



Helping animals THROUGH WELFARE SCIENCE



SCIENCE GROUP REVIEW OF 2010

Published March 2011

Editorial

The RSPCA is widely regarded as one of the world's most successful animal welfare organisations and is dedicated to its charitable objective of preventing cruelty and promoting kindness to all animals. This involves us in a wide range of activities aimed at improving the welfare of animals. At the heart of this endeavour lies the work of our four science departments: companion animals, farm animals, research animals and wildlife. Also, the knowledge and experience of our inspectorate, animal centres – both domestic and wildlife – and hospitals make a significant contribution to ensuring that our policies and activities are informed by scientific evidence and practical experience. This unique combination supports the RSPCA's integrity and enables it to exert considerable influence on a wide range of practitioners, decision-makers and the public in order to improve animal welfare.

In 2010 the Society continued its work on the welfare issues associated with pedigree dog breeding. This includes the development of a puppy contract which will allow the public to make properly informed decisions when buying a puppy and a three-year collaborative project which aims to estimate the prevalence of inherited and acquired disorders in pure-bred cats and dogs.

The RSPCA's welfare standards for farm animals continue to represent best practice in breeding, rearing, transport and slaughter. The farm animals department is determined to ensure that the standards continue to be progressive and improve the lives of millions of farm animals as well as encouraging the positive development of farm assurance schemes. A collaborative project on the development and application of on-farm welfare outcome assessment is described in this *Review*.

The RSPCA's research animals department has been heavily involved in the development of a new European Directive on the protection of animals used for scientific purposes. The department worked to try and ensure that this legislation included requirements for a robust system of authorisation including ethical review, along with fuller implementation of the Three Rs and improved standards of husbandry and care.

Finally, in the area of wildlife, the importance of the Society's scientific knowledge and experience cannot be underestimated. This is particularly true concerning the contentious debate on the culling of badgers to prevent the spread of bovine tuberculosis. The wildlife department produced a detailed, evidence-based response to the government's consultation which raised the concern that the proposed culling policy could increase the risk of the disease spreading and cause suffering to badgers.

This *Review* confirms that the application of evidence-based policy and practice informed by properly conducted science continues to be the way forward for animal welfare.



John Rolls
RSPCA Director of Policy

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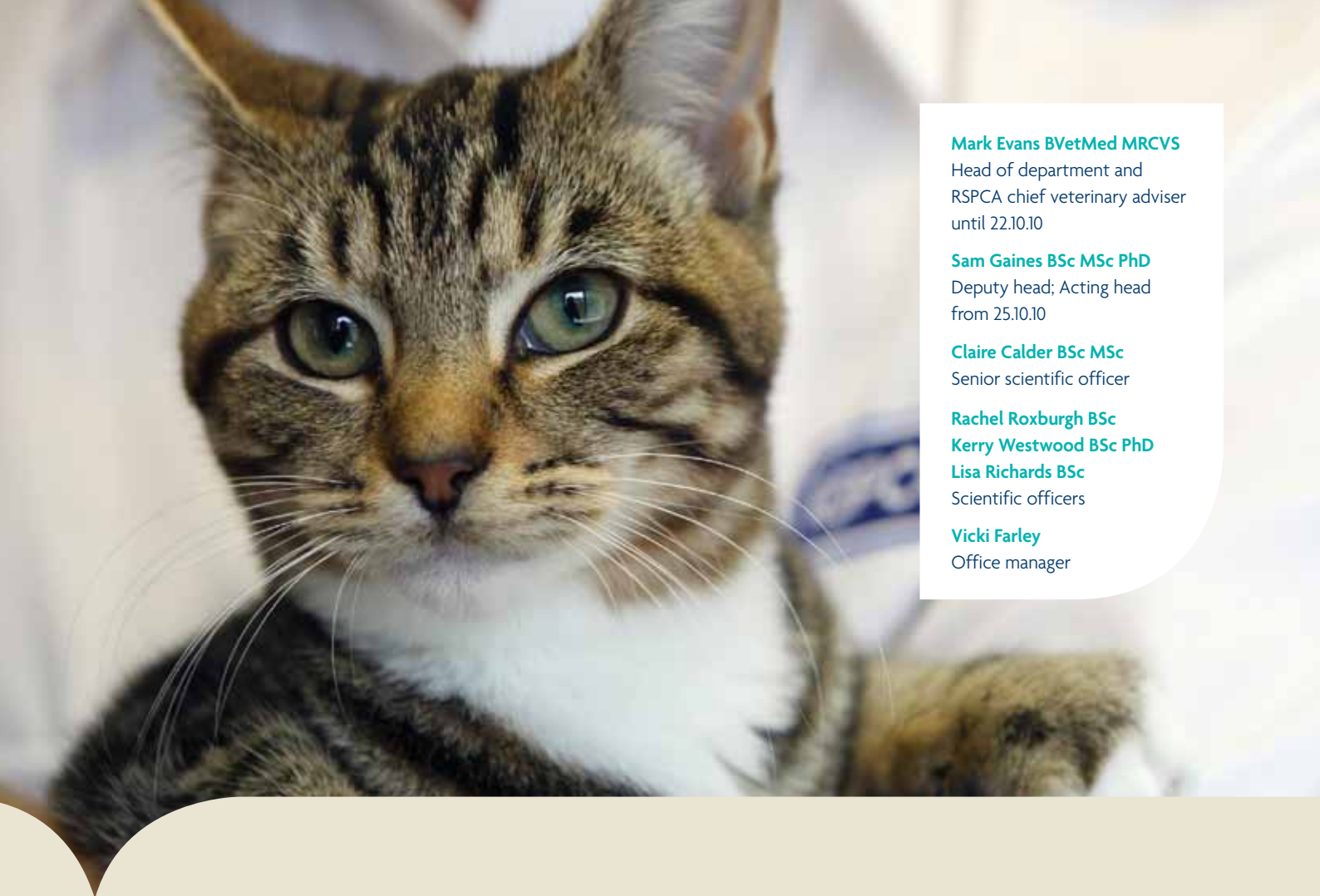
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Companion animals

The RSPCA companion animals department is dedicated to protecting and improving the welfare of the millions of animals kept as pets, working animals and sporting athletes in the UK.

We believe that everything the RSPCA says and does to help companion animals should be based on science, experience and common sense. To achieve this, the department generates, collates, reviews and communicates science and good practice to empower people – both inside and outside of the RSPCA – with the knowledge they need to protect and improve the welfare of companion animals.

Our work currently covers the following species: dogs, cats, rabbits, horses, donkeys, guinea pigs, chinchillas, hamsters, gerbils, rats, mice, pigeons, doves and micro-pigs.

Micro-pigs as pets

Micro-pigs are becoming increasingly popular as pets, and have received a great deal of media attention recently. They are often advertised as cute pets that are easy to look after. However, the RSPCA is concerned about their suitability as pets, how well their welfare needs can be met by non-specialist keepers and the way they are bred.

To address these concerns, and to help inform the media and members of the public, the companion animals department, in conjunction with the farm animals department, has written a position statement on the suitability of micro- and mini-pigs as pets. This position statement and information on keeping pet pigs can be found at: www.rspca.org.uk/petpigs

Pedigree dog breeding

Throughout 2010, the RSPCA companion animals department has been continuing its important work on the welfare issues associated with pedigree dog breeding.

Three major reports have now been published on dog breeding in the UK¹, including an independent scientific report commissioned by the companion animals department: *Pedigree Dog Breeding in the UK: A Major Welfare Concern?* All three reports concluded that the welfare issues associated with pedigree dog breeding are very serious, and that urgent action is needed to improve and protect the welfare of pedigree dogs. Each report also included a series of recommendations for possible ways forward – these have informed the department's activities on this significant animal welfare issue in 2010.

Puppy sales contract

The concept of a puppy sales contract was identified as a key action to improve dog welfare in all three reports on dog breeding in the UK. The companion animals department is therefore collaborating with the British Veterinary Association Animal Welfare Foundation (BVA AWF) to develop documentation that will enable the public to make properly informed decisions when buying a puppy.

The contract is still in the early development stages, but the concept is that a seller of any puppy (pure-bred and cross-breed dogs) should provide a Puppy Information Pack (PIP). This will give the buyer information about the puppy and its parents. The PIP would be tied into a simple contract containing a warranty from the seller that the

information in the PIP is true and complete.

The first stage in the development of a puppy sales contract was completed in 2010, and the RSPCA and BVA AWF will continue to work on this in 2011.

Choosing a puppy guidance

Another vital recommendation made in each of the reports was for the provision of expert, evidence-based information to potential puppy buyers. As such, the companion animals department commissioned experts at the University of Bristol to write a 10-step guide to choosing a puppy. The document covers key points that potential puppy buyers should consider from the moment they think about buying a puppy, right through to choosing a happy, healthy animal to take home.

This document will be used to underpin an exciting new RSPCA campaign due to launch in 2011 – to provide potential owners with the information they need to be able to make properly informed decisions when selecting a happy, healthy puppy.

Online surveillance of inherited and acquired disease in dogs and cats

All three reports also identified the urgent need for systematic collection of data on inherited diseases. In fact, this was considered to be the most urgent recommendation by the authors of the RSPCA-commissioned report.

Although work to date has focused on dogs, the welfare issues associated with selective breeding also affect other companion animal species, including cats. We are collaborating with the Royal Veterinary College and the University of Sydney on a three-year PhD research project to develop a new system for data collection, analysis and interpretation covering both dogs and cats. The project aims to estimate the prevalence of inherited and acquired disorders in pure-bred dogs and cats in order to identify breeds at greatest risk of specific conditions.

Work on the project commenced in October 2010 and more information is available on the project website:

www.rvc.ac.uk/VEctAR

Independent advisory council

The need for an independent advisory council to provide advice on the welfare issues associated with dog breeding was identified by each of the three reports, and the RSPCA companion animals department worked collaboratively with other organisations throughout 2010 to take this forward. The Advisory Council on the Welfare Issues of Dog Breeding has now been established, and the Council held its first meeting at the end of 2010. The companion animals department will continue to support the Council in 2011. Further information is available on the Advisory Council's website: <http://dogadvisorycouncil.org.uk>

**TAKING ACTION TO IMPROVE
AND PROTECT THE WELFARE
OF PEDIGREE DOGS**



FOOTNOTES AND REFERENCES

¹ *Pedigree Dog Breeding in the UK: A Major Welfare Concern?* commissioned by the RSPCA is available at: www.rspca.org.uk/pedigreedogs

A Healthier Future for Pedigree Dogs by the Associate Parliamentary Group for Animal Welfare (APGAW) is available at: www.apgaw.org/reports-a-publications/pedigree-dog-report

The Independent Inquiry Into Dog Breeding, commissioned by the Kennel Club and the Dogs Trust is available at: www.dogbreedinginquiry.com

Improving the welfare of pet rabbits

Since the beginning of 2007, over 20,000 rabbits have come into RSPCA care and hence the welfare of companion rabbits is a big priority for the Society. The RSPCA believes the welfare needs of pet rabbits are often poorly understood by owners. This lack of knowledge, together with traditional housing and husbandry practices may have a negative impact on the welfare of a significant number of rabbits. Therefore, the Society is developing a long-term campaign to improve rabbit welfare in England and Wales. The campaign aims to raise awareness and increase understanding of rabbits' welfare needs and change the attitudes and behaviour of owners to improve rabbit welfare.

To underpin this campaign, two scientific studies have been commissioned by the RSPCA. These studies will steer the rabbit campaign strategy and communications with owners.

Investigation into the spatial needs of socially-housed pet rabbits

Although owners are required by law¹ to provide a suitable environment for their pet, the limited scientific research regarding pet rabbits' environmental needs suggests that many rabbits are housed inadequately. A previous RSPCA-funded scientific study at the University of Lincoln found that singly-housed rabbits were motivated to have access to more space than is available in a traditional rabbit hutch and concluded that traditional small housing may compromise rabbit welfare.

We are keen to further this work and therefore an additional scientific study has been commissioned at the University of Bristol. This study will investigate the spatial needs of pair-housed rabbits as the RSPCA currently recommends that rabbits are housed in compatible pairs wherever possible. The investigation will consider the entire living space including structure, dimensions, resources provided and other factors that may affect welfare such as handling and frequency of access to an exercise area. This study will assist the RSPCA in developing practical, evidence-based housing guidance for pet rabbits.

Assessment of the state of rabbit welfare in the UK

The RSPCA is funding the University of Bristol to assess the state of companion rabbit welfare in the UK. This study will produce a prioritised list of all welfare issues affecting rabbits. This will ensure the RSPCA plans the most effective campaign to bring about a positive improvement for rabbit welfare. Tools developed during the study will be reproducible, allowing the state of rabbit welfare to be reassessed in the future.



The provision of quality, written husbandry information on rabbits in outlets

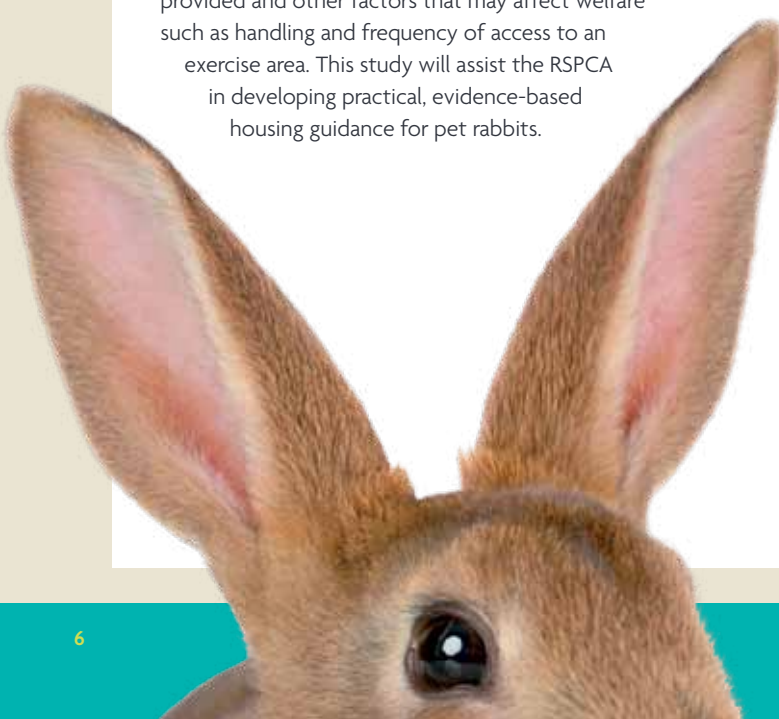
In 2009, a new welfare indicator was produced by the companion animals department. The provision of quality, written husbandry information on rabbits in a sample of retail outlets was assessed for inclusion in the RSPCA's annual report *The welfare state: measuring animal welfare in the UK*. A survey of pet shops in England and Wales was conducted to determine the number of rabbits on sale and the quality of care information provided, either on signs or in free care sheets. It was estimated that there are approximately 4,000 rabbits on sale in pet shops in England and Wales. At the time of the survey, free rabbit care sheets were only available in 33 percent of shops selling rabbits and only 27 percent of shops had comprehensive written information available (on signs or in free care sheets) that covered all five welfare needs as defined by the Animal Welfare Act 2006. The RSPCA believes that anyone selling or rehoming a rabbit has a responsibility to provide good quality care advice to help inform potential rabbit owners. The Society is therefore concerned that the results of this survey suggest this is not the case in most outlets selling rabbits. The full report can be read at: www.rspca.org.uk/in-action/whatwedo/animalwelfareindicators

THE WELFARE OF COMPANION RABBITS
IS A BIG PRIORITY FOR THE RSPCA

Anyone interested in learning more about rabbit care and the RSPCA pet rabbit campaign can sign up to receive emails at: www.rspca.org.uk/campaigns/rabbits.

FOOTNOTES AND REFERENCES

- ¹ One of the five welfare needs stated under the Animal Welfare Act 2006 is an animal's need for a suitable environment.



Dog behaviour therapy and training – improving welfare

Early in 2010, the RSPCA joined forces with a large number of animal welfare, behaviour, training, canine and veterinary organisations to voice their serious concerns about the use of aversive dog-training techniques. These techniques are based on the principle of applying an unpleasant stimulus to inhibit behaviour and include the use of prong collars, electric shock collars and pinning dogs to the ground. The use of such methods may compromise the welfare of dogs, as they can cause pain and fear. They may also worsen the behavioural problems which they aim to address, potentially placing owners at risk.

As well as releasing a multi-organisation press statement, a website was created to provide further information about the behaviour of dogs, the possible consequences of using aversive training techniques and where to go for appropriate

advice on behaviour and training issues. To date, the website www.dogwelfarecampaign.org has had more than 32,000 visits from over 120 countries.

Electric shock collars

The RSPCA companion animals department also responded to the Welsh Assembly Government consultation on the Animal Welfare (Electronic Devices) (Wales) Regulation 2010 – to ban the use of electric shock collars on dogs and cats in Wales. The RSPCA strongly believes that these devices may compromise welfare and that they have no place in modern animal training. Instead the Society recommends the use of reward-based methods. The RSPCA was therefore delighted that the consultation was successful and the legislation was passed by the National Assembly for Wales in March 2010.

The legislation was subsequently challenged, and a judicial review hearing was held in October 2010. However, the judgement in the Royal Courts of Justice was in favour of the decision to ban the use of these devices on dogs and cats – a great result for animal welfare in Wales.



Welfare needs

The companion animals department continues to generate new scientific, evidence-based pet care information for owners, by working with experts in behaviour, veterinary and welfare science. This information focuses on the welfare needs of specific companion animal species, by detailing what those needs are and how they can be met.

The Animal Welfare Act 2006 places a legal 'duty of care' on all animal owners and keepers, to ensure that they meet the welfare needs of their animals (www.rspca.org.uk/animalwelfareact).

To assist owners in interpreting this legal responsibility, our expert-reviewed pet care information is easy to understand and applicable to a broad range of husbandry situations. It gives owners a clear understanding of what their pets' environmental, dietary, behavioural, company and health and welfare needs are, and how to meet them.

In 2010 we expanded our growing range of species-specific information to include advice for mice, rats, hamsters, guinea pigs, chinchillas and ferrets. These can be found on the RSPCA website pet care section www.rspca.org.uk/allaboutanimals/pets

Furthermore, we have provided more detailed information on specialist areas of care regarding dog aggression (www.rspca.org.uk/allaboutanimals/pets/dogs/behaviour/aggression/-/article/CAD_CanineAggression) and top tips on what to do if you think your pet has been poisoned and how to prevent poisonings (www.rspca.org.uk/allaboutanimals/pets/general/poisoning).

THE RSPCA CONTINUES TO GENERATE EVIDENCE-BASED PET CARE INFORMATION



Our team of companion animal welfare scientists will continue to add more detailed advice for pet owners to the RSPCA website over the coming months and years and will regularly review and update the advice in line with the latest science and best practice.

Methods of identification in equines

The RSPCA has commissioned Dr Mark Kennedy from Anglia Ruskin University to conduct an independent review of the welfare impact of hot branding, freeze marking and microchipping in equines.

The report will include a scientific literature review, stakeholder consultation, and observations of behaviour during the application of identification methods. This work will help to develop an evidence-based RSPCA position on equine identification methods.

Welfare of dogs in Great Britain

The Royal Veterinary College, funded by the companion animals department, has recently completed an innovative two-year study: *The welfare of dogs in Great Britain: identification of priority issues*. The project used a literature review, stakeholder survey and a panel of experts to identify and prioritise the welfare issues affecting pet dogs in Great Britain. In addition, the study included the development of a unique general tool to prioritise welfare issues, as well as providing an estimate of the pet dog population in Great Britain.

In order to make a real improvement to pet dog welfare, it is critical that the



RSPCA is able to focus its work on the most important welfare issues. The results of this project will be used to guide the RSPCA's strategy for pet dogs in the future.

Influencing decision makers

Scientific staff from the RSPCA's companion animals department promote the Society's policies, aims and objectives through advocacy to government, statutory bodies, industry, academia and other organisations. Below are some of the examples of our work with animal welfare stakeholders.

Membership of committees and working groups

- The Cat Group.
- Dog Welfare Review Board.
- British Veterinary Association Dog Breeding Stakeholder Group.
- Pet Obesity Task Force (chair).

Meetings and events

- Animal Behaviour and Training Council meetings – to discuss regulation of animal trainers and animal behaviour therapists.
- Companion Animal Sector Council meetings – to discuss a rabbit health and welfare strategy for Great Britain.
- Feline Advisory Bureau Cat Group meeting.
- Science Advisory Council to Department for Environment, Food and Rural Affairs (Defra) Stakeholder meeting.
- British Small Animal Veterinary Association conference, Birmingham.

- Feline Advisory Bureau annual conference.
- Association of Pet Behaviour Counsellors 21st birthday conference.
- 12th International Association of Human-Animal Interaction Organizations conference, Stockholm.
- Companion Animal Behaviour Therapy Study Group study day, Birmingham.
- Canine Science Forum, Vienna.
- International Society of Applied Ethology conference, Uppsala, Sweden.
- Rabbit Welfare Association & Fund conference, Manchester.
- University of Bristol symposium: 'From Ants to Anthrozoology: a celebration of the work of John Bradshaw'.

Responses to consultations included the following

- Welsh Assembly Government – consultation on the Animal Welfare (Electronic Devices) (Wales) Regulations 2010.
- Defra – consultation on dangerous dogs.

RSPCA animal hospitals

The assessment and prevention of pain in cats

Ovariohysterectomy (removal of the ovaries and uterus) is a common surgical procedure in small animal charity practice. The RSPCA Greater Manchester Animal Hospital (GMAH) carries out this procedure on thousands of dogs and cats each year. It is vital that veterinarians ensure that this procedure is carried out using an appropriate level of pain management. Pre-emptive analgesia (the prevention of pain) is obviously preferable to the treatment of discomfort after surgery.

Pain assessment

GMAH is using a number of methods to determine post-operative pain and therefore evaluate the best method of pain prevention following this elective surgery in cats.

Simple descriptive scale (SDS)

A numerical scale is created which relates to behavioural signs suggestive of pain in cats. For example, a cat that is happy to be stroked all over, including the surgical site, is given a score of one. At the other extreme, a cat that looks uncomfortable, growls and hisses when stroked and resists wound pressure is given a score of four.

Dynamic and interactive visual analogue scale (DIVAS)

This scoring system is based on observing cats from a distance to identify behavioural changes (e.g. sitting in a hunched posture may indicate pain in cats) followed by direct interaction through handling and palpating the wound site. A point on a 10cm line is then ascribed to each cat from 0cm being no pain to 10cm being the maximum pain possible.

Mechanical pressure nociceptive threshold testing device

This involves the measurement of an animal's response to quantified pressure. The device consists of a probe that is applied to the wound. A force in newtons is recorded as the mechanical threshold value when the patient exhibits a response, such as turning towards the device.

Prevention of pain

Anaesthetic protocols should be appraised using the pain assessment methods detailed. For example, new agents should be introduced when their inclusion decreases post-operative pain scores.

GMAH is currently evaluating the following variables for feline ovariohysterectomy:

- **Age of patient**
Early neutering in cats (prior to puberty at approximately four months of age) is a rapid and simple surgery. Fewer complications are likely compared to conventional neutering from six months of age. Consequently, surgical time and post-operative pain appear to be reduced in younger patients.
- **Choice of opiate**
Butorphanol and buprenorphine are licensed opiates for the control of pain in cats. A quad anaesthetic combination of medetomidine, midazolam, ketamine and an opiate provides a safe and reliable method of anaesthesia in kittens.
- **Choice of non-steroidal anti-inflammatory drugs (NSAID)**
GMAH is currently evaluating the level of pain relief 24 hours after ovariohysterectomy. Either meloxicam or carprofen are administered to feline patients.



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Conclusion

Animals should receive appropriate analgesia to prevent post-operative pain. Assessment of pain is largely based on behavioural scoring systems. Mechanical pressure devices may reduce the subjectivity of behavioural scoring. The results of pain assessment should be used to refine anaesthetic and surgical protocols. Early neutering, using anaesthetic combinations with several modes of analgesia, appears to minimise the risk of post-operative pain in cats.



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Farm animals

The RSPCA farm animals department works to improve the lives of as many farm animals as possible. With over 900 million cattle, sheep, pigs and poultry reared in the UK each year, along with many millions of farmed fish, the department has the opportunity to have a huge impact on animal welfare both in this country and beyond.

The department's scientific and field staff translate the latest scientific research and practical experience into RSPCA policies and higher-welfare practices and systems. Using their own expertise, and in consultation with external experts, the department ensures that these practices and systems are commercially viable and practical for farmers, hauliers and abattoirs to implement.

Ensuring that all of the RSPCA's farm animal

policies are informed by the latest scientific and practical experience is an important role of the department. Having such a strong evidence base to our arguments gives our position and advice more weight, which is vital when lobbying and working on a national and international level for improvements in farm animal welfare. The department seeks improvements in legislation by lobbying and working with UK and EU governments and policy makers, as well as seeking change on a voluntary level by working with retailers, the farming industry, animal organisations, veterinarians and scientists. The department also raises awareness of farm animal welfare through external presentations and media interviews, and produces consultation responses, scientific reports and a range of information resources.

Setting the standard

Since the early 1990s the RSPCA has been developing welfare standards for farm animals, which reflect the Society's farm animal policies for the major species farmed in the UK. These standards aim to represent best practice in terms of breeding, rearing, transporting and slaughtering/killing of farm animals in indoor and outdoor systems.

The standards are constantly being reviewed and developed by the RSPCA's farm animals department experts, who use the latest scientific research and practical experience to inform the standards. Each of the standards has a technical working group, which includes representatives from the farming industry (both large and small scale), veterinarians and welfare scientists. The RSPCA consults these groups on a regular basis regarding the development of the standards, taking their expert opinions and advice into consideration before making a final decision on amendments to the standards.

The RSPCA and external stakeholders use the standards on a wide scale to demonstrate how higher-welfare livestock farming practices can bring benefits not only to the animals, but also to the producers, for example through the improved productivity that can result from better health. The standards have been used to develop farm and food assurance schemes outside the UK and have also influenced legislation and codes of recommendations at a UK and an EU level.

The primary outlet for the implementation of the standards is through the RSPCA's own farm assurance scheme, Freedom Food. All farms, hauliers and abattoirs approved by Freedom Food must implement all of the RSPCA welfare standards and are assessed annually by Freedom Food assessors to ensure compliance with the standards. Each year a proportion of Freedom Food members are also visited by RSPCA Farm Livestock Officers (FLOs), who undertake risk-based visits. These visits are often unannounced and check compliance with the RSPCA standards. FLOs also carry out a number of Welfare Outcome Assessments (WOAs) on Freedom Food farms, giving the RSPCA a picture of the level of welfare being achieved through application of the standards (see 'Measuring welfare outcomes' section opposite).



Measuring welfare outcomes

Over the last 16 years, the RSPCA's farm animals department has been developing the nature and content of its farm animal welfare standards. During this time the Society has funded a number of studies that have helped to inform standards development.

The RSPCA has become increasingly mindful that in order to make meaningful improvements to the welfare of farm animals, it is necessary to examine the level of welfare being achieved on a farm as a result of implementing the standards required by assurance schemes, such as Freedom Food. Assessing and measuring animal welfare in this way is referred to as Welfare Outcome Assessment (WOA), a prototype methodology which was initially developed a few years ago by Bristol University via an RSPCA-funded project. To develop further this important area, the RSPCA farm animals department, in conjunction with the Soil Association and University of Bristol's Department of Clinical Veterinary Science, recently secured project funding for £2.7 million from The Tubney Charitable Trust. The five-year project aims to incorporate WOA more fully into the RSPCA's Freedom Food and Soil Association farm assurance schemes and promote the uptake of outcome-based assurance within other UK and European farm assurance schemes. Ultimately, this project will ensure the RSPCA welfare standards for farm animals continue to be progressive and remain at the forefront of improving the lives of many millions of farm animals, as well as encouraging other farm assurance schemes to adopt a similar approach to the benefit of farm animal welfare.

THIS PROJECT WILL ENSURE THE RSPCA WELFARE STANDARDS CONTINUE TO BE PROGRESSIVE...

Farmed game bird welfare

During the first half of 2010, the farm animals department provided advice on the development of the Defra Code of Practice for the welfare of game birds reared for sporting purposes.

The RSPCA believes that many aspects of the Codes (released in July), including management, inspection and veterinary health planning, can help to improve the welfare of many of these birds. However, one of the Society's major concerns is the use of cages for some breeding birds. While barren cages have not been recommended by Defra, they have not advised against so-called 'enriched' versions. With the Farm Animal Welfare Council (FAWC) advising the government that cages appear unable to meet the basic physical and behavioural needs of game birds (*Opinion on the welfare of farmed game birds*, November 2008), the RSPCA urged Defra to carry out further scientific research to help inform how game birds should be kept. This research is going ahead with the Scottish Agricultural College and with a member of the department on the project steering group, the Society will continue to follow its progress.

Pigs

Pork provenance – voluntary code of practice for the labelling of pork and pork products

A new voluntary code of practice for the labelling of pork and pork products – aspects of which were developed in conjunction with the RSPCA's farm animals department – was launched in February 2010 by the government-initiated Pig Industry Supply Chain Task Force.

The new code, which covers production method definitions, country of origin and breed labelling, aims to clear up confusion amongst consumers about different terms found on pork products by setting detailed requirements on how the pigs are reared if certain labelling terms are to be used. The production method definitions cover the labels free-range, outdoor bred and outdoor reared. If a retailer has signed up to the code they have committed to only using these terms on their packaging if the pigs have come from systems which have met certain criteria relating to the pigs' environment and management. Most of the major UK retailers have signed up to the code, as have a number of food service companies.

The next step is to encourage smaller retailers and outlets, such as farm shops, to sign up. As part of the continuing development of the code a management group has been set up – the Pork Provenance Management Board – onto which the RSPCA has been invited. As well as working directly with the code's developers the RSPCA has, through its Think Pig campaign, also been working to improve consumers' understanding of these labelling terms and the different production systems in which pigs are kept. In January, these issues were highlighted to MPs at a House of Commons event on pig production and welfare where an RSPCA farm animals department scientist gave a presentation on the issue of labelling and consumer power. This is also an important topic within the pig industry – in September a farm animals department specialist took part in a roundtable discussion on the topic of pig meat labelling organised by the trade

publication *Meat Trades Journal* in conjunction with the British Pig Executive (BPEX). It remains an important area of work for the farm animals department in 2011.

'FreeTails' pig welfare project

In May, the farm animals department received a grant from The Tubney Charitable Trust to gather and analyse information on current practices and initiatives in relation to pig welfare, specifically indoor free farrowing and the avoidance of tail docking and tail biting. As part of this project the farm animals department devised a questionnaire to capture this information, which was sent to relevant researchers, producers, processors and retailers.

A follow-up workshop was held in October with key stakeholders to discuss these issues further, including the current challenges to the implementation of improved practices and how these might be overcome. This work is set to continue in 2011 with a conference in January, to enable knowledge transfer to and engagement with a wider audience, including government. As part of this project, researchers from the Scottish Agricultural College and Newcastle University have been commissioned to investigate the economics of the marketplace for higher welfare pork products; their report will be finalised in early 2011.



Ducks

Access to an open water source

In 2007, the RSPCA's farm animals department secured funding from The Tubney Charitable Trust to commission a research project to further develop practical ways of providing farmed ducks with an open source of water for expression of water-related behaviours.

The research, which is being conducted by the University of Cambridge in conjunction with the UK duck industry, aims to develop a commercially viable system that enables ducks to perform key water-related behaviours without risk to their health. The project has been progressing well and the research has identified a potential open water facility that could be provided to allow ducks to express water-related behaviours. The university is in the process of trialling this preferred facility in a commercial context to determine its full impact on welfare and to see how it performs against other methods of open water provision. The project is due to complete in late 2011 with the publication of journal articles to follow shortly after. The learnings will be used to inform further development of the *RSPCA welfare standards for ducks*.

Laying hens

Phasing out beak trimming

The legal ban on routine beak trimming of laying hens, due to start in January 2011, has been delayed. The RSPCA is very disappointed that the problems that can occur without beak trimming, such as injurious pecking and cannibalism, cannot yet be fully and confidently avoided without beak trimming. However, the Society does believe that a detailed strategy involving all sectors of the laying hen industry, including rearing and breeding, and results from ongoing research will help to enable this ban by 2016. This date was suggested by Defra and although not written in law, will be a goal the farm animals department will be working hard to achieve across the industry, including continued participation in Defra's Beak Trimming Action Group. The change in legislation also restricts the method of beak trimming to infrared, a non-invasive

technique involving less handling and proven to be more consistent. In 2010, the department finalised detailed standards to be included in the *RSPCA welfare standards for hatcheries* 2011 publication, to help safeguard the welfare of chicks at the time of infrared trimming, if it is deemed necessary.

Research on the range

The University of Bristol has continued with the final year of an RSPCA-funded project, aiming to find practical ways to further encourage hens to use the range fully, which can have positive effects on bone strength and behaviour. As part of this three-year project, information is being collected from a number of farms, including types of enrichment on the range, layout inside the housing and hen ranging behaviour. One of the visits to each of these farms also involves detailed assessment of individual hens, looking at welfare indicators such as



feather cover and injuries. The farm animals department will be reviewing the results of this project after its completion in 2011 and aims to use the information to enhance the requirements and guidance on this topic in the *RSPCA welfare standards for laying hens*.

Chickens

Overseas chicken production – visits to Thailand and Brazil

More chickens are consumed worldwide than any other farmed animal – around 51,000 million each year. The largest-producing countries of chicken meat are Thailand and Brazil, and they export great volumes of chicken meat to the UK each year, which is mainly used in processed foods such as ready meals and sandwiches. In a global food market, it is important that we have a good knowledge and understanding of how farm animals, particularly those consumed in the UK, are being reared in other countries. Therefore the farm animals department broiler welfare expert has visited the second-largest chicken producer in Thailand and producers in Brazil to find out about the standards they implement on their farms.

As in the UK, the majority of chickens produced in these countries are reared indoors. In Brazil, buildings had open sides, with wire mesh and curtains (plastic sheeting) covering them. Temperature and ventilation were controlled by lowering/raising the curtains. Additional control was achieved by ceiling-mounted fans and, when required, wood burners provided heat. However, producers in Brazil are now generally moving towards controlled environment housing (CEH), which is typically found in the UK. The litter (substrate covering the floor) varied by region and could be wood shavings, as used in the UK. In Thailand, the design and type of buildings were very much the same as those found in the UK, but rice husk was used as the litter substrate. In both countries, the feeding and drinking equipment was similar to that used in the UK. Biosecurity measures and procedures differed little to those implemented in the UK.

The welfare standards implemented by the Brazilian companies were little different to those typically implemented in the UK for 'standard' chicken production, with the exception that the stocking density was approximately 30 percent lower ($26.5 \text{ v } 38 \text{ kg/m}^2$). They also used the same breed of bird that is mainstream in the UK. However, the company in Thailand implemented welfare standards that were above UK basic industry standards for several key areas. For example, stocking density was 26–32 percent lower ($26\text{--}28 \text{ v } 38 \text{ kg/m}^2$), and they used a breed of bird that is not quite as fast growing and which would be marketed in the UK as 'slower growing'. Also, when catching birds to transport for slaughter they would catch them one-by-one around the body, and not by the legs. All the producers visited were keen to learn more about the RSPCA welfare standards for chickens and consider how they could implement them on their farms to further improve the welfare of their chickens.

It is clear from these visits that it is incorrect to assume that chicken meat produced overseas is reared to lower welfare standards than that produced most commonly in the UK.

The RSPCA has always maintained that it is not possible to make assumptions about welfare simply based on country of production, adding weight to the Society's call for labelling with method of production, not just country of origin.



Slaughter and CCTV in abattoirs

A very significant – and highly emotive – aspect of farm animal production is the welfare of the animals at the time of slaughter or killing. The farm animals department's work during 2010 to improve welfare in this area has included gathering the latest scientific information on improved methods of humane killing and utilising this to facilitate ongoing development of the RSPCA welfare standards (such as moving away from the use of inverted shackling of conscious poultry). The department has also liaised with key governmental bodies such as the Food Standards Agency (FSA) to discuss and seek progress on welfare at slaughter and killing, and to press for information about this area to be made more publicly available.

In addition, we have continued to work directly with individual abattoirs to provide advice and information on how to safeguard welfare at all stages. An important element when working to progress welfare in slaughterhouses is ensuring that standards and procedures are properly implemented and enforced. To this end, in February 2010 the RSPCA called for the installation of closed-circuit television (CCTV) in all abattoirs, following the public release of

footage showing poor practices in certain abattoirs. CCTV can serve both as a monitoring tool for enforcement bodies, and also as a staff training tool for use by abattoir managers. The RSPCA believes that with such a large number of animals going through abattoirs every day, the significant welfare risks warrant closer scrutiny of the process than is currently the case. The department is in the process of putting in place provisions to ensure that use of CCTV becomes mandatory within its farm animal welfare standards – and hence within all Freedom Food approved abattoirs. Already, around half of Freedom Food approved abattoirs have CCTV, showing that its implementation is commercially viable and technologically possible. The farm animals department will be working with those Freedom Food approved abattoirs that have yet to install CCTV to achieve 100 percent coverage before the end of 2011. In addition, the Society has asked retailers to institute a policy of only sourcing meat from abattoirs with CCTV, and several have responded very positively, showing commitment to progressing this as soon as possible.

Dairy cattle

The National Dairy Cow Welfare Strategy

In the spring of 2009, concerns about the overall welfare of dairy cattle led the RSPCA to become the first organisation to publicly call for a National Dairy Cow Welfare Strategy to be developed.

Since then, leading industry bodies such as DairyCo, the National Farmers' Union (NFU) and the British Cattle Veterinary Association (BCVA) have worked to develop such a strategy which was launched in August 2010. The RSPCA was also involved in this process by advising on each successive draft. The administrators of the Strategy will be the Cattle Health and Welfare Group for England, of which the department's cattle specialist is a member. The RSPCA believes that this Strategy offers a collective and co-ordinated approach to addressing some of the problems associated with the modern dairy cow, such as lameness, mastitis and infertility. The Strategy will also seek to develop better systems of on-farm recording and the use of aggregated health and welfare data – something that has never previously been achieved in the UK.



Salmon

Wrasse as a biological control for sea lice

Sea lice are parasites that damage the skin of salmon which, as well as being an issue in itself, can make them more susceptible to other diseases infecting them through their damaged skin. Sea lice are therefore a major issue which can affect the welfare of salmon. At present, there is a limited number of drugs which can be used to treat salmon for sea lice, and there is evidence that some lice are becoming resistant to some of these treatments.

The department is currently analysing the issues associated with the biological control of sea lice in farmed salmon using 'cleaner' fish, notably a species of wrasse. To assist us in examining whether such a strategy is feasible and welfare-friendly, we have sought guidance from a number of experts, for example, the North Atlantic Fisheries College (NAFC) in Shetland. In 2011 the department will be continuing to look into this and in particular will be gathering further information from Freedom Food approved salmon farms using 'cleaner' fish as a biological control of sea lice under derogation.

SEA LICE ARE A MAJOR ISSUE WHICH CAN AFFECT THE WELFARE OF SALMON

Influencing decision makers

Examples of membership of committees and working groups

- BPEX Pig Health and Welfare Council.
- Pork Provenance Management Board.
- England Cattle and Sheep Health and Welfare Council.
- Welsh Assembly Government Animal Health and Welfare Strategy Implementation Group.
- European Animal Welfare Platform (EAWP) poultry cluster.
- Farm Animal Welfare Forum.
- Beyond Calf Exports Forum.
- Poultry Welfare Forum.
- Seal, Aquaculture and Salmon working group.

Department for Environment, Food and Rural Affairs (Defra)

- Pig experts live transport group.
- Ruminant experts live transport group.
- Core stakeholder group for the implementation of the EU Broiler Directive into UK.
- Game bird working group.
- Beak trimming action group.

Universities/research institutes/ research projects

- University of Newcastle and Scottish Agricultural College: PigSAFE project steering group on alternative farrowing environments for pigs.
- AssureWel project laying hen technical group and project team.
- Duck welfare project technical group.
- Scientific research discussion group at Cambridge University on provision of an open water source for farmed ducks.
- Bristol University laying hen fitness to travel (funded by Defra) and reducing injurious pecking (funded by The Tubney Charitable Trust) project steering group.
- Scottish Agricultural College game bird housing project steering group (funded by Defra).

Examples of key meetings and events during 2010

- Participated in the Poultry Welfare Forum.
- Co-sponsored and participated in the National Cattle Mobility Event at Reaseheath College.
- Participated in the Defra animal products labelling workshop.
- Participated in the EAWP poultry cluster meeting.
- Met with EU Commissioner John Dalli and NGOs to urge him to adopt EU-wide mandatory labelling of all animal products with production method.
- Attended the Universities Federation for Animal Welfare (UFAW) conference regarding recent advances in animal welfare science.
- Visited chicken producers in Brazil to investigate production systems and standards.

- Met with Hungarian chicken producer to discuss RSPCA welfare standards for chickens.
- Participated in the Breakfast Roundtable discussion in London organised by the RSPCA to discuss the future of animal welfare.
- Participated in meeting of the Beyond Calf Exports Stakeholders Forum.
- Attended the FAWC open meeting.
- Participated in the Farming Regulation Task Force and LINK meeting.
- Participated in an EU workshop on implementation of EU legislation on pig welfare.
- Participated in an EU workshop on alternatives to castration in piglets.
- Participated in a *Meat Trades Journal*/BPEX roundtable discussion on pig meat labelling.
- Participated in Defra food labelling workshop.
- Several meetings with major retailers to discuss progression of farm animal welfare standards.
- Met with the Australian Egg Corporation to discuss different systems of housing laying hens.
- Organised/participated in information exchange workshop on pig welfare involving key scientific and food and farming industry representatives.
- Met with the FSA to discuss various issues relating to monitoring and enforcement of animal welfare rules in slaughterhouses.
- Met with the FAWC to discuss current and future welfare issues.

Responses to consultations included the following

- EconWelfare consultation on farm animal welfare.

European Food Safety Authority (EFSA)

- The welfare of broilers in relation to genetic growth rate.

Defra

- Farm Regulation Task Force.
- An amendment to the Mutilations Regulations (permitted procedures) (England) 2007, regarding beak trimming of laying hens.
- The welfare of game birds reared for sporting purposes.

Humane Slaughter Association (HSA)

- Electrical water bath stunning of chickens.

FAWC

- FAWC Strategic Plan 2011–2015.

Examples of presentations given during 2010

- Iowa State University on the work of the RSPCA farm animals department.
- House of Commons 'Pig Business' event on pig welfare and pig meat labelling.
- Harper Adams University College on farm animal welfare and the work of the RSPCA.

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Research animals

Animals are used for many different purposes in research and testing and each area of use raises specific ethical, welfare and scientific issues. The RSPCA adopts a constructive, practical approach, judging every issue individually, critically questioning the necessity and justification for animal use and arguing the need to reduce the conflict between the interests of animals and science as far as possible.

Our ultimate aim is the replacement of animal experiments with humane alternatives worldwide. Until this can be achieved, we work to help ensure that the minimum numbers of animals are used and that they experience the minimum suffering and have the best possible quality of life.

The Society liaises with those involved in animal use in government, industry and academia to promote initiatives that:

- lead to fuller implementation of the 3Rs*
- develop processes of effective ethical review



The use of bacterial colonies can sometimes replace the use of animals.

* The 3Rs are: **replacement** of animals with humane alternatives, **reduction** of animal use, and **refinement** of husbandry and procedures to reduce suffering and improve welfare throughout the animals' lives.

New animal experiments law for Europe

A European Directive on the Protection of Animals used for Scientific Purposes (2010/63/EU)¹ officially came into force on 9 November 2010. This new law replaces a 1986 Directive which has been recognised as outdated and unsatisfactory since at least 2002. The RSPCA, together with Eurogroup for Animals², has been actively involved in the development of the new Directive, trying to ensure that it raises the standards of animal welfare and ethical review throughout Europe. In general, some significant advances were achieved but the final wording of the Directive is a compromise that falls short of what we wanted in a number of respects. However, it is acknowledged that some EU countries currently have only very limited regulations relating to animal experiments and this Directive represents a significant step forward for them.

Each EU member state now has two years to transpose the Directive into national law, ready to take effect by 1 January 2013. Since April 2010, when the likely final contents of a political compromise on the Directive became known, the focus of the RSPCA has largely been on transposition in the UK. This does not mean that we have neglected issues affecting implementation throughout Europe – at a meeting of Eurogroup for Animals in early December, it was recognised that much needs to be done to help some EU member states implement effective systems of authorisation and project review. Using our experience with the UK system, the research animals department will assist Eurogroup to develop guidance for its member organisations to use in their own countries.

Many of the provisions of the new Directive are modelled on the system that has been in place for many years in the UK, under the Animals (Scientific Procedures) Act 1986 (ASPA)³. Therefore, on the face of it, transposition should not be a problem in the UK. The government has indicated that it is minded to transpose the Directive by means of regulations under the European Communities Act 1972, which would allow amendment of the current ASPA with a minimum of parliamentary scrutiny.

However, some of the provisions in the ASPA are higher than the basic minimum ones set out in the new Directive and although, through Article 2 of the new EU law, the UK government has the freedom to maintain these, we have not seen any evidence that the Home Office is prepared to bring forward the necessary measures to do this. A major concern is that the composition and function of the local ethical review process in place within each research establishment could be seriously undermined, despite the significant contribution these have made to improving animal welfare, science and the local 'culture of care' over the past decade. This is particularly worrying given the moves towards 'self-regulation' and that the number of official inspections of establishments is likely to be drastically diminished.

Additional concerns are that space allowances for some animals such as dogs and rats could be reduced, and there is a qualifying clause in the Directive that could allow animals to suffer 'severe pain, suffering or distress that is long-lasting and cannot be ameliorated' (a higher level than currently allowed). A similar clause would even allow the use of great apes in 'an emergency situation'. It is becoming apparent that the new UK coalition government could use the transposition process, alongside government drives for 'better regulation' and cuts in the Home Office budget, to radically reduce the existing regulatory process in the UK⁴. The RSPCA would find this completely unacceptable.

The research animals department has been involved in many discussions about UK transposition. In September, John Rolls (RSPCA director of policy) and Maggy Jennings (head of the research animals department) met with Lynne Featherstone MP, the new minister responsible for overseeing the regulation of animal experiments in the UK. Our scientific staff have organised and taken part in discussions on the Directive under the auspices of the Boyd Group, a forum for debate between representatives of the research funders, learned societies, industry, and animal welfare groups. Consensus views are being developed on topics such as the scope of the Directive (in terms of species and developmental stages covered), its impacts on the development and uptake of alternatives to the use of animals, the boundaries the Directive sets (especially restrictions on the use of non-human primates), issues to do with competence, standards and guidance, procedures for authorisation and ethical review, and how the Directive promotes transparency. The objective is to feed the output of discussions to the Home Office, with the intention of helping to shape policy. RSPCA staff have also discussed our concerns about transposition of the Directive with Home Office officials, and scientists from academia and industry more widely. The Home Office has promised public consultations on the content of the new regulations, and we expect these during 2011.

SOME UK PROVISIONS ARE HIGHER THAN THE BASIC MINIMUM ONES SET OUT IN THE NEW DIRECTIVE

FOOTNOTES AND REFERENCES

- 1 http://ec.europa.eu/environment/chemicals/lab_animals/legislation_en.htm
- 2 Eurogroup for Animals is the umbrella group of the leading animal welfare organisations from across the European Union. See: www.eurogroupforanimals.org/
- 3 www.homeoffice.gov.uk/science-research/animal-research/
- 4 <http://nds.coi.gov.uk/content/detail.aspx?NewsAreaId=2&ReleaseID=417079&SubjectId=32>



Working internationally

Issues relating to the use of animals in research and testing need to be considered in a global context. Industries that use animals, whether pharmaceutical, chemical or agricultural are multinational, and the regulatory testing requirements they work to are international. Scientists in academia also commonly collaborate on an international basis. However, the legislative controls on animal experiments in different countries, and particularly the priority given to animal welfare and ethical review, varies significantly – this is a serious concern. Provision of advice on ethics, animal welfare, the 3Rs and legislation internationally is therefore an increasingly important role for the research animals department, working closely with the RSPCA's international department.

Key activities and events during 2010:

- In May, the RSPCA's international and research animals departments, in conjunction with the European Commission (EC-TAIEX) and the Croatian State Veterinary Directorate, organised a two-day workshop¹ on the regulation of animal experiments, for representatives of governments, regulatory bodies and industry across the **Western Balkans**.

RSPCA scientific staff, and experts invited from across Europe, aimed to help those countries seeking future membership of the European Union understand what they need to do to bring their animal welfare laws into line with those already operating in EU countries. Information provided related to legislation, ethics, animal welfare and how the 3Rs can be more fully implemented. Over 80 delegates, each nominated by a participating country, attended from across Albania, Bosnia and Herzegovina, Croatia, Kosovo, Macedonia, Montenegro, Serbia and Turkey.

- In August, the Society organised and delivered presentations and training workshops in **Korea** and **China** for representatives from research establishments using animals. The events, which covered ethics, animal welfare and the 3Rs, were well attended and enthusiastically received by the participants.
- In November, the Society was invited to give a presentation on laboratory animal housing and care, and to run a special mini-symposium on humane care and use of animals (below), at the 4th Asian Federation for Laboratory Animal Science Congress². The conference, which was held in Taiwan, attracted hundreds of delegates from countries across **Asia**.



FOOTNOTES AND REFERENCES

- 1 TAIEX event AGR 41044. For more information, see: http://ec.europa.eu/enlargement/taieX/dyn/taieX-events/library/detail_en.jsp?EventID=41044
- 2 www.aflas2010.org

PROVISION OF ADVICE INTERNATIONALLY IS AN INCREASINGLY IMPORTANT ROLE

Improving the care of animals

Rodent welfare

The **RSPCA/UFAW Rodent Welfare Group**¹ used its **2010 meeting** to focus on the effects of husbandry practices, such as handling and cage change, on rodents.

Although these are extremely commonplace events in the lives of laboratory animals, recent research suggests that they can have quite a profound impact on rodent behaviour and welfare, which can then affect the quality of scientific data. For example, it is common practice to pick mice up by the base of the tail, yet this can induce increased fear and anxiety in comparison with less stressful methods such as cupping in the hands, or picking up the tunnel from the home cage while the mouse is inside².

Cage-cleaning stress can arise from noise, handling and the removal of the animals' scent deposits from the cage base.

A speaker at the meeting described how, although the general effect of cage cleaning on adult rats is not yet clear, cleaning within two to three days of birth in rats was stressful and should be avoided. Other talks included the impact of removing rats from groups, which can cause social stress, and a technique for administering substances in chocolate instead of by oral gavage, resulting in improved bioavailability and reduced stress. In two interactive sessions, speakers discussed how the results of research into the effects of housing, husbandry and scientific procedures could be brought to the 'cageside' more effectively. On the basis of their experiences with implementing refinement, delegates emphasised the importance of good communication between researchers, veterinarians, animal technologists and care staff throughout the decision-making process when changing protocols.



Over 120 delegates attended from a wide range of establishments within industry and academia, reflecting the strong interest in the subject area. The meeting report will be available in the journal *Animal Technology and Welfare* in 2011.



FOOTNOTES AND REFERENCES

- 1 This group provides an annual forum for scientists, veterinarians, animal technologists and care staff to discuss the 3Rs in research and testing using rodents. For more information, see: www.rspca.org.uk/sciencegroup/researchanimals/implementing3rs/rodentwelfaregroup
- 2 www.nature.com/news/2010/100912/full/news.2010.462.html

Genetically altered animals: reduction and refinement

Recent years have seen significant increases worldwide in the creation and use of genetically altered (GA) animals. A major contributing factor is the large-scale generation of thousands of new strains of GA mice – the production and maintenance of which involves substantial numbers of animals. Implementation of the 3Rs is therefore particularly important in this field and in 2010 the research animals department undertook a number of initiatives with this aim:

- The movement of GA animals between research establishments is becoming increasingly common practice. In order to minimise potential pain, suffering and distress and improve animal welfare it is vital that animal care information, tailored to individuals and strains of animal, is readily accessible to all involved. Ensuring this information travels in advance of the animals – in preparation for their arrival – with an additional copy

accompanying them, will facilitate the provision of a consistent standard of care throughout the animals' lifetimes. An initiative led by the RSPCA consolidated recent advances in the routine 'welfare assessment' of animals, with developments in the area of 'mouse passports' and welfare/phenotypic databases. It resulted in the production of **key guidance**¹, endorsed by the Wellcome Trust Sanger Institute and the Genetics Network that will help ensure a consistent standard of care throughout the animals' lifetimes.

- In March, a training event **Transgenics and the 3Rs – what's it all about?** was held for scientists and technicians, the aim being to highlight 3Rs opportunities in this area of research. The meeting included a range of presentations relating to good practice in the production, breeding and care of GA mice, and posters along the same theme are now available². As the meeting was over-subscribed it will be run again in 2011.
- In July, a new two-day training course entitled **Managing mouse colonies: breeding, genetics and welfare** was established and run for the first time. Participants were limited to 30 and



came from a variety of backgrounds including senior animal technicians, animal unit managers and scientists from universities and research institutions across the UK and Europe.



FOOTNOTES AND REFERENCES

- 1 The booklet *GA passports – the key to consistent animal care* can be downloaded free of charge at: www.rspca.org.uk/sciencegroup/researchanimals/implementing3rs/gapassport
- 2 At: www.rspca.org.uk/sciencegroup/researchanimals/implementing3rs/transgenictraining

Zebrafish welfare

Over the past two decades the use of zebrafish in research has been increasing year-on-year and these animals now rank as one of the major species used. However, the specific husbandry requirements of zebrafish are still far from fully understood and protocols for feeding, grouping and breeding them, plus environmental factors such as water parameters and provision of environmental enrichment, can vary from laboratory to laboratory.

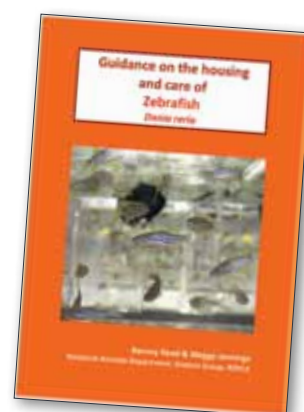
Investigation into the natural ecology of the zebrafish and the environmental preferences of this species have only recently begun, as have systematic efforts to establish optimal standards relating to their housing and care. There is a clear desire for a fuller understanding of the behaviour and requirements of these animals and a need to better define the factors that may affect their welfare. With this in mind, a resource

published in November by the research animals department, entitled **Guidance on the housing and care of zebrafish**, aimed to help improve the welfare of these animals by:

- facilitating understanding of zebrafish behaviour and their requirements
- highlighting welfare considerations relating to breeding, supply, housing and care
- identifying, where possible, consensus for appropriate environmental and care conditions
- providing recommendations for improving health, welfare and egg quality, and for reducing the potential for stress and suffering
- stimulating discussion and research to identify good practice in areas where current knowledge is sparse or inconclusive.

THE USE OF ZEBRAFISH HAS BEEN INCREASING YEAR-ON-YEAR

The resource can be downloaded free at: www.rspca.org.uk/zebrafish



Promoting refinement

Two new scientific reports aimed at reducing animal use and suffering were published in 2010. Both were produced under the auspices of the BVA AWF/FRAME/RSPCA/UFAW¹ UK Joint Working Group on Refinement (JWGR)².



- The first report aims to further the implementation of the **3Rs in batch potency tests used in vaccine production**³. A potency test is routinely performed on every batch of a vaccine, to demonstrate that the batch will be effective in preventing the disease in question and meet required potency standards. The test also provides checks on the consistency of the manufacturing process. However, the current batch potency test protocol involves challenging control (unvaccinated) groups of animals with the disease, which can cause substantial suffering. Alternatives to replace batch potency tests involving
- The second JWGR report of the year covers the **assessment of pain, suffering and distress in laboratory animals**⁵. Successful refinement clearly depends upon the ability to assess animal welfare effectively, and detect any signs of pain or distress as rapidly as possible, so that any suffering can be alleviated. However, there is still much reliance on subjective assessments of animals and new information on techniques for monitoring animals is often not reviewed and put into practice within individual establishments.

The JWGR report addresses this by setting out general principles for observing animals more objectively,

recognising and assessing indicators of pain or distress and tailoring these to individual projects. It reviews systems for recording indicators of suffering, including score sheets, and provides guidance on setting up practical protocols for monitoring animals that will effectively detect signs of suffering. A longer, online version of the report includes other topics such as disseminating information about welfare assessment and training those responsible for monitoring and assessing animals. The report is intended for all staff required to assess or monitor animal welfare, including animal technologists and care staff, veterinarians and scientists, as well as members of ethics or animal care and use committees.

For further information on either of these projects, please contact: research_animals@rspca.org.uk

FOOTNOTES AND REFERENCES

- 1 British Veterinary Association Animal Welfare Foundation/ Fund for the Replacement of Animals in Medical Experiments/Royal Society for the Prevention of Cruelty to Animals/Universities Federation for Animal Welfare.
- 2 www.rspca.org.uk/sciencegroup/researchanimals/implementing3rs/refinement
- 3 Jennings et al (2010) <http://dx.doi.org/10.1016/j.jbiologicals.2010.04.004>
- 4 www.edqm.eu
- 5 Hawkins et al (2011) <http://la.rsmjournals.com/cgi/content/abstract/45/1/1>



Developing good practice for local Ethical Review Processes

May 2010 saw the completion of the RSPCA's research animals department and LASA's Education, Training and Ethics Section¹ joint project aimed at developing 'good practice guidelines' on the roles, responsibilities and functions of the Ethical Review Process (ERP). The resultant report, **Guiding principles on good practice for local Ethical Review Processes** is now available to download from either the RSPCA or LASA websites at: www.rspca.org.uk/ethicalreview and www.lasa.co.uk respectively.

The project began in late 2008 with two workshops involving staff from around 50 research establishments, who had a diverse range of roles within their establishments and who were closely involved with the work of their local ERP. This facilitated the collection of many examples of good practice developed by establishments over the 10 years that ERPs had been in existence. These were then discussed and presented in an easy-to-use report format, providing information and ideas on what works well and what to avoid, with examples of specific activities that ERPs can undertake.

Though designed for the UK system, the guidance covers functions that will be part of the work of ethics and animal care committees worldwide. Its sectional format means that overseas readers can select those functions that are most appropriate to them, so the guidelines should prove useful on an international basis.

In the latter half of 2010, the role of the ERP came under scrutiny as the process of transposing the new EU Directive into UK law began. The Directive only requires an 'Animal Welfare Body' with a reduced membership, aims and functions, compared to UK ERPs. The RSPCA believes that the UK should retain the requirement for a local ERP with aims, functions and membership as currently set out. Many colleagues within the scientific community have expressed similar views and have stressed that the ERP encapsulates what any good establishment should be doing to promote high standards of animal welfare, enhance scientific achievements and generate a good culture of care.

This was clearly the view of participants in the **2010 RSPCA Lay Members' Forum**² which this year attracted nearly 80 participants to The Royal Society venue. The theme of the meeting was implementation of the 3Rs and how lay members can assist with this. Presentations explored: approaches to alternatives, reduction through statistics and good experimental design, understanding severity classification and assessing suffering through objective welfare assessment. A series of short presentations then looked at how different establishments tackle ERP Function 2: examining project licences, and the Forum had an update from the Chief Home Office Inspector regarding the EU Directive and its transposition into UK law.

Information regarding current resources of interest to ERP members can be found at: www.rspca.org.uk/ethicalreview or by emailing erp-laymembers@rspca.org.uk



FOOTNOTES AND REFERENCES

1 www.lasa.co.uk/s_ete.html

2 www.rspca.org.uk/sciencegroup/researchanimals/ethicalreview/eventsandnewsletters

THE ERP ENCAPSULATES WHAT ANY GOOD ESTABLISHMENT SHOULD BE DOING TO PROMOTE HIGH STANDARDS OF ANIMAL WELFARE, ENHANCE SCIENTIFIC ACHIEVEMENTS AND GENERATE A GOOD CULTURE OF CARE

Influencing decision makers

Scientific staff from the RSPCA's research animals department promote the Society's policies, aims and objectives through advocacy to government, statutory bodies, industry, academia and other organisations. They are members of many national and international committees and working groups, and also have expert input into a range of consultations, both to government and non-governmental bodies, on a wide range of laboratory animal issues. Staff have also produced papers on a variety of topics that have been published in peer-reviewed scientific journals.

Membership during 2010 included the following

- Home Office/BIS Steering Group on Better Regulation.
- Animal Procedures Committee (APC) – including member of the sub-committee on housing and husbandry of laboratory animals, and member of the working group reviewing the revision of the European Directive on animals in scientific procedures.
- Laboratory Animal Science Association – Education, Training and Ethics Section (as co-convener).
- European Partnership for Alternative Approaches to Animal Testing – Mirror Group.
- BVA AWF/FRAME/RSPCA/UFAW Joint Working Group on Refinement (the research animals department provides the secretariat for this initiative).
- The Boyd Group.
- UFAW 3Rs Liaison Group.
- Focus on Alternatives.
- Various ethical review processes in industry and academia.
- 4th Asian Federation for Laboratory Animal Science (AFLAS) Congress Meeting.
- Laboratory Animal Science Association (UK) Winter Meeting.
- 8th Joint Home Office, Society of Biology and Universities UK workshop – options for implementation of new European Directive.
- European Partnership for Alternative Approaches to Animal Testing (EPAA) – Annual Conference 2010.
- Home Office/Animal Welfare Stakeholders' meeting on transposition of the Directive.
- National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs) meetings – project funding.
- Society of Experimental Biology Annual Congress.
- Measuring Behavior 2010.
- The 3Rs in cancer research – Cancer Research UK event.
- Ethical issues and the 3Rs: refining animal models day – University of Oxford event.

Examples of meetings/events during 2010

- 11th Symposium of the Federation of European Laboratory Animal Science Associations (FELASA).
- New Visions in Science meeting on the 3Rs and their reporting in scientific literature – Danish Society for the Protection of Laboratory Animals event.



Robert Atkinson BSc MSc DPhil

Head of department until 29.10.10

Colin Booty BSc

Deputy head; Acting head from 1.11.10

Adam Grogan BSc

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Rupert Griffiths until 14.02.10

Andrew Kelly BSc PhD until 10.03.10

Lee Stewart BSc MSc from 14.06.10

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RSPCA wildlife centre managers

Sue Gallagher

Office manager

Tash Faulding from 27.07.10

Administration assistant

Wildlife

Badger cull

Despite growing public concern, the appreciation of the welfare needs of wild animals is often inadequate. The RSPCA wildlife department seeks to improve welfare provisions for captive and free-living wild animals. This is achieved through research, promoting an awareness of the requirements of animals, and an emphasis on a precautionary and humane approach to human interactions with wild animals.

The contentious issue of culling badgers to prevent the spread of bovine tuberculosis (bovine TB) to cattle continued to be the focus of much attention and activity – on both a scientific and political level, and at the interface between those two.

Research results on various aspects of bovine TB continued to appear in the scientific journals, with important papers on topics such as the continued monitoring of cattle data after completion of the badger culling trial and a study investigating the effect of vaccinating free-living badgers with BCG. Assessing these and their potential implications for policy – whether that of the RSPCA or the government's position – is important because the evidence base is not static!

The RSPCA expressed its disappointment when the coalition government scaled back the plans of the previous government regarding the implementation of a Badger Vaccine Deployment Project in England, restricting its use to one area of 100 square kilometres instead of six. In September, Defra announced the launch of a consultation on its proposal to issue licences to farmers/landowners who wish to cull and/or vaccinate badgers at their own expense. The RSPCA wildlife department produced a detailed, evidence-based response to the proposals, outlining concerns that implementing the proposed culling policy could increase the risk of disease spreading and cause suffering to badgers.

In Wales, the original plan by the Welsh Assembly Government to cull badgers in an area of north Pembrokeshire was withdrawn after the Badger Trust won a Judicial Review on the Statutory Order the government had passed to implement its plan. Subsequently, however, the government redrafted the Order and launched a new consultation to which the RSPCA produced another detailed response.

Wild animals in circuses

For many years, the RSPCA has pushed for a ban on the use of wild animals in circuses. Unfortunately, around 40 wild animals, including tigers, zebras and an elephant, continue to tour with circuses in the UK. The import of three elephants from Germany in 2009 also suggests the industry is looking to expand.

As we reported in 2007, the previous government promised to ban the use of some species in circuses but, due to numerous shortcomings in the process and despite extensive submissions from the Society and other welfare groups, it failed to deliver.

In December 2008, Defra issued a public consultation to canvas opinion. Three options were presented: a total ban of wild animals in circuses, statutory regulation and voluntary self-regulation. The RSPCA submitted a detailed response outlining why a total ban is required to adequately protect animal welfare. Out of nearly 13,000 responses received, an overwhelming 94 percent agreed, including veterinarians and zoo professionals.

Worryingly, in the latter part of 2010, Ministers made reference to a proposal



for self-regulation received from an industry body. As well as doing nothing to advance animal welfare, self-regulation would fail to deliver what the overwhelming majority of consultation respondents want, including the circus industry itself.

With such unequivocal results from the consultation, the Society had hoped for swift action from the new coalition government but, at the time of going to press, no decision has yet been made. An announcement is expected in early 2011.

AROUND 40 WILD ANIMALS, INCLUDING TIGERS, ZEBRAS, AND AN ELEPHANT, CONTINUE TO TOUR WITH CIRCUSES IN THE UK

Euthanasia of large cetaceans

When a juvenile female bottle-nosed whale was spotted in the Thames in 2006 it created a media sensation, with millions of people watching the drama of this animal's plight unfold over three days. Unfortunately, subsequent investigations have shown that the animal would have died, regardless of the rescue attempts, due to a build-up of myoglobin in her bloodstream. Myoglobin is an important oxygen and iron binding protein that is found in the muscles of most mammals, with particularly high concentrations found in diving mammals like whales. The physical impact of a heavy animal beaching causes trauma to the whale's body, resulting in the release of myoglobin into the bloodstream. This, along with the effects of dehydration which beached whales also suffer from, then causes irreversible damage to the kidneys.

Post-mortems of northern bottle-nosed whales, and other similar species, have shown that they all died – or would have died had they not been euthanised – of kidney failure. The Marine Animal Rescue Coalition (MARC), of which the RSPCA is a member, therefore took the difficult decision that all stranded large

toothed whales should be euthanised at the earliest opportunity, to prevent further suffering.

Work is now underway to find the most humane method of euthanising these animals. This needs to take into account the circumstances of the stranding, especially if large numbers of onlookers are present. The RSPCA is working with MARC and the Institute of Zoology on this research and we hope that the post-mortem findings that led to this decision will be published in due course.



Compassionate conservation

As an animal welfare organisation, the RSPCA is primarily concerned with individuals rather than populations; but it is vice versa for conservationists. This difference in priorities can sometimes lead to conflict between the two fields but they are not necessarily mutually exclusive. At a basic level, it could be argued that the survival of a population depends on the well-being of individuals within it.

Welfare should be an integral consideration when developing conservation strategies. Historically there has been little collaboration between conservationists and welfarists but, in September, members of the wildlife department attended a Compassionate Conservation Symposium held in Oxford. Hosted by the Wildlife Conservation Research Unit (WildCRU) and the Born Free Foundation, this meeting aimed to stimulate debate and promote dialogue between scientists and practitioners on animal welfare issues in conservation. The conference was organised around four themes: animal welfare in field conservation; captive animal welfare and conservation; international trade in live wild animals; and conservation consequences of wildlife rescue, rehabilitation and release. Wildlife department staff gave presentations on wild animal rehabilitation as a model for reintroductions, the ethics of keeping animals in zoos, and welfare implications of international trade in live animals.

Welfare and conservation may clearly overlap on issues such as the trade in exotic pets but compassionate conservation has a potentially important role to play in the UK, including reintroductions of native species such as dormice and beavers, management of wildlife such as deer, and research (for example, radio-collaring of water voles).



RSPCA wildlife centres review

The centres continue to strive for a better understanding of the casualties in their care. Numerous research projects have been undertaken this year to investigate post-release survival in several species. Techniques such as radio tracking are used, as well as simpler methods such as marking – for example, ringing birds and relying on re-sightings for information on how long these animals survive and how far they have travelled.

Some of this work is carried out in conjunction with the wildlife department and has been promoted widely at various conferences and symposia. In addition, the wildlife department and centres continue to develop species rehabilitation protocols, based on best practice and sound science.

RSPCA EAST WINCH WILDLIFE CENTRE



Corkscrew injuries to seals

During July 2010, the RSPCA East Winch Wildlife Centre was approached by Norfolk police to assist in the investigation of unusual mortality of common seals being found on the north Norfolk coast. Several bodies were brought to the centre and thorough forensic post-mortem examinations were performed to determine the cause of death. All had identical injuries, with the skin sliced off the body in a distinctive corkscrew-shaped pattern. It became apparent that similar injuries had occurred in seals in Scotland, Northern Ireland and Canada.

An international collaboration with other marine mammal experts ruled out deliberate killing or predation and concluded that the

injuries were being caused by certain ships or boats, equipped with modern encased propellers such as the Kort nozzle or a type of azimuth thruster, operating in shallow coastal waters. Such systems are common to a wide range of vessels including tugs, self-propelled barges and rigs, various types of offshore support vessels and research boats.

Further investigation is ongoing to precisely identify the type of vessels involved

and what measures can be taken to prevent future seal deaths. In order to do this, it is necessary to determine the reasons why seals are attracted to the propellers; are they lured towards particular vessels because of prey associated with them or in response to an acoustic cue created by the propeller?

Further details can be found in the preliminary report at: www.smru.st-and.ac.uk/documents/366.pdf



RSPCA MALLYDAMS WOOD WILDLIFE CENTRE



Investigating radio tag attachment methods for the juvenile little owl (*Athene noctua*)

In the 2006 *Science Group Review*, we reported on the use of tail-mounted radio tags in order to assess juvenile little owl survival following release. Three further years of tracking have been undertaken and two methods investigated to find the most appropriate attachment that considers both animal welfare and the collection of sufficient survival data.

Following a period of artificial rearing, 19 juveniles were fitted with TW-4 tail-mounted tags and released within areas of favoured little owl habitat, including grazed farmland and orchards. Eleven individuals were soft released and were quick to disperse. With none returning for support feed, the remaining owls were hard released.

Following tagging, no adverse behavioural effects were evident, although premature tag-shedding did occur, limiting the number of subjects tracked. Tracking was also restricted by signal loss, either through tag failure or owl dispersal.



As a result of insufficient data collection, in 2009 Ag393 leg mounts were fitted to a further seven hard released individuals. These were quicker to fit, so decreased handling time and, despite initial fitting problems, appeared to be better tolerated. All leg tags remained attached, although signal was lost on one. The table below shows an overview of survival data collected.

Both tag attachments confirmed independent survival following release, with leg mounts allowing for greater data collection. Further investigation is necessary in order to understand overall survival. Continued tracking using leg mounts is therefore recommended.

Overall comparison of survival data collected using both tail- and leg-mounted tag attachments

OUTCOME	TAIL-MOUNTED TAGS		LEG-MOUNTED TAGS	
	Number (n=19)	Mean days before tracking ceased*	Number (n=7)	Mean days before tracking ceased*
ALIVE	4	36.3	2	127.5
PREDATED/KILLED	4	7.4	4	8.0
SIGNAL LOSS	4	4.8	1	12.0
TAG LOSS	7	4.0	0	0.0

* Tracking ceased either due to bird death, tag being shed, signal loss or completion of study.

RSPCA STAPELEY GRANGE WILDLIFE CENTRE



Factors affecting the likelihood of release of injured and orphaned wood pigeons (*Columba palumbus*)

We investigated the reasons for admission and outcomes for 2,653 wood pigeons brought to Stapeley Grange between 2005 and 2009.

Reasons for admission varied, with the most common reason for adults (33 percent) and juveniles (38 percent) being 'injury (cause uncertain)' and 'orphan', respectively. Twenty-one percent of adults and 16 percent of juveniles had been attacked by cats. Sixty-five percent of adults and 37 percent of juveniles were euthanised within 48 hours of admission to prevent further suffering. Only 14 percent of adults and 31 percent of juveniles were

released back to the wild. The remainder were either euthanised more than 48 hours after admission or died in care despite treatment.

Unlike body condition on admission, age, weight on admission and severity of symptoms were significant factors in determining the likelihood of release.

The percentage of adults and juveniles euthanised within the first 48 hours increased over the five-year period, from 54.6 percent to 75 percent and 26.5 percent to 39.1 percent, respectively. This indicates that triage has improved over the five-year period and those birds unlikely to survive to the release stage were identified sooner.

In 2007 and 2008, there was a reduction in the median number of days in care for those birds euthanised more than 48 hours after being admitted, possibly due to the introduction of radiography for all birds on



admission. Leg band recovery data for 15 birds revealed post-release survival ranging from 21–2,545 days (median = 231 days) compared to 1–2,898 days (median = 295) for non-rehabilitated birds. The data suggests that rehabilitated juveniles were able to survive independently following release.



The post-release survival and dispersal of rehabilitated juvenile Eurasian badgers (*Meles meles*)

For many years, rehabilitators have sought badger-free areas to release orphaned badger cubs but this has become increasingly difficult. Therefore West Hatch Wildlife Centre has been investigating the survival of badger cubs released into 'dispersal sites', where badgers are known to be in the vicinity.

Between 2005 and 2009, 16 cubs were released in four groups at two 'dispersal sites'. They were fitted with radio collars and tracked until they died or their signal was lost.

Results show all four groups separated and dispersed within four weeks of release. Of the 16 badgers tracked, nine died within the first four months (five in road traffic collisions and four from unknown causes), five radio signals were lost and one slipped its collar before release. One cub is still alive after 300 days (at 1st December 2010).

Using Kaplan-Meier survival estimates, only three badgers (19 percent) survived post release. Survivorship curves show that overall median survival was 100 days (95 percent CI 49.74–150.26). Males fared worst, with estimated survival of zero percent compared to females at 32.5 percent with median survival times of 71 days (95 percent CI 38.1–103.8) and 103 days (95 percent CI 53.79–152.21) respectively.

Results indicate that badger cubs are poor candidates for this type of release, possibly due to the complexities of group living.

Important questions remain: are badger-free sites best? Would cubs do better released at an earlier age? Should they be reared in groups? We will continue this research into their survival.



INVESTIGATING THE POST-RELEASE SURVIVAL OF REHABILITATED BADGER CUBS

Photo: Richard Thompson, Mallydams Wood Wildlife Centre

Influencing decision makers

Scientific staff from the RSPCA's wildlife department promote the Society's agreed policies, aims and objectives through advocacy to government, statutory bodies and other organisations at the highest level. They are members of many national and international committees and working groups and also have key input into a range of consultations, both to government and non-governmental bodies, on a wide range of wildlife issues.

Below is a small selection of the committees, meetings, events and consultations in which wildlife staff have participated during 2010:

Representation on external committees

- Animal Welfare Network (Wales).
- Ashdown Area Deer Group.
- British Wildlife Rehabilitation Council (BWRC) steering committee.
- International Wildlife Rehabilitation Council (IWRC) symposia committee.
- Marine Animal Rescue Coalition (MARC).
- Species Survival Network (SSN) board (until November 2010).
- The Deer Initiative.
- The Mammal Society.
- Whalewatch coalition.
- Wildlife and Countryside Link (Trustee until November 2010).
- Wildlife and Countryside Link Whale working group.
- Wildlife and Countryside Link Wildlife Trade working group.
- World Conservation Union's Otter Specialist Group.
- Zoos Forum.

Consultation responses

Defra

- The use of wild animals in travelling circuses.
- A badger control policy in relation to bovine tuberculosis.

Natural England

- Informal consultation: wildlife general licences.

Welsh Assembly Government

- An issue paper on wild deer management in Wales.
- Badger control in the Intensive Action Area.
- Informal consultation: wildlife general licences.

Meetings and events

- 15th meeting of the Conference of the Parties to the Convention on International Trade in Endangered Species of Flora and Fauna (CITES), 13–25 March in Doha, Qatar.
- Eurogroup wildlife experts' meeting in Brussels, Belgium to review Eurogroup's wildlife policies, EU Invasive Species Strategy, sanctuary guidelines and other wildlife issues.
- Compassionate Conservation Symposium, Oxford University. Presentations made by staff on wild animal rehabilitation as a model for reintroductions, the ethics of keeping animals in zoos for conservation purposes, and welfare implications of international trade in live animals.
- Meeting with RSPCA Australia's chief scientist to discuss wildlife welfare issues faced by both organisations.
- Meeting with the Welsh Assembly Government about wildlife issues.
- Meeting with Minister of State for Agriculture and Food, regarding badgers and bovine tuberculosis.
- Meeting with Parliamentary Under Secretary of State, regarding wild animals in circuses.
- Meetings with non-governmental organisations (NGOs) and local authority representatives about updating a guidance document on licensing pet shops and other sellers.
- International Wildlife Rehabilitation Council conference in Albuquerque, New Mexico. An RSPCA co-sponsored event with presentations by staff on the importance of animal welfare in wildlife rehabilitation.
- Presentations at The Badgers' Trust conference and the British Wildlife Rehabilitation Council conference on the post-release survival and dispersal of rehabilitated juvenile Eurasian badgers (*Meles meles*).
- Deer Management Conference 2010.
- Deer Initiative Partnership meetings: Swindon and Oxford/Wytham Woods. Discussion of recent deer management activities by organisations and a visit to discuss research and illustrative issues arising on a specific site.
- Meeting of NGOs to discuss issues relating to cetaceans in UK waters.
- Meeting with other member organisations of MARC to review current practice and discuss procedures for euthanasia of large stranded cetaceans around the UK.

- Sea Alarm meeting at Mallydams Wood Wildlife Centre. Representatives from various European oiled wildlife rescue organisations met to discuss contingency planning for large oil spills within Europe and further afield.
- Symposium on crustacean sentience to discuss current research into humane dispatch methods and the ability of these animals to feel pain.
- UFAW symposium on wild bird care in the garden; poster prepared by staff on the numbers of birds caught by cats that were admitted to RSPCA wildlife centres.
- Meeting with Pest Management Alliance to discuss glue boards and other issues.
- Campaign Against Illegal Poisoning Stakeholder meeting, in which there was a review of recent campaign-related work and proposed action.

External funding

- Research into the effect of tags on rehabilitated and released seabirds, Swansea University. Jointly funded by the RSPCA and Oiled Wildlife Care Network.
- Research into the survival of hedgehogs during hibernation, Reading University. The RSPCA has contributed radio transmitters to this project for tracking the hedgehogs.
- Review of the humaneness of rat and mole traps, Wildlife Conservation Research Unit, University of Oxford.

Scientific publications

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- Couper D and Gibbons L M. (2010) *Tetrameres* species parasites in tawny owls (*Strix aluco*). *The Veterinary Record* 167(7):258–259.
- Couper D, Margos G, Kurtenbach K and Turton S. (in press) Prevalence of *Borrelia* infection in ticks from wildlife in south-west England. *The Veterinary Record*.
- Dowding C V, Shore R F, Worgan A, Baker P J and Harris S. (2010) Accumulation of anticoagulant rodenticides in a non-target insectivore, the European hedgehog (*Erinaceus europaeus*). *Environmental Pollution* 158(1):161–166.
- Griffiths R, Murn C and Clubb R. (2010) Survivorship of rehabilitated juvenile tawny owls (*Strix aluco*) released without support food, a radio tracking study. *Avian Biology Research* 3(1):1–6.
- Kelly A, Scrivens R and Grogan A. (2010) Post-release survival of orphaned wild-born polecats (*Mustela putorius*) reared in captivity at a wildlife rehabilitation centre in England. *Endangered Species Research* 12(2):107–115. (doi:10.3354/esr00299).
- Kelly A, Leighton K and Newton J. (2010) Using stable isotopes to investigate the provenance of a Eurasian eagle owl (*Bubo bubo*) found in Norfolk, England. *British Birds* 103:213–222.
- McConnell B, Morrison C, Sparling C, Sadler L, Charles A and Sharples R. (in press) Post-release dive ability in rehabilitated Harbour seals (*Phoca vitulina*). *Marine Mammal Science*.



Photos: Joe Murphy, E.A. Jones, Andrew Forsyth x2/RSPCA photolibrary



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