pig</b>	Scotland	1	0	0
	Northern Ireland	1	0	1
		<b>2</b>	<b>0</b>	<b>1 (50%)</b>
<b>Koi carp</b>	England	2	0	0
	Wales	1	0	0
		<b>3</b>	<b>0</b>	<b>0</b>
<b>Horse</b>	Wales	<b>1</b>	<b>0</b>	<b>0</b>
<b>Parrot</b>	Northern Ireland	<b>1</b>	<b>0</b>	<b>1 (100%)</b>
<b>Racing pigeon</b>	Scotland	<b>1</b>	<b>0</b>	<b>0</b>
<b>Total</b>	England	35	18 (51%)	4 (11%)
	Wales	4	0	1 (25%)
	Scotland	22	3 (14%)	0
	Northern Ireland	34	4 (12%)	9 (26%)
		<b>95</b>	<b>25 (26%)</b>	<b>14 (15%)</b>
<b>Newt</b>	England	<b>1</b>	<b>1 (100%)</b>	<b>0</b>
<b>Pony</b>	England	1	1 (100%)	0
<b>Poultry</b>	England	3	1 (33%)	0
<b>Cattle</b>	Scotland	2	0	1 (50%)
	Northern Ireland	1	0	1
		<b>7</b>	<b>2 (29%)</b>	<b>2 (29%)</b>
<b>Peacock</b>	England	1	0	0
<b>Arctic fox</b>	Scotland	1	0	0
<b>Total</b>		<b>2</b>	<b>0</b>	<b>0</b>

## Part C: Incidents in 2004: species, samples and the pesticides involved

Table 14 on page 33 shows the number and percentage of pesticide poisonings for the past 10 years.

**Table 14:** incidents involving companion animals (1995-2004)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Incidents investigated	271	275	253	235	149	160	109	150	130	95
Percentage of pesticide incidents	34%	35%	34%	38%	32%	36%	31%	30%	32%	26%

### Cats

b In 2004 there were 32 incidents with cats and the cause of death was found in 15 incidents. About 10 cats were poisoned in seven incidents. Table 15 on page 33 shows the number and percentage of pesticide poisonings for the past 10 years.

**Table 15:** incidents involving cats (1995-2004)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Incidents investigated	90	112	110	91	58	63	41	40	35	32
Percentage of pesticide incidents	33%	38%	37%	38%	24%	30%	29%	30%	20%	22%

- c Pesticide abuse accounted for all seven of the incidents which poisoned about 10 cats.
- Four incidents (numbers 51, 2338, 4115 and 8751) involved alphachloralose.
  - In one incident, alphachloralose had been mixed with tuna fish and left on an allotment, allegedly to control rats. Two cats became ill, but recovered after treatment.
  - In another incident (number 5), a fish bait appeared to have been prepared with carbosulfan. This incident involved the death of two cats and weedkiller was at first thought to be the cause. The weedkiller had been applied in a residential area and did not appear to be to a satisfactory standard. However, analysis confirmed that carbosulfan was the cause of death of the cats.
  - There were another two incidents in residential areas, one (number 37) involved metaldehyde and one (number 38) involved difenacoum.

### Dogs

d In 2004 the scheme investigated 55 incidents with dogs. The cause of death was found in 22 incidents. In 18 incidents involving pesticides, about 18 dogs were poisoned. Table 16 on page 34 shows the number and percentage of pesticide poisonings for the past 10 years.

## Part C: Incidents in 2004: species, samples and the pesticides involved

**Table 16:** incidents involving dogs (1995-2004)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Incidents investigated	170	163	138	149	89	98	63	104	91	55
Percentage of pesticide incidents	39%	35%	34%	40%	38%	41%	33%	32%	37%	33%

- e The abuse of pesticides was found in seven of the incidents with dogs, and these incidents involved a range of compounds.
- Two incidents (numbers 16 and 150) involved the abuse of strychnine. In one of these incidents, the motive may have been to protect chickens from foxes.
  - There were two incidents (numbers 61 and 5178) where metaldehyde was abused, although in one of these incidents it was not clear if the symptoms displayed by the dog were due to metaldehyde.
  - The abuse of carbamate pesticides occurred in several incidents – one (number 1) involved a police dog exposed to methomyl, one (number 8) involved carbofuran and one (number 141) involved aldicarb.
- f The misuse of pesticides accounted for seven incidents. Nearly all of these (incident numbers 106, 112, 114, 129, 144, 155) involved metaldehyde slug pellets, and in four of these incidents, spillages that had not been cleared were involved.
- There was one incident (number 4111) caused by the misuse of difenacoum.
- g There were four incidents where the source of the pesticide was not known.
- Three of these incidents (numbers 124, 4006 and 4132) involved anticoagulant rodenticides.
  - There was an incident (number 123) with metaldehyde, where slug pellets had been applied to a field the day before the incident. No spillages were seen, although it is assumed that the dog involved must have found spilt pellets somewhere in the area.

### Other companion animals

- h There were eight incidents with other companion animals (see table 13 on page 32 for details). The cause of death was found in two incidents, but neither was due to pesticides.

## Part C: Incidents in 2004: species, samples and the pesticides involved

### Other vertebrates

- i There was one incident (number 32) at a regionally important site where great crested newts were present in a garden pond. A rodenticide product was poured into the pond and grain recovered was confirmed as containing coumatetralyl. It was suspected that the product had been used to kill the newts. There were seven dead newts and 48 live newts found in a pile of weed removed from the pond. The live newts were returned to the garden pond. The seven dead newts included great crested, palmate and smooth newts and these were kept by the police to be identified by an expert.

### Livestock

- j Livestock is not normally covered by the scheme, but they may be accepted if there are other environmental samples associated with the incident. There were seven incidents reported. Three incidents involved poultry (chicken, a goose and a duck). The cause was found in four incidents, and two were caused by exposure to pesticides.
- One incident (number 9) involved a pony, which died following a rodenticide treatment on an island.
  - One incident (number 76) involved difenacoum bait which was intentionally left in an area chickens had access to.

### Exotic animals

- k The scheme investigated two incidents involving exotic animals (see table 13 on page 32 for species), but the cause of death was not found.

## 5 Honeybees

- a In 2004, there were 23 suspected poisonings of beneficial insects (see table 17 on page 36), with 15 incidents reported in England, two incidents reported in Wales and six incidents reported in Scotland. There was one incident that involved bumblebees and there was also an incident where only wild bees were available for analysis. Pesticides were the cause in four of these incidents, and these incidents were all in England. There were no pesticide incidents reported from Scotland or Wales.

## Part C: Incidents in 2004: species, samples and the pesticides involved

**Table 17:** number of incidents involving bees in the UK during 2004

<b>Number of incidents investigated:</b>	<b>23</b>	
<b>Number of incidents caused by pesticides:</b>	<b>4</b>	
<b>Pesticide found</b>	<b>Number of incidents</b>	<b>Number of colonies affected</b>
Carbamate compounds – bendiocarb	3	29
Organophosphorus compounds – pirimiphos-methyl	1	4
<b>Total</b>	<b>4</b>	<b>33</b>

*(There were also eight incidents where small residues of fluvalinate were found and an incident where thymol was found.)*

*(See appendix 2 for further details.)*

- b Diseased honeybees were found in two incidents investigated, and this was considered to be the likely explanation for the deaths. The cause of death in the remaining honeybee incidents could not be found.
- There were eight incidents where small residues of fluvalinate (approximately 0.005 micrograms per bee) were identified in the bees examined. These levels are not considered high enough to be the cause of death of the bees. These residues have not been confirmed by an alternative method and they are reported in appendix 2 to show the frequency that residues of this chemical are found.
  - A beekeeper reported deaths of bees after using thymol (Apiguard), and this chemical was confirmed at nine micrograms per bee, by an unvalidated analytical method (incident number B16). The significance of this residue is uncertain.
- c Bendiocarb and pirimiphos-methyl were found in the incidents caused by pesticides (see table 17 on page 36). For the incidents investigated and the percentage of pesticide poisonings for the past 10 years, see table 18 on page 36. For a summary of the 2004 bee incidents where pesticides were involved, see table 19 on page 37. For reviews and articles on bee poisoning incidents see references 1, 2, 9, 11 and 18 on pages 47 and 48.

**Table 18:** incidents involving bees 1995-2004

	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>
Incidents investigated	56	40	40	43	28	48	23	25	24	23
Percentage of pesticide incidents	59%	20%	38%	28%	32%	22%	22%	20%	33%	17 %

## Part C: Incidents in 2004: species, samples and the pesticides involved

**Table 19:** pesticides found in beneficial insect incidents in the UK during 2004

Month	Location	Number of colonies in apiary	Number of colonies affected	Pesticide involved	Level detected
March	Warwickshire	4	4	pirimiphos-methyl	0.0037 micrograms per bee
April	North Yorkshire	3	3	bendiocarb	0.011 micrograms per bee
July	Nottinghamshire	22	20	bendiocarb	0.037 micrograms per bee
August	Lincolnshire	8	6	bendiocarb	0.014 micrograms per bee

- d No pyrethroid spray applications were confirmed as the source for bee poisoning incidents in 2004. There was one incident where initial enquiries suggested that pyrethroid applied to oilseed rape might be involved, but no residues of these compounds were found.
- e All incidents where pesticides were found are also summarised in appendix 2. In 2004, three incidents involved bendiocarb and one of these (incident B14) was caused by misuse. In the two other incidents (numbers B2 and B10), there were no known treatments of wild bee colonies in the area, but it is likely that they were also due to honeybees robbing bendiocarb-treated comb, which had not been sealed off or removed. There was one incident (number B1) of pesticide abuse, which involved pirimiphos-methyl.
- f In Lincolnshire (incident number B14), a beekeeper experienced a lot of deaths in six out of eight of his colonies. Dying bees were seen with their proboscises fully extended and wasps taking the dead bees were also affected. This incident coincided with the suspected treatment of a honeybee nest in a church, 150 metres from the apiary. Bees from the apiary were thought to have raided the treated nest and removed the comb. Two days later, the beekeeper blocked up the treated nest (which had not been sealed after treatment) and collected wax pupae and powder from it. After this action, the deaths in his colonies reduced. The bees were foraging on clover 100 metres from the apiary, and the weather was warm and dry. During a site visit, dead bees from the church were collected, as was the pupae and powder sample taken by the beekeeper. The beekeeper was asked to send in some of his dead bees, but none were received. Analysis of the bees and a sample of powder confirmed residues of bendiocarb. The amount found (0.014 micrograms bendiocarb per bee) is likely to be the cause of their death. This incident was recorded as misuse as the treated nest had not been sealed off properly.
- g There was an incident (number B2) early in the season, in North Yorkshire, when 200 to 300 bees were found dead near their colonies. The three hives were checked every day and were kept in a

## Part C: Incidents in 2004: species, samples and the pesticides involved

garden. The bees were found with their proboscises out and some were lying on their backs with their legs moving. Many of the drones were also affected. The incident involved all three colonies, but most deaths were from one colony. It was thought that the bees were foraging on flowering plants and trees in surrounding gardens. The nearest crop of oilseed rape was thought to be one mile away, to the south east of the apiary, but the owner noted the bees tended to fly in the opposite direction. The laboratory tests confirmed a residue of 0.011 micrograms of bendiocarb per bee, so it is possible that these bees died from pesticide poisoning.

- h In another incident (number B10), a beekeeper in Nottinghamshire discovered a lot of deaths in 20 of his 22 colonies. The bees were found over two days and appeared to be disorientated. Many were seen with an extended proboscis. The hives were on the flat roof of a city-centre property and the bees were thought to forage locally on nearby flowerbeds and gardens. The beekeeper has another apiary over 10 km away, but this was unaffected. The laboratory tests on a sample of dead bees confirmed a residue of 0.037 micrograms of bendiocarb per bee, so these bees are thought to have died from pesticide poisoning. At present, the source of the bendiocarb is not known in both of these incidents. However, treatments of wild bees, where the treated comb has not been removed or sealed off properly, are usually the source of this pesticide.
- i A beekeeper in Warwickshire (incident number B1) suspected that a substance had been intentionally introduced into all of his colonies. The beekeeper had four colonies and most of the bees were already dead by the time he found out about the incident. A grey-brown powder was found and due to the colour, it was thought this might be a powder concentrate, possibly permethrin based. This powder covered the centre of the exposed crown board. A similar powder was found outside the entrance of a second hive. The bees in the two other hives were also affected, although no powder was found anywhere on or inside these hives. The beekeeper had no idea how the powder came to be there, although a recent minor argument may have provided a motive for an attack on the hives. The laboratory tests confirmed a residue of 0.0037 micrograms of pirimiphos-methyl per bee, so it is possible that these bees died from pesticide poisoning. A sample of the submitted powder was also analysed and was confirmed to contain 1.6% w/w pirimiphos-methyl, so the incident was abuse of the pesticide.

### 6 Suspected poisoned baits and suspicious samples

- a Each year a number of suspected baits and suspicious samples are investigated, even though no dead animals have been found. There were 43 such incidents in 2004 and pesticides were

## Part C: Incidents in 2004: species, samples and the pesticides involved

found in 16 (37%) of these. Table 20 on page 39 shows the number of possible baits and suspicious samples analysed, and the percentage in which pesticides were found, for the past 10 years. There were seven incidents of abuse and nine incidents of misuse. Some of the baits were indiscriminate attempts to control pests. Badger setts (see also section on badgers) were involved in two misuse incidents and one abuse incident.

**Table 20:** incidents involving possible baits and suspicious samples (1995-2004)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Incidents investigated	72	63	66	62	67	64	35	47	31	43
Percentage of pesticide incidents	39%	46%	48%	47%	33%	44%	46%	43%	45%	37%

- b A range of chemicals was found in the abuse incidents.
- The badger sett incident (number 111), involved permethrin smoke generators left in a sett.
  - In two incidents (numbers 4015 and 4035), searches of gamekeepers' premises revealed baits and pesticides including sodium cyanide, alphachloralose and carbofuran.
  - Grain left in a cat owner's garden was confirmed as bromadiolone (incident number 4066).
  - Eggs containing mevinphos were found in woodland (incident number 63).
  - A bait containing metaldehyde was found in a residential area where a number of cats have died (incident number 156).
  - Finally, grain that contained difenacoum was left in an area, possibly to poison pigeons (incident number 4).
- c The nine misuse incidents involved products used to control vertebrates, particularly anticoagulant rodenticides. Some incidents involved metaldehyde.
- There were two incidents (numbers 98 and 140), where exposed or poorly protected bait points were found. These incidents involved difenacoum and other anticoagulant rodenticides.
  - There was one incident (number 128), where a warfarin formulation for rat control appeared to have been used to control squirrels.
  - There were three incidents that involved unapproved products or offences relating to the storage of approved products. Two incidents involved searches of gamekeepers' premises and in one (number 41) various pesticides were not stored properly. Of most concern was the presence of sodium cyanide. In the other incident (number 113), a range of pesticides, including bendiocarb, was claimed to be for personal use and many of the pesticides were no longer approved or were not correctly stored.
  - There was an incident (number 75) with metaldehyde that was recorded as misuse as it

## Part C: Incidents in 2004: species, samples and the pesticides involved

was alleged that an allotment association had supplied the product in an unlabelled bag with no instructions.

- The two incidents at badger setts were recorded as misuse. In one (number 43), aluminium phosphide was placed in a sett during a rabbit-control treatment. In the other (number 60), slug pellets had been applied near the sett entrance in a field being treated.
- Finally, a serious misuse incident (number 62) arose with an aluminium phosphide treatment of rat holes in a barn. Appropriate safety precautions were not taken, and several employees became ill.

### 7 Pesticides

- a The chemicals found in the 100 vertebrate and bait incidents are listed in table 4 on page 21. Details of these incidents are also given in appendix 2. Pesticides involved in incidents affecting beneficial insects can also be found in table 4 on page 21 and appendix 2.
- b In 2004, 27 different chemicals were thought to be behind all incidents (except the incidents relating to beneficial insects), compared with 22 in 2003. There were 24 different chemicals from England (18 in 2003), nine from Scotland (12 in 2003), five from Wales (six in 2003) and five from Northern Ireland (seven in 2003). Table 21 on page 40 shows the number of different pesticides involved in all incidents (except incidents relating to beneficial insects) for the past 10 years.

**Table 21:** the number of different pesticides implicated in all incidents (excluding bees, 1995-2004)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Number of compounds	36	29	26	34	27	29	23	23	22	27

### 8 Other causes of death

- a There were 62 incidents where the cause of death of vertebrates was caused by something other than pesticide poisoning. This represents 21% of these incidents. In 2003, there were 77 incidents (23% of all incidents). The bodies of animals that die from disease, starvation or trauma are not usually sent for analysis. However, it is possible that a sub-lethal dose of a pesticide contributed to their death. It is not possible for the scheme to monitor the effects of these doses, but if pesticides are strongly suspected in an incident, tissues may be sent for analysis.

# Part D: Conclusions

## 1 Number of incidents

a In 2004, 104 of the 355 incidents reported involved pesticides. Other causes of death (other chemicals, disease, starvation, and so on) were identified in 64 other incidents (see table 1 on page 20). There were 27 incidents reported that were classed as 'not applicable' because no pesticides were identified and no dead animals were found. Since 1999, the average number of incidents reported each year (except 2001) is about 430. However, before this there were about 620 incidents reported each year (see table 22 on page 41). Despite this difference in the number of incidents reported, the overall percentage of incidents involving pesticides has remained at around 30%.

**Table 22:** number of incidents reported to the scheme 1997-2004 and number of pesticide incidents identified

	1997	1998	1999	2000	2001	2002	2003	2004
<b>England</b>								
Incidents reported	333	334	232	244	133	188	160	145
Pesticide incidents	118 (35%)	108 (32%)	84 (36%)	83 (34%)	51 (38%)	80 (42%)	62 (39%)	59 (41%)
<b>Wales</b>								
Incidents reported	51	32	41	42	34	50	43	38
Pesticide incidents	13 (25%)	9 (28%)	9 (22%)	11 (26%)	6 (18%)	10 (20%)	10 (23%)	7 (18%)
<b>Scotland</b>								
Incidents reported	144	167	135	167	127	156	145	121
Pesticide incidents	36 (25%)	52 (31%)	40 (30%)	57 (34%)	35 (28%)	34 (22%)	37 (26%)	34 (28%)
<b>Northern Ireland</b>								
Incidents reported	79	79	45	53	52	56	49	51
Pesticide incidents	19 (24%)	16 (20%)	6 (13%)	11 (21%)	17 (33%)	7 (13%)	17 (35%)	4 (8%)
<b>Total</b>								
<b>Incidents reported</b>	<b>607</b>	<b>612</b>	<b>453</b>	<b>506</b>	<b>346</b>	<b>450</b>	<b>397</b>	<b>355</b>
<b>Pesticide incidents</b>	<b>185 (30%)</b>	<b>185 (30%)</b>	<b>139 (31%)</b>	<b>162 (32%)</b>	<b>109 (32%)</b>	<b>131 (29%)</b>	<b>126 (32%)</b>	<b>104 (29%)</b>

- b There are regional variations in the number of incidents, both in the total reported and in confirmed pesticide incidents (see table 22 on page 41).
- In England, 330 incidents (on average) were reported in 1997 and 1998, but only an average of 240 incidents was reported in 1999 and 2000. The decrease in incidents reported has continued through 2002 to 2004, with an average of 160 incidents being reported during this time. The overall decrease in incidents reported since 1999 may partly account for the 5% increase in the percentage of pesticide incidents found in 2004.
  - In Wales, the number of incidents reported each year peaked at 51 in 1997. Only 32 incidents were reported in 1998. So, the number of incidents reported for 2004 is within

## Part D: Conclusions

the range seen in previous years. The percentage of confirmed pesticide incidents is also within the range seen in previous years.

- In Scotland, the number of incidents reported and the percentage confirmed as pesticide incidents are broadly similar to that seen in previous years.
  - In Northern Ireland, only 45 incidents were reported in 1999, compared to 79 in previous years. The number of incidents reported each year has remained at around 50 since 1999. In 2003, the percentage of incidents involving pesticides was the highest recorded to date (35%), but this fell to only 8% in 2004.
- c In 2004, there were no incidents involving the approved use of pesticides. In 2003, there were four approved use incidents (see table 23 on page 42). This is the first year that approved use incidents have not been reported to the scheme. The scheme relies on incidents being found and reported and some incidents, particularly those involving small animals, are less likely to be reported. Also, the scheme is only able to monitor severe or lethal effects.

**Table 23:** Number of vertebrate-related pesticide-poisoning incidents in each category of use (1996-2004)

	1996	1997	1998	1999	2000	2001	2002	2003	2004
Abuse	136 (69%)	125 (74%)	95 (55%)	61 (47%)	95 (63%)	81 (78%)	78 (62%)	85 (71%)	55 (55%)
Misuse	19 (10%)	21 (12%)	45 (26%)	31 (24%)	22 (15%)	6 (6%)	19 (15%)	16 (14%)	18 (18%)
Approved use	11 (6%)	3 (2%)	4 (2%)	7 (5%)	9 (6%)	2 (2%)	5 (4%)	3 (3%)	0
Unspecified use	26 (13%)	21 (12%)	22 (13%)	29 (22%)	19 (13%)	14 (13%)	22 (17%)	13 (11%)	23 (23%)
Veterinary	4 (2%)	0	7 (4%)	2 (2%)	4 (3%)	1 (1%)	2 (2%)	1 (1%)	4 (4%)
<b>Total</b>	<b>196</b>	<b>170</b>	<b>173</b>	<b>130</b>	<b>149</b>	<b>104</b>	<b>126</b>	<b>118</b>	<b>100</b>

- d In 2004 there were 19 incidents caused by the misuse of pesticides. In 2003, there were 17 misuse incidents. This number is within the range seen for previous years (see table 23 on page 42). Misuse incidents are often associated with pesticides stored in locations that are not secure or appropriate. Pesticides must be kept in their original packaging so the instructions for use can be followed. Other misuse incidents include unprotected rodenticide-treated grain, or pellets spilt in fields.
- e As in previous years, incidents of deliberate abuse account for more than half of those incidents involving pesticides. In 2004, there were 56 abuse incidents, compared to 85 incidents reported

## Part D: Conclusions

in 2003. The proportion of abuse incidents (54%) is also lower than the 68% reported in 2003. However, the percentage of abuse incidents has ranged from 47% in 1999 to 74% in 1997 (except for 2001). So, the statistics for 2004 are not exceptional when compared to previous years, although it is the lowest number of abuse incidents reported by the scheme. There were also 25 incidents caused by unspecified use, where the source of the pesticide could not be identified or the incident could not be placed in one of the other categories. This number is within the range seen in previous years, but represents an increase since 2003. However, there were no unspecified use incidents reported from Scotland during 2003. In 2004, there were four incidents reported that involved the suspected abuse of veterinary products. Again, this is within the range seen in previous years, but represents the highest frequency since 2000. Details of all these poisoning incidents can be found in appendix 2.

### 2 Incidents affecting vertebrates

- a Of the 332 incidents affecting vertebrates, 100 involved pesticides (see table 23 on page 42). There were no incidents of approved use, and incidents of misuse amounted to 18. The deliberate abuse of pesticides was behind 55 incidents and there were 23 unspecified use incidents. During 2004, there were four incidents with pesticides formulated as veterinary medicine products.
- b Figure 2 on page 13 shows the relative proportion of incidents associated with alphachloralose, carbamate and organophosphorus compounds over several years. Since 1994, carbamates have consistently been involved in a larger percentage of vertebrate-poisoning incidents than either organophosphates or alphachloralose, and there is no sign of this trend changing. In 2001, there was an increase in the percentage of alphachloralose incidents, to a level not seen for nearly 10 years. This may in part have been due to the information being affected by the foot-and-mouth crisis, although the percentage in 2002 is also high. In 2002, the Environmental Panel of the Advisory Committee on Pesticides considered including alphachloralose in the Poison Rules 1982 and recommended that it is classified under part one. Pure alphachloralose is no longer sold as a rodenticide by the main UK supplier. All of the alphachloralose incidents were abuse incidents and most of the carbamate incidents also arose from abuse.
- c The highest number of pesticide poisoning incidents amongst vertebrates involved birds of prey. Buzzards are the species most frequently poisoned by pesticides, followed by red kites. In previous years, the scheme has reported background residues of organochlorine compounds in

## Part D: Conclusions

sparrowhawks. However, during 2004 there were incidents where the death of sparrowhawks has been caused by anticoagulant rodenticides. Sparrowhawks usually feed on small birds and some mammals, but they may scavenge on carcasses. The scheme has reported incidents where sparrowhawks have been poisoned from pesticides applied to carcasses.

### 3 Bee incidents

- a Since 2001, the number of bee incidents reported each year has been an average of 24 (ranging from 56 incidents in 1995, to 28 incidents in 1999). However, the percentage of poisoning incidents for 2004 is lower than that seen in previous years. In 2004, there were eight incidents where the pesticide fluvalinate was identified, which is similar to the six incidents seen in 2003. Incidents with bendiocarb have halved, from six incidents in 2003 to three incidents in 2004. The poor summer in 2004 may account for this reduction in incidents. In 1995, 11 bendiocarb incidents were reported, and in 1994 and 1999 there were six bendiocarb incidents. Anyone using a pesticide to control bees, particularly professional users, should refer to the free HSE advice leaflet 'Feral Honey Bees – points to consider when asked to treat a honey bee nest' ([www.hsebooks.co.uk](http://www.hsebooks.co.uk)).
- b No applications of pyrethroid spray were confirmed as the source for a bee poisoning during 2004. However, in the past, the scheme has reported incidents with pyrethroids, and often they are associated with a mix of pyrethroid and fungicide. The possible risks of pesticide applications to honeybees cannot be effectively reviewed unless the regulatory authority, the Pesticides Safety Directorate (PSD), recommends changes to approval conditions or highlights areas for research. One source of the information that could help PSD is the scheme, so beekeepers must continue to collect samples of dead honeybees when they suspect a pesticide poisoning.

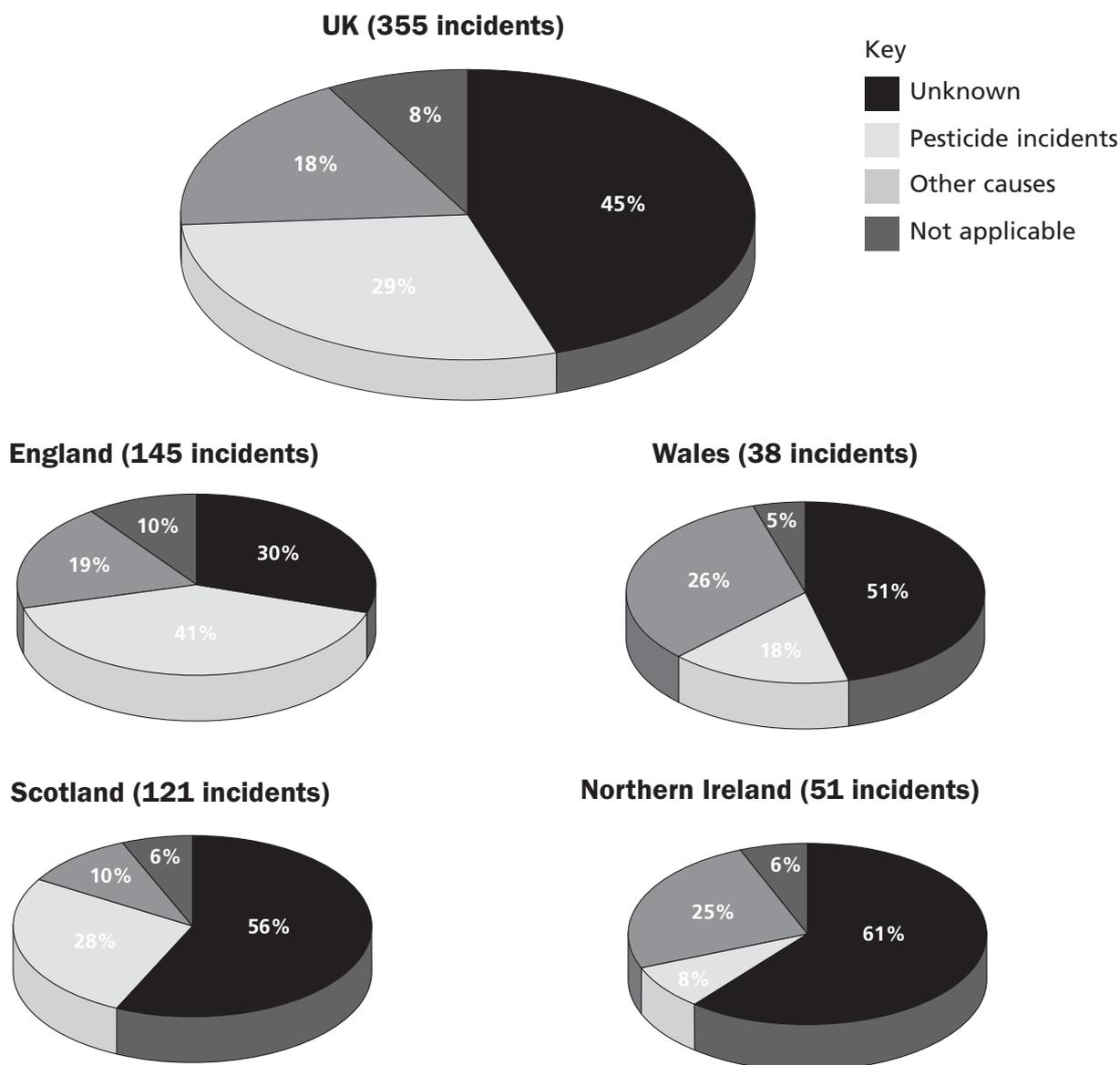
### 4 Incidents with no known cause

- a There are always a number of incidents where the cause remains unknown. This may be due to several things, such as not having enough tissues to analyse, poisoning by other chemicals and so on. In 160 incidents reported in 2004, the cause of death was not found (see figure 3 on page 45). This number of incidents is less than in 2003, when 177 incidents were from an unknown cause. However, the variation is within the range of information seen in previous years.

## Part D: Conclusions

b There were 27 incidents that were classed as “not applicable”, which is an increase since 2003 (17 incidents). These incidents involved suspected baits or suspicious samples where no dead or poisoned animals were found. Often they just involved food placed for animals or birds, or discarded food items.

**Figure 3: Percentages of reported incidents in 2004 by cause of incident**



### Publications

Appendix 3 gives a list of publications that have arisen from work carried out by the scheme and its findings. The results of the scheme have also been widely used in several publications.

## Part E: Acknowledgements

We would like to thank David Graham of the Department of Agriculture, Food and Rural Development (DARD) for providing the results from Northern Ireland. Kathy Wood of PSD provided the information on enforcement action in England. For identifying the pesticide residues in this report, we would like to thank the analytical chemists, particularly Ainsley Jones, Andrew Charlton, Sheonaidh Charman, Vicki Jowett and Trevor Platt at Central Science Laboratory (CSL), and Laura Melton at Scottish Agricultural Science Agency (SASA). We are also grateful to colleagues in Defra, SEERAD, ARAD, DARD, SASA and CSL, who have taken part in investigations during 2004, and to all individuals and organisations who have supported the Wildlife Incident Investigation Scheme by reporting incidents, sending in evidence, providing information or contributing in other ways.

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# Appendix 1 - Investigation procedures

The scheme relies on members of the public and interested organisations finding and reporting carcasses or suspected baits for analysis. In England and Wales, the scheme is organised regionally with the relevant Rural Development Service (RDS) or Agricultural Rural Affairs Department (ARAD) wildlife officer deciding (in consultation with others if necessary) whether an investigation should be started. This 'screens out' incidents that may not involve pesticides.

In England and Wales, after agreeing to investigate an incident, the carcasses are taken to a local Veterinary Laboratories Agency for a post-mortem. This may result in bacteriological or virological tests being carried out to find out whether disease contributed to the deaths.

An RDS or ARAD wildlife officer may visit the affected area to gather information to help identify the cause of the incident. A further visit may be needed in incidents that do not involve abuse, in order to get more information (for example, to interview relevant contacts not available before or to follow up the results of analysis).

Incidents may not be investigated if they are not covered by the scheme (for example, if poisoning is thought to have involved other chemicals or pollutants). If the visit to the site or the post-mortem identifies the cause of death as something other than pesticide poisoning, tissues may not be sent for analysis.

The report on any visit, the findings from the post-mortem and any relevant tissues from casualties are sent to the Wildlife Incident Unit (WIU) at the Central Science Laboratory, Sand Hutton, York, where the tissues are analysed. The staff there will assess the probable cause of the incident and whether any pesticide residues found contributed to the death or illness of the animal. An animal's death is generally confirmed as due to a pesticide if residues above levels thought to be lethal are found. In some cases, the presence of residues and other findings from the post-mortem may be used to identify the cause of death.

Honeybee deaths in England and Wales are investigated in a similar way. Beekeepers pass samples of dead bees to the National Bee Unit of the Central Science Laboratory at Sand Hutton, York to be investigated. RDS or ARAD wildlife officers visit the sites to gather relevant information. Bee samples are sent to the WIU for analysis, where reports of the incidents are also produced.

# Appendix 1 - Investigation procedures

The Scottish scheme is similar to those in England and Wales. Samples are sent to the Scottish Agricultural Science Agency (SASA) in Edinburgh to be investigated. Veterinary support is provided by the Veterinary Investigation Laboratories of the Scottish Agricultural College and by Lasswade Veterinary Laboratory. Scottish Executive Environment and Rural Affairs Department (SEERAD) staff normally only visit sites when pesticide poisoning has been confirmed, unless there is clear evidence of deliberate abuse or misuse of a pesticide.

The Northern Ireland scheme is similar to the Scottish scheme. Samples are sent to laboratories in Northern Ireland. As with the Scottish scheme, site visits are normally only carried out when pesticide poisoning has been found. Investigations are usually carried out by the Health and Safety Executive Northern Ireland. If the abuse and misuse of pesticides affects wildlife, this may break the Wildlife (Northern Ireland) Order 1985, which is enforced by the Police Service of Northern Ireland (PSNI), supported by the Countryside and Wildlife Branch of the Department of the Environment (Northern Ireland).

If an incident will be investigated for legal proceedings, the Defra Investigation Section, along with PSD, gathers evidence and information collected by the RDS and ARAD wildlife officers. SEERAD staff in Scotland and the PSNI, DARD staff and others in Northern Ireland carry out a similar role. The HSE and local authorities also have a regulatory role and local departments work together to co-ordinate enforcement action. The police may also investigate cases.

All the schemes use analysis techniques and equipment that can identify low levels of pesticides residues.

# Appendix 2 - Incidents where pesticides were detected in 2004

Number	Chemical	Category	Species or sample involved	Month	County	Comments
113	bendiocarb/ other pesticides	misuse	10 samples	May	West Yorkshire	A search of a gamekeeper's premises revealed pesticides which were claimed to be for personal use, but many were no longer approved, or were professional products, or were not correctly stored. An enforcement notice was issued.
B14	bendiocarb	misuse	honeybee, wild bee	August	Lincolnshire	Treated honeycomb was not removed or sealed off well enough after treatment on a colony of wild bees. No honeybees were sent in for analysis, so no enforcement action was taken.
107	bromadiolone	misuse	2 hedgehogs, 4 baits	September	Norfolk	Bait points in this residential area were not protected well enough. A small residue of difenacoum also found in the hedgehogs. Follow-up action is continuing.
74	difenacoum	misuse	30 house sparrows, bait	May	Glamorgan	Exposed bait was left in a residential area. The sparrows also had a small residue of warfarin present.
98	difenacoum/ warfarin/ brodifacoum/ bromadiolone	misuse	6 grain samples	March	Norfolk	Rodenticide products were found with more than one active ingredient (mainly difenacoum, but very small residues of brodifacoum in two samples and bromadiolone in another two samples). Difenacoum and warfarin were also present in two samples. The Health and Safety Executive is to take follow-up action.
140	difenacoum/ bromadiolone	misuse	3 bait, 2 grain	November	Suffolk	Exposed bait was in a field of winter oilseed rape. This may have been an attempt to prevent damage by moorhens.
4111	difenacoum	misuse	dog	September	Tayside	Scottish Executive Environment and Rural Affairs Department (SEERAD) investigation, warning letter issued to pest control contractor.
128	warfarin	misuse	grain	June	Middlesex	A formulation for rat control appeared to have been used to control squirrels. An advice letter was sent to the pest control contractor.
43	aluminium phosphide	misuse	badger sett	March	Bedfordshire	A badger sett appeared to have been gassed during a rabbit-control treatment. The person responsible was prosecuted by the police and had to pay fines and costs totalling £1443.
62	aluminium phosphide	misuse	rat hole	March	Norfolk	Adequate precautions were not taken during a rodent-control treatment in a barn and employees were ill. The employer was prosecuted by the Health and Safety Executive, with fines and costs totalling £52,320.
60	metalddehyde	misuse	badger sett, sample	April	Essex	Slug pellets were applied near a badger sett. An advisory letter was sent to those responsible.
75	metalddehyde	misuse	3 samples	June	Essex	It was alleged that an allotment association had supplied this metalddehyde in an unlabelled bag, without instructions. The application was very dense on the allotment and bird droppings contained metalddehyde. The matter was referred to Trading Standards for follow-up action.
106	metalddehyde	misuse	dog	August	Buckinghamshire	Slug pellets split on farmland were eaten by a dog. The dog failed to respond to treatment and was put down. A guidance letter was sent to the farmer.
112	metalddehyde	misuse	dog, pellets	September	North Yorkshire	Split pellets were left in an arable area for several days. A dog that ate some pellets was treated but had to be put down. RSPCA gave a verbal warning.

# Appendix 2 - Incidents where pesticides were detected in 2004

Number	Chemical	Category	Species or sample involved	Month	County	Comments
114	metaldehyde	misuse	dog, pellets	September	Lincolnshire	Piles of pellets were left near a public bridleway possibly as a slug trap. There was no prosecution.
129	metaldehyde	misuse	dog, pellets	November	Suffolk	Slug pellets had been applied to a field and many small spillages were noted. A dog that ate some pellets recovered, but has permanent liver damage. A guidance letter was sent.
144	metaldehyde	misuse	dog, sample	November	Essex	The dog ate spilt pellets. It recovered and no residue was found in a blood sample (but this was taken 10 days after exposure). The farm worker was prosecuted and pleaded guilty and had to pay £500 plus costs and compensation of £429.10.
155	metaldehyde	misuse	dog	June	Kent	A dog chewed through a container left on a kitchen table. It was claimed that there was not the correct amount of Bitrex in the product. There were no tissue samples to test and so no enforcement action was taken.
41	sodium cyanide	misuse	9 samples	February	Buckinghamshire	A gamekeeper's premises were searched after the death of a buzzard. This revealed unsafe and improper storage of a range of pesticides, particularly sodium cyanide. All pesticide charges were dropped, but the RSPB was involved in a successful prosecution of two keepers for illegally killing a buzzard. Each received fines and costs of £2,500.
49	mevinphos	abuse	5 crows, 2 magpies	April	Worcestershire	History of abuse with organophosphate compounds in the area.
63	mevinphos	abuse	2 baits	May	South Yorkshire	Two contaminated chicken eggs were found next to a footpath in a woodland where illegal badger snaring is suspected. A follow-up raid on a gamekeeper found only an amateur product which no longer had approval.
B1	pirimiphos-methyl	abuse	honeybee	March	Warwickshire	A formulation containing pirimiphos-methyl was deliberately placed in beehives.
141	aldicarb	abuse	dog	November	South Yorkshire	Residential area with a history of incidents.
8	carbofuran	abuse	dog, fox, 11 samples	January	Hampshire	Bromadiolone was also present in the fox and this compound had been used in the area. A raid on a market gardener found unapproved pesticide products and storage offences. The pesticides involved include carbofuran, carbofuran, chlorpyrifos, dimethoate, fonofos, disulfoton and aldrin.
26	carbofuran	abuse	badger	March	Devon	A small residue was found as well as severe injuries, but abuse suspected.
108	carbofuran	abuse	2 buzzards	August	Shropshire	Found in a wood used to raise pheasants.
109	carbofuran	abuse	buzzard, bait	September	Cornwall	Found near a pheasant-release pen in an area with extensive game-rearing interests. Pheasant may have been used as the bait.
125	carbofuran	abuse	red kite, bait	October	Northumberland	Rabbit used as a bait in this area with farmland and game rearing.
131	carbofuran	abuse	buzzard	October	Pembrokeshire	Found on the edge of a shooting estate.
4009	carbofuran	abuse	red kite	January	Dumfries & Galloway	Background residue of bromadiolone also identified. The Police, SEERAD and the RSPB investigated but there was not enough evidence to prosecute.
4021	carbofuran	abuse	kestrel, tawny owl, 2 buzzards, 5 barn owls	February	Border	Police and SEERAD investigated this incident where only buzzards were poisoned. Sub-lethal residue of bromadiolone was also found in one buzzard. A low residue of coumatetralyl was found in a tawny owl.

# Appendix 2 - Incidents where pesticides were detected in 2004

Number	Chemical	Category	Species or sample involved	Month	County	Comments
4026	carbofuran	abuse	buzzard	February	Highland	SEERAD investigation.
4029	carbofuran	abuse	mole, 2 buzzards, 4 baits	March	Tayside	Rabbit bait used. The police and SEERAD investigated the incident. Incident reported in the press, no charges made to date.
4031	carbofuran	abuse	goshawk, crow, 15 buzzards, 14 baits, chemicals	March	Border	A police investigation found 11 pheasant and three rabbit baits. The gamekeeper pleaded guilty and was fined £5500 for offences under the Wildlife & Countryside Act. He was also 'admonished' for a charge of possessing carbofuran. Background residues of bromadiolone were found in two of the buzzards, and of difenacoum in a third buzzard.
4032	carbofuran	abuse	buzzard, bait	March	Tayside	The police and SEERAD investigated the incident where rabbit bait was used. The incident was reported in the press and no charges have been made yet. Background residue of difenacoum was also present in the buzzard.
4034	carbofuran	abuse	gull, 5 buzzards, 2 crows, 5 baits	March	Tayside	No residues were found in the gull. The police and SEERAD investigated the rabbit bait used. The incident was reported in the press and no charges have been made yet. Background residues of difenacoum were present in three buzzards, with coumatetralyl also present in one bird.
4048	carbofuran	abuse	buzzard	April	Border	A background residue of difenacoum was also present. The police investigated the matter but no charges have been made yet.
4061	carbofuran	abuse	buzzard	June	Highland	The police, SEERAD and the RSPB have investigated the matter.
4062	carbofuran	abuse	crow, 3 buzzard, 7 baits	June	Strathclyde	Rabbit bait used. A background residue of difenacoum was also present in one buzzard. The police, SEERAD and the RSPB are still investigating the matter.
4074	carbofuran	abuse	crow, 2 immature peregrine falcon, bait	July	Grampian	Pigeon bait used. A background residue of bromadiolone was also present in one of the peregrines. The police and SEERAD investigated this matter, which had a lot of TV, radio and press coverage.
4105	carbofuran	abuse	buzzard	September	Border	The police and SEERAD investigated the matter and the person responsible was prosecuted in June 2005 (total fine £90).
4117	carbofuran	abuse	buzzard, 2 baits	October	Strathclyde	Pigeon baits were used. The police could not gather enough evidence for a prosecution.
4122	carbofuran	abuse	buzzard, bait	October	Border	A hare was used as bait, SEERAD and the police are still investigating the matter.
4133	carbofuran	abuse	red kite, 2 buzzards, 2 baits	November	Highland	Pheasant baits were used. Background residues of bromadiolone and difenacoum were also identified in the red kite. No carbofuran was found in the pheasants or one of the buzzards. The police, SEERAD and the RSPB investigated the matter.
5	carbosulfan	abuse	2 cats	January	Norfolk	In an urban area, cats had been eating contaminated fish which had not been left for them by their owners.
1	methomyl	abuse	dog, fox, 40 samples	January	Greater London	Abuse of a product not approved in the UK being used in an allotment area. There were also rodenticides, difenacoum, bromadiolone and coumatetralyl confirmed in some samples. The fox probably died from starvation. An enforcement notice was issued and the person responsible paid fines and costs of £305.

# Appendix 2 - Incidents where pesticides were detected in 2004

Number	Chemical	Category	Species or sample involved	Month	County	Comments
36	methomyl	abuse	buzzard	April	Somerset	Found near an estate with game-rearing interests. Exposure to bromadiolone had also occurred.
4066	bromadiolone	abuse	grain bait	May	Dumfries & Galloway	The police investigated the matter but there was not enough evidence for a prosecution.
32	coumatetralyl	abuse	sample, 7 newts	March	County Durham	A rodenticide product was poured into a garden pond, possibly to kill newts. The species killed were great crested, palmate and smooth newts.
4	difenacoum	abuse	grain	January	South Yorkshire	Rodenticide was used, presumably to poison pigeons.
21	difenacoum	abuse	blackbird, 3 baits	March	Norfolk	Bread baits were used, in this residential area. A small residue of brodifacoum was also found in one of the bait samples.
38	difenacoum	abuse	cat, bait	April	West Sussex	A residue was confirmed in cat-food bait. The cat was ill, but no residues were confirmed in a blood or vomit sample.
76	difenacoum	abuse	house sparrow, chicken, 4 chicks, grain	April	Norfolk	A rodenticide bait appears to have been deliberately left in an area chickens may have access to, but no residues were found in the chicks or the house sparrow.
111	permethrin	abuse	badger sett, sample	September	Somerset	Permethrin smoke generators were left near a badger sett to cause them harm.
33	alphachloralose	abuse	goshawk, kestrel, tawny owl, little owl, 2 sparrowhawks, 4 buzzards	March	Leicestershire	Only one buzzard had alphachloralose residue and bromadiolone was also found in this buzzard and one other buzzard. The cause of death for the other species is uncertain.
51	alphachloralose	abuse	2 cats, bait	April	County Durham	Contaminated tuna fish was used as bait on an allotment, possibly intended for rats.
53	alphachloralose	abuse	marsh harrier	April	Norfolk	A poisoned male marsh harrier was found in an area with a history of harrier persecution.
66	alphachloralose	abuse	peregrine	April	Shropshire	Suspected abuse of alphachloralose, but the source is uncertain.
2338	alphachloralose/ coumatetralyl/ difenacoum/ bromadiolone	abuse	buzzard, cat	February	Down	
4025	alphachloralose	abuse	buzzard, 2 crows, bait	March	Central	Rabbit bait was used and only one crow poisoned. The buzzard died from starvation. The police and SEERAD investigated the matter.
4035	alphachloralose/ sodium cyanide	abuse	chemicals, 2 gamebags, knife, 2 baits	March	Tayside	The police investigated this incident where two rabbit baits were found. Those responsible pleaded guilty to unlawful storage of pesticides and were fined £1200.
4044	alphachloralose	abuse	red kite	April	Dumfries & Galloway	Background residues of bromadiolone and difenacoum were also present. The police investigated but there was not enough evidence to prosecute.
4051	alphachloralose	abuse	buzzard	April	Grampian	A background residue of bromadiolone was also identified. The police investigated the matter.
4115	alphachloralose	abuse	cat	March	Antrim	

# Appendix 2 - Incidents where pesticides were detected in 2004

Number	Chemical	Category	Species or sample involved	Month	County	Comments
4127	alphachloralose	abuse	peregrine	November	Border	SEERAD and the police are still investigating this matter of a hare bait being used.
8751	alphachloralose	abuse	cat, bait	June	Down	
37	metalddehyde	abuse	2 cats	January	Norfolk	In a residential area one cat was ill and the other was found dead.
61	metalddehyde	abuse	dog	May	Essex	The dog's illness is possibly due to some other cause, but slug pellets had been intentionally left on a garden patio.
92	metalddehyde/ bromadiolone	abuse	fantail dove, blackbird, greenfinch, woodpigeon, 2 baits	April	Lancashire	In a residential area, a small residue of coumatetralyl was also found in one bait. The cause of death of the birds is uncertain, but a small residue of difenacoum was found in the dove.
156	metalddehyde	abuse	suspected bait	November	Worcestershire	A number of cats have died in a residential area bordering farmland.
5178	metalddehyde	abuse	dog	April	Fermanagh	
4015	sodium cyanide/ carbofuran	abuse	chemicals, (mink and rabbit bait)	February	Border	The police and SEERAD investigated but there was not enough evidence for a prosecution. A background residue of bromadiolone was identified in the mink.
16	strychnine	abuse	dog, bait	February	Cumbria	Chicken carcass was laced with strychnine. As well as the dog that died, one other dog was also unwell. There was a successful prosecution, with fines and costs totalling £3000.
150	strychnine	abuse	dog	November	Shropshire	Found in an area near farmland and woodland used for pheasant rearing.
4043	strychnine	abuse	3 foxes	April	Highland	SEERAD investigated but there was not enough evidence to prosecute. A background residue of bromadiolone was identified in one fox, and a residue of difenacoum was found in a second fox.
73	triazophos	unspecified	blackbird, 15 jackdaws, 15 rooks	May	Wiltshire	A large residue was found in the jackdaws. This type of poisoning has not been reported in birds for nearly 10 years.
79	triazophos	unspecified	crow, 2 magpies	June	Shropshire	A bird was put down. A small residue was found but the source was uncertain.
B2	bendiocarb/fluvalinate	unspecified	honeybee	April	North Yorkshire	A bee treatment in the wild was suspected, but no treatment has been identified in the area.
B10	bendiocarb	unspecified	honeybee	July	Nottinghamshire	A bee treatment in the wild was suspected, but no treatment has been identified in the area.
58	brodifacoum	unspecified	2 red kites	April	Oxfordshire	Two birds tested, but a large residue found only in one red kite. The source is uncertain, but incidents with brodifacoum have occurred in this area before.
132	brodifacoum/bromadiolone	unspecified	fox	November	North Yorkshire	The source of the rodenticides is uncertain, but brodifacoum is not approved for use outside buildings and a small residue of difenacoum was also found.
4006	brodifacoum	unspecified	dog, bait	January	Lothian	SEERAD investigated the matter and the dog made a full recovery.
4045	brodifacoum/ bromadiolone/difenacoum	unspecified	buzzard	April	Fife	There were also significant injuries present.
4079	brodifacoum	unspecified	2 tawny owls	July	Dumfries & Galloway	The residue in the liver of one of the owls was 0.29 mg/kg. No residues were found in the second owl.

# Appendix 2 - Incidents where pesticides were detected in 2004

Number	Chemical	Category	Species or sample involved	Month	County	Comments
4132	brodifacoum/bromadiolone	unspecified	dog	November	Tayside	Police and SEERAD investigated.
6	bromadiolone/difenacoum	unspecified	3 foxes	January	Middlesex	Found in an urban area. The source of rodenticide was unknown.
24	bromadiolone	unspecified	sparrowhawk, tawny owl	March	Lancashire	Found in a rural area. The source of the rodenticides is uncertain. A small residue of brodifacoum was also found in the sparrowhawk.
85	bromadiolone	unspecified	fox	June	Glamorgan	A small residue of difenacoum was also present. The source is uncertain.
4022	bromadiolone/difenacoum	unspecified	buzzard	February	Tayside	There was a small amount of bleeding from the beak, and the lungs were congested and frothy.
4023	bromadiolone/difenacoum/brodifacoum	unspecified	buzzard	February	Grampian	Remains of small mammals were found in the digestive tract.
4068	bromadiolone/difenacoum	unspecified	buzzard	June	Lothian	
4128	bromadiolone	unspecified	barn owl	November	Strathclyde	Extensive areas of bleeding under the skin. A small residue of brodifacoum was also present.
2-05	difenacoum	unspecified	2 buzzards	December	Norfolk	Some signs of trauma were also present in these birds, but the amount of pesticide found may have contributed to their deaths.
9	difenacoum/brodifacoum/flocoumafen/bromadiolone	unspecified	pony, 4 crows, 4 samples	January	Devon	Ponies and crows had access to bait left for rats. Bait points had been protected. Bait samples contained a mixture of rodenticides.
68	difenacoum	unspecified	red kite	May	Clwyd	The source of the difenacoum is uncertain.
117	difenacoum	unspecified	2 badgers	September	Leicestershire	Large liver residue, but the source of the compound was uncertain.
124	difenacoum	unspecified	dog	September	Cheshire	The source of the difenacoum is uncertain.
4138	difenacoum	unspecified	sparrowhawk	December	Grampian	Found in a garden.
123	metaldehyde	unspecified	dog	September	Hampshire	Dog presumably ate split slug pellets in this arable area.
126	metaldehyde	unspecified	badger, sample	October	Cornwall	The badger was seen behaving strangely on a golf course and was treated by a local vet. Metaldehyde was confirmed in the badger's faeces, but the source is uncertain.
48	diazinon	veterinary	red kite	April	Dyfed	Source of the diazinon is uncertain, but abuse is suspected. The red kite had also been exposed to difenacoum.
4082	diazinon	veterinary	red kite	July	Central	A background residue of difenacoum was also present. SEERAD investigated the matter.
34	fenthion	veterinary	buzzard, magpie, 13 ravens, bait	March	Dyfed	Many dead birds were found in an area with sheep farming. Lamb was assumed to be the bait. A small residue of difenacoum was also found in the buzzard.
55	fenthion	veterinary	buzzard, red kite	April	Dyfed	Suspected abuse of the compound, but the source is uncertain.
B5	fluralinate	disease	honeybee	July	Norfolk	Acarine may have been the cause of the incident.
B13	fluralinate	disease	honeybee	July	East Yorkshire	Acarine may have been the cause of the incident.
139	bromadiolone	shot	fox	October	Essex	The residue was at a level which is often regarded as significant, but there were clear signs that the animal had been shot.
4037	bromadiolone	starvation	golden eagle	March	Tayside	Sub-lethal residue found.
4014	bromadiolone/difenacoum	trauma	barn owl	February	Tayside	Low background residues found.

# Appendix 2 - Incidents where pesticides were detected in 2004

Number	Chemical	Category	Species or sample involved	Month	County	Comments
4124	difenacoum	trauma	red kite	October	Western Isles	Sub-lethal residue found.
39	difenacoum	trauma	barn owl	March	Powys	Suspected road traffic victim, but also had a residue present.
15	brodifacoum	unknown	sparrowhawk	February	Greater London	Background residue found but cause of death unknown.
4063	brodifacoum/bromadiolone	unknown	kestrel	June	Grampian	Sub-lethal residue found.
4095	brodifacoum	unknown	buzzard	September	Tayside	Sub-lethal residue found.
4001	bromadiolone	unknown	buzzard	January	Fife	Low background residue found.
4003	bromadiolone/difenacoum	unknown	otter	January	Border	Sub-lethal residues found.
4008	bromadiolone	unknown	buzzard	January	Dumfries & Galloway	Sub-lethal residue found.
4033	bromadiolone/ chlorphacinone/ difenacoum	unknown	buzzard	March	Tayside	Sub-lethal residues found.
4042	bromadiolone	unknown	buzzard	March	Grampian	Sub-lethal residue found.
4052	bromadiolone	unknown	3 stoats	April	Highland	Animals found in bag at roadside. Low background residues of bromadiolone identified in two stoats.
4075	bromadiolone	unknown	2 barn owls	July	Dumfries & Galloway	Low background residue found in one bird.
22	difenacoum	unknown	buzzard	February	Worcestershire	Exposure to difenacoum occurred, but the cause of death is uncertain.
4064	difenacoum	unknown	buzzard	June	Grampian	Sub-lethal residue found.
4118	difenacoum	unknown	badger	October	Central	Low background residue found.
4125	difenacoum	unknown	buzzard	November	Fife	Sub-lethal residue found.
B3	flualinate	unknown	honeybee	May	North Yorkshire	An investigation suggested the deaths were associated with a pyrethroid insecticide, but no residues were found.
B4	flualinate	unknown	honeybee	May	Buckinghamshire	
B7	flualinate	unknown	honeybee	June	Hampshire	
B8	flualinate	unknown	honeybee	July	Denbighshire	
B9	flualinate	unknown	honeybee	June	Staffordshire	
B16	thymol	unknown	honeybee	August	Kent	The pesticide had been used to treat varroa mites. The residue was confirmed by an unvalidated method and the significance of it is uncertain.

In incidents 41, 113 and 155 samples were not available for laboratory analysis, but analysis in the field, or information gathered during enquiries into the incident, implicate the pesticide.

In incidents B2, B3, B4, B5, B7, B8, B9 and B13 all the residues are very small (and not confirmed by an alternative method) and not thought to be the cause of death, but probably originate from varroa mite treatments.

## Appendix 3 - Major scheme publications produced since 1976

- 1 Hamilton, GA, Hunter, K, Ritchie, AS, Ruthven, AD, Brown, PM and Stanley, PI (1976). Poisoning of wild geese by carbophenothion-treated winter wheat. *Pestic. Sci.* 7: 175-183.
- 2 Brown, PM, Bunyan, PJ and Stanley, PI (1977). The investigation and pattern of occurrence of animal poisoning resulting from the misuse of agricultural chemicals. *J. Forens. Sci. Soc.* 17: 211-221.
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- 4 Felton, CL, Brown, PM, Fletcher, MR, Stanley, PI, Quick, MP and Machin, AF (1981). Bird poisoning following the use of warble fly treatments containing famphur. *Veterinary Record*, 108: 440.
- 5 Keymer, IF, Fletcher, MR and Stanley, PI (1981). Causes of mortality in British Kestrels (*Falco tinnunculus*). In: *Recent Advances in Study of Raptor Diseases*. Cooper, JE and Greenwood, AG (EDS.), Chiron Publications, Keighley. 143-151.
- 6 Hamilton, GA, Ruthven, AD, Findlay, E, Hunter, K and Lindsay, DA (1981). Wildlife deaths in Scotland resulting from misuse of agricultural chemicals. *Biological Conservation*, 21: 315-326.
- 7 Fletcher, MR and Hardy, AR (1983). Wildlife poisoning incidents from agricultural pesticides in England and Wales. *Proceedings 10th International Congress Plant Protection*, 2: 725.
- 8 Hardy, AR, Fletcher, MR and Stanley, PI (1986). Pesticides and wildlife: Twenty years of vertebrate wildlife incidents investigated by MAFF. *State Veterinary Journal*, 40: 182-192.
- 9 Hardy, AR, Greig-Smith, PW and Stanley, PI (1987). Birds as indicators of the intensity of use of agricultural pesticides in the UK. In *The Value of Birds*. Diamond, A.W. and Fillion, J. (Eds.), ICBP Technical Publication number 6: 119-132.
- 10 Brown, RA, Hardy, AR, Greig-Smith, PW and Edwards, PJ (1988). Assessing the impact of rodenticides on the environment. *OEPP/EPPO Bull.*, 18: 283-292.
- 11 Greig-Smith, PW (1988). Wildlife hazards from the use, misuse and abuse of pesticides. *Aspects of Appl. Biol.* 17: 247-256.

## Appendix 3 - Major scheme publications produced since 1976

- 12 Greig-Smith, PW (1988). Hazards to wildlife from pesticide seed treatments. In: *Application to seed and soil*. Martin, TJ (Ed), Monograph number 39, BCPC. 127-134.
- 13 Greig-Smith, PW (1989). Tracking the safety of pesticides for wildlife. *British Sugar Beet Review*, 57: 23-27.
- 14 Greig-Smith, PW (1990). Understanding the impact of pesticides on wild birds by monitoring incidents of poisoning. In: *Wildlife Toxicology and Population Modelling: integrated studies of agroecosystems*. Kendall, R.J. and Lacher, T.E. (Eds.), Lewis Publishers, Boca Raton, 301-319.
- 15 Greig-Smith, PW (1990). Investigations of honeybee poisoning by pesticides in the UK, 1981-1989. *Proceedings*, Fourth International Symposium on Harmonisation of Methods for Testing the Toxicity of Pesticides to Bees. Research Institute of Apiculture, Dol, Czechoslovakia 1990, 29-34.
- 16 Greig-Smith, PW (1991). Use of cholinesterase measurements in the surveillance of wildlife poisoning in farmland. In *Cholinesterase-inhibiting insecticides*. Mineau, P (Ed). Elsevier. 127-150.
- 17 Fletcher, MR and Grave, RC (1992). Post-registration surveillance to detect wildlife problems arising from approved pesticides. *Proceedings British Crop Protection Council - Pests and Diseases 1992*, 2: 793-798.
- 18 Hart, ADM and Greig-Smith, PW (1992). Validation of environmental risk assessment procedures for pesticides. *Proceedings British Crop Protection Council - Pests and Diseases 1992*, 2: 799-804.
- 19 Fletcher, MR, Greig-Smith, PW and Stevenson, JH (1994). The Scheme to investigate the suspected poisoning of honeybees by agricultural chemicals in England and Wales. In: *Proceedings 5th International Symposium on the Hazards of Pesticides to Bees*. Appendix 18, 139-145: Plant Protection Service, Wageningen, The Netherlands.
- 20 Fletcher, MR (1994). Pesticide poisoning of wildfowl in England and Wales. *Wildfowl*, 45: 255-259.
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- 22 Hunter, K (1995). The poisoning of non-target animals. In: *Pesticides - Development, Impacts, and Controls*. Best, GA and Ruthven, AD (Eds), RSC publications, 74-86.
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- 25 Barnett, EA and Fletcher, MR (1998). The poisoning of animals from the negligent use of pesticides. *Proceedings British Crop Protection Council - Pests and Diseases 1998*, 1: 279-284.
- 26 Mineau, P, Fletcher, MR, Glaser, LC, Thomas, NJ, Brassard, C, Wilson, LK, Elliott, JE, Lyon, LA, Henny, CJ, Bollinger, T and Porter, SL (1999). Poisoning of raptors with organophosphorus and carbamate pesticides with emphasis on Canada, U.S. and U.K. *J. Raptor Res*, 33: 1-37.
- 27 Edwards, PJ, Fletcher, MR and Berny, P (2000). Review of the factors affecting the decline of the European brown hare, *Lepus europaeus* (Pallas, 1778) and the use of wildlife incident data to evaluate the significance of paraquat. *Agriculture, Ecosystems and Environment*, 79: 95-103.

The results of the scheme have also been widely used in several other publications.







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