

Monitoring Impacts of Vertebrate Pesticides in the UK: 1993 to 2011

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Introduction

Post-registration impacts of pesticides in the UK are monitored by the Wildlife Incident Investigation Scheme (WIIS) [1]. The scheme has been operated by government scientists since 1985 and, since 1993, reports have been published with information on individual incidents. Incidents involving both wildlife and companion animals are recorded.

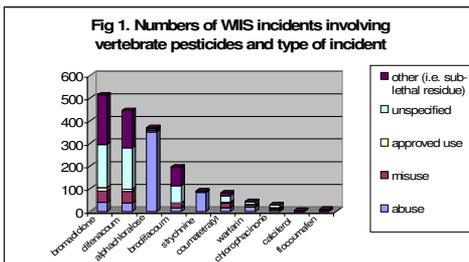
Vertebrate pesticides are used in the UK for the management of a variety of pests including Norway rats (*Rattus norvegicus*), house mice (*Mus musculus*), grey squirrels (*Sciurus carolinensis*), various birds and, formerly, moles (*Talpa europaea*). The majority of vertebrate pesticides used in the UK, however, are anticoagulant rodenticides. The necessity that vertebrate pesticides possess toxicity to mammals (and sometimes birds) results in inevitable risks to wildlife. Therefore, non-target casualties of vertebrate pesticides comprise a substantial proportion of WIIS incidents.

Methods

An analysis of public domain WIIS data from 1993 to 2011 is presented here. WIIS reports were examined and data transposed to a Microsoft Excel spreadsheet. Eight fields were used for each incident: month and year of incident, active substance, species, number of individuals, type of casualty (i.e. wildlife, companion animal), whether primary or secondary poisoning was involved, location (county). Within WIIS, each incident is attributed to one of four categories as follows: approved use, misuse, abuse, unspecified. The latter category is used when an incident cannot be attributed to one of the others. Recently, and increasingly within the last 4 years, incidents are recorded where carcasses of predatory birds and other wildlife are recovered without symptomology, or with other obvious causes of death such as starvation or trauma, but with low-level residues of second-generation anticoagulants.

Results & Conclusions

14 different vertebrate pesticides were found to have been responsible for 1,791 WIIS incidents in the period 1993 to 2011 (Fig. 1).



A wide range of non-target species is involved in WIIS incidents (Figure 2). Among predatory and scavenging birds, buzzards (*Buteo buteo*) and red kites (*Milvus milvus*) predominate. Pesticides were not the cause of death in many cases and only sub-lethal residues were found in 487 (27.2%) incidents, increasingly in the last three years.

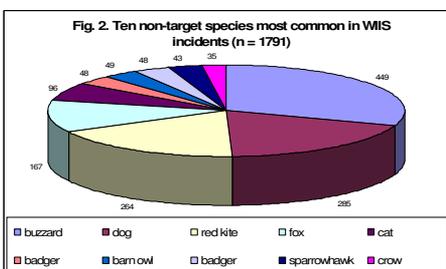
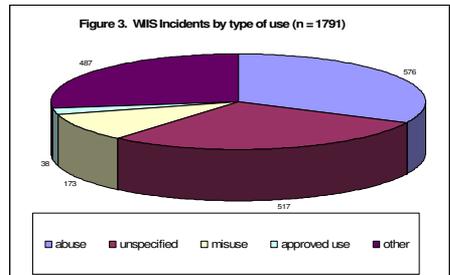


Figure 3 shows the distribution of incidents according to type. Abuse incidents, in which there was intent to cause harm, were most common (31.2%). The most prevalent abuse was the use of alphachloralose in meat bait to kill corvids. Buzzards and red kites were often accidental victims. A further 9.7% of incidents are caused by pesticide misuse. Only 2.1% of incidents (and none within the last 3 years) were caused when pesticides were used according to label instructions. Many incidents cannot be allocated to one of these three categories (28.9%), but there is no reason to suspect that they are distributed between the three types (abuse, misuse, approved use) in a proportion that is different from those for which a cause is found. If the 'unspecified' incidents are allocated in the same proportion, we arrive at a total of 98 approved use incidents over the 19-year period of the analysis. This low level affords confidence that, used according to label instructions, vertebrate pesticides, including anticoagulant rodenticides, pose no significant acute risk to non-targets in the UK.



It is often said that WIIS under-records incidents and this is obviously true as some casualties are not found. But, with more than 32 years of continuous WIIS operation, it would be apparent if there was a failure to detect a major impact on an important wildlife species. It may be significant that populations of the two species of predatory/scavenging birds most frequently found in WIIS incidents, buzzard and red kite, are currently expanding rapidly in the UK.

There is no room for complacency because other studies, such as those conducted by the UK Predatory Bird Monitoring Scheme (PBMS), show that exposure of wildlife to anticoagulants in the UK is widespread [3]. Mitigation is required urgently to reduce this contamination [4]. Schemes such as WIIS and PBMS will be important in monitoring impacts of pesticides as the European Commission's Sustainable Use Directive (SUD) [5] is implemented. Within the SUD, a system of risk indicators is applied so that the benefits of the legislation are apparent in the improved health of man and the environment. Monitoring schemes such as WIIS will play an important part by providing direct and specific risk indicators.

Main findings:

1. Second-generation anticoagulants are found in the majority of WIIS incidents (65.1%). Their frequencies approximately in proportion to the volumes used.
2. Buzzards and red kites are the most common wildlife species affected by vertebrate pesticides. UK populations of both species are rapidly increasing.
3. Most WIIS incidents (40.9%) involve criminal abuse and misuse of pesticides.
4. Approved use results in very few incidents (2.1%) suggesting that permitted use patterns are largely appropriate to protect non-target animals.
5. Low-level residues are increasingly found in WIIS incidents. It is uncertain if this is due to a change in WIIS sampling/analytical strategy or to a real increase in non-target exposure.

References

- [1] Health and Safety Executive 2010. Wildlife Incident Investigation Scheme. <http://www.pesticides.gov.uk/environment.asp?Id=58>. Accessed 25.11.11.
- [2] Walker L.A., Lövefjörn M.R., Pereira M.G., Potter ED, Sainsbury AW and Shore RF 2010. Anticoagulant rodenticides in predatory birds 2009: a Predatory Bird Monitoring Scheme (PBMS) report. Centre for Ecology & Hydrology, Lancaster, UK. 17pp.
- [3] Campaign for Responsible Rodenticide Use 2011. <http://www.thinkwildlife.org.uk>. Accessed 25.11.11.
- [4] European Community 2009. Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the sustainable use of pesticides for Community action to achieve sustainable use of pesticides. *Official Journal of the European Communities* L 309/71: 16 pp.