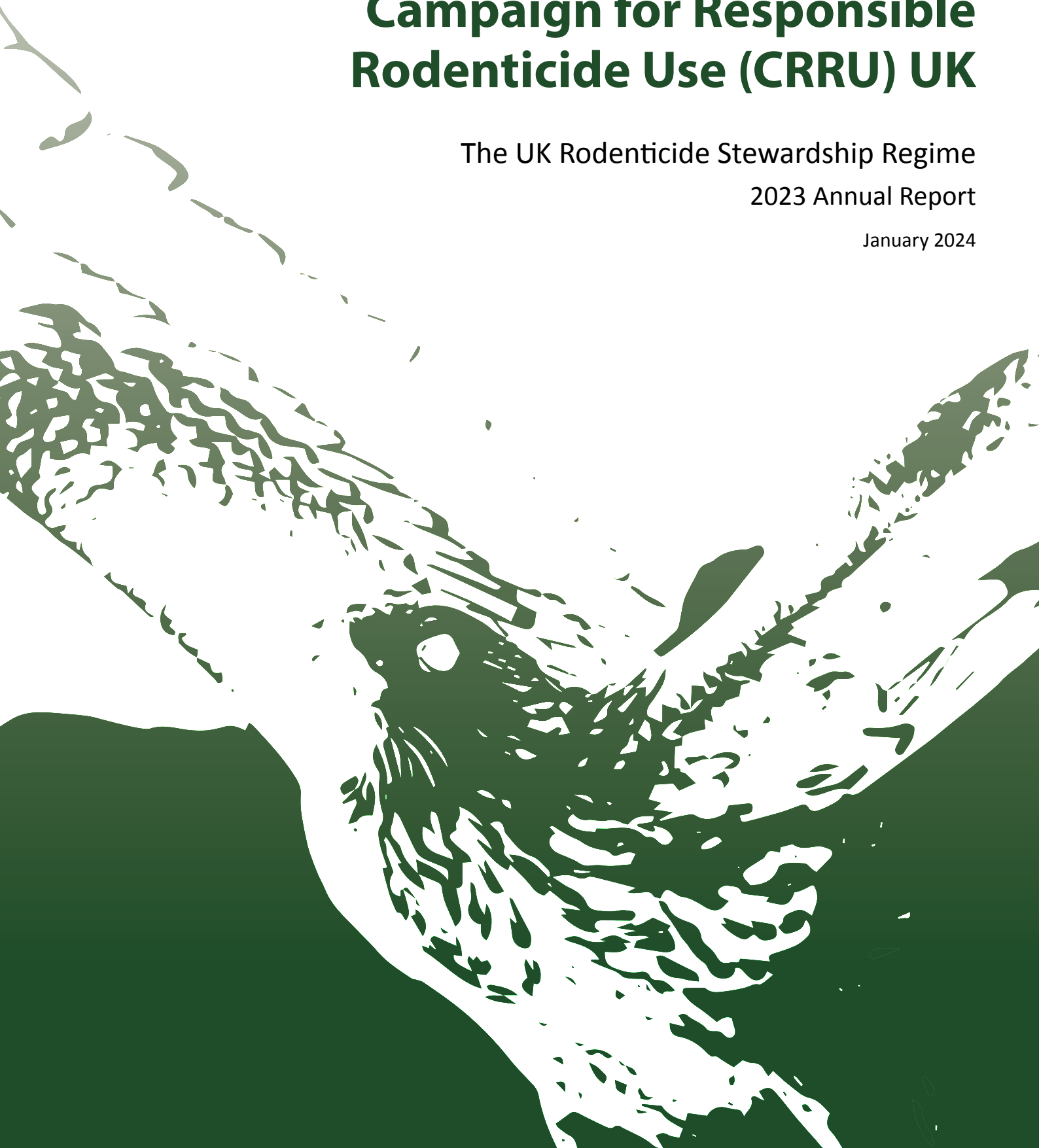


Campaign for Responsible Rodenticide Use (CRRU) UK

The UK Rodenticide Stewardship Regime

2023 Annual Report

January 2024



The UK Rodenticide Stewardship Regime Campaign for Responsible Rodenticide Use (CRRU) UK Annual Report 2023

Authors:

Buckle, A.,¹ Broome, R.,² Bull, S.,³ Christopher, P.,⁴ Davies, M.,² Moseley, R.,⁵ and Ward-Thompson, D.⁶

¹ School of Biological Sciences, The University of Reading, School of Biological Sciences, Harborne Building, Whiteknights, Reading, RG6 6AS

² Killgerm Chemicals Ltd., Wakefield Road, Ossett, West Yorkshire, WF5 9AJ

³ BASF plc, 4th & 5th Floors, 2 Stockport Exchange, Railway Road, Stockport, SK1 3GG

⁴ Red Rock Services Ltd., 59a Mytton Oak Road, Shrewsbury, Shropshire, SY3 8UQ

⁵ Syngenta, CPC4 Capital Park, Fulbourn, Cambridge, CB21 5XE

⁶ British Pest Control Association, 4A Mallard Way, Pride Park, Derby DE24 8GX

Where the acronym CRRU is used in this document it refers to the Campaign for Responsible Rodenticide Use UK

CRRU UK Member Companies:

Babolna Bioenvironmental Centre Ltd

BASF plc

Envu

Bell Laboratories Inc

Killgerm Group Ltd

LiphaTech S.A.S.

LODI UK Ltd

Pelsis Ltd

PelGar International Ltd

Quimica de Munguia S.A.

Rentokil Initial plc

Syngenta Crop Protection AG

Unichem d.o.o.

Zapi SpA

FOREWORD

This is the seventh year in which the UK Rodenticide Stewardship Regime has been in operation co-ordinated by CRRU UK. During that time, fundamental changes have been made to ways in which rodenticides are purchased and used by professionals in the three main user sectors, farming, gamekeeping and professional pest management. One of the most important of these is that all who buy professional rodenticide products must show proof of competence at the point of sale; this being a certificate showing either possession a CRRU-approved training qualification or membership of a CRRU-approved farm assurance scheme. Most recently, further rigour has been applied to training and certification with a requirement that CRRU-approved courses are Ofqual regulated.

Many aspects of rodenticide application practice are now supported by published CRRU guidelines. The most important of these being the CRRU Code of Best Practice, a revision of which has been produced since the last of these reports was issued. Other more specialised documents and on-line training materials cover aspects of rodenticide use in more detail, including permanent baiting, environmental risk assessments, burrow baiting and use of rodenticides in game management.

A framework of monitoring has also been introduced covering all aspects of the regime, including residues in wildlife, anticoagulant resistance, barn owl breeding and understanding and adoption of best practice. Details of these monitoring programmes are provided later in this report.

KAP (Knowledge, Attitudes and Practice) surveys have been conducted regularly to follow over time changes in many different metrics and parameters associated with rodenticide use and the regime. These surveys provide quantitative evidence of the degree of change implemented during stewardship. We know that more practitioners are qualified, more know about and apply best practice, fewer routinely use the technique of permanent baiting, larger numbers understand the need for and apply principles of integrated pest management, more know about pathways by which rodenticide residues enter wildlife and how to prevent it, and more know about CRRU and stewardship, what they stand for and what their objectives are.

All these changes, meticulously tracked by CRRU, are immensely encouraging. However, at the start of stewardship, government set specific targets for CRRU to meet regarding wildlife contamination and anticoagulant rodenticide residues. These targets remain unmet after seven years, although there have been significant changes in the composition of residues in the nominated sentinel species, barn owl. Residues of two of the less potent and more resisted substances, bromadiolone and difenacoum, have significantly declined while those of the resistance-breakers, brodifacoum and difethialone, have increased. These changes have undoubtedly been brought about, at least in part, by the spread of anticoagulant-resistant rodents across the UK and the need to control them. However, although the composition of residues has changed there has been no demonstrable reduction in the overall frequency and concentration of anticoagulant residues in barn owls. A similar picture is seen in other species such as red kite, buzzard and sparrowhawk in studies conducted by other organisations.

The regime is presently under review by the Government Oversight Group (GOG), more of which later. However, in view of the stubbornly static overall levels of residues in barn owls, the CRRU Board of Directors has considered and is implementing a series of measures to strengthen the regime. The intention of these changes, to be implemented over the next two years, is to improve further knowledge and the implementation of best practice in our largest user sector, farming, and to curtail applications of anticoagulants in those areas where wildlife exposure is considered to be most likely, away from buildings. Although this report shows the progress that has been made in all aspects of the governance and use of rodenticides by professional pest control technicians, gamekeepers and farmers alike, we must hope that when implemented these voluntary changes to the regime will result in necessary demonstrable reductions in wildlife exposure to rodenticides.

It remains for me, as in previous reports, to say that this complex and nationally-implemented stewardship regime is entirely operated by voluntary contribution of resources from the CRRU stakeholder organisations and member companies. Once again I offer grateful thanks to those organisations, and to the individuals involved, both from me personally and on behalf of all whose livelihoods depend on our continued ability to conduct effective rodent pest management to protect human and animal health and hygiene.



Dr Alan Buckle
Chairman CRRU UK, University of Reading

FOREWORD

1. SUMMARY

2. INTRODUCTION

2.1 Elements of Stewardship

- 2.1.1 Regime Framework
- 2.1.2 Best Practice
- 2.1.3 Communication
- 2.1.4 Training
- 2.1.5 Farm Assurance Schemes
- 2.1.6 Point of Sale Controls
- 2.1.7 Monitoring
- 2.1.8 Oversight, Report and Review

2.2 The Five-Year Review

2.3 Strengthening the Regime

3. REPORTS FROM THE CRRU UK WORK GROUPS ON PROGRESS DURING 2023

3.1. General

3.2 Best Practice Work Group (Leader, Dee Ward-Thompson, BPCA)

- 3.2.1 Purpose
- 3.2.2 Code of Best Practice and Other Guidelines
- 3.2.3 Changes to product authorisations and use scenarios
- 3.2.4 Farm Assurance Schemes

3.3 Training and Certification Work Group (Leader, Matthew Davies, Killgerm Chemicals Ltd.)

- 3.3.1 Purpose
- 3.3.2 Training courses and certification
- 3.3.3 Continuing Professional Development
- 3.3.4 A summary of the CRRU UK T&CWG achievements, 2022/23
- 3.3.5 Future work

3.4. Regulatory Work Group (Leader, Sarah Bull, BASF plc)

- 3.4.1 Purpose
- 3.4.2 Regulatory Work Group Activities 2023
- 3.4.3 Future work /Closing remarks

3.5 Point-of-Sale Work Group (Leader Rupert Broome, Killgerm Chemicals Ltd.)

- 3.5.1 Purpose
- 3.5.2 Independent Audit Process for Point-of-Sale Compliance
- 3.5.3 Online reporting tool for allegations of non-compliance at the Point-of-Sale

3.6 Monitoring Work Group (Leader, Richard Moseley, Syngenta Ltd.)

- 3.6.1 Purpose
- 3.6.2 Anticoagulant liver residues in barn owls - Report of Barn Owl liver residues for birds found dead in 2022 (UK Centre for Ecology & Hydrology)
- 3.6.3 Rodenticide Knowledge, Attitudes and Practices (KAP) Surveys
- 3.6.4 Barn owl breeding performance (University of Reading and Wildlife Conservation Partnership)
- 3.6.5 Resistance in UK Rats and Mice (University of Reading)

3.7 Communications Work Group

- 3.7.1 Headline news
- 3.7.2 Content
- 3.7.3 Outputs
- 3.7.4 New for 2024
- 3.7.5 Selection of published items 2022-23

4. CONCLUSIONS

1. SUMMARY

The UK Rodenticide Stewardship Regime was established in 2016 and designed to meet the ‘High Level Principles’ set by the Health and Safety Executive (HSE) (<https://www.hse.gov.uk/biocides/rodenticides.htm>). As the only stewardship scheme that did so, the regime is joined and funded by all manufacturers holding professional rodenticide product authorisations. Supporting hundreds of product authorisations, the regime is directed by the CRRU UK Task Force, currently comprising 32 stakeholder organisations, and implemented through a structure of six work groups. The purpose of stewardship is to deliver three key benefits:

- governance of the supply chain,
- a competent workforce and,
- monitoring compliance.

Each year of operation, CRRU has reported progress to HSE and the Government Oversight Group (GOG). The GOG has found the regime ‘fit for purpose’ at each assessment, although with some elements that required further development.

A major part of the regime has been the operation of a series of monitoring studies, each a requirement set by the GOG from the outset of the regime and conducted on behalf of CRRU by independent scientific and academic contractor agencies.¹ This report summarises the results of these monitoring studies. Highly significant changes brought about by the regime in the way that professional rodenticides are distributed, purchased and applied, across three user groups and tens of thousands of users, are readily apparent. The report also describes the structure and functioning of the regime and the CRRU Work Groups during 2023. The objectives and achievements of each of these groups towards delivering the key benefits are also described.

From the outset of stewardship the intention of HSE was to conduct a ‘major review’ after five years of implementation and this review is now ongoing.

¹ HSE (2018). Report on the Rodenticides Stewardship Regime. Assessment of Implementation – January 2018. An information paper by the Rodenticides Stewardship Regime Government Oversight Group. Rodenticides Stewardship Government Oversight Group. 12 pp.

2. INTRODUCTION

2.1 Elements of Stewardship

2.1.1 Regime Framework

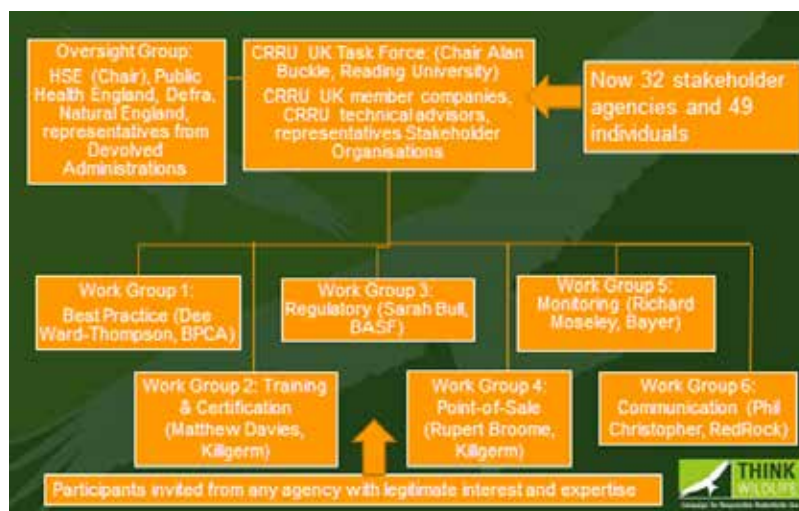
A condition of authorisation for all rodenticides, when used outdoors, is that authorisation holders should demonstrate that stewardship is applied for products to meet the 'High Level Principles' published by HSE.² The CRRU stewardship regime is the only one in operation in the UK that meets these principles and, therefore, membership has become a *de facto* requirement for all authorisation holders. The member companies contribute to the funding, development, direction and evaluation of the regime, and make adjustments to its operation when these are considered necessary (see section 2.3).

The regime comprises elements to meet the HSE high level principles and to achieve three key HSE-defined benefits, as follows:

- **governance of the supply chain**, which gives governance over, and provides the driver for, later stages,
- **a competent workforce** capable of delivering stewardship standards and of demonstrating an appropriate understanding and attitude toward case-specific control of rodents and use of rodenticides,
- **monitoring compliance** with the regime and its environmental impacts, and if possible of the level of conflict reduction (an assessment of whether rodenticides and stewardship together are actually tackling the problems).

The regime is operated through six CRRU work groups, with defined remits and objectives (Figure 1).³ Five of these are led and populated by volunteers from authorisation-holder companies and stakeholder agencies. The sixth, communications, also employs a specialist contractor. Implementation of the regime is directed by the CRRU Board and the Task Force.

Figure 1. Delivery and oversight structures for the rodenticide stewardship regime.



2.1.2 Best Practice

The main purpose of the regime is to promote best practice and ensure its application by users of professional rodenticides. The wide experience and knowledge of CRRU stakeholder organisations is harnessed to provide CRRU best practice guidance. The most important expression of this is the CRRU Code of Best Practice.⁴ This is supported by a range of additional documents, some aimed broadly across all user groups, such as those published on environmental risk assessment and permanent baiting, and some aimed towards single user groups, such as the guidance

² HSE (2021). Rodenticides. UK rodenticide stewardship regimes. Regime principles. Available at: <https://www.hse.gov.uk/bio-cides/rodenticides.htm>. Date accessed: 28.02.21.

³ CRRU (2015). Outline of CRRU Structure to deliver co-ordination of UK SGAR Stewardship Regime. Campaign for Responsible Rodenticide Use. February 2015. 7 pp. Available at: <https://www.thinkwildlife.org/downloads/>. Date accessed: 28.02.21.

⁴ CRRU (2021). CRRU UK Code of Best Practice. Date Issued – March 2015

Best Practice and Guidance for Rodent Control and the Safe Use of Rodenticides. Campaign for Responsible Rodenticide Use. July 2021. 36 pp. Available at: <https://www.thinkwildlife.org/downloads/>. Date accessed: 10.11.23.

document for gamekeepers.⁵

An over-arching principle of stewardship best practice is the concept of the 'risk hierarchy', wherein those who conduct any rodent pest management activity must consider all risks and apply those measures which are considered likely to be fully effective and which present the least risk.

One of the most important steps taken towards the delivery of the regime's aims was the decision taken by HSE and authorisation-holders to publish on product labels the requirement for users to follow any instructions provided by the CRRU UK Code of Best Practice (or equivalent).

2.1.3 Communication

Stewardship is an exercise in communication between CRRU and rodenticide users, those who supply them, those who audit their activities and the many different organisations that seek to support and influence the way they go about rodent pest management. Therefore, communication has been at the forefront of all CRRU activities. CRRU conducts regular surveys of Knowledge, Attitudes and Practice (KAP) among these user groups (see sections 3.6.3 and 3.7). The independent market research company that carries out these surveys on behalf of CRRU has expressed the opinion that the four CRRU KAP surveys, conducted in 2015, 2017, 2020 and most recently 2023, provide the most comprehensive understanding of a communication process, and changes in user behaviour that it has brought about, ever developed for biocide/pesticide use in the UK.

2.1.4 Training

For the first time in April 2016, purchase of professional rodenticides was permitted only to those who could prove competence. One such proof is the possession of certification obtained after participating in training and passing an examination.⁶ A training framework was established providing a basis for the delivery of training, via commercial training agencies, and the setting, invigilation and marking of examinations by independent Awarding Organisations (AO). The required content of CRRU-approved courses was determined and comprises 13 separate training elements. AOs were invited to submit existing courses to CRRU for evaluation against the required elements. Those that were found acceptable were CRRU-approved and individuals who already held the certifications/qualification were considered competent through a process of 'grandfathering' (see section 3.3.2 and Table 5). A recent change to training requirements is that all CRRU-approved training courses must meet the requirements of The Office of Qualifications and Examinations Regulation (Ofqual) and be regulated by it (<https://www.gov.uk/government/organisations/ofqual>). Further strengthening measures are to be implemented in training and the application of continuing professional development (CPD) (see section 3.3.3).

2.1.5 Farm Assurance Schemes

A difficulty at the introduction of the regime, and hence the authorisation of SGAR products by HSE, was the requirement for proof of competence in the farming sector. Various estimates between 80,000 and 120,000, this population of rodenticide users is by far the largest. Such a constituency of users could not be expected to take training and pass examinations within the time schedule set for the introduction of stewardship in 2016.

A process was therefore agreed with HSE and put in place in which all members of CRRU-approved farm assurance schemes (FAS) were considered competent for purchase of professional rodenticides. Work was conducted in collaboration with the schemes to integrate CRRU best practice guidance into their standards.

FAS standards carry wording like that found in Red Tractor Standards as follows, "All staff are trained and competent to carry out the activities they do". The next stage of the development of competence in the agriculture sector was to develop a suite of sector-specific training courses and to promote the uptake of those courses among farmers (section 3.3.2). Content for continuing professional development (CPD) in the agriculture sector is to be developed and promoted, with the help of existing CPD providers (Table 6). To support these FAS requirements, from January 2026 all professional users will need to present certification from an Ofqual-regulated training qualification.

2.1.6 Point of Sale Controls

Requirement for proof of professional competence at the point-of-sale was a significant change to the supply of

⁵ CRRU (2017). CRRU UK – Rat control and game management. 2nd Edition. July 2017. 16 pp. Available at: <https://www.thinkwildlife.org/downloads/>. Date accessed: 28.02.21.

⁶ CRRU (2015). Proposals for Development of Courses in Rodent Pest Management and Associated Approved Certifications. Campaign for Responsible Rodenticide Use. April 2015. 4 pp. Available at: <https://www.thinkwildlife.org/downloads/>. Date accessed: 10.11.23.

rodenticides brought about by stewardship. A process was developed in which every supplier at a point-of-sale, 661 in 2023, made a record of the certification presented at time of purchase so records can be scrutinised during an audit process operated by the independent BASIS (Registration) Limited (section 3.5.2). Many sales are online and guidance was also provided to online retailers about the requirement for proof of competence.⁷ These sales are also audited by BASIS. In 2023, BASIS reported that 99% of premises audited obtained either a 'pass' or 'qualified' pass grade.

An online portal has been established whereby anybody who believes they have witnessed the sale of a professional rodenticide contrary to the conditions of authorisation can report to CRRU. These reports are investigated and, when justified, appropriate action is taken.

2.1.7 Monitoring

When authorising outdoor uses of SGARs with the requirement for stewardship, HSE set out a number of monitoring programmes that were necessary so that progression towards set objectives could be measured.⁸ The requirement for monitoring is set broadly across all aspects of the regime. There are three main HSE-required scientific monitoring programmes and, over the seven years of stewardship these studies are conducted either annually or, in the case of the KAP, every two to three years.

KAP surveys were mentioned previously.⁹ A baseline study was conducted in 2015 to establish user knowledge and practice prior to stewardship implementation. Three subsequent surveys, in 2017, 2020 and 2023, have charted changes. The degree of understanding and application of best practice appears to differ between user groups. A key finding has been the sudden and profound changes in all recorded metrics for gamekeepers caused by the requirement for them to attend tailor-made courses offered by their trade associations, and to pass an examination, before they were considered competent to purchase and use SGARs, in their predominantly outdoor use scenarios. Moreover, across the board, the KAP surveys have recorded very substantial changes towards best practice in all user groups (section 3.6.3). This is a very significant achievement of the stewardship regime, and its communication function, given the large numbers of users, the short period for implementation and the broad scope of use scenarios.

An overriding concern about the use of SGARs in the UK is the widespread nature of residues in wildlife.¹⁰ No proven adverse effects on UK populations of exposed species have so far been documented;¹¹ indeed populations of some of the most exposed species are increasing rapidly.^{12,13} Nevertheless, the fact of this exposure, and its scope, is a concern that must be addressed. The barn owl (*Tyto alba*), and the extent of its exposure to SGARs, is the selected sentinel species for a wide group of vertebrates exposed to SGARs through their predation upon non-target wild small mammals.¹⁴ Annually, CRRU contracts the UK Centre for Ecology and Hydrology (UKCEH) to conduct a study of liver residues in a sample of, ideally, 100 barn owls found dead in the UK (section 3.6.2). The study has resulted in *post mortem* examination of a total of 789 barn owls; among these it was possible to conclude that SGAR exposure had not contributed to the death of 784 (99.4%).¹⁵ However, mean summed SGAR residues in barn owl livers have neither increased nor decreased during the period 2016-2023.¹⁶

The third required monitoring programme is an annual assessment of the status of anticoagulant resistance among

⁷ CRRU (2018). CRRU UK – Guidance for Internet Sales of Rodenticides in the UK. CRRU Stewardship. Version 2: APRIL 2018. Available at: <https://www.thinkwildlife.org/downloads/>. Date accessed 10/11/23.

⁸ HSE (2016). Performance Monitoring and Assurance: Rodenticide Stewardship Regime. Health and Safety Executive. March 2016. 3 pp.

⁹ Story Seeds. (2023). Rodenticide Knowledge, Attitudes and Practices (KAP): Survey: August 2023 Re-run. 146 pp.

¹⁰ van den Brink, N., Elliott, J.E., Shore, R.F. and Rattner, B.A. 2018. Anticoagulant Rodenticides and Wildlife. Springer International Publishing AG, Switzerland. 398 pp.

¹¹ Smith, R.H. and Shore, R.F. 2015. Environmental Impacts of Rodenticides. Chapter 16 in Rodent Pests and their Control. CAB International, Wallingford, Oxon. pp 330-345.

¹² Buckle, A. and Prescott, C. 2018. Anticoagulants and Risk Mitigation. Chapter 12 in Anticoagulant Rodenticides and Wildlife. (van den Brink et al., eds). Springer International Publishing AG, Switzerland. pp. 319-355.

¹³ Balmer, D.E., Gillings, S., Caffrey, B.J. et al., 2013. Bird Atlas 2007-2011: the breeding and wintering birds of Britain and Ireland. BTO Books, Thetford. 720 pp.

¹⁴ HSE (undated). Potential success criteria for Second Generation Anticoagulant Rodenticide (SGAR) Stewardship Scheme. Draft. 9pp.

¹⁵ Ozaki, S., Carter, H. Chaplow, J.S., Dodd, B.A., Pereira, M.G., Potter, E.D., Sleep, D., Toon, B., and Walker, L.A. (2023). Second generation anticoagulant rodenticide residues in barn owls 2022. UKCEH contract report to the Campaign for Responsible Rodenticide Use (CRRU) UK, pp. 26. Available in draft.

¹⁶ Shore, R.F., Henrys, P.A. & Walker, L.A. 2014. Power analysis of liver second generation anticoagulant rodenticide (SGAR) residue data in barn owls from Britain: a Predatory Bird Monitoring Scheme (PBMS) report. CEH contract report to the Health & Safety Executive. 45pp. <https://wiki.ceh.ac.uk/x/DAIDC>.

rats and mice in the UK (section 3.6.5). This work is carried out and reported by scientists at the University of Reading and the Animal and Plant Health Agency (APHA), using DNA analysis of tail-tip samples sent in by practitioners to detect the presence of resistance mutations. The accumulated data for 2009 to 2023 show the widespread distribution of resistance in both key target rodent species.¹⁷ However, we anticipate that with improved knowledge of the disposition of resistance foci, the ability since 2016 to use effective anticoagulants against resistant rats and the recent re-introduction of a non-anticoagulant active substance for use against Norway rats and house mice, cholecalciferol, we are able to moderate these detrimental processes.

A fourth monitoring programme, not requested by HSE but put in place by CRRU, is the assessment of breeding success of UK barn owl populations. The UKCEH study shows that a high proportion of UK barn owls carry residues of SGARs in their livers. CRRU felt that it would be valuable to monitor breeding in a sample of these birds taken from five separate regions of the UK (section 3.6.4).

2.1.8 Oversight, Report and Review

The stewardship regime is supervised by a Government Oversight Group (GOG), chaired by HSE UK and comprising representatives of other agencies including HSE Northern Ireland, the Department for the Environment, Food and Rural Affairs (Defra), UK Health Security Agency, Natural England, the devolved administrations of Northern Ireland, Wales and Scotland. Annually since the start of stewardship in 2016, CRRU has produced a report and attended a review meeting with the GOG held at the HSE office at Bootle. These interactions have resulted in a series of annual reports from the GOG providing commentary on the government view of the implementation and progress of stewardship and defining areas that require future attention.¹⁸ The GOG reports have concluded that, with certain caveats, the regime initially met the requirements of the high level principles and has continued to do so during the seven-years of implementation.

When the regime started, the GOG declared that a full review would be conducted of cumulative data in 2020, to help inform an overall assessment of the regime at that time. The COVID-19 pandemic delayed that timetable. The review is now underway (see below).

2.2 The Five-Year Review

When the regime began in 2016, HSE and GOG stated that there would be a 'formal evaluation' of the operation and achievements of the regime not later than five years after initiation in 2016.¹⁹ This was in addition to the annual assessments that had taken place up to that point. Consequently, a meeting of the GOG and CRRU to review the first five years of stewardship took place on 12th May 2021. To support CRRU Work Group presentations at the meeting, and subsequently to inform publicly all stewardship stakeholders and participants, CRRU published a detailed report covering the establishment, operation and achievements of the regime in its first five years.²⁰

A presentation by the CRRU UK Chairman was intended to remind the GOG of decisions made by government at the start of stewardship that may have had an effect on its operation. These were: 1) to decline the request of CRRU UK and other stakeholders to establish a formal system of licensing for the UK professional pest control industry, 2) to put the use of rodenticides by the general public (also called 'amateurs' and 'non-professionals') outside the scope of the stewardship regime, and 3) to permit certification of professional competence in the farming sector to be provided either by formal training (as is the case for the professional pest control and gamekeeping sectors) or by membership of a CRRU-approved farm assurance scheme. The response of the GOG to this was that these points remain under consideration.

The GOG response to Work Group presentations and CRRU report was that industry had delivered what it said it would in the establishment and operation of the stewardship regime and, as at all intervening annual reviews, the regime was considered by government to be 'fit for purpose'. However, the GOG noted that the environmental targets

¹⁷ Buckle, A., Cawthraw, S., Neumann, J. and Prescott, C. (2023) Anticoagulant Resistance in Rats and Mice in the UK – new data for August 2022 to July 2023. The University of Reading, Whiteknights, Reading. Report No. VPU/23/002. 34 pp.

¹⁸ HSE. 2020. Report on the Rodenticides Stewardship Regime Assessment of Implementation – January 2020. Rodenticides Stewardship Government Oversight Group. 16 pp. Available at <https://www.hse.gov.uk/biocides/rodenticides.htm>. Date accessed: 10.11.23.

¹⁹ HSE. 2018. An information paper by the Rodenticides Stewardship Regime Government Oversight Group. Report on the Rodenticides Stewardship Regime. Assessment of Implementation – January 2018. Rodenticides Stewardship Government Oversight Group. 12 pp. Available at: <https://www.hse.gov.uk/biocides/rodenticides.htm>. Date accessed: 30.10.23.

²⁰ CRRU UK. 2021. Five Years of Rodenticide Stewardship 2016-2020. Campaign for Responsible Rodenticide Use (CRRU) UK. July 2021. 75 pp. Available at: <https://www.thinkwildlife.org/downloads/>. Date Accessed: 30.10.23.

set for the regime at the outset had not been met, in particular the aim that “*There should be a significant decrease in the exposure of the sentinel species – Barn Owl – in terms of sum residues of SGARs detected in livers of barn owl carcasses collected over the first four years.*”²¹

A subsequent meeting was held, with participation of HSE, GOG and CRRU, on 2nd December 2022 at which further assessment of the regime took place. At the request of members of the GOG, four sub-groups, each with CRRU participation, have been established as follows:

- Resistance subgroup within GOG to consider how regulatory action might be able to impact the spread of resistance.
- Monitoring best practice – GOG to get a better understanding of how CRRU’s proposed changes will contribute to a better data set.
- Residues Monitoring – Agreed at meeting that this should be formally extended to include more species.
- Sales data – Consider the use of sales data to help enhance stewardship, allowing for more targeted action.

The membership and terms of reference of these sub-groups have been agreed and they have held their first meetings.

2.3 Strengthening the Regime

Following the review meeting of 12th May 2021 (see above), and in regard of the continuing lack of progress towards the government-set environmental objectives, the CRRU Directors and Work Group Leaders held a series of meetings during 2022 at which a wide range of measures to strengthen the regime was considered.

Significant proposals for changes to the regime were submitted to the Directors by the Training and Certification Work Group and were agreed for implementation. These included changes to the requirements for proof of competence, mainly in the farming sector, and a new requirement for all certification via qualifications either to be less than five years old or for proof of competence to be provided by membership of a CRRU-approved scheme for continuing professional development (CPD). These changes were proposed so that, for the first time, proof of competence at point of sale for the purchase of professional-only rodenticide products will be the same across all user sectors. Also for the first time since the regime started, training qualifications become time-limited and not a *de facto* ‘qualification for life’. These changes will take place from 1st January 2026, which will give all practitioners who wish to purchase professional rodenticides from that date not less than two years to upgrade their proof of competence qualifications.

A further measure to strengthen the regime, intended directly to reduce exposure to rodenticides, are changes to the authorisations of the active substances bromadiolone and difenacoum. At the start of the regime, the CRRU Directors voluntarily decided that no applications for authorisations for the two use scenarios ‘open areas’ and ‘waste dumps’ would be made to HSE for the three most potent SGAR substances, brodifacoum, difethialone and flocoumafen. This was because it was considered that those scenarios presented the greatest risk of wildlife exposure to SGARs and the benefits of use of those substances did not outweigh the risks of their application. However, some applications for authorisations of products containing bromadiolone and difenacoum for use in these scenarios were made by manufacturers and granted by HSE. After seven years of stewardship, and with environmental targets unmet, the CRRU Directors considered what more might be done to reduce wildlife exposure and revisited these decisions.

After careful consideration of the potential benefits of proposed changes to authorisations, implications for users and alternative rodent pest management techniques available, the CRRU Directors, voluntarily and unanimously, decided to withdraw authorisations for bromadiolone and difenacoum in open areas and waste dumps from 1st January 2025. Residues of bromadiolone and difenacoum, although declining,²² continue to comprise the majority of combined SGAR residues in barn owls, and probably in other wildlife species. Therefore, this measure, applied to the use scenarios which result in significant wildlife exposure is intended directly to help CRRU to meet government-set environmental objectives. A further indirect benefit is anticipated in the reduction of exposure of wildlife to brodifacoum. This is because CRRU was aware of the purchase and use of brodifacoum products in open areas,

²¹ Shore, R.F., Henrys, P.A. & Walker, L.A. 2014. Power analysis of liver second generation anticoagulant rodenticide (SGAR) residue data in barn owls from Britain: a Predatory Bird Monitoring Scheme (PBMS) report. CEH contract report to the Health & Safety Executive. 45pp. <https://wiki.ceh.ac.uk/x/DAIDC>.

²² Ozaki, S., Carter, H. Chaplow, J.S., Dodd, B.A, Pereira, M.G., Potter, E.D., Sleep, D., Toon, B., and Walker, L.A. 2023. Second generation anticoagulant rodenticide residues in barn owls 2022. UKCEH contract report to the Campaign for Responsible Rodenticide Use (CRRU) UK, pp. 26. Available in draft.

even though no authorisations for this use exist. Thus, from 2025 onwards a single and simple message can be put to users that no SGARs can be used away from buildings.

CRRU has put out a call through multiple communication channels to all user groups asking for comments and offering to answer questions. More communications are planned for the future as authorisation withdrawal dates approach.

This will mean that the main continuing uses of SGARs will be the very important scenarios known as 'outdoors – around buildings' and 'in and around buildings'. This in turn makes the consideration of what is a building all the more important and the CRRU Best Practice Work Group has carried out work, in consultation with HSE, to develop guidance on the terms 'building' and 'waste dump' as they apply to rodenticide product labels. These will be explained in more detail in a subsequent section of this report (section 3.2.3).

3. REPORTS FROM THE CRRU UK WORK GROUPS ON PROGRESS DURING 2023

3.1. General

The stewardship regime is operated through six Work Groups (WGs) (Figure 1), each headed by a Work Group Leader. Five are populated by representatives from CRRU stakeholder organisations. All of these people have full-time jobs in other companies and organisations but give their time, and considerable expertise, to help the regime to deliver its goals. The sixth WG, communications, also employs a specialist contractor. The functioning of all six WGs is directed by the CRRU UK Board and Task Force, the latter comprising 45 representatives from 32 different stakeholder organisations.

The current composition of the six CRRU WG is shown at the CRRU website (<https://www.thinkwildlife.org/stewardship-regime/>).

3.2 Best Practice Work Group (Leader, Dee Ward-Thompson, BPCA)

3.2.1 Purpose

The Best Practice Work Group (BPWG) provides guidance and promotes responsible use of rodenticides to ensure a “*competent workforce*” among all professional user groups. The objective is to ensure that all users of authorised rodenticides, within the UK Rodenticide Stewardship Regime, are aware of and apply the requirements of the CRRU Code of Best Practice (COBP) and other guidance as required by product labelling. The WG seeks to report the operations of stakeholder organisations when they monitor and audit the compliance of their members with the COBP, and in doing this is the principal point of contact with farm assurance schemes, so that membership of them provides proof of competence at point-of-sale. With the establishment of various codes and guidance documents, which themselves are also fundamental to delivery of training and to farm assurance scheme standards, the WG is instrumental in certification at point-of-sale and, thereby, in “*supply chain governance*”.

3.2.2 Code of Best Practice and Other Guidelines

The principal instrument by which CRRU promotes best practice is the CRRU Code of Best Practice (COBP). This is based on latest knowledge of safe and effective use of rodent pest management techniques, concepts of risk mitigation developing as a result of the implementation of the Biocidal Products Regulation and with consideration to the two HSE legacy guidance documents, one for professional pest controllers and one for farmers, which preceded it. The first version was finalised and published in March 2016 after a process of consultation with all user stakeholder groups and HSE and ahead of the introduction of the stewardship regime. However, regulatory processes, changes to use practices, development of risk mitigation measures and introduction of new active substances resulted in a need for revision. Consequently, a second version of the code was issued by the WG in July 2021.²³ A number of other guidance documents and on-line training aids have been produced including advice on permanent and burrow baiting, guidance about rodent pest management for gamekeepers and on how to conduct environmental assessments.

The importance of the CRRU code of best practice, other guideline and advice documents provided by the WG is demonstrated in the label phrases that appear on all authorised professional rodenticide products, as follows:

Using this product in a manner that is inconsistent with the label may be an offence. Refer to the CRRU UK Code of Best Practice (or equivalent) for guidance.

Follow any additional instructions provided by the CRRU UK Code of Best Practice (or equivalent).

Where possible, prior to the treatment inform any bystanders (e.g. users of the treated area and their surroundings) about the rodent control campaign in accordance with the CRRU UK Code of Best Practice.

To reduce risk of secondary poisoning, search for and remove dead rodents during treatment at frequent intervals, in line with the recommendations provided by the CRRU UK Code of Best Practice.

²³ CRRU UK. 2021. CRRU UK Code of Best Practice. Best Practice and Guidance for Rodent Control and the Safe Use of Rodenticides. Campaign for Responsible Rodenticide Use (CRRU) UK. July 2021. 35 pp. Available at: <https://www.thinkwildlife.org/downloads/>. Date accessed: 01.11.23.

3.2.3 Changes to product authorisations and use scenarios

With the requirement to meet environmental targets, all product authorisations for use of bromadiolone and difenacoum products in ‘open areas’ and at ‘waste dumps’ will be voluntarily withdrawn by manufacturers from 1st January 2025. This is because, although they are declining, residues of these substances still contribute the majority of residues in barn owls, and it is considered that ‘open area’ uses present the greatest risk of their exposure to wildlife.

Therefore, from January 2025, the only use of SGARs outdoors will rely on the label scenarios ‘in and around buildings’ and ‘outdoors – around buildings’. Presently there is no specific regulatory definition of a ‘building’ to assist users in understanding the permitted scope of rodenticide applications under these scenarios.

The BPWG consulted among its members from different user sectors, and with HSE, and provides the following additional guidance:

For the purposes of rodent pest management a building is typically considered to be a permanent fixed structure forming an enclosure and providing protection from the elements. Buildings can be used to exclude certain non-target animals and birds from taking baits placed inside. They are usually erected on foundations, largely enclosed and constructed from wood, brick, concrete or metal. Temporary structures or structures that can easily be moved would not generally be considered to be buildings.

Given the diverse use areas for these products we understand that this may not directly address all scenarios raised by members. Cases where temporary structures are erected or moved into open areas to justify continued baiting will not be considered acceptable. Recognising that these products are only for use by trained professionals, reasonable judgement will be necessary.

The WG also noted the absence of a definition of the use scenario ‘waste dumps’ and provide the following additional guidance:

This scenario covers control of rats and disposal of rats in waste dumps and landfills where the exposure is assumed to be higher than that described in the open area scenario. For example, waste dumps do not include municipal waste management facilities (e.g. recycling centres) where treatment is undertaken to prevent risks to public health in urban settings.

Overall, the withdrawal of use in open areas and waste dumps, and the additional guidance on the remaining permitted outdoor use will assist professional users to avoid unnecessary exposure of non-target species.

3.2.4 Farm Assurance Schemes

At the introduction of the regime, and the requirement to produce proof of professional competence at the point-of-sale, it was decided that membership of an approved farm assurance scheme (FAS) provided proof of competence.²⁴ From March 2018 all CRRU-approved schemes published standards compliant with the CRRU COBP. Members of 18 different schemes, totalling more than 80,000 farm businesses, are now audited regularly to schemes’ standards.

For the first time in 2020, the WG rapporteurs requested and obtained data on pass/fail rates for farm audits conducted on behalf of each FAS. Some of these data refer only to audits as a whole, with data specific to the rodent control sections unavailable. That said, results for passes and fails are encouraging and these data from FASs are provided to the GOG in confidence.

Table 1. The CRRU-approved farm assurance schemes, their membership numbers and the frequency of audits conducted in 2021- 2023.

Scheme	Numbers on Scheme	Audit frequency	Geographical coverage	Period covered
AIC	2,138	12m	UK	Jan-Dec 2023
British Egg industry Council	1,850	6m or 18 months	UK	2021-2022

²⁴ HSE (2017). First Report on the Rodenticides Stewardship Regime Assessment of Implementation – February 2017. Rodenticides Stewardship Government Oversight Group. Available at: <https://www.hse.gov.uk/biocides/Rodenticides-Stewardship-Regime-GOG-rev-Feb2017.pdf>. Date accessed: 23.02.21

QMS Beef and Lamb	9,321	12m	Scotland	Sep 2022 – Oct 2023
QMS Pigs	179	12m	Scotland	Sep 2022 – Oct 2023
Farm Assured Welsh Livestock Beef and Lamb	6,851	18m	Wales	Jan –Dec 2022
Scottish Quality Crops	3,117	12m	Scotland	Oct 2022-Sep 2023
Northern Ireland Farm Quality Beef and Lamb	11,804	18m	NI	Jan 2022- Jun 2023
Northern Ireland Farm Quality Assurance Cereals	798	18m	NI	Jan 2022- Jun 2023
Laid in Britain	54	12m	England , Wales, Scotland	Oct 2022-Nov 2023
Red Tractor Beef & Lamb	19,486	18 months	England	Oct 2022-Sep 2023
Red Tractor Dairy	10,707	18 months	UK	Oct 2022-Sep 2023
Red Tractor Dairy Goats	37	18 months	UK	Oct 2022-Sep 2023
Red Tractor Crops	2,170	12 months	England, Wales	Oct 2022-Sep 2023
Red Tractor Fresh Produce	1,958	12 months	UK	Oct 2022-Sep 2023
Red Tractor Pigs	54	12 months	England, Wales, NI	Oct 2022-Sep 2023
Red Tractor Chickens	260	12 months	UK	Oct 2022-Sep 2023
Red Tractor Turkeys	16,041	12 months	UK	Oct 2022-Sep 2023
Red Tractor Ducks	1,882	12 months	UK	Oct 2022-Sep 2023

3.3 Training and Certification Work Group (Leader, Matthew Davies, Killgerm Chemicals Ltd.)

3.3.1 Purpose

All aspects of the work of the Training and Certification Work Group (T&CWG) are intended to support the development and maintenance of a “*competent workforce*” and disseminate the fundamental requirements of responsible rodenticide use of across the three user sectors: professional pest control, gamekeeping, farming. “*governance of the supply chain*” is also delivered through the certification procedure applied by the T&CWG.

3.3.2 Training courses and certification

The major deliverable of the work group continues to be provision of CRRU-approved training through 129 training providers serving four Awarding Organisations (AOs): BASIS (Registration) Ltd./Open Awards; City and Guilds/National Proficiency Tests Council (NPTC); Royal Society for Public Health (RSPH); Lantra. In the period August 2022 to July 2023, eight different CRRU-approved courses were offered and examined. A total of 3,807 certificates were awarded to training participants during the period, bringing the total number of certificates awarded for CRRU-approved courses to 40,877 during the period of the regime (Table 2). This continues to be a very substantial contribution to maintenance of a “*competent workforce*”. A report containing more details of the courses provided and certificates awarded has been provided in confidence to the GOG. From 2019 onwards all the awarding organisations provided information on examination pass rates.

Table 2. The total numbers of CRRU-approved training certificates and qualifications awarded by the following awarding organisations: BASIS (Registration) Ltd. Open Awards, City & Guilds/NPTC, Lantra, Royal Society for Public Health.

Time Period	Total number of certificates/qualifications issued
August 2015 to July 2016	7,285
August 2016 to July 2017	6,044
August 2017 to July 2018	5,498
August 2018 to July 2019	4,711

August 2019 to July 2020	3,916
August 2020 to July 2021	4,424
August 2021 to July 2022	5,192
August 2022 to July 2023	3,807
Total	40,877

3.3.3 Continuing Professional Development

The Continuing Professional Development (CPD) component of the stewardship scheme continues to be available. Expertise of CRRU UK member companies, stakeholder organisations and individuals has been harnessed to create a series of CPD training modules made freely available at the CRRU UK website (<http://www.thinkwildlife.org/training-certification/continuing-professionaldevelopment-cpd-and-stewardship>). The modules, each comprising a PowerPoint presentation taking 45-60 minutes for completion, are supported by detailed trainers' notes. The modules are viewed independently by professional rodenticide users as a method of self-teaching. Additionally, they are downloaded by training organisations and used during face-to-face or online education events (Table 4.).

Trainers have been registering these events with relevant CPD awarding organisations (see Table 4) and participants have claimed CPD awards from such activities. Membership of a registered CPD scheme is strongly promoted by CRRU UK for all competent professional rodenticide users (Table 5), although it is not presently a mandatory condition for proof of competence at point of sale (see 'Future work' for an update on this).

Table 3. The total numbers of downloads of CRRU learning resources to support CPD (correct at 17.11.2023)

CPD presentation	Total number of times downloaded (most introduced 31st June 2018)
Changes to the Classification of Anticoagulants and Permitted Pack Sizes	5,984
Environmental Risk Assessments	7,515
Direct bait application in burrows. Justification and mitigation measures	4,397
Exposure of Wildlife to Rodenticides	4,671
Anticoagulant rodenticide resistance in rats and mice (April 2019)	6,544
'Less Wasteful Way of Feeding Pheasants (and Rats)' Video produced by GWCT.	15,000
Total	29,111 (15,000 views of GWCT video not included)

The five CPD modules available are:

1. Environmental Risk Assessments.
2. Exposure of Wildlife to Rodenticides.
3. Direct application of bait in burrows. Justification and mitigation measures.
4. Changes to the classification of anticoagulants and permitted pack sizes.
5. Anticoagulant rodenticide resistance in rats and mice.

A further resource to support CPD, released in 2020, is an educational video 'Less Wasteful Way of Feeding Pheasants (and Rats)' Video produced by GWCT.

There has been a total of 29,111 CRRU CPD module downloads (Table 3, correct at 06.10.2023) since introduction of the scheme on 31 July 2018, which is up from 17,512 in the previous report to GOG. The module on Environmental Risk Assessment has proved particularly popular, with 7,515 downloads since CPD support was established. Also note the 15,000 views of the GWCT video.

Table 4. Those involved in rodent control are encouraged to maintain their knowledge gained from achieving approved certification, by joining an established CPD scheme. The following established CPD schemes are available to those in the professional pest management, farming and gamekeeping sectors. Note: CRRU signposts users to these schemes and promotes scheme membership, but does not provide formal approval. (see 'Future work' for an update on this).

Established CPD schemes	
Scheme Name	Provider (Awarding Organisations administering CRRU- approved training and certification)
NRoSO (National Register of Sprayer Operators)	City & Guilds/NPTC (National Proficiency Tests Council)
PIPR (Pig Industry Professional Register)	City & Guilds/NPTC (National Proficiency Tests Council)
BASIS Professional Register	BASIS Registration Ltd.
BASIS PROMPT Register	BASIS Registration Ltd.
BASIS Amenity Training Register	BASIS Registration Ltd.
Lantra Skills Plus	Lantra
Other schemes	Other providers
AHDB Dairy Pro	AHDB (Agriculture and Horticulture Development Board)
BPCA Registered	British Pest Control Association
PestWise	Skills Passport
In-house schemes are available in the professional pest management sector	
An alternative option	Awarding Organisations
Training and Certification: users can repeat the approved training and certification options at regular intervals, in order to maintain their knowledge to stewardship levels	BASIS, City & Guilds / NPTC, Lantra, RSPH

3.3.4 A summary of the CRRU UK T&CWG achievements, 2022/23

- Training Framework review: All CRRU-approved training and certification is now Ofqual regulated. The initial aim was by 31st July 2022. Lantra met this from 1st September 2022. The remaining Awarding Body was BASIS Registration/Open Awards, who met Ofqual regulation in time for 1st January 2023. (Note that RSPH and City & Guilds and NPTC options were already Ofqual regulated.) Ofqual regulation provides extra rigour, further security measures and 'comparability' between similar qualifications. For example, invigilation is a requirement. This means that unsupervised rodent control examinations are not possible. 'Comparability' considerations include learning hours and closer alignment of this:
 - Lantra's Ofqual regulated option is 'Lantra Awards Level 2 Award in Rodent Management (2022 onwards)', which replaces the now grandfathered:
 - Lantra: Rodent Control on Farms (2015 -2022) Online: elearning.lantra.co.uk
 - Lantra: Responsible and Effective Control of Commensal Rodents (2015-2022) Online: elearning.lantra.co.uk
 - BASIS/Open Awards regulated option is 'Open Awards Level 2 Award in the Principles of Rodent Control (2023-onwards)', which replaces the now grandfathered:
 - Killgerm Principles of Rodent Control (2016 – January 2023, through BASIS)
 - BASIS/Open Awards regulated option is 'Open Awards Level 2 Award in Rodent Control for Gamekeepers and Rural Environments (2023-onwards)', which replaces the now grandfathered:
 - Rat Control for Gamekeepers (2015 – January 2023, through BASIS)
 - BPCA Using Rodenticides Safely (Exam through Lantra) (2023-onwards) replaces the now grandfathered:
 - BPCA Using Rodenticides Safely (2015 – January 2023, through BASIS)

- The list of CRRU-approved certification has been updated to reflect the changes (Table 5) <https://www.think-wildlife.org/training-certification/>
- It was agreed that, from 2026, users must hold a stewardship-approved certificate obtained within the last five years (i.e. from 2021 onwards in 2026) or evidence the alternative of older approved certification in conjunction with CRRU-approved CPD participation (to prove up-to-date knowledge). This will be required at the point-of-sale.
- Timeline is as follows:
 - 2023: Ofqual regulation now in place for all currently-available training and certification. Set criteria for CPD schemes and approve schemes by end of the year. Publish list of approved CPD schemes.
 - 2024: Work with POS regarding CPD scheme & training checks
 - 2025: Last year for users to join CPD schemes or re-certify ahead of 2026 deadline. Trial POS audits in preparation for 2026 deadline.
 - 2026: All users to hold either a training certificate from 2021 onwards (within the last 5 years) or an older certificate with CPD proof. POS audits to include these checks, as a requirement, for the first time.

Table 5. Certification allowing purchase and use professional rodenticides labelled under stewardship requirements (correct at 21.11.23)

Current certification
RSPH/BPCA Level 2 Award in Pest Management (2010 onwards)
RSPH/BPCA Level 2 Certificate in Pest Management (2010 onwards)
City & Guilds NPTC Level 2 Award in the Safe Use of Pesticides for Vertebrate Pest Control for Rats and Mice (QCF) (PA-R&M) (2013 onwards)
Lantra Awards Level 2 Award in Rodent Management (2022-onwards)
Open Awards Level 2 Award in the Principles of Rodent Control (2023-onwards)
RSPH Level 2 Award in the safe use of rodenticides (2015 onwards)
BPCA Using Rodenticides Safely (Exam through Lantra) (2023-onwards)
Open Awards Level 2 Award in Rodent Control for Gamekeepers and Rural Environments (2023-onwards)
Note: CRRU Wildlife Aware (accredited by BASIS). For holders of qualifications listed above issued before the dates shown, this is an approved update to certified status.

Grandfather certification
Killgerm Principles of Rodent Control (2016 – January 2023, through BASIS)
Rat Control for Gamekeepers (2015 – January 2023, through BASIS)
BPCA Using Rodenticides Safely (2015 – January 2023, through BASIS)
RSPH Level 3 Diploma in Pest Management (2010 – 2016)
RSPH/BPCA Level 2 Certificate in Pest Control (2004 – 2010*)
RSPH Level 2 Certificate in Pest Control (2000 – 2004*)
RSH Certificate in Pest Control (pre-2000 inclusive*)
BPCA Diploma in Pest Control Part 1 (Previously ‘BPC Diploma Part 1’, ‘RSH/BPC Certificate in pest control’, ‘BPC Diploma’, ‘Operators certificate of proficiency’, ‘British Pest Control Association Certificate in general pest control’ and ‘Certificate pre-1988’) (pre-2004 inclusive)
NPTC Level 2 Certificate of Competence in Vertebrate Pest Control (assessed in the context of rats and mice) (2002 – 2014)

Lantra: Rodent Control (previously Rat and Mouse Control) (2009 – 2015)
Lantra: Rodent Control on Livestock Units (2013 – 2015)
Lantra: Rodent Control on Farms (2015 – 28th February 2018 inclusive) Note: This entry refers only to the customised training provision version of ‘rodent control on farms’. Certificates are identified by the text ‘customised provision’.
Lantra: Rodent Control on Farms (2015 -2022) Online: elearning.lantra.co.uk
Lantra: Responsible and Effective Control of Commensal Rodents (2015-2022) Online: elearning.lantra.co.uk
Killgerm Principles of Rodent Control (previously Killgerm Rodent Biology and Control) (2004 – 2015)
*RSH / RSPH certificates may bear a date up to two years after the end date stated above. These are still acceptable at the point-of-sale. Note 1: The ‘BPC Certificate of Proficiency (1989 – 1994)’, ‘BPCA Diploma Part II (1995 – 2008)’ and ‘BPCA Accredited Technician in Pest Control (2008 onwards) which became the BPCA Advanced Technician in Pest Management from 2016 and BPCA Certificated Advanced Technician in 2020 are all accepted at the point-of-sale because other approved certification is a prerequisite for these. Note 2: CRRU Wildlife Aware (accredited by BASIS) For holders of qualifications listed above issued before the dates shown, this is an approved update to certified status.

3.3.5 Future work

A CPD framework has been approved by the CRRU T&C WG (Table 6). This is being used to approve CPD schemes in line with the framework. Four CPD schemes have engaged in this process and two forms have been submitted so far. The intention is to approve schemes by the end of 2023. The mapping form is below:

Table 6. CPD Framework for approval of CPD schemes (CRRU UK Training & Certification Work Group): Criteria for CPD schemes to be approved by CRRU – mapping form

CPD scheme approval criteria	Name of scheme:
Criteria	Evidence
1. Quantifiable. A system for points / hours / credits	
2. Target. A quota for points / credits / hours to meet annually or other time-period	
3. Evidenced. Learner submits evidence of learning e.g. training / events	
4. Recordable. Learner records for points and quota	
5. Demonstrable. Membership can be proven at point-of-sale by certificate or ID card or other suitable means	
6. Auditable. Records accessible for point-of-sale audits and CRRU T&C WG compliance checks	

<p>7. Submissible. Data on numbers of CRRU compliant members to be submitted to Government Oversight Group annually, via Monitoring Work Group</p>	
<p>8. Membership criteria. Members to hold CRRU approved certification</p>	
<p>9. Rodent control content.</p> <p>3 points / hours / credits, of rodent control content that conforms to CRRU guidelines, required each year. This is to be assessed as part of the event.</p>	

3.4 Regulatory Work Group (Leader, Sarah Bull, BASF plc)

3.4.1 Purpose

Since inception, there has been no change to the remit of the CRRU Regulatory Work Group, which is to:

- Work towards harmonisation and simplification of product labels to permit all appropriate risk mitigation measures to be understood and applied by all user groups.
- To provide stewardship monitoring data to HSE (as required by the UK Rodenticide Stewardship Regime).
- To support the three key benefits of the regime, namely “*supply chain governance*”, “*competent work-force*” and “*monitoring compliance*”.

A requirement for the UK authorisation of a professional rodenticide product is provision by the authorisation holder of a full range of product stewardship actions meeting the ‘High Level Principles’ published by HSE.²⁵ This requirement is satisfied by membership of CRRU UK, and thereby participation in the UK Rodenticide Stewardship Regime.

As a condition of authorisation, monitoring data continues to be submitted by the Regulatory Work Group to HSE (see section 4.6).

3.4.2 Regulatory Work Group Activities 2023

In Q1 2023, CRRU Directors voted unanimously to withdraw use of bromadiolone and difenacoum in open areas and waste dumps. With this decision, the CRRU Directors tasked the Regulatory Work Group to explore options and define timelines for implementation.

The first priority was to ensure all SGAR authorisation holders had the opportunity to be represented on the WG for discussion of this topic. Once the wider Regulatory Work Group was in place, meaningful discussions could begin with the main objectives to deliver an implementation plan which would:

- be co-ordinated and timely.
- minimise administrative burden on authorisation holders and the HSE.
- be fair to all authorisation holders.
- enable clear and simple messaging to the market and end users.
- be cost efficient.

The first WG meeting (March 2023) to discuss withdrawal of use of bromadiolone and difenacoum in open areas and waste dumps, resulted in the following proposals to the HSE:

²⁵ HSE (2021). Rodenticides. Available at: <https://www.hse.gov.uk/biocides/rodenticides.htm>. Date accessed: 23.02.21.

- Implementation via Reg (EU) No. 354/2013 (the Changes Regulation), Chapter II, Article 6.
- Notifications to be submitted before 30th September 2023.
- Labels to be amended to remove open area and waste dump uses without delay.
- Timeline to allow revised authorisations to be issued on 1st January 2024.
- Grouping of notifications to minimise fees.

In principle, the HSE agreed most of the proposals, except the timeline which was considered too short for the likely number of applications and the fee structure which did not fit with the HSE's cost recovery policy.

A second WG meeting (May 2023) considered an alternative timeline which had been put forward by the HSE and discussed ideas for an alternative fee structure. The following revised proposals were provided to the HSE:

- Harmonised phase-out dates i.e. 4th July 2024 for sales and 31th December 2024 for use, enabling HSE to stagger issue of documents up to 4th July 2024.
- A single blanket authorisation document for all affected products per authorisation holder, significantly reducing the administrative burden for HSE and minimising costs to authorisation holders.

The HSE agreed the new timeline but unfortunately a blanket authorisation document was not considered appropriate. Nevertheless, the HSE agreed to prepare a new template and to introduce a streamlined process, thus reducing the fee per product by almost 50%.

In June 2023, final agreement was reached by all authorisation holders on the timelines and the revised fee structure. Confirmation of this agreement, together with information on the number of planned applications and submission timelines, were subsequently communicated to the HSE.

3.4.3 Future work /Closing remarks

The CRRU regulatory Work Group maintains the opinion that application fees can be significantly reduced by implementation of simple changes, such as the blanket amendment document drafted by the Work Group. We strongly urge the HSE to re-consider this option which fulfils the HSE's requirement for each product to have a legal record whilst benefiting resource and costs.

It is clear that the workload and fees associated with gaining, maintaining and amending authorisations in Great Britain and Northern Ireland following the UK's exit from the EU far exceed expectations. We encourage HSE to involve authorisation-holders in discussions on simplification of processes as well as the future regulation of rodenticides with the objective to further improve effective rodent control, user-friendliness of labels and ultimately safety of rodenticide application in the UK.

3.5 Point-of-Sale Work Group (Leader Rupert Broome, Killgerm Chemicals Ltd.)

3.5.1 Purpose

The projects implemented by the Point-of-Sale Work Group within the stewardship regime are focused on "*governance of the supply chain*".

3.5.2 Independent Audit Process for Point-of-Sale Compliance

A cornerstone of the stewardship regime is the imposition of competence checks at the point-of-sale. As well as "*supply chain governance*", these checks drive the "*competent workforce*" benefit because only appropriately competent personnel can purchase professional rodenticides. The importance of this measure within the regime overall made necessary a procedure to audit its application.

Following the successful pilot project in 2017, a full Rodenticide Point of Sale (RPOS) audit procedure was implemented in 2018 and has been in place since, including throughout the Coronavirus pandemic, during which time audits were conducted remotely.

The RPOS audit process is conducted by an independent agency, BASIS (Registration) Ltd. It is the responsibility of all product authorisation holders to ensure that their products are placed on the market only through outlets which are registered with the new RPOS audit scheme run by BASIS and have passed an audit.

The primary highlights of the RPOS audit outcomes year to date to September 2023 are as follows :

- A decrease of 4.2% in the numbers of premises registered to undergo the RPOS audit. (661 year to date to end September 2023 versus 690 throughout full year 2022.)
- In 2023 the regional split of premises registered to undergo the RPOS audit has remained very stable at :
 - England 70%
 - Scotland 13%
 - Northern Ireland 7%
 - Wales 11%
- Of the premises audited, there has been an increase in the proportion of outright passes at the point of the initial audit, which now stands at 83% (up from 79% in 2022).
- There has been an increase in the number of premises obtaining a qualified pass with their initial audit. This has risen to 17% in 2023 from 14% in 2022. Each of these premises will have been required to demonstrate to BASIS after their initial audit that improvements have been made to their Point of Sale controls before BASIS grant them certification for 2024.
- The number of premises which failed to pass the audit (including premises for which an audit visit failed to occur) remained low at the initial audit stage, being stable at only 1%.
- In addition, in 2023 there have been 30 deletions from the RPOS audit. This represents outlets which had previously been participating in the RPOS audit scheme, however they have decided not to continue in 2023. CRRU UK does not attach any particular significance to these deletions as they represent only 4% of overall outlets audited in 2022.
- During 2023, BASIS decided to drop the “Pass Noted” measurement used in previous years as this was considered not to be adding value to the audit process and could potentially cause some confusion. This represents a welcome streamlining of the RPOS audit process.
- In addition, it is worth noting that in 2023 one premises on the island of Jersey dropped off the RPOS audit register, however two other outlets remain registered for the RPOS audit. The UK scheme has been extended to the Bailiwick of Jersey since 2019.

Figure 2. Numbers of completed Rodenticide Point of Sale (RPOS) Audits 2023.

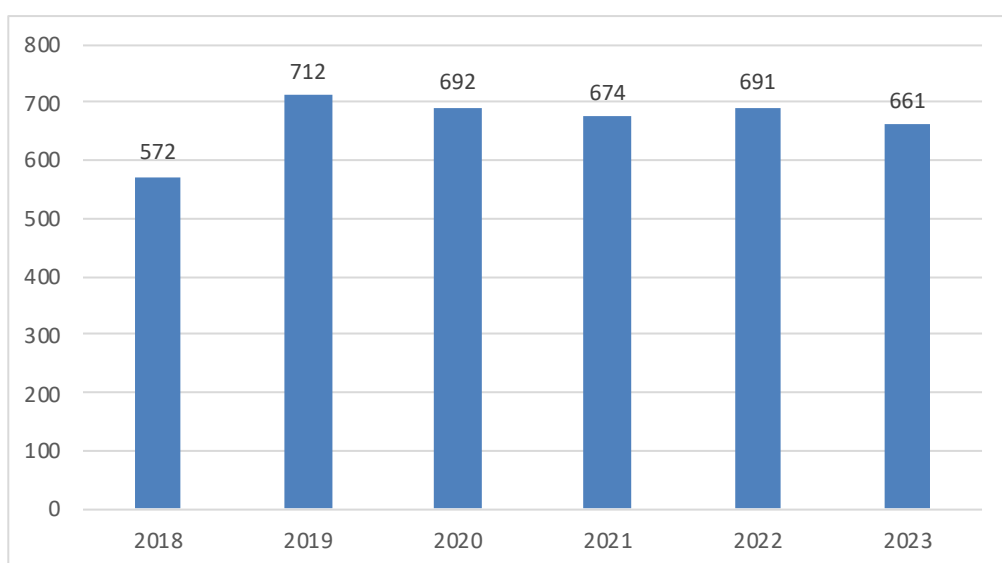


Figure 3. Numbers of premises registered for Rodenticide Point of Sale (RPOS) Audits 2023 (n = 661).

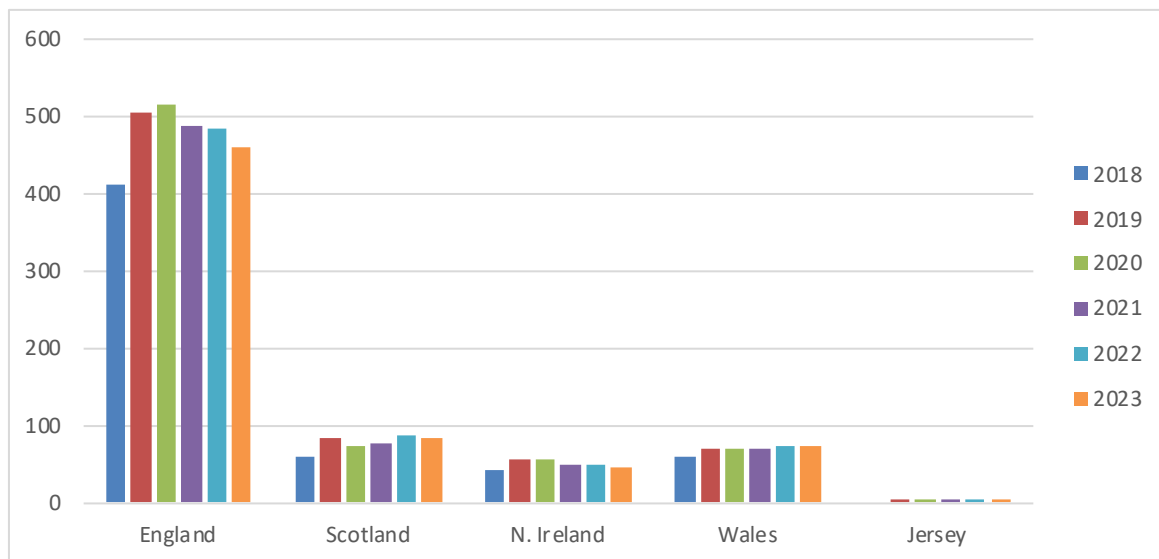
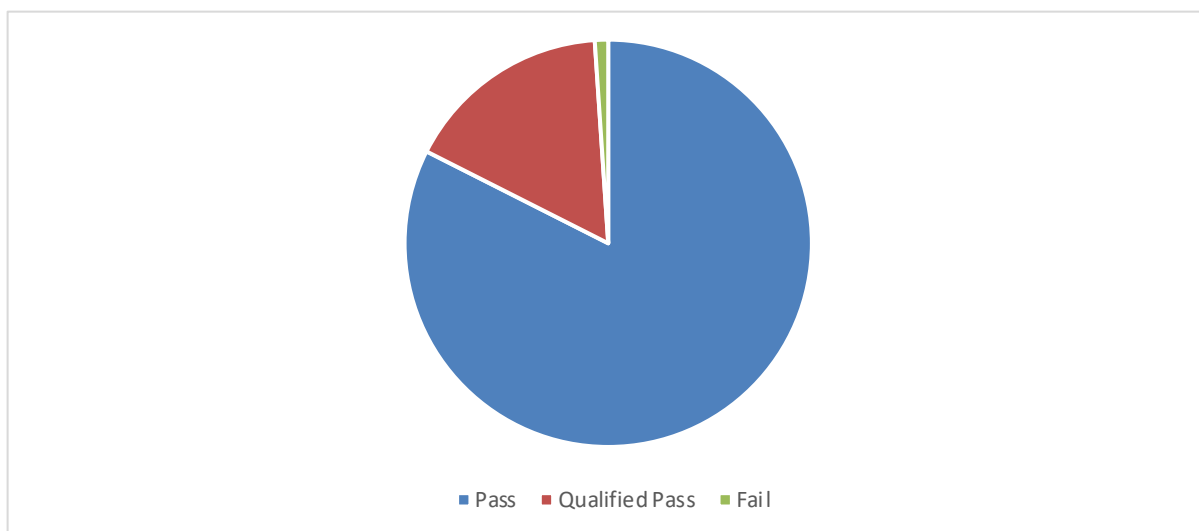


Figure 4. Proportions of initial audit grades during point of sale audits conducted in 2023



It is noteworthy to see initial audit outcomes for 2023 show an ongoing level of consistency in terms of compliance across the years, accepting the distortion of remote audits during the pandemic :

Table 7. Changes in different audit outcomes over the five years that the RPOS has operated.

Year	2019	2020	2021	2022	2023
Pass & Pass Noted	80%	90%	94%	85%	83%
Qualified Pass	18%	8%	5%	14%	17%
Fail	2%	2%	1%	1%	1%

3.5.3 Online reporting tool for allegations of non-compliance at the Point-of-Sale

Since October 2017, an additional supporting measure for the governance of the supply chain has been put in place by CRRU UK in the form of the operation of the on-line tool for reporting allegations of incidents where a failure to comply with point-of-sale competence checks, or a wider failure to comply with the Stewardship Regime, is said to have been observed.

<https://www.thinkwildlife.org/stewardship-regime/report-a-concern/>

During the period 1st January to 30th September 2023, the following allegations have been received via the on-line reporting tool :

- 2 allegations of non-compliance have been submitted, of which both are “unique” allegations.
- Both of these allegations have been submitted by different complainants.
 - Both of the allegations related to sales of rodenticide on the internet.
 - One of these investigations resulted in the listing being removed.
 - Investigation and action relating to the other allegation is ongoing at this time.

Since October 2017, when the on-line reporting tool went live, CRRU UK has received a total of 70 allegations via the reporting tool.

- 67 of these have been unique allegations. The others were repeats of the same allegation.
- Of all the allegations in total, 62 have related to internet sales of rodenticide.
- Of those allegations relating to internet sales :
 - 11 relate to allegations which were not upheld.
 - 34 resulted in the listing being removed, or in one instance the website being taken down.
 - 6 relate to instances where the wording of the listing was amended to become compliant.
 - 7 related to apparently illegal sale of rodenticide and these were reported to HSE.

The number of allegations being flagged to CRRU UK for investigation has continued to reduce.

Alternative routes for reporting and managing allegations of non-compliance do exist, however, for example the British Pest Control Association has developed links with eBay through which member companies can report instances of non-compliance.

CRRU UK will continue to offer a “Report a Concern” function through the CRRU UK website, however based on the limited numbers of concerns being reported this should no longer be treated as a reliable metric but rather just an indicator.

3.6 Monitoring Work Group (Leader, Richard Moseley, Syngenta Ltd.)

3.6.1 Purpose

The Monitoring Work Group provides oversight of and reports studies from independent contracted agencies on the progress of the stewardship regime to meet the HSE/GOG key benefit “*monitoring compliance*”. Furthermore, through the supply of anticoagulant resistance information to practitioners, to allow them to make informed choices about the use of active substances, the WG also supports the key benefit of a “*competent workforce*”. The scope of required stewardship monitoring is shown in Annex 1.

3.6.2 Anticoagulant liver residues in barn owls - Report of Barn Owl liver residues for birds found dead in 2022 (UK Centre for Ecology & Hydrology)

Summary

The 2022 UK CEH report,²⁶ as yet seen only in draft, is the eighth in a series of annual reports (2015-2022) that describe the monitoring of second-generation anticoagulant rodenticide (SGAR) liver residues in barn owls in Britain. As proposed by Shore et al. (2014)²⁷ at the initiation of the stewardship regime, the metrics used to monitor exposure of barn owls to SGARs are:

a) Changes in the ratio of birds with detectable residues of flocoumafen and difethialone (these metrics are used instead of residue concentrations as for other SGARs because too few birds carried residues of these substances in the baseline years),

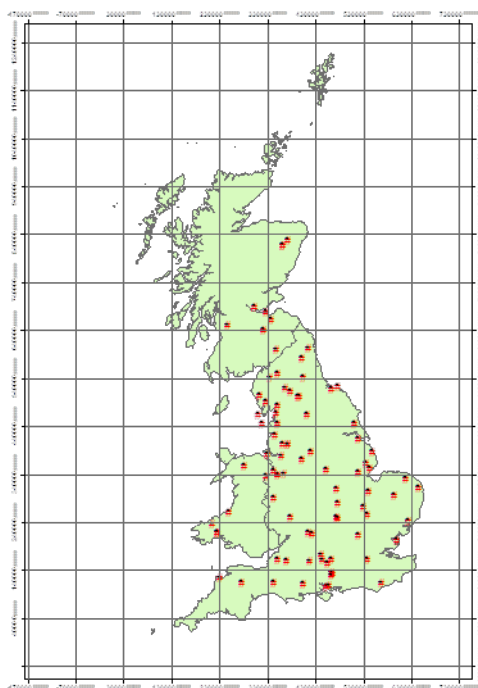
²⁶ Ozaki, S., Chaplow, J.S., Dodd, B.A., Pereira, M.G., Potter, E.D., Sleep, D., Toon, B., and Walker, L.A. (2022) Second generation anticoagulant rodenticide residues in barn owls 2021. UKCEH contract report to the Campaign for Responsible Rodenticide Use (CRRU) UK, pp. 25 https://pbms.ceh.ac.uk/sites/default/files/Stewardship-2021-owls_FINAL.pdf

²⁷ Shore, R.F., Henrys, P.A. & Walker, L.A. 2014. Power analysis of liver second generation anticoagulant rodenticide (SGAR) residue data in barn owls from Britain: a Predatory Bird Monitoring Scheme (PBMS) report. CEH contract report to the Health & Safety Executive. 45pp. <https://wiki.ceh.ac.uk/x/DAIDC>.

- b) Changes in the ratio the number of owls with “high” concentrations: number of owls with “low” concentrations for brodifacoum, difenacoum, bromadiolone, and summed SGARs (Σ SGARs),
- c) Change in “low” and “high” concentrations of brodifacoum, difenacoum, bromadiolone, and Σ SGARs

The total of 88 birds tested in the 2022 report is lower than the target 100 individuals due to the presence of avian influenza in some specimens, which were discarded. The provenance of the owls shows a wide distribution for samples throughout England, Scotland and Wales

Figure 5. Geographical locations where the 88 barn owls that died in 2022 were found that were analysed for liver SGAR residues. From Ozaki et al., (2023).



The main findings of the study were summarised by the authors as follows:

‘Overall, there were significant differences in liver SGAR accumulation between barn owls that died in baseline years and in 2022: a potential reduction of bromadiolone and difenacoum and an increase in brodifacoum residues from 2016. However, the lack of significant reductions in Σ SGAR residues in barn owls in 2022 suggests that full implementation of stewardship since 2018 has yet to result in a statistically significant reduction in exposure of barn owls to SGARs’.

As with baseline and subsequent years, bromadiolone, difenacoum and brodifacoum continue to be the most detected SGAR’s. Among the 88 birds sampled, 79.5% had detectable liver residues of one or more SGARs, and 44.3% of the livers tested from birds that died in 2022 had multiple compounds present.

The presence or absence of liver SGAR residues in barn owls is not one of the agreed metrics used for assessing the outcomes of stewardship. However, the simple measure of “% barn owls with detected SGARs” is easy to understand and commonly used to describe the extent of contamination of barn owls.

Changes in the three agreed metrics

- a) Numbers of barn owls containing detectable residues of flocoumafen and difethialone.

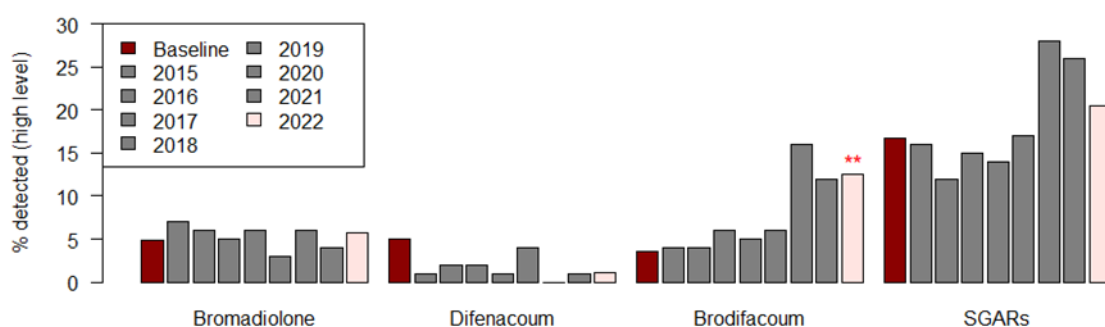
Flocoumafen and difethialone occurred too infrequently barn owl livers in baseline years to allow statistical analysis of residue concentrations. There was no significant difference in the proportion of barn owls with detectable liver residues of flocoumafen between 2022 and the baseline years (3% vs 0%). However, significantly more barn owls were found with detectable liver residues of difethialone in 2022 when compared to baseline years (6.8% vs 0.3%). The increase in the frequency of difethialone residues suggests an increase in the use of this active substance.

b) The ratio of birds with “low” (<100 ng/g wet weight (wet wt.) vs “high” (>100 ng/g wet wt.) concentrations for any single SGAR or for summed SGARs (Σ SGARs).

Significantly more owls were found with “high” concentrations of brodifacoum in their livers in 2022 than in the baseline years. Whereas for bromadiolone and difenacoum, there were no significant changes between baseline years and 2022 in the ratios of birds with “low” vs “high” residues.

The percentages of birds with “high” residues among those with detected SGAR residues in all nine monitoring years/periods are shown in Figure 6. The percentage for brodifacoum exceeded 10%, and the value for Σ SGARs exceeded 20% in 2022. The percentages were below 10% for bromadiolone and difenacoum for all monitoring years.

Figure 6. Percentage of barn owls with “high” (>100 ng/g wet wt.) liver SGAR concentrations. No birds found in 2020 had “high” residues of difenacoum in their liver. Statically significant differences between baseline and the most recent year are indicated: * = $P < 0.05$, ** = $P < 0.01$, *** = $P < 0.001$. From Ozaki et al., (2023).



c. Average concentrations of brodifacoum, difenacoum, bromadiolone and Σ SGARs in the cohort of owls with “low” residues (<100 ng/g wet wt.) and “high” residues (>100 ng/g wet wt.)

There was no significant difference between barn owls from baseline years and from 2022 in the concentrations of “high” residues for all SGAR residues, including Σ SGARs.

For individual SGAR active substances:

- “low” residues of bromadiolone and difenacoum were significantly lower in 2022 than the baseline years,
- “low” residues of brodifacoum were significantly higher in 2022 than baseline years,
- too few birds carried “high” residues of difenacoum in 2022 to test whether their magnitude was significantly different between that year and the baseline years.

Although any trend in the magnitude of SGAR residues in barn owl livers is not a metric set by government for monitoring the effectiveness of the stewardship regime, observed trends can be instructive. “Low” residues of brodifacoum appear to be increasing, although “high” residues show no significant trend. The statistical tests conducted indicate that both “low” and “high” bromadiolone residues have significantly declined, whereas for difenacoum, no significant time trend was observed for either “low” or “high” residues. Although no significant difference was observed in the magnitude of Σ SGARs between the baseline years and 2022, the magnitude of “low” Σ SGAR residues, excluding brodifacoum, were significantly lower than baseline years in 2016, 2021 and 2022.

Conclusions

As in baseline years,²⁸ residues of one or more active ingredients were present in the majority of barn owls in 2022 but most residues (79.5% for Σ SGARs) were <100 ng/g wet wt. There were statistically significant differences between baseline years and 2022 in terms of prevalence or magnitude of detectable concentrations. The prevalence

²⁸ Shore, R.F., Henrys, P.A. & Walker, L.A. 2014. Power analysis of liver second generation anticoagulant rodenticide (SGAR) residue data in barn owls from Britain: a Predatory Bird Monitoring Scheme (PBMS) report. CEH contract report to the Health & Safety Executive. 45pp. <https://wiki.ceh.ac.uk/x/DAIDC>.

of difethialone and brodifacoum residues increased, while those of bromadiolone and difenacoum decreased. The increase in difethialone compared of the baseline years reflects that this SGAR was new to the market in the baseline years. However, detection rate of difethialone remained relatively low even in 2022. Meanwhile, a significantly higher proportion of birds had “high” concentrations of brodifacoum compared to the baseline years, and the magnitude of “low” brodifacoum residues had increased over the monitoring period. Thus, it is evident from these results that exposure to brodifacoum may be increasing. Moreover, the results on brodifacoum residues and sum of the other active ingredient suggest that the increase in the magnitude of low brodifacoum residues might be compensating for declines in the other active ingredients at low residues, particularly bromadiolone and difenacoum. The decline in exposure to difenacoum and bromadiolone may indicate a change in usage patterns and the relative exposure to barn owls of these active ingredients.

The reasons for these changes are likely to be complex and, for example, may involve the large number of brodifacoum products currently available.²⁹ Also instrumental may be information from the UK Rodenticide Action Group (RRAG) about the prevalence of resistance to bromadiolone and difenacoum in Norway rats³⁰ and house mice,³¹ and advice that bromadiolone and difenacoum should not be used against some resistant rodent strains.

The results of residue monitoring are, however, made in the context of a UK barn owl population that is expanding in range and increasing in density.³² Furthermore, there is evidence from *post mortem* examinations carried out prior to liver residue analysis that few barn owls appear to be detectably harmed by SGAR exposure. A total of 789 dead barn owls have now been examined during the CEH/CRRU project. Their deaths were attributed to a variety of causes, mainly road traffic collisions and starvation. In five birds (0.6% of the total), signs of haemorrhage were not associated with physical trauma and therefore exposure to SGARs may have contributed to their deaths.

However, the continuing lack of reductions in ΣSGAR residues in barn owls in 2022 suggests that implementation of the stewardship regime has yet to result in a statistically significant reduction in the overall exposure of barn owls to SGARs, although significant changes in the composition of these residues were observed.

3.6.3 Rodenticide Knowledge, Attitudes and Practices (KAP) Surveys

General

A Knowledge, Attitude and Practices (KAP) survey is a quantitative method, using predefined questions formatted in a standardised questionnaire, that provides access to quantitative and qualitative information. The KAP survey is a very widely used tool to observe changes in behaviour, and in the level of adoption of advice, in a very wide range of scenarios. In other words, KAP studies collect information on what is known, believed and done in relation to a particular topic in a specific community.³³ However, it must be noted that that a KAP survey records an “opinion” and is based on the “declarative” (i.e. statements). In other words, the KAP survey reveals what was said in response to questions or propositions posed to correspondents, but there may be gaps between what is said and what is done.

Previous KAP studies were carried out in 2015, prior to the introduction of the stewardship regime, in 2017, two years after initiation and in 2020. The fourth KAP survey conducted on behalf of CRRU was completed and published in 2023.³⁴ Earlier KAP surveys were collated and reported by Mr. Mike Heisig of the Research Engine company, on behalf of CRRU. The 2023 KAP was again conducted and reported by Mike Heisig, now of Storey Seeds, with the support of England Marketing to gather the elements of the survey dealing with the agriculture sector.

Sampling Frame and sample sizes

The 2023 questionnaire was reviewed in preparation for the transition from its Computer Assisted Telephone Interview (CATI) methodology (2015, 2017, and 2020) to its current form as a fully web compatible survey. The 2020 KAP

²⁹ HSE (2023). UK authorised biocidal products. Available at: <https://www.hse.gov.uk/biocides/uk-authorized-biocidal-products.htm>. Date accessed 09.11.23

³⁰ Buckle, A., Charlton, J., Meyer, A. and Prescott, C. (2021). Anticoagulant resistance in the Norway rat and guidelines for the management of resistant rat infestations in the UK. Rodenticide Resistance Action Group, UK. Revised January 2021. 11 pp.

³¹ Buckle, A., Charlton, J., Meyer, A. and Prescott, C. (2021). RRAG House Mouse Resistance Guideline. Rodenticide Resistance Action Group, UK. 9 pp.

³² Heywood, J.J.N., Massiminio, D., Balmer, D.E., Kelly, L., Noble, D.G., Pearce-Higgins, J.W., Wotton, S., Gillings, S. and Harris, S.J. (2023). The Breeding Bird Survey 2022. British Trust For Ornithology, Thetford. BTO Research Report 756. 36 pp.

³³ Kaliyaperumal K. 2004. Guideline for conducting a knowledge, attitude and practice (KAP) study. AECs Illumination 4:7–9.

³⁴ Research Engine. 2020. Rodenticide Knowledge, Attitudes and Practices: Survey: August 2020 Re-run. 35-37 Ludgate Hill, London. 171pp.

survey was itself a transition/hybrid project as 16% of the farmer interviews, 15% of the gamekeeper sample and 50% of the PCO sample was collected through a CATI methodology. The remainder, 85% of the 2020 gamekeeper sample and 50% of the 2020 PCO sample, was collected as self-completion web interviews and the data was merged with the CATI sourced interviews.

In 2023, this move towards online response gathering continued, with just 16% of the farmer sample being gathered via CATI. The remaining 84% of the sample, plus 100% of the gamekeeper and PCO samples was collected online. KAP objectives are to.

1. Measure awareness of rodent control strategies and control approaches used.
2. Define rodenticide products used, situation, frequency, quantities applied, and methods used.
3. Assess knowledge and attitudes regarding potential adverse impacts on humans, non-target animals and the environment for different ways of controlling rodents.
4. Quantify knowledge and degree of implementation of risk mitigation measures.
5. Define awareness, understanding and attitudes to codes of practice, (in particular the CRRU 7-point code of practice and in 2017 the CRRU UK Best Practice guideline) and impact on use practices.
6. Identify influencers and influences and their impact on attitudes and behaviours, including, advice sources, training programmes, and communications.
7. Compare and contrast knowledge, attitudes and practices between different types of users (farmers, gamekeepers, professional pest controllers) across the duration of the regime.

As with previous KAPs the rodenticide user community is broken into segments, with the livestock farming segment further divided into sub-segments to reflect different types of farm enterprises (see Table 9). The other segments, gamekeepers and pest control officers, are homogeneous.

The 2023 KAP will again highlight the areas of improvements amongst all sectors regarding the seven points listed above, and these developments are highlighted below. This KAP will reflect significant improvements in the awareness of CRRU in within the user groups, and a notable change in the habits of some farmer groups, where the preference to contract out pest management and use the services of a professional pest control company has increased. This preference to use a contractor was to help farmers protect themselves in retaining Quality Assurance certifications. This resulted in farmer samples being smaller and harder to achieve than anticipated, and this contracted out section may need to be captured in future KAP's.

Table 9. KAP survey samples 2015-2023.

SEGMENT	SUB SEG-MENT	Achieved 2015	Achieved 2017	Achieved 2020	Achieved 2023
Arable		50	100	100	67
Livestock	Dairy	30	64	64	30
Livestock	Sheep	30	62	62	44
Livestock	Pigs	30	60	60	32
Livestock	Poultry	30	60	60	32
Gamekeepers		43	63	93	75
Pest Control Officers (PCO)		55	120	150	123
TOTAL SAMPLE		268	512	589	403

Demographics – Key Information

The data collected shows that the membership of assurance schemes across the farming sectors has decreased in the sections interviewed by the KAP. This may be the result of more farmers contracting out their pest services to protect

their membership of assurance schemes, and future KAP's may need to change to reflect this demographic.

Assurance schemes in the PCO demographic remain prominent with an increase to 86% of the 2023 respondents being members of one of the two major recognised trade bodies, NPTA and BPCA.

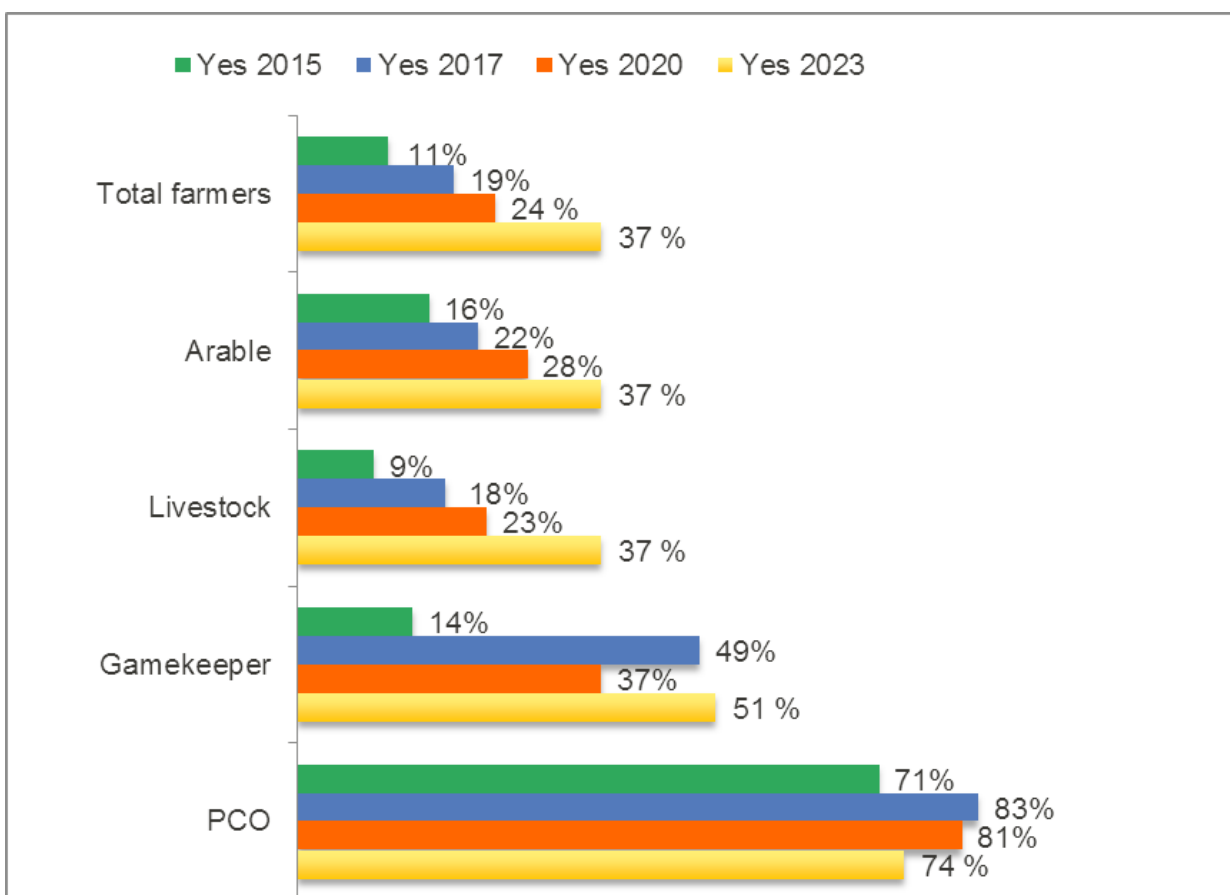
Knowledge - Qualifications and Training

The 2023 KAP survey shows that formal training levels have remained relatively static with the exception of Gamekeepers, who may be reverting to non-chemical control measures. LANTRA continues to be the dominant source for qualifications in the farming sector, and RSPH with professional pest controllers.

However, the 2023 results reflect an increase in the number of farmers who are part of a recognised CPD scheme, with an increase of 17% since the 2020 survey.

The 2023 survey also reflects a rise amongst all farmer groups in their attendance at training or seminars, showing a growing level of understanding amongst the one of the weaker groups in previous KAP's (Fig. 7)

Figure 7. Attendance by all KAP respondents at training and seminars about responsible rodenticide usage during the last 3 years.

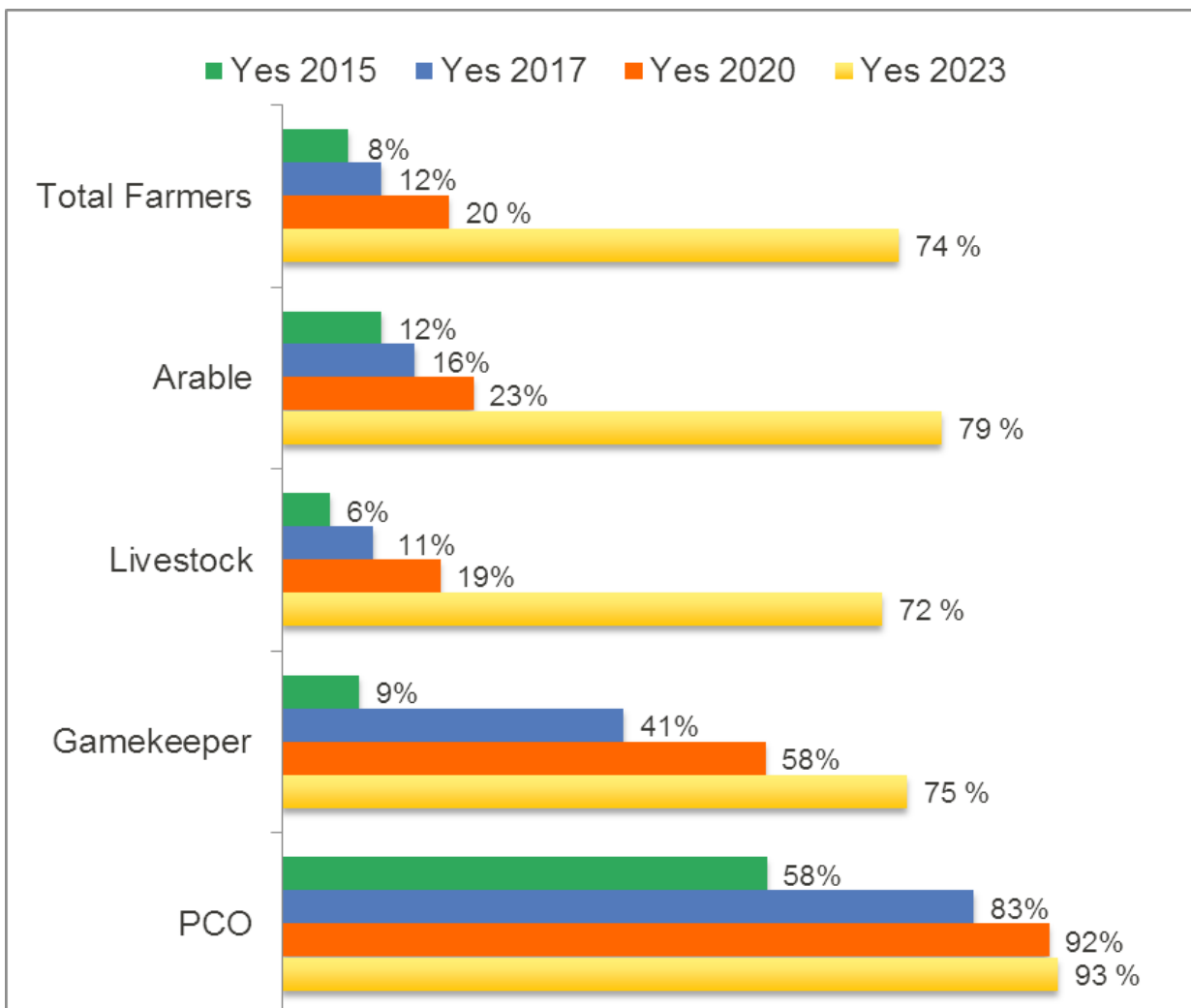


Knowledge - Awareness of CRRU

One of the most striking and encouraging details to be revealed by the 2023 KAP is the significant increase in

awareness about CRRU within the user groups (Fig. 8). The development of knowledge in the farming groups is striking, but both gamekeepers and pest controllers show an increased knowledge of CRRU and the 'CRRU Code of Best Practice'. This may reflect the learning from the 2020 survey and a change in Communications strategy by CRRU to reach user groups who previously reflected lower levels of knowledge about CRRU. Over 50% of all respondents in all groups stated that they no longer automatically presume that they will apply a rodenticide when they approach a new rodent problem.

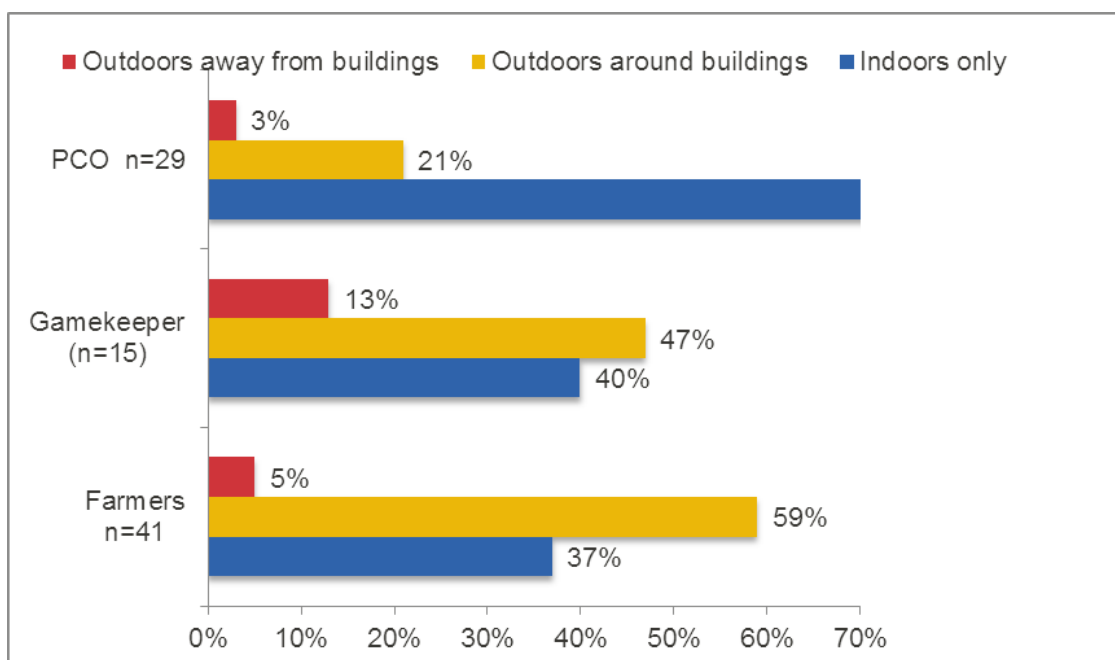
Figure 8. Knowledge of CRRU based on responses from all respondents.



Knowledge - Active Ingredients

The farming rodenticide user group reflected a far more developed knowledge of the active ingredients that they were applying in 2023 than in previous surveys (Fig. 9). The active ingredients used by all sectors has changed since the first KAP in 2015, with brodifacoum making up a larger percentage of applied products in 2023, but rodenticide application rates reducing overall. The 2023 survey highlights that the potential misuse of brodifacoum is most noticeable within the gamekeeper sector, with 13% of respondents applying the product in areas not permitted by the label (Fig. 9). The recent amendments to product labels to remove open area application on all anticoagulants may help manage this situation.

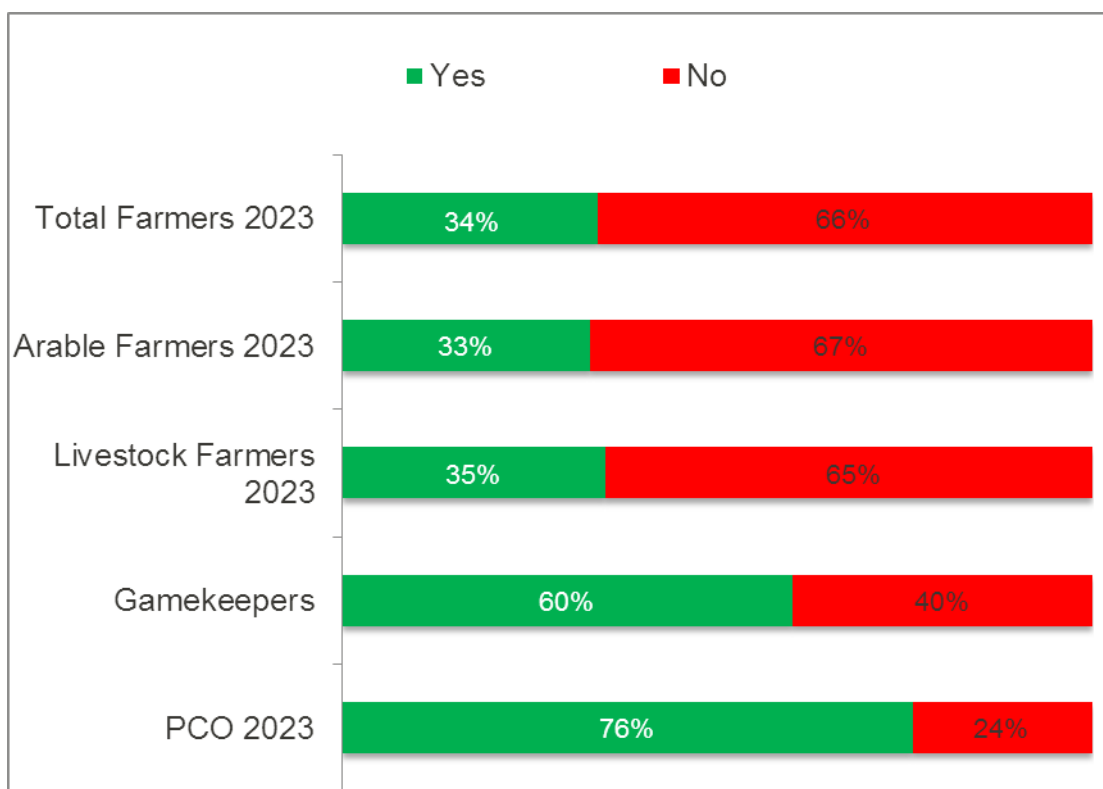
Figure 9. Among respondents who knew the active substances used and used brodifacoum, where was it used?



Knowledge - Resistance

All surveyed groups show a greater knowledge of resistance amongst rodent populations, which may account for the application of actives such as brodifacoum on a more regular basis (Fig. 10). The levels of concern are especially high amongst gamekeepers, and the conclusion of the survey is that higher levels of awareness are related to local rodent populations, and higher levels of awareness drive higher levels of concern. Farmers reflect the lowest level of knowledge regarding resistance, and this is reflected in the information they have regarding the resistance status in their immediate area.

Figure 10. Awareness of all respondents of resistance in their areas of operation.



Knowledge - Attitudes (adverse Impacts)

The attitudes displayed by all user groups in the 2023 survey show that environmental concerns are considered to be very dominant or quite dominant by at least 61% of farmers, 97% of gamekeepers and 96% of PCOs (Fig. 11).

Figure 11. Importance of environment when considering rodent pest management options.



However, there is a marked difference in the perception of the user groups about the source of rodenticide contamination within the environment. Farmers believe that the source is poisoned target species, while PCO's and gamekeepers believe that non target species are the source. Farmer user groups also put a greater emphasis on the potential direct contamination of non-target species, such as dogs, than on risks to wildlife when considering adverse impacts. All users tend to be more concerned with the environment than personal safety when applying rodenticides.

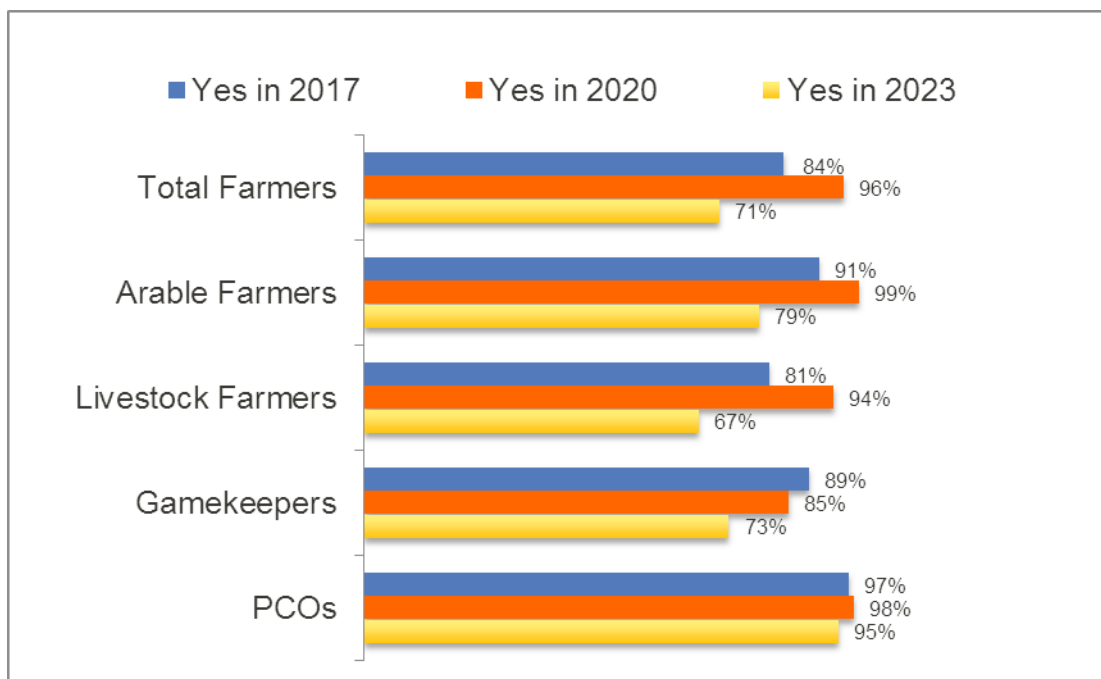
Attitudes (risk minimisation)

When minimising the risk of environmental contamination farmers tend to concentrate on the removal of dead target rodents and the regular checking of rodenticide. They place less importance on the collection of old rodenticides than the PCO and the gamekeeper sectors, highlighting the difference in attitude as to what the source of rodenticide contamination is in the environment. However, farmer groups report that the retrieval of unused bait is seen as easy to carry out by 92% of the responders. All farmer groups are more likely to investigate other control measures that avoid using rodenticide than in previous KAP surveys.

Interestingly, although all groups have improved with their knowledge of CRRU and the CRRU Code, there seems to

have been only limited increase in the applications of environmental risk assessment (ERA) and, indeed, a reduction among some user groups (Fig. 12). These results conflict with other findings of the 2023 KAP, but it may be that some user groups are automatically applying the principles of ERA without actually recognising the term.

Figure 12. Knowledge of environmental risk assessment among all respondents.



Practice - Brands and Active Substances

The 2023 KAP showed an increase of 26% in the numbers of farmers having knowledge of brand names of rodenticides applied. This perhaps suggests more knowledge of the product label that they are working with. All user groups showed more varied reasons for choosing the product that they are applying, but recommendation remains a strong driver for the farming sector when selecting products. Size of print continues to be the issue that all user groups refer to most when asked about how to improve product labels.

Practice - Resistance

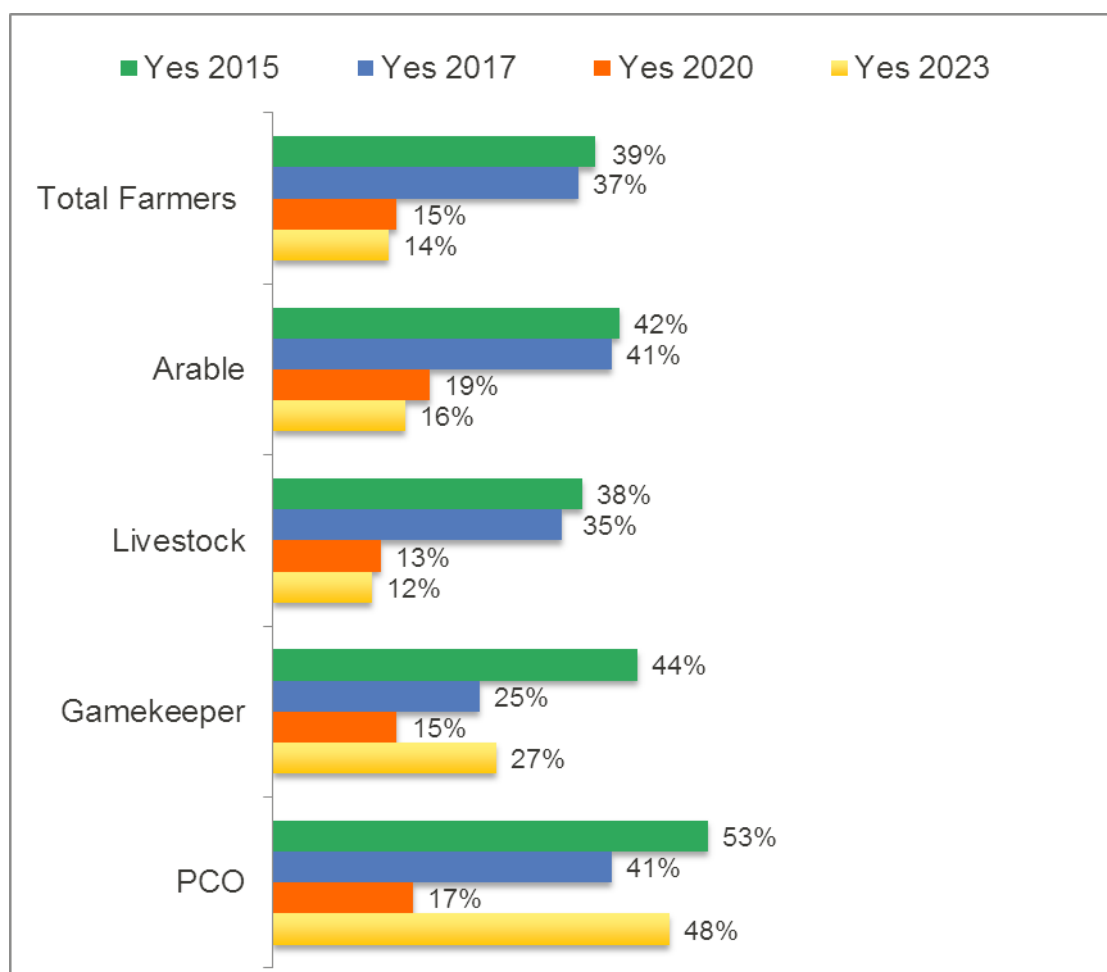
When farmers believe that they are dealing with resistant rodent populations, they tend to reach decisions based on their experience, and on information from trade journals. PCO's and gamekeepers appear to be more aware of the other sources of information available to them, including DNA resistance testing and reference points such as the UK Rodenticide Resistance Action Group. Farmers do however indicate that they are more willing to use control measures other than rodenticide to control infestations, and a practical reduction in the reliance on application of a more potent rodenticide to control rodent problems. Other user groups also indicate a move away from more potent anticoagulant, with non-anticoagulant rodenticides becoming increasingly used by PCO's.

Practice - Permanent baiting

Encouragingly, when asked about baiting with rodenticides on a permanent basis, all farm user groups reflect a continuing trend in reduction to the amount of permanent basis being carried out on farms (Fig. 13). This may be a response to specific advice on this practice in farm assurance scheme standards. However, after consistent reductions in the use of permanent baiting by gamekeepers and PCO's in the last two surveys, use of this practice appears to

have increased among both groups. More work is required to understand why this has happened but it may reflect changes in the interpretation of the rule that requires sites where permanent baiting is used to have “high potential for reinvasion when other methods of control have proven insufficient”.

Figure 13. Use of permanent baiting by all respondents.



Conclusions

The information in the above report clearly indicates that in almost all areas of the Knowledge, Attitude and Practice surveys conducted on behalf of CRRU, there has been marked improvement in the three years since the 2020 survey. The farmer rodenticide user group especially has reflected developments in training, CPD, environmental awareness and product knowledge that clearly indicate that the CRRU stewardship message is being absorbed and understood. However, although the implementation of the stewardship regime is an important driver for best practice among all user groups, it should be noted that there are many other influences that serve to reinforce the stewardship message. The KAP also shows that there are areas for improvement in each user group, especially the gamekeepers where there appears to be some knowledge loss. The decision to remove ‘open areas’ from all SGAR authorisations will remove ambiguity in the understanding of this use scenario, the main one used by gamkeepers. CRRU will continue to develop communication routes to ensure that key stewardship messages are absorbed by the more difficult-to-reach sectors covered by the KAP.

3.6.4 Barn owl breeding performance (University of Reading and Wildlife Conservation Partnership)

General

The Barn Owl Monitoring Scheme (BOMS) is one of the surveillance projects being carried out, within the UK Rodenticide Stewardship Regime, by the Campaign for Responsible Rodenticide Use (CRRU) UK.³⁵

³⁵ Buckle, A. P., Prescott, C., Davies, M. and Broome, R. (2017). The UK Rodenticide Stewardship Regime. A model for anticoagulant risk mitigation? In: Proceedings of the Ninth International Conference on Urban Pests, eds. Davies, M., Pfeiffer, C. and Robinson, W.H. Aston University, Birmingham, 9-12 July 2017. Pp. 165-170. Available at: <https://www.icup.org.uk/>. Date

The barn owl (*Tyto alba*) is a charismatic and iconic species of Britain's agricultural landscape that typically hunts rough grassland on open farmland, where meadows, field margins and woodland edge habitats provide high densities of their small mammal prey.^{36,37} The most frequently taken prey items in mainland Britain are field vole (*Microtus agrestis*) and wood mouse (*Apodemus sylvaticus*), whilst bank vole (*Myodes glareolus*), common shrew (*Sorex araneus*) and pygmy shrew (*Sorex minutus*) assume secondary importance in the diet. Both UK commensal species, Norway rat (*Rattus norvegicus*) and house mouse (*Mus musculus*), are also taken but usually contribute less than 1% of the diet of barn owls.³⁸

The Barn Owl Monitoring Scheme (BOMS) was established to record certain breeding parameters in selected UK barn owl populations. The project is operated as collaboration between independent barn owl experts (Wildlife Conservation Partnership), who conduct field work, and the University of Reading, where data analysis and interpretation is carried out. An important feature of the study is the ability to follow year-on-year the same nest sites. This permits the estimation of percentage nest site occupancy, which is an important metric in barn owl breeding performance not provided from other studies. Each year, a report is produced giving data on barn owl breeding during the preceding breeding season, and these data are compared with similar information obtained during previous years.

The BOMS was conceived to provide surveillance of UK barn owl breeding performance so that significant breeding perturbations could be observed and, hopefully, explained. The purpose also was to obtain information about barn owl breeding among a sub-set of the UK barn owl population to permit reporting of breeding among birds carrying SGAR liver residues that are typical of those found in the annual studies reported by UKCEH. The BOMS is concerned with the breeding performance of live birds, while liver residues can only be obtained from dead ones.

The BOMS provides annual data on key breeding parameters for selected barn owl populations. CRRU has received and analysed the annual BOMS data sets for 2015, 2016, 2017, 2018, 2019, 2021 and 2022, together with similar available data provided by WCP from the same nest sites for 2011 to 2014. The annual BOMS data set for 2020 was not available because of restrictions imposed by the COVID pandemic

Recent breeding performance

For all bird species, estimating numbers of birds in a population is always problematic, because numbers will fluctuate from year to year as individuals breed, die and migrate, and it is usually impossible to count all individuals. Estimates of population size are commonly derived from surveys, and for barn owl, such surveys rely heavily on estimating numbers of breeding pairs over successive breeding seasons.

The most recent organised national survey of the barn owl breeding population conducted across the UK was undertaken between 1995 and 1997 and provided a national estimate of c. 4,000 breeding pairs, using a standardised survey design,³⁹ although this was subsequently considered this to be a little on the low side.

Over subsequent years, considerable conservation effort has been targeted at Britain's barn owl population, and expert groups and organisations have reported UK population estimates of c. 9,000 breeding pairs in 2011 and 2014. The breeding population is currently estimated at between 9,000 and 12,000 pairs and considered close to the upper end of this range.⁴⁰

An increase in the barn owl population over the last 21 years has been acknowledged by 'The state of the UK's birds 2016' Report, by downgrading barn owls from the 'Amber List' in 2015 to the 'Green List' in 2016.⁴¹

Two extreme years for barn owls were the breeding seasons of 2013 and 2014. The month of March 2013 was the coldest reported since 1962 and, during that month, numbers of dead barn owls reported to the BTO's ringing scheme were about three times above normal. With nest occupancy estimated to be below 72% of the 'all-years' average, 2013 is considered to be one of the worst barn owl breeding seasons since 1958.

accessed: 13.11.23

³⁶ Shawyer, C. R. (1987). *The Barn Owl in The British Isles: Its Past, Present and Future*. The Hawk Trust, London. ISBN 0-9503187-2-8.

³⁷ Toms, M., (2014). *Owls*. The New Naturalist Library No 125. Harper Collins. ISBN 978-0-00-742555-6.

³⁸ Love, A.R., Webbon, C.E., Glue, D. and Harris, S. (2000). Changes in the food of British Barn Owls (*Tyto alba*) between 1974 and 1997, *Mammal Review* 30: 107-129.

³⁹ Toms, M.P., Crick, H.Q.P. and Shawyer, C.R. (2001). The status of breeding Barn Owls *Tyto alba* in the United Kingdom 1995-97. *Bird Study*, 48: 23-37.

⁴⁰ Shawyer, C.R. 2019. *Barn Owls in 2019*. Available at: <https://www.bto.org/news-events/news/2018-04/barn-owls-2018-update-colin-shawyer>. Date accessed: 03.09.2019.

⁴¹ Eaton, M., Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove, A., Noble, D., Stroud, D and Gregory, R. (2015). *Birds of Conservation Concern 4: the population status of birds of the UK, Channel Islands and Isle of Man*. *British Birds*: 108; 708-746.

The mild winter of 2013-14 was followed by an early spring and one of the warmest summers on record. Subsequently, 2014 became a peak year for small mammals, and in spite of the low breeding productivity during the summer of 2013 and higher than average barn owl mortality in the winter of 2013 and 2014, both nest occupancy and breeding productivity in many areas was especially high in 2014. The estimated 9,000 pairs that attempted to breed in 2014, with most traditionally used nests sites occupied by breeding birds, was considered to provide a reliable UK population estimate for the species at that time.

With such marked annual fluctuations, nest occupancy and productivity, data in any one year are unlikely to provide an accurate reflection of the actual barn owl breeding population. The most recent surveys now use a standardised methodology that is conducted over several consecutive years, using the most productive years to estimate population size.

Overall, 2015 was a poor breeding season for barn owls in the UK, although not as bad as that of 2013; while 2016 and 2017 were better, primarily as a result of repeat and second nesting attempts, following in both years a highly productive June and July. The 2018 breeding season in the UK was generally poor when compared with 2017, with below average nest occupancy and below average brood size. The 2019 breeding season was generally good, with nest occupancy above average; while 2020 was a poor year for barn owls, with nest occupancy down by 8.5% and brood size down by 14% when compared with the average for previous years.

According to The Barn Owl Trust, nest occupancy for UK barn owls was above average in 2021, although there was only a marginal improvement in brood size when compared with the really poor year of 2020.⁴²

Barn owl breeding

We have information from a variety of sources giving estimates over more than a century for UK barn owl populations. The overall trend was one of sharp decline throughout much of the 20th century, incidentally most of this long before the introduction of the SGARs. Latterly, however, there has been an increase in the barn owl population from a low point of about 4,000 breeding pairs during the 1990s to, currently, an estimate of as many as 14,000 breeding pairs. The reasons for this substantial apparent increase are certainly complex and are likely to include climate, but the effects of intensive conservation efforts by a number of agencies are also highly significant. Scarcity of available nesting sites had been restricting population growth and schemes to provide nest boxes (e.g. see: <https://www.barnowltrust.org.uk/barn-owl-nestbox/>) have been so successful that it is now estimated that at least 25% of UK barn owl pairs breed in a provided nest box.⁴³

From 2011 to 2021 (with the exception of 2020) between 98 and 130 barn owl nest sites were surveyed each year across five regions of the UK, and during this time, between 23 and 78 of these nest sites were successful, producing between 83 and 336 fledgling birds each year. Across the five regions surveyed during this time, the annual mean nest productivity for the successful nests ranged between 2.4 and 4.3 young, with an overall mean nest productivity of 2.96 (n = 533).

It is important to recognise that barn owl nest occupancy and breeding success can vary considerably from year to year for a very wide variety of reasons, including population numbers, prey availability and weather conditions. For this reason, both the 1982-1985 Barn Owl Survey of Britain and Ireland and the 1995-97 BTO/Hawk and Owl Trust 'Project Barn Owl' survey provided annual UK population estimates over their three- or four year study periods, thus embracing the more complete yearly cycle of field vole abundance.

For example, in years when vole numbers are particularly low (such as 2013), many barn owls will remain at or near their winter roosts and will make little attempt to occupy their breeding sites. In such years there is every likelihood that many barn owls will simply go unrecorded, and surveys conducted in these years alone (rather than peak years like 2014), are likely to underestimate the population size.

The average date for the first successful egg laid in the nests monitored across the five regions was the 18th May and the 14th April in 2013 and 2014 respectively (Table 8), indicating that the few barn owls which were able to breed in 2013 had delayed their breeding activity on average by 34 days when compared with 2014. This, in combination with the high mean 2013 nest productivity would suggest that food availability was a limiting factor for the barn owls at the onset of breeding, but not as the season progressed.

In 2011, 2012, 2014, 2017, 2019, 2021 and 2022 when the average date for the first successful egg laid in the nests

⁴² Barn Owl Trust (2023). Current UK Barn Owl population. <https://www.barnowltrust.org.uk/barn-owl-facts/current-uk-barn-owl-population/#:~:text=2022%20Barn%20Owl%20numbers&text=Between%20them%2C%20an%20impressive%205%2C404,Barn%20Owl%20nest%20sites%20reported>. Date accessed 10.10.23.

⁴³ Toms, M. 2014. Owls. The New Naturalist Library, Volume 125. HarperCollins, London. 419pp.

monitored across the five regions was between the 10th and 23rd April, the number of birds fledged each year ranged from 120 to 336. In contrast, for 2013, 2015, 2016 and 2018, the average date for the first egg laid in the nests monitored across the five regions was between the 30th April and the 18th May, and the number of birds fledged each year ranged from 83 to 154 (Table 8). The ability of the birds to lay eggs early in the season would appear to be an important factor influencing the total number of fledged birds produced each year.

Table 8. Barn owl nest productivity between 2011 and 2022; indicating total numbers of nests monitored, average date of first egg laid, numbers of nests that produced fledged birds, numbers of fledged birds produced, and mean productivity per successful nest.

	2011	2012	2013	2014	2015	2016
Total number of nests monitored	98	101	99	121	130	129
Average date of first egg (number of nests)	23/04/11 (46)	10/04/12 (53)	18/05/13 (22)	14/04/14 (64)	12/05/15 (43)	02/05/16 (59)
Nests that produced fledgling birds	56	63	23	78	41	61
Total number of birds fledged	186	153	83	336	103	154
Nest surveyed that were productive	57.1%	62.4%	23.2%	64.5%	31.5%	47.2%
Mean productivity per successful nest	3.32	2.43	3.61	4.31	2.51	2.52
Total number of Barn Owl chicks ringed*	8,536	7,329	3051	14,515	4,970	7,657
Total number of Barn Owl Nest Record Reports*	1,975	2,330	894	2,915	1,792	2,331
	2017	2018	2019	2021	2022	
Total number of nests monitored	124	121	120	110	114	
Average date of first egg (number of nests)	15/04/17 (57)	30/04/18 (40)	20/04/19 (54)	23/04/21 (36)	15/04/22 (52)	
Nests that produced fledgling birds	61	45	58	47	53	
Total number of birds fledged	153	122	154	134	120	
Nest surveyed that were productive	49.2%	37.2%	48.3%	42.7%	46.5%	
Mean productivity per successful nest	2.51	2.71	2.66	2.85	2.85	
Total number of Barn Owl chicks ringed*	11,039	6,698	10,561	7,805	-	
Total number of Barn Owl Nest Record Reports*	3,053	2,448	3,345	3,040	-	

The marked fluctuations in barn owl breeding productivity year on year are widely thought to be primarily the result of annual changes in small mammal abundance and extreme weather events at critical times during the barn owl's annual cycle.⁴⁴

The samples of barn owls used in the BOMS and the CEH liver residue study are necessarily selected using different sampling schemes.⁴⁵ In the first, barn owl nesting sites are chosen as being typical of nest locations in the UK, and where nesting attempts have been recorded in the recent past. All nests studied are within five defined Regions, as this disposition permits intensive field study during a relatively short time window in the annual barn owl breeding cycle. In the second, carcasses are discovered by members of the public and submitted to the Predatory Birds Monitoring Scheme (see <https://pbms.ceh.ac.uk/>). A sub-sample of livers is taken for residue extraction and analysis from among those submitted, having consideration for the condition of the carcass, the dates of submission of specimens, the estimated ages of submitted birds and the locations where they were found. Furthermore, no direct assessment of residue levels can be made of BOMS birds because they are inevitably alive when handled and ringed by the field researchers. However, it is the opinion of those who conduct and report the BOMS that, notwithstanding differences in sampling regime, the two samples are generally representative of the UK barn owl population as a whole and,

⁴⁴ Toms, M., (2014). Owls. The New Naturalist Library No 125. Harper Collins. ISBN 978-0-00-742555-6.

⁴⁵ Ozaki, S., Chaplow, J.S., Dodd, B.A., Pereira, M.G., Potter, E.D., Sleep, D., Toon, B., and Walker, L.A. (2022) Second generation anticoagulant rodenticide residues in barn owls 2021. UKCEH contract report to the Campaign for Responsible Rodenticide Use (CRRU) UK, pp. 25 https://pbms.ceh.ac.uk/sites/default/files/Stewardship-2021-owls_FINAL.pdf.

therefore, the BOMS provides an assessment of the breeding performance of British barn owls in the presence of the rodenticide residues typically found in the UKCEH study.

No information is directly provided by this study on any putative relationship between barn owl nest productivity and exposure of barn owls to anticoagulant rodenticides. The number of breeding pairs of barn owl in any given year is determined by factors which include the level of overwintering mortality of breeding adults, the survival of first year birds and the successful recruitment of these birds into the breeding population. Data presented from various reported studies in Britain between 1987 and 2021 indicate that the productivity of barn owls has not changed markedly over this 35-year period. Breeding success is influenced by prey availability and survival, which in turn is shaped by numerous other factors such as climate, habitat quality and population density (Toms, 2014). There is good evidence that barn owls are widely exposed to SGARs, but the impact of this exposure on the productivity of the UK population, if any, is difficult to quantify directly.

Future BOMS Studies

CRRU has taken the decision that the 2022 Barn Owl Monitoring Scheme survey will be the final BOMS. The BOMS has now provided seven years of data that have provided us with a detailed benchmark of fluctuations in the nesting and fledging behaviour of Barn Owls in the survey areas. It is clear from the data that successful nesting numbers go up and down depending on a number of factors, including weather characteristics and prey availability. As with previous BOMS studies, the eggs and barn owls (both young and adult) studied during 2022, none was found to have any unusual growth characteristics or physical deformities (such as abnormal feather development or pattern of moult), that might suggest any sub-lethal effects of exposure to anticoagulant rodenticides.

Should further BOMS studies be deemed necessary in the future, CRRU will consider further surveys.

3.6.5 Resistance in UK Rats and Mice (University of Reading)⁴⁶

General

An annual report of the status of resistance monitoring in UK is a requirement for delivery of the stewardship regime set by the GOG (Annex 1). The dissemination of information on the geographical distribution of resistance, its frequency in Norway rats and house mice and appropriate resistance management strategies supports a '*competent workforce*'.

Summary

A total of 122 rodent tissue samples were received for DNA sequencing at the laboratories of the Animal and Plant Health Agency (APHA) during the period August 2022 to July 2023. Among these, 22 samples did not yield DNA material that could be sequenced. Of the remaining 100 samples, 95 were of Norway rat tissue and 5 were house mouse.

Among the 95 Norway rats, 25 were wild type (i.e. fully susceptible) and 70 carried one or more of the well-known resistant mutations (i.e. Y139C, Y139S, Y139F, L128Q, L120Q). Thus, 73.7% of Norway rats were anticoagulant resistant. This frequency was similar to that found in previous studies of Norway rat resistance in the UK and is similar to the value for the entire 2009 to 2023 sample.

The SNP that was found most frequently in the sample was Y139C, with 27 individuals carrying this mutation. Among these, 16 were heterozygous and 7 homozygous, with a further four hybrid resistant. The large number of Y139C-resistant rats continues a trend found in the previous sampling period (2021-22), in which the same mutation also predominated among Norway rats. The frequency of heterozygosity suggests that Y139C rats may be spreading into areas in which a degree of susceptibility remains. The geographical distribution of the Y139C mutation in the UK has no central focus, unlike the other resistance mutations, and is found virtually anywhere in England south of a line joining the estuaries of the Mersey and Tees.

The numbers of Norway rats carrying the four other mutations were as follows: Y139S, one; Y139F, nine; L120Q, 17; L128Q, 20. Among these, the majority was found in the expected 'heartlands' of their respective foci, but one heterozygous L120Q animal was found as an extreme outlier in northern Derbyshire, the first record of any kind for the county, and one heterozygous Y139F individual was found in South Lancashire, near previous outlying records of this mutation.

⁴⁶ Buckle, A., Cawthraw, S., Neumann, J. and Prescott, C. (2023) Anticoagulant Resistance in Rats and Mice in the UK – new data for August 2022 to July 2023. The University of Reading, Whiteknights, Reading. Report No. VPU/23/002. 34 pp.

Hybrid resistance was again found in the sample, with two rats from West Sussex carrying the L120Q and Y139C mutations and two from Lanarkshire carrying the L128Q and Y139C mutations.

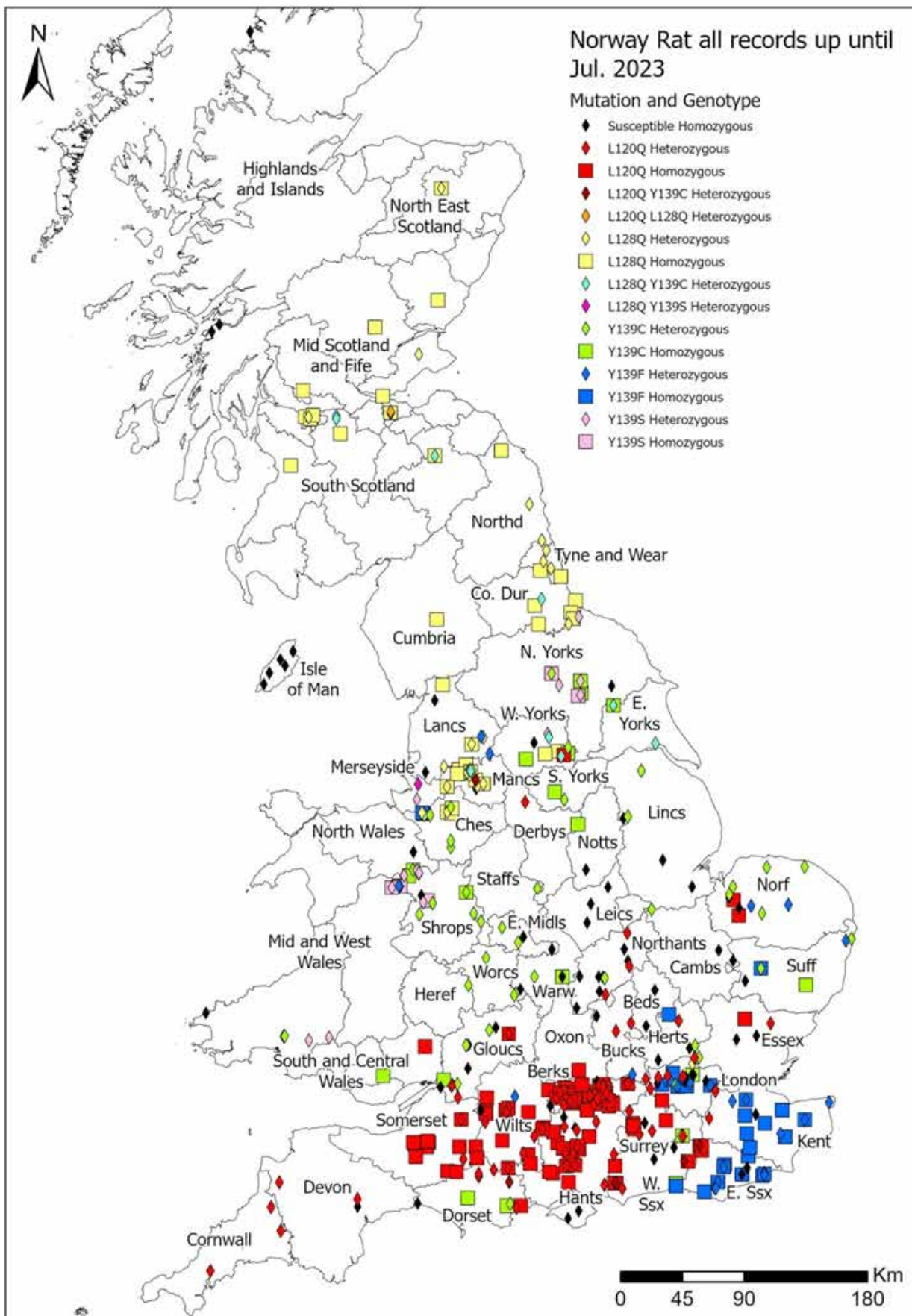
Only five house mouse samples were obtained but all were found to be anticoagulant resistant. Three were homozygous for the L128S mutation, one homozygous for Y139C and one animal carried both mutations. It is the position of the Rodenticide Resistance Action Group (RRAG) that all UK house mouse infestations should be assumed to carry resistance and treatments should be conducted against them accordingly.⁴⁷

During the period 2009 and 2023, in which DNA resistance sequencing has been conducted, first at the University of Reading and now at APHA, a total of 584 Norway rat and 134 house mouse tissue samples have been examined, with DNA extracted and sequenced. Among these samples it was found that 77.3% of rats and 94.8% of mice carried one or more single nucleotide polymorphisms which are known significantly to affect the efficacy of anticoagulant rodenticides. These results may not reflect the true frequency of resistance in the two species, however, because samples are generally sent by those experiencing difficulties in obtaining control of rodent infestations with anticoagulants.

Large numbers of samples permit the geographical distribution of resistance in Norway rats in the UK to be determined (Figure 13). L128Q is largely restricted to Scotland and the north of England. Y139S is found mainly in Wales, on the Anglo-Welsh border and in an expanding focus in North Yorkshire. L120Q is very widespread across central southern England, but with increasing frequency in East Anglia and the far south-west. Y139F is found mainly in Kent, East Sussex and Greater London, but now with an established focus in the north-west.

⁴⁷ Buckle, A., Charlton, J., Meyer, A. and Prescott, C. (2021a). RRAG House Mouse Resistance Guideline. Rodenticide Resistance Action Group, UK. 9 pp.

Figure 13. Consolidated map showing all Norway rats found to carry an anticoagulant resistance SNP, both in homozygous and heterozygous form, for any of the five main resistance mutations found in that species, and for combinations of them (i.e. hybrid resistance). Data on susceptible individuals is also included. Records for 2009–2023.



Particularly with regard to the three most severe Norway rat mutations, namely L120Q, Y139F and Y139C, outlying resistant foci occur with increasing frequency almost anywhere in England, such as the one found in the latest sample in northern Derbyshire. These are disseminated either by natural rodent movement or by human transportation systems. Although, there remains evidence of areas of remnant susceptibility in some parts of the Midlands, Cumbria and on the north-east coast, these areas are now increasingly infiltrated by resistance.

The maps of Norway rat (Fig. 13) and house mouse resistance (Fig. 14) foci presented in the report permit reasonably fine-grained advice to be given to rodenticide users about which interventions to use and which to avoid, following recommendations of the RRAG.^{48,49} Implementation of that advice would: 1) facilitate faster and more effective rodent control for the better protection of human and animal health, 2) prevent the increasing severity and spread of anticoagulant resistance, and 3) *(and of great importance to the objectives of the Campaign for Responsible Rodenticide Use (CRRU) UK and rodenticide stewardship,)* reduce unnecessary and ineffective emissions of anticoagulants into wildlife and the wider environment.

This information is increasingly understood by those who use professional rodenticides, with the apparent consequence that quantities used of the most commonly resisted second-generation anticoagulants, bromadiolone and difenacoum, may be decreasing. However, the reverse of that coin is the more potent resistance-breaking active substances, brodifacoum, difethialone and flocoumafen, and in particular the former, are increasingly used against resistant rodents, possibly resulting in a reduction in residues of bromadiolone and difenacoum in barn owls and an increase in residues of brodifacoum.⁵⁰

The data presented in the University of Reading report are supplied to the Rodenticide Resistance Action Committee of CropLife International in Brussels, which publishes on-line maps providing immediate access to the information via an informative interactive on-line platform that can now also be downloaded onto mobile devices (<https://rrac.info/index.html>).

⁴⁸ Buckle, A., Charlton, J., Meyer, A. and Prescott, C. (2021a). RRAG House Mouse Resistance Guideline. Rodenticide Resistance Action Group, UK. 9 pp.

⁴⁹ Buckle, A., Charlton, J., Meyer, A. and Prescott, C. (2021b). Anticoagulant resistance in the Norway rat and guidelines for the management of resistant rat infestations in the UK. Rodenticide Resistance Action Group, UK. Revised January 2021. 11 pp.

⁵⁰ Ozaki, S., Chaplow, J.S., Dodd, B.A., Pereira, M.G., Potter, E.D., Sleep, D., Toon, B., and Walker, L.A. (2022) Second generation anticoagulant rodenticide residues in barn owls 2021. UKCEH contract report to the Campaign for Responsible Rodenticide Use (CRRU) UK, pp. 25 https://pbms.ceh.ac.uk/sites/default/files/Stewardship-2021-owls_FINAL.pdf.

3.7 Communications Work Group (Leader, Phil Christopher, Red Rock Services)

3.7.1 Headline news

Markedly higher awareness of CRRU and key rodenticide stewardship principles has been found among farmers and gamekeeper by the recently completed Knowledge, Attitudes and Practice survey 2023 (report available here: thinkwildlife.org/download/add URL).

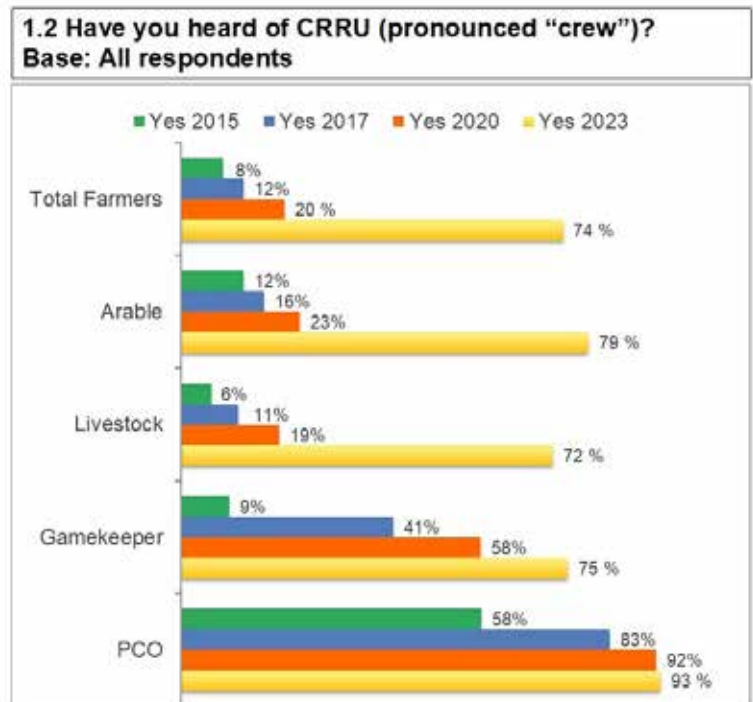
In order to build on this towards the 90%+ benchmark already evident in the pest control operatives (PCO) sector of rodenticide users, this clearly begs the question, how has this come about?

Our best hypothesis is the one substantive addition to the communications programme since the previous 2020 KAP survey. This is the Think Wildlife newsletter, first published in quarter one 2022, with content based closely on the CRRU Code of Best Practice.

Just over 50,000 printed copies were distributed with the Farmers Guardian (FG) weekly newspaper, inserted within its poly-wrap for maximum delivery outreach. FG covers all livestock and cropping farm enterprises and its readership data confirms at least two readers for every copy.

To cover gamekeeping and professional pest control as well as farming, it was also supplied as a downloadable PDF to all of CRRU's very supportive stakeholder organisations for making available to their own members. This was also the case in professional pest control, positioned carefully in view of that sector's existing high ownership of rodenticide stewardship as information for recent new recruits.

The full newsletter is available here: thinkwildlife.org/download/crru-newsletter/?wpdmdl=18197&refresh=652e1193e479b1697517971



Collectively, UK farmers, gamekeepers, pest controllers and rodenticide suppliers share a troublesome Achilles heel that is not going to heal on its own. The problem is leakage of rodenticide poisons into wildlife. Routine monitoring of barn owls by the UK Rodenticide Stewardship Regime from 2016 to 2021 finds "stubbornly static" rodenticide presence in nearly 90% of barn owls.

Particularly troubling is that two-thirds of the barn owls sampled each year are selected intentionally as juveniles, defined as less than two years of age. This means these birds acquired rodenticide residues with stewardship rules in place. By the way, almost all barn owls analysed have died by collision with vehicles or natural causes rather than a fatal level of rodenticide.

Although not monitored so routinely, many other predators, scavenger and prey species are also known to carry rodenticide contamination. These include red kites, buzzards and kestrels; small mammals such as voles and field mice; together, it is thought, with slugs, snails and the animals

No.1 2022 Future of rodenticide use depends on ALL farmers, gamekeepers and pest controllers

available to download from thinkwildlife.org/download/crru-uk-code-of-best-practice-2021/?wpdmdl=18095. Clearly, that is where to go for more detail than space allows here.

Meanwhile, in bite-size chunks, here is what's covered in this newsletter:

- 1) First things first – a clear plan for control and staying legal.
- 2) Risk hierarchy – simplest and lowest risk first.
- 3) Non-poison – much to gain, few disadvantages.
- 4) Rodenticides – which to use for best and cost-effective results?
- 5) Bad landlord – repel or exclude unwanted visitors.
- 6) Checklist for max impact, max cost-effectiveness, no unintended consequences.

PART 1: FIRST THINGS FIRST – A CLEAR PLAN FOR CONTROL AND STAYING LEGAL

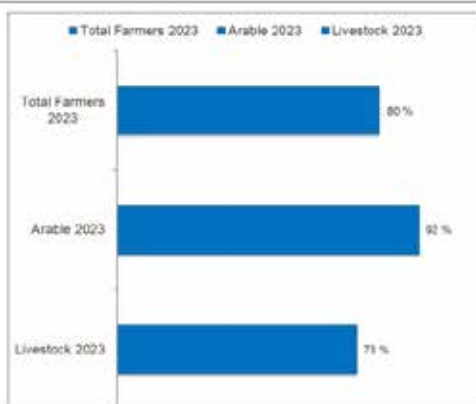


Even if you know there's a rodent problem to deal

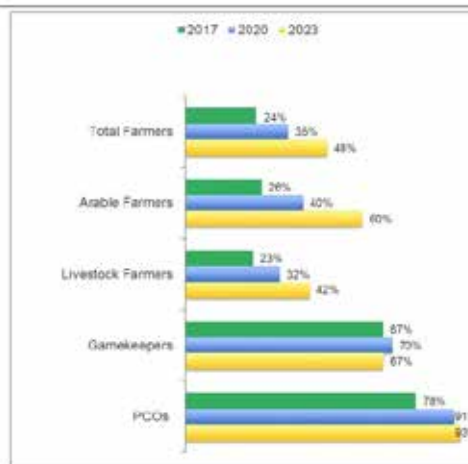
Top half of front page. Format: A4, 4-pages.

In addition to this widespread increased awareness of CRRU, the KAP survey graphics that follow on the next page show significant gains in recognition for the CRRU Code of Best Practice, 'risk hierarchy' and stewardship-compliant action, for example.

1.3 (Ask if heard of CRRU at 1.2) Have you heard of the 'CRRU CODE OF BEST PRACTICE' which is a comprehensive 24-page guide to rodent control?

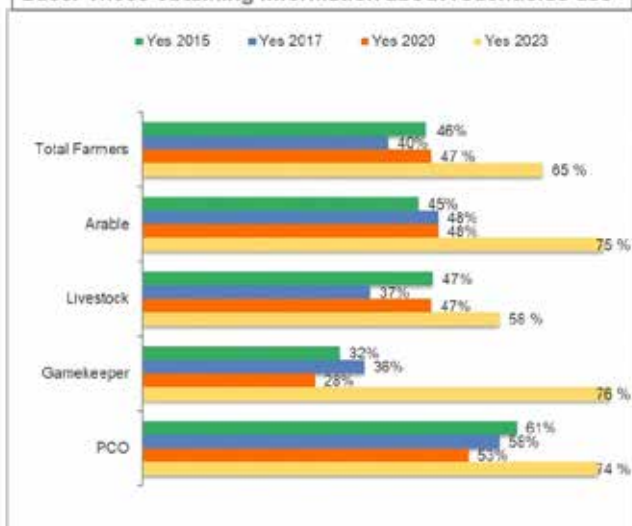


1.6 Have you heard of the term: 'Risk Hierarchy' when applied to rodent control?

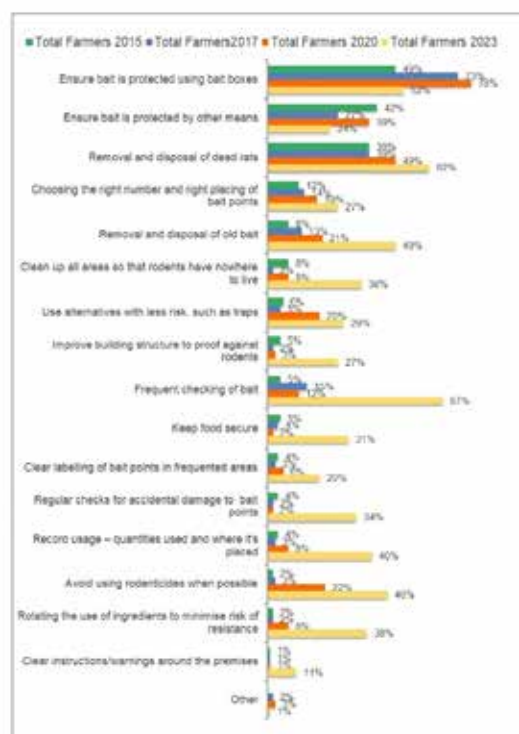


3.3 IF YES (Obtained advice): Can you recall if you made some changes in your approach after you received this information Y/N?

Base: Those obtaining information about rodenticide use



6.1 What steps and actions do you take to ensure that you minimise risks whilst ensuring that you do gain effective control?
Base: All Farmer respondents



For the record, and particularly for GOG members who have joined since the previous report (2022), here is a recap of CRRU's established communications strategy.

3.7.2 Purpose

CRRU's communications function promotes all aspects of the regime orientated to persuading farmers, gamekeepers and pest controllers to follow best practice guidelines for stewardship-labelled rodenticides. As defined in original 2016 regime documentation, this is pursued by 'Dissemination of information from CRRU to external agencies about CRRU's co-ordination of the Stewardship Regime'.

Accordingly, CRRU provides a regular supply of reader-centric editorial content for publication by organisations with memberships of, and/or outreach to, rodenticide users in the three user sectors.

3.7.3 Content

In practice, this is enacted via CRRU-originated plain English narrative, distributed through multiple printed and online/digital information channels. These include independent publishers in farming, gamekeeping and professional pest control sectors; supply chain businesses and stakeholders; and relevant membership organisations (eg, the four national farming unions, National Gamekeepers’ Organisation, Scottish Gamekeepers’ Association, Game and Wildlife Conservation Trust, Agriculture & Horticulture Development Board, British Pest Control Association, National Pest Technicians’ Association) and CRRU Task Force members.

Wherever possible, we do produce differentiated versions , each with orientation to one of our three rodenticide user sectors. The following themes are included wherever relevant in communication materials:

- Users and suppliers of stewardship-labelled rodenticides have personal and professional responsibility for consistent and constant best practice, as defined in regime documentation.
- Assessment of the stewardship regime’s impact by GOG will include levels of rodenticide residues found in sentinel non-target species.
- If this assessment finds insufficient beneficial impact, future changes in rodenticide availability and application may be introduced.

3.7.4 Outputs

Clearly, the behavioural changes being sought (and achieved as evident in responses to the KAP survey’s question 6.1 above) by CRRU come about due to multi-factorial influences, including training and CPD, product labelling and point-of-sale guidance, as well as published information generated by the CRRU communications programme.

Each annual report since 2016 includes a list of that year’s distributed items. Working back over the past year, here are the topics covered and timings:

Timing	Topic	Summary
Oct '23	Getting ahead of the game for imminent rodenticide change-of use rules (feature article for NGO magazine)	Controlling rats on game shoots in open areas away from buildings is possible without using any anticoagulant rodenticides, according to one of NGO’s four national vice chairmen David Wiggins, head keeper at.....
Sep '23	Helping farmers/gamekeepers* adapt for 2024 rodenticide changes *Two sector-specific versions	To help farmers/gamekeepers prepare for next year’s rodenticide authorisation changes, which effectively will rule out using any second-generation anticoagulant (SGAR) in open areas away from buildings, the Campaign for Responsible Rodenticide Use is appealing for practical questions that need addressing.
Aug '23	Next year’s SGAR changes: Questions wanted from the sharp end please (separate versions for PEST and Pest Control News)	Changes to rodenticide authorisations, effectively ruling out all second-generation anticoagulants from being applied away from buildings, will surely have consequences both known and as yet unknown for pest controllers.

Jun '23	Ending use of second generation anticoagulants bromadiolone and difenacoum away from buildings	Legal authorisation is being withdrawn for open area and waste dump use for the only two second generation anticoagulant rodenticides (SGARs) currently allowed to be used that way, bromadiolone and difenacoum. This will take effect in July next year.
Apr '23	Rodenticides alarm bells for all who use professional rodenticides – farmers, gamekeepers, pest control technicians alike	The latest surveillance in barn owls together with recent intelligence from the government-run Wildlife Incident Investigation Scheme ring alarm bells for professional-grade rodenticide users, according to the Campaign for Responsible Rodenticide Use.
Mar '23	Appreciation for pest control's John Hope	It is with great sadness that we learned of the death of pest control stalwart John Hope, states CRRU chairman Alan Buckle.
Feb '23	Open letter to gamekeepers: Support from the Think Wildlife programme	Recent high-profile incidents of raptor poisonings have brought the gamekeeping sector's use of rodenticides under increased scrutiny. Clearly, these incidents damage gamekeeping's good name for managing and protecting the countryside, and jeopardise the continued use of rodenticides by gamekeepers.
Dec '22	Increasingly widespread resistance in rats and mice to anticoagulant rodenticides: CRRU action plan	New surveillance has found genes for resistance to anticoagulant rodenticides in 78% of rats and 95% of house mice. These include "small but troubling numbers" with two or more such genes, labelled 'hybrid resistance'. In both rats and mice, the geographical distribution of both single-gene and hybrid-resistance continues to spread.
Oct '22	Marked increase in illegal rodenticide use threatens future availability	A sudden and marked increase in the numbers of wildlife incidents that involve the powerful rodenticide brodifacoum has been identified by the government-run Wildlife Incident Investigation Scheme (WIIS).
Oct '22	Updated options for rodenticide 'proof-of-competence' training	The choice of training for farmers and trainee pest controllers to become recognised competent users and authorised purchasers of professional grade rodenticides has been updated in conjunction with the Campaign for Responsible Rodenticide Use UK (CRRU).
Aug '22	Could delinquent minority restrict rodent control options for responsible majority?	Another year of "stubbornly static", and in some cases rising, rodenticide residues in barn owls has prompted an uncomfortable question about the use of poison baits: could irresponsible practices by a delinquent minority restrict future pest control options for the responsible majority?

3.7.5 New for 2024

A new edition of the Think Wildlife newsletter is currently in production for distribution in quarter one, 2024. This covers the practical options for effective zero-SGAR rodent control in open areas away from buildings arising from next year's authorisation changes that will make all five SGARs ineligible for such use.

A summer 2024 edition is also planned to explain far-reaching changes to rodenticide purchaser and user certification being introduced under CRRU's **'strengthening the regime'** programme. These changes are not yet in the public domain, so not suitable for disclosure here.

Updates and information / Buying and using professional rodenticides

Buying and using professional rodenticides

20 September 2023

Science and technology

Text only view



Unsure of the best way to access professional rodenticides? Read our guide to find out which assurance schemes you may need to participate in and where and how rodenticides can be used.

Use these quick links to jump to information on:

- [Proof of competence](#)
- [Purchasing rodenticide](#)
- [CRRU approved farm assurance schemes](#)
- [CRRU UK approved training courses](#)
- [CPD and refreshing your training](#)
- [Chemical control options](#)

Proof of competence

The UK Rodenticide Stewardship Scheme run by the [CRRU \(Campaign for Responsible Rodenticide Use\)](#) was set up in 2015 to assure the HSE (Health and Safety Executive), the UK government body responsible for the regulation of rodenticides, that rodenticides can continue to be used safely.



Controlling drift of pre-emergence herbicides

about 16 hours ago



Plant protection products – where we stand on glyphosate

5 days ago



No agreement on EU glyphosate renewal

7 days ago



PPPs registration – what you need to know

7 days ago



Sep 2023: nfuonline.com/updates-and-information/buying-and-using-professional-rodenticides/

🏠 / [Updates and information](#) / Upcoming changes to rodent control – what you need to know

Upcoming changes to rodent control – what you need to know

🕒 20 September 2023

📄 Text only view

★ Science and technology



Photograph: KBIimages / Alamy Stock Photo

Changes to the way rat infestations can be controlled in open areas away from buildings come in to force next year. Read our explainer on what you need to know.

Item in full here: [nfuonline.com/updates-and-information/
upcoming-changes-to-rodent-control-what-you-need-to-know/](https://nfuonline.com/updates-and-information/upcoming-changes-to-rodent-control-what-you-need-to-know/)

🏠 / [Updates and information](#) / Withdrawal of authorisation for rodenticides used in open spaces

Withdrawal of authorisation for rodenticides used in open spaces

🕒 20 June 2023

📄 Text only view

🌿 Environment and climate

🔬 Science and technology

🏡 Farm business



Photograph: Stephen Barnes/Environmental issues / Alamy

Legal authorisation for the use of certain rodenticides for open areas and waste dumps is being withdrawn. This change will take effect in July 2024 and has been instigated by the Campaign for Responsible Rodenticide Use UK, supported by HSE.

This was a voluntary decision made by the rodenticide industry to withdraw two minor uses for a restricted number of products containing the two specific active substances. This has been done to help industry meet the environmental targets placed on it by the regulator.

This change will withdraw the authorisation for use of bromadiolone and difenacoum, the only two SGARs (second generation anticoagulant rodenticides) that are currently permitted for use in open areas. It was instigated following a unanimous decision from all of the Directors of CRRU with the aim to help to meet rodenticide stewardship environmental targets.

There is a static incidence of rodenticide residues found in around 80% of barn owls, which are the HSE-nominated species for surveillance. This change will hope to address this figure by creating a simple, clear message regarding the use of SGARs; they cannot be applied away from buildings.

Sales of products due to end in July

Sales of products containing bromadiolone and difenacoum for use in open areas and waste disposal areas will end on the 4 July 2024.

Products will be permitted for use up until 31 December 2024, at which point it will become illegal to use SGARs to treat a rodent infestation that is not associated with a building.

Product label instructions will be changed according to the new regulations by manufacturers.

More information on using professional rodenticides on farm is available at: [What do I need to buy professional rodenticides?](#)

We also have a quick guide to on label instructions for rodenticide use: [Illegal rodenticide use could affect future availability of products](#)

Rats! SGARs to be banned for outdoor use

Legal authorisation is being withdrawn for open area and waste dump use for the only two second generation anticoagulant rodenticides (SGARs) currently allowed to be used that way, bromadiolone and difenacoum. This will take effect in July 2024.

The change was instigated voluntarily by the Campaign for Responsible Rodenticide Use UK (CRRU), with support to make the necessary amendments from UK biocides regulator, the Health & Safety Executive (HSE). CRRU Chairman Dr Alan Buckle said that the change was a unanimous decision by all CRRU Directors to help meet rodenticide stewardship's environmental targets.

"A primary factor leading to this is the stubbornly static incidence of rodenticide residues in around 80% of barn owls, the HSE-nominated sentinel species for annual surveillance," he explained. "This change will enable a single clear message about

SGAR use: None of these products can be applied away from buildings."

Sales of products containing bromadiolone and difenacoum for use in open areas and at waste dumps will cease on 4 July 2024. These products purchased on or before that date will be authorised for use in open areas and waste dumps until 31 December 2024. After that, it will be illegal to use any SGAR product to treat a rodent infestation not associated with a building.

Manufacturers will change product label instructions accordingly and will continue to promote the application of integrated pest management practices among all rodenticide users. The CRRU Code of Best Practice offers a range of effective methods for rodent management away from buildings, including elimination of harbourage, food and water; lethal non-anticoagulant baits; and trapping, shooting and dogs.

CRRU policy

At the beginning of the UK Rodenticide Stewardship Regime the CRRU UK Board of Directors decided that manufacturers would not apply for authorisations for products containing the active substances brodifacoum, difethialone and flocoumafen to be used in 'open areas' and at 'waste dumps'. This was because it considered that these high-potency anticoagulants were most likely to result in risk to wildlife when used in these scenarios. The CRRU board has now unanimously decided to extend this policy to products containing bromadiolone and difenacoum, thereby applying a consistent approach to all SGARs.

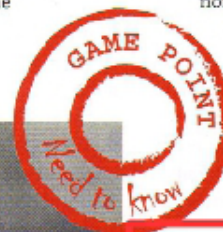
There are two reasons for this. The first is that the previously excluded SGARs bromadiolone and difenacoum contribute significantly to the total burden of SGAR residues found in UK wildlife, and at the initiation of the regime it was a

critical requirement set upon CRRU UK by the regulatory agency, HSE, to reduce all SGAR residues in wildlife. The second reason is that there has been a recent and sudden increase in exposure of wildlife to products containing brodifacoum. Such an apparently recent and widespread increase can only be explained by use of this substance, contrary to label instructions, in the open countryside.

The new CRRU policy gives a clear message to all UK SGAR users: none of them can be used anywhere away from buildings and such use is illegal and may be subject to prosecution.

CRRU took this decision after carefully considering the availability of alternatives and finding that options exist for those needing to control rodents in open areas and at waste dumps. These include chemical and non-chemical methods, as well as lethal and non-lethal techniques, so that unavailability of SGARs for use away from buildings need not be detrimental either to human and animal health or the rural economy.

Outdoor use of the only two remaining anticoagulant rodenticides is to be banned next year.



Effective rat control
Gamekeepers have access to a number of effective rat control methods in the absence of SGARs – indeed, many gamekeepers are avoiding the use of poison altogether for fear of the consequences to non-target wildlife.

Feeders designed to deter rats are available through specialist wildlife management suppliers, as are suitable traps and excluders. There are also options available which make use of sophisticated remote monitoring to cut down on operator time, increase efficiency and reduce overall costs. ●

Image: iStock.com/Nigel Harris



Search... Q

SUBSCRIBE PODCAST

PIGWORLD
THE VOICE OF THE BRITISH PIG INDUSTRY

NEWS FEATURES COMMENT NUMBERS PIG PRICES MAGAZINES SUPPLIES

FLEX CircoPRRS The first licensed-to-mix PCV2 and PRRS vaccine combin

Jun 2023

Authorisation withdrawn for use of two rodenticides way from buildings

By ALISTAIR DRIVER June 15, 2023 3 News Read

LinkedIn Twitter Facebook



Legal authorisation is being withdrawn for open area and waste dump use for the only two second generation anticoagulant rodenticides (SGARs) currently allowed to be used that way, bromadiolone and difenacoum.

This change, instigated voluntarily by the Campaign for Responsible Rodenticide Use UK, with support to make the necessary amendments from UK biocides regulator, the Health and Safety Executive (HSE), will take effect in July next year.

CRRU Chairman Dr Alan Buckle said the move was a unanimous decision by all CRRU Directors to help meet rodenticide stewardship's environmental targets. "A primary factor leading to this is the stubbornly static incidence of rodenticide residues in around 80% of barn owls, the HSE-nominated sentinel species for annual surveillance," he explained. "This change will enable a

BarnReport PRO
Field Management • Cattle • Horses • New Feed

NEWS FEATURES COMMENT NUMBERS PIG PRICES MAGAZINES SUPPLIES JOB

Rest comfortably knowing you are protected by CircoMax

Legal authorisation is being withdrawn for open area and waste dump use for the only two second generation anticoagulant rodenticides (SGARs) currently allowed to be used that way, bromadiolone and difenacoum.

This change, instigated voluntarily by the Campaign for Responsible Rodenticide Use UK, with support to make the necessary amendments from UK biocides regulator, the Health and Safety Executive (HSE), will take effect in July next year.

CRRU Chairman Dr Alan Buckle said the move was a unanimous decision by all CRRU Directors to help meet rodenticide stewardship's environmental targets. "A primary factor leading to this is the stubbornly static incidence of rodenticide residues in around 80% of barn owls, the HSE-nominated sentinel species for annual surveillance," he explained. "This change will enable a single clear message about SGAR use: None of these products can be applied away from buildings."

Sales of products containing bromadiolone and difenacoum for use in open areas and at waste dumps will therefore cease on July 4, 2024. Products purchased on or before that date will be authorised for use in open areas and waste dumps until December 31, 2024. After that, it will be illegal to use any SGAR product to treat a rodent infestation not associated with a building.

Manufacturers will change product label instructions accordingly and will continue to promote the application of integrated pest management practices among all rodenticide users. The CRRU Code of Best Practice offers a range of effective methods for rodent management away from buildings, including elimination of harbourage, food and water; lethal non-anticoagulant baits; and trapping, shooting and dogs.

Risk to wildlife

In a statement, CRRU's UK Board of Directors said, at the beginning of the UK Rodenticide Stewardship Regime they decided that manufacturers would not put forward applications for products containing the active substances bromadiolone, difenacoum and floccouafen to be used in 'open areas' and 'at waste dumps'.

This was because it considered that these high-potency anticoagulants were most likely to result in risk to wildlife when used in these scenarios.

"The CRRU board has now unanimously decided to extend this policy to products containing bromadiolone and difenacoum, thereby applying a consistent approach to all second-generation anticoagulant rodenticides (SGARs)," they say said.

"There are two reasons for this. The first is that the previously excluded SGARs bromadiolone and difenacoum contribute significantly to the total burden of SGAR residues found in UK wildlife, and at the initiation of the regime it was a critical requirement set upon CRRU UK by the regulatory agency, the Health and Safety Executive (HSE), to reduce all SGAR residues in wildlife.

"The second reason is that there has been a recent and sudden increase in exposure of wildlife to products containing bromadiolone. It is considered that such an apparently recent and widespread increase can only be explained by use of this substance, contrary to label instructions, in the open countryside.

"The new CRRU policy will permit a clear message to be put out to all UK SGAR users: none of them can be used anywhere away from buildings and such use is illegal and may be subject to prosecution."

The board said it took this decision after carefully considering the availability of alternatives and finding that options exist for those needing to control rodents in open areas and at waste dumps.

SHARE: LinkedIn Facebook Twitter Email

PREVIOUS ARTICLE: May Parlwatch survey shows mixed results in terms of...
NEXT ARTICLE: OBE awarded to former NPA chief executive Zoe...

THINK WILDLIFE
Campaign for Responsible Rodenticide Use

PCN
PEST CONTROL NEWS

Next year's SGAR changes: Questions wanted from the shag and phase

Next year's changes to rodenticide authorisations, effectively ruling out all second-generation anticoagulants from being applied away from buildings, will surely have consequences both known and as yet unknown for pest controllers.

To animals at least some of them, the Campaign for Responsible Rodenticide Use is appealing for practical questions that need addressing. CRRU chairman Dr Alan Buckle acknowledges that pest technicians at the sharp end are best placed to modify their use of various integrated control measures for urban and agricultural, environmentally responsible and wildlife-aware vector control.

"Of course, dexterity may not be particularly straightforward and will certainly demand sound knowledge of what next year's changes to SGAR authorisations involve and why they are being made," he says.

To help pest control bosses and technicians alike understand these things as fully as possible, PCN is inviting readers to submit questions that will be answered in the next issue. Please email them to questions@pcn.thinkwildlife.org. Dr Buckle emphasises that there is no such thing as a dull question.

"Giving credit where it's due, the British Pest Control Association has recently conducted such an exercise among its members and we want to extend this as far as possible among the pest control sector, farmers and gamekeepers," he explains.

In addition to the detail of next year's changes, it is also important to understand the context. An HSE-led panel is the official body to which CRRU reports for its management of the UK Rodenticide Stewardship Regime.

An uncomfortable truth is that, even years since inception, the regime's environmental targets have not been met," Dr Buckle adds. "Responsible readers will be all too aware that many wildlife species, especially avian and mammalian predators and scavengers, are widely exposed to and contaminated by SGARs.

"The widespread nature of this exposure is a grave concern and what the stewardship regime is required to reduce. The static, somewhat sentinel species, of course, whose exposure to SGARs is indicative of several others with similar ecology, is the barn owl.

"HSE has said that, unless the stewardship regime's environmental targets are met, there will be a review of who can use SGARs, how they are used and where they can be applied. Clearly, we have been warned."

British Dairying, Dec 2022

NEWS

Rodenticide warning



There has been a sudden and marked increase in wildlife incidences involving the rodenticide brodifacoum

The Wildlife Incident Investigation Scheme (WIS) has identified a sudden and marked increase in the number of wildlife incidents involving the powerful rodenticide brodifacoum.

It claims some incidents involve either negligent misuse or intentional abuse to harm wildlife, which if continued, could lead to more restrictive regulation.

"This could mean some user groups no longer have access to these products, or that some use scenarios are no longer allowed, possibly both," says Dr Alan Buckle, Chairman of the Campaign for Responsible Rodenticide Use UK.

"The recent high-profile death of a rare bird of prey was the result of one such incident and WIS has evidence of many more involving other raptor species." On all rodenticide product labels, manufacturers have to include specific instructions, and failing to follow these, whether deliberate or unintended, is illegal and risks users being prosecuted. The key is always to read the label carefully.

Important labelling

Dr Buckle spells out what some of the instructions mean:

- 'Outdoors - around buildings' allows bait to be deployed only to treat an infestation of a building. The 'outdoors' part means that baits can be put down outside the building to control an infestation within, provided all label instructions about protecting bait placements are followed.
- 'Open areas' covers treating a rat infestation (not mice) which is not demonstrably associated with a building. Among anticoagulant products, only those containing difenacoum and bromadiolone are authorised for use in open areas. Products containing brodifacoum, difethialone and floccouafen must never be used in 'open areas' away from buildings. This is to protect wildlife from these more potent substances.
- 'Burrow baiting' is permitted on some product labels and means that baits can be applied directly into rodent burrows, generally outdoors. This is only allowed away from buildings if the product label says that both burrow baiting and 'open areas' use are allowed.

Future of rodenticide use depends on ALL farmers, gamekeepers and pest controllers

www.pestcontrolnews.com @pestcontrolnews facebook.com/pestcontrolnews

Collectively, UK farmers, gamekeepers, pest controllers and rodenticide suppliers share a troublesome Achilles heel that is not going to heal on its own. The problem is leakage of rodenticide poisons into wildlife. Routine monitoring of barn owls by the UK Rodenticide Stewardship Regime from 2016 to 2021 finds "stubbornly static" rodenticide presence in nearly 90% of barn owls.

Particularly troubling is that two-thirds of the barn owls sampled each year are selected intentionally as juveniles, defined as less than two years of age. This means these birds acquired rodenticide residues with stewardship rules in place. By the way, almost all barn owls analysed have died by collision with vehicles or natural causes rather than a fatal level of rodenticide.

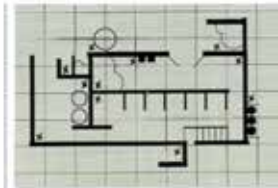
Although not monitored so routinely, many other predator, scavenger and prey species are also known to carry rodenticide contamination. These include red kites, buzzards and kestrels; small mammals such as voles and field mice; together, it is thought, with slugs, snails and

in compliance with the terms and conditions of authorisation". These are summarised on product labels, thereby creating a legal obligation on all users to follow instructions for use exactly.

Of course, you can study the CRRU Code of Best Practice's 30+ pages of information and guidance, available to download from thinkwildlife.org/download/crru-uk-code-of-best-practice-2021/?wpsdnd=18095. Clearly, that is where to go for more detail than space allows here.

Meanwhile, in bite-size chunks, here is what's covered in this newsletter:

- 1) First things first – a clear plan for control and staying legal.
- 2) Risk hierarchy – simplest and lowest risk first.
- 3) Non-poison – much to gain, few disadvantages.
- 4) Rodenticides – which to use for best and cost-effective results?
- 5) Bad landlord – repel or exclude unwanted visitors.
- 6) Checklist for max impact, max cost-effectiveness, no unintended consequences.



Fri 28 Oct 2022

VERMIN CONTROL

For each of the seven courses, passing the course exam yields a formal certification.



The choice of training for farmers and trainee pest controllers to become recognised competent users and authorised purchasers of professional grade rodenticides has been updated in conjunction with the Campaign for Responsible Rodenticide Use UK (CRRU).

Lantra Awards has developed an Ofqual-regulated 'Lantra Awards Level 2 Award in Rodent Management' to replace both 'Rodent Control on Farms' and 'Responsible and Effective Control of Commensal Rodents' certifications.

Dr Matt Davies, head of CRRU training and certification, says rodenticide stewardship is strengthened by Ofqual regulation.

In addition to the new one from Lantra, Royal Society for Public Health and City and Guilds National Proficiency Test Council courses were already Ofqual-regulated. The remaining options

Updated options for rodenticide proof-of-competence training

are anticipated to meet this level of regulation soon," he says.

For farmers, there are now seven courses in total (listed at thinkwildlife.org/training-certification).

In each case, passing the end of course exam yields a formal qualification/certification accepted at point of sale for professional use rodenticides under the UK Rodenticide Stewardship Regime, operated by CRRU.

Seven Ofqual-regulated courses

- Royal Society for Public Health (RSPH)/British Pest Control Association (BPCA) Level 2 award in pest management
- RSPH/BPCA Level 2 certificate in pest management
- City and Guilds National Proficiency Test Council Level 2 award in the safe use of pesticides for vertebrate pest control for rats and mice
- Lantra Awards Level 2 award in rodent management
- Killgerm principles of rodent control (taken through BASIS)
- RSPH Level 2 award in the safe use of rodenticides
- BPCA Using rodenticides safely (exam through BASIS)

Red Rock Services

Twitter: @thinkwildlife or twitter.com/thinkwildlife

CRRU
10 Tweets

CRRU
@thinkWildlife
Campaign for Responsible Rodenticide Use UK... and makes UK Rodenticide Stewardship, answer to HSE-led government panel.
thinkwildlife.org | Joined May 2018
100 following · 1M followers

11 You Retweeted

BASIS PROMPT @BASIS_PROMPT · Feb 27
Citizen science project needs farmers, gamekeepers and pest controllers. Read the full news piece all about it here: www.thinkwildlife.org/news/27th-feb-2022-thinkwildlife-crru-10-prompts-to-a-prompt

STOP THE SPREAD OF RESISTANCE
REQUEST YOUR KIT HERE

Great support from stakeholders

Search Twitter

You might like

- RanGONE** @ranzone... Follow you Follow
- PRO-CURE Pest, Bird...** @pro_cure... Follow you Follow
- Roger Mills** @rogermills1 Follow you Follow

Show more

What's happening

- Ukraine conflict - LIVE
Minsk strike hits central Kharkiv as conflict continues in multiple Ukrainian cities
Trending with #UkraineRussiaWar, Ukraine
- Liverpool Echo · Yesterday
Upland dipper makes £2m pretending to be a giant
- Washington Post LLC · Yesterday
Lithuania's Prime Minister Ingrida Šimonyte on how she thinks the world should respond to the Russian invasion of Ukraine and what is at stake for her country

Messages

CRRU
@thinkWildlife

Headline says it all. If relevant to you, please read it here (& enter FREE prize draw): thinkwildlife.org/download/crru-...

THINK WILDLIFE
Campaign for Responsible Rodenticide Use UK

Future of rodenticide use depends on ALL farmers, gamekeepers and pest controllers
No.1 2022

Urgently, all farmers, gamekeepers, pest controllers and volunteer ratters should make a commitment to use poisons that are safe for the environment. The problem is that the majority of rodenticides currently available are not safe for the environment. The UK Government has recently signed a deal to ban the use of the most toxic rodenticides by 2025. This means that farmers, gamekeepers and pest controllers will need to find alternative ways to control their rodent pests. We are looking for people who are willing to help us with this challenge.

1. Committing to use the most effective and safest rodenticides available.
2. Using poisons that are safe for the environment.
3. Using poisons that are safe for the environment.
4. Using poisons that are safe for the environment.
5. Using poisons that are safe for the environment.

FREE PRIZE DRAW:
Win a professional rodenticide kit or a £500 cash prize. Enter now at thinkwildlife.org/download/crru-...

Ran PRU - Feb 21, 2022 · TweetDeck

1 View Tweet activity

1 Retweet · 3 Likes

Search Twitter

Relevant people

- CRRU** @thinkWildlife
Campaign for Responsible Rodenticide Use UK... and makes UK Rodenticide Stewardship, answer to HSE-led government panel.

What's happening

- Ukraine conflict - LIVE
Minsk strike hits central Kharkiv as conflict continues in multiple Ukrainian cities
Trending with #UkraineRussiaWar, Ukraine
- Liverpool Echo · Yesterday
Upland dipper makes £2m pretending to be a giant
- POI dot - Yesterday
A mock up of a TIME cover featuring Putin as Hitler was created as a statement, artist says

Trending in United Kingdom
London Underground
3,000 Tweets

Trending in central regions
India Wiloughby

4. CONCLUSIONS

The UK Rodenticide Stewardship Regime⁵¹ is in its seventh year and, like its predecessors, this report provides an update on the progress of the regime. The regime is evaluated by the GOG according to the delivery of three key benefits: ‘supply chain governance’, ‘competent workforce’ and ‘monitoring compliance’.⁵² The theme throughout this report has been the delivery of these benefits by the work of those engaged in implementing the stewardship programme, and foregoing sections provide detail of actions taken and results achieved.

Once again, a KAP survey⁵³ involving hundreds of rodenticide users, among three user groups, has shown that all aspects of knowledge about best practice in rodent pest management and consequently professional competence have improved again in all user sectors since the last survey in 2020. Training has also resulted in thousands more pest management professionals gaining an Ofqual-regulated qualification and subsequent certification. Approximately 80,000 farmers are members of CRRU-approved farm assurance schemes so that their farms are regularly inspected and audited to ensure that the necessary standards of best practice in rodent pest management are met.

The liver residue study conducted on behalf of CRRU by UK CEH has confirmed once again that exposure to SGARs of the nominated sentinel species, barn owl, has not decreased.⁵⁴ However, the composition of these residues appears to be changing, with more owls found with residues of brodifacoum and difethialone and fewer with bromadiolone and difenacoum. A possible reason for this is discussed in the following paragraph. However, disappointing as this is, these results provide confidence that the experimental design developed for the barn owl monitoring study is capable of showing statistically significant differences should they occur. Work is ongoing and described below to strengthen the regime, hopefully, to permit it to meet its environmental targets. Furthermore, the results show that exposure of barn owls to SGARs is not increasing overall.

The continuing survey of anticoagulant resistance once again shows this phenomenon to be very widespread among both rats and mice in the UK.⁵⁵ Indeed, there is some evidence that areas that were once inhabited by mainly anticoagulant-susceptible Norway rats now have severe resistance mutations increasingly present in them. No other country globally has more different resistance mutations and a greater density of proven resistance foci than the UK. The RRAG has issued guidance on how practitioners should conduct pest management in areas of resistance.^{56,57} These recommendations include the use of SGARs that are not resisted, applications of non-anticoagulant active substances and the use of non-chemical control interventions, such as traps. Although we have no UK-wide data for the quantities of the different active substances applied, we have some indirect information for the UK CEH barn owl liver residue study that the quantities used of the two resisted SGARs, bromadiolone and difenacoum, may be declining.⁵⁸ These declines are, unsurprisingly, balanced by increases in barn owl exposure to the resistance-breaking active substances brodifacoum and difethialone, particularly the former.

In spite of the successful delivery of all aspects of the regime as it was envisaged at the outset,⁵⁹ and the fact that it has been considered ‘fit for purpose’ by the GOG throughout its operation, the failure of the regime so far to deliver the principal objective of a reduction in the liver residues in barn owls must be addressed. Therefore, over the period covered by this report, the CRRU Board of Directors and the Work Groups have developed a package of strengthening measures designed to facilitate the achievement of this objective. Two of these measures are particularly significant.

⁵¹ Buckle, A. P., Prescott, C., Davies, M. and Broome, R. (2017). The UK Rodenticide Stewardship Regime. A model for anticoagulant risk mitigation? In: Proceedings of the Ninth International Conference on Urban Pests, eds. Davies, M., Pfeiffer, C. and Robinson, W.H. Aston University, Birmingham, 9-12 July 2017. Pp. 165-170. Available at: <https://www.icup.org.uk/>.

⁵² HSE. 2020. Report on the Rodenticides Stewardship Regime, Assessment of Implementation – January 2020. An information paper by the Rodenticides Stewardship Regime Government Oversight Group. 11 pp. Available at: <https://www.hse.gov.uk/biocides/rodenticides.htm>. Date accessed: 01.03.21.

⁵³ Story Seeds 2023. Rodenticide Knowledge, Attitudes and Practices: Survey: August 2023. 146 pp.

⁵⁴ Ozaki, S., Chaplow, J.S., Dodd, B.A., Pereira, M.G., Potter, E.D., Sleep, D., Toon, B., and Walker, L.A. (2022) Second generation anticoagulant rodenticide residues in barn owls 2021. UKCEH contract report to the Campaign for Responsible Rodenticide Use (CRRU) UK, pp. 25, https://pbms.ceh.ac.uk/sites/default/files/Stewardship-2021-owls_FINAL.pdf.

⁵⁵ Buckle, A., Cawthraw, S., Neumann, J. and Prescott, C. (2023) Anticoagulant Resistance in Rats and Mice in the UK – new data for August 2022 to July 2023. The University of Reading, Whiteknights, Reading. Report No. VPU/23/002. 34 pp.

⁵⁶ Buckle, A., Charlton, J., Meyer, A. and Prescott, C. (2021a). RRAG House Mouse Resistance Guideline. Rodenticide Resistance Action Group, UK. 9 pp.

⁵⁷ Buckle, A., Charlton, J., Meyer, A. and Prescott, C. (2021b). Anticoagulant resistance in the Norway rat and guidelines for the management of resistant rat infestations in the UK. Rodenticide Resistance Action Group, UK. Revised January 2021. 11 pp.

⁵⁸ Ozaki, S., Chaplow, J.S., Dodd, B.A., Pereira, M.G., Potter, E.D., Sleep, D., Toon, B., and Walker, L.A. (2022) Second generation anticoagulant rodenticide residues in barn owls 2021. UKCEH contract report to the Campaign for Responsible Rodenticide Use (CRRU) UK, pp. 25, https://pbms.ceh.ac.uk/sites/default/files/Stewardship-2021-owls_FINAL.pdf.

⁵⁹ HSE. 2015. UK Anticoagulant Rodenticide Product Authorisation and the CRRU Stewardship Scheme. Information document, January 2015. Health and Safety Executive. 12 pp.

The first, developed by the Training and Certification Work Group, is to bring a training requirement for proof of competence to all users of professional rodenticides for the first time. This will mainly affect those in the farming sector, who previously were able to rely on certification of membership of a CRRU-approved farm assurance scheme for purchase of these products. Farming is by far the largest sector with which the regime engages, and rodenticide use on farm undoubtedly carries substantial risk of wildlife exposure. It is felt that promotion of a greater understanding of these risks and ways to mitigate them within the farming sector, by detailed and up-to-date training, will lead to reduced wildlife exposure and thereby to lower SGAR residues in wildlife. Excellent and accessible training courses focused on farmers and farming are available and the sector will have two years to obtain the necessary qualifications. However, essential to the continued promotion of best practice in the agriculture sector will be engagement with and ongoing support from farm assurance schemes.

The second measure involves voluntary changes to the authorised uses of SGARs. Applications of SGARs in 'open areas', that is away from buildings and usually in the open countryside, are considered to carry substantial risks of wildlife exposure because such areas will usually include the habitats of many wildlife species. For this reason, at the outset of the regime, the CRRU companies decided not to apply for open area use of the three most potent SGARs, brodifacoum, difethialone and flocoumafen. They have now decided to withdraw the only remaining bromadiolone and difenacoum authorisations in that use. This will of course affect all users of SGARs, but particularly gamekeepers, whose use of these substances largely relied on the 'open area' use scenario. This measure is also expected to have a beneficial effect to reduce exposure of wildlife to brodifacoum. This is because it is suspected that many users purchase brodifacoum products and apply them in open areas ignorant of the fact that this is illegal. This new measure will bring all UK SGAR authorisations into line and permit a single message to users that SGARs cannot be applied away from buildings.

In spite of these substantial changes, the task of reducing exposure of non-target wildlife to SGARs is a substantial, complex and long-term procedure. It involves those who use these products according to best practice, those who misuse them unintentionally and those that abuse them purposely to harm protected species. The latter are very unlikely to be deterred by any stewardship measures applied by CRRU. This is best done by strengthened operations of detection, enforcement and prosecution by government and other agencies whose job it is to do this.

NB. Throughout this document, where the acronym CRRU is used for the Campaign for Responsible Rodenticide Use, it refers to CRRU UK.

Annex 1.

Required data		Data to be provided
1	Environmental Impacts (Monitoring Compliance)	1. CEH annual survey of residues in livers of 100 barn owls
		2. Annual survey of barn owl breeding performance
		3. Annual review of WIIS incidents*
2	Whether the rodenticides are effective (Competent Workforce)	1. Annual report of training uptake and award of certification/ qualification by CRRU-approved awarding bodies
		2. Annual report of number of members of CRRU-approved farm assurance schemes
		3. Provision of up to date, relevant best practice guidance documents
		4. Promotion of regime objectives and raising awareness by stakeholder organisations
3	Resistance monitoring (Competent Workforce)	1. Annual report of status of resistance monitoring in UK and elsewhere in EU
4	Awareness using the Knowledge, Attitude and Practice (KAP) survey (Competent Workforce/Monitoring Compliance)	1. KAP survey baseline study (published)
		2. Repeated KAP surveys in 2017 and 2019
5	Point of sale information (Supply Chain Governance)	1. Output from the Point of Sale Audit. Interim results provided by June 2018.
6	Training (Competent Workforce)	(see point 2 above)
* Government is currently examining the feasibility of using data on several species from a variety of sources (PBMS and WIIS) as a further qualitative, or possibly quantitative, assessment of changes in the environmental impact of anticoagulant rodenticides.		

