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Biological Sciences Newsletter

Riseholme Hooks International Research Project

Two academics from the Department of Biological Sciences have netted a huge research project with the Environment Agency to record the long-term movements of bream in the River Witham.

Dr Paul Eady, Reader in Behavioural Ecology, and Dr Charles Deeming, Senior Lecturer in Conservation Biology, are working alongside Chris Gardner (pictured) of the Environment Agency to record fish movements and habitat use throughout the rivers in Lincolnshire, in order to inform river habitat improvement schemes.

"This is truly groundbreaking research into the secret lives of lowland river fish," said Paul (pictured). *"The lowland reaches of the River Witham are typical of many river systems in that they have been highly modified for purposes of drainage and flood control. These changes in river morphology can present many challenges to the fish population, including a reduced ability to access specialised habitats for spawning and refuges during periods of high flow."*

"Apart from the practicalities of tagging and monitoring the fish, one of the main challenges has been the analysis and interpretation of more

than 3 million pieces of data. However, we have uncovered some fascinating insights into the behaviour and ecology of bream in the Witham which can be used to inform the management of this important lowland river habitat."

"Given that it is difficult to see what the bream are doing under water, we have utilised acoustic telemetry to identify where individual fish are 24 hours a day, seven days a week. One of the surprising findings is that a number of bream make substantial journeys of around 20km in around one day, with one fish travelling just short of 120km within a month."

The project was launched in 2006 using just 7 bream. Since then, more than 80 adult bream, weighing between 1.8 and 3.2 kg (4lb to 7lb), have been tagged. The survey is taking place on a 40km stretch of the River Witham between Bardney lock, near Lincoln, and the Witham's tidal limit at Boston. The tags on the fish emit ultrasonic signals to 27 fixed receivers along the length of the river.

The study has identified that most activity happens in spring and that the fish congregate en-masse in certain areas of the river over winter ●



Paul Eady pictured on the banks of the River Witham

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Chris Gardner returning a tagged bream to the main river at Bardney



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Do Dogs Get Down in the Dumps?

An MSc student has been seeking canine volunteers to take part in what is believed to be the first study to link dogs' recovery from a behaviour problem to a scientific assessment of their emotions.

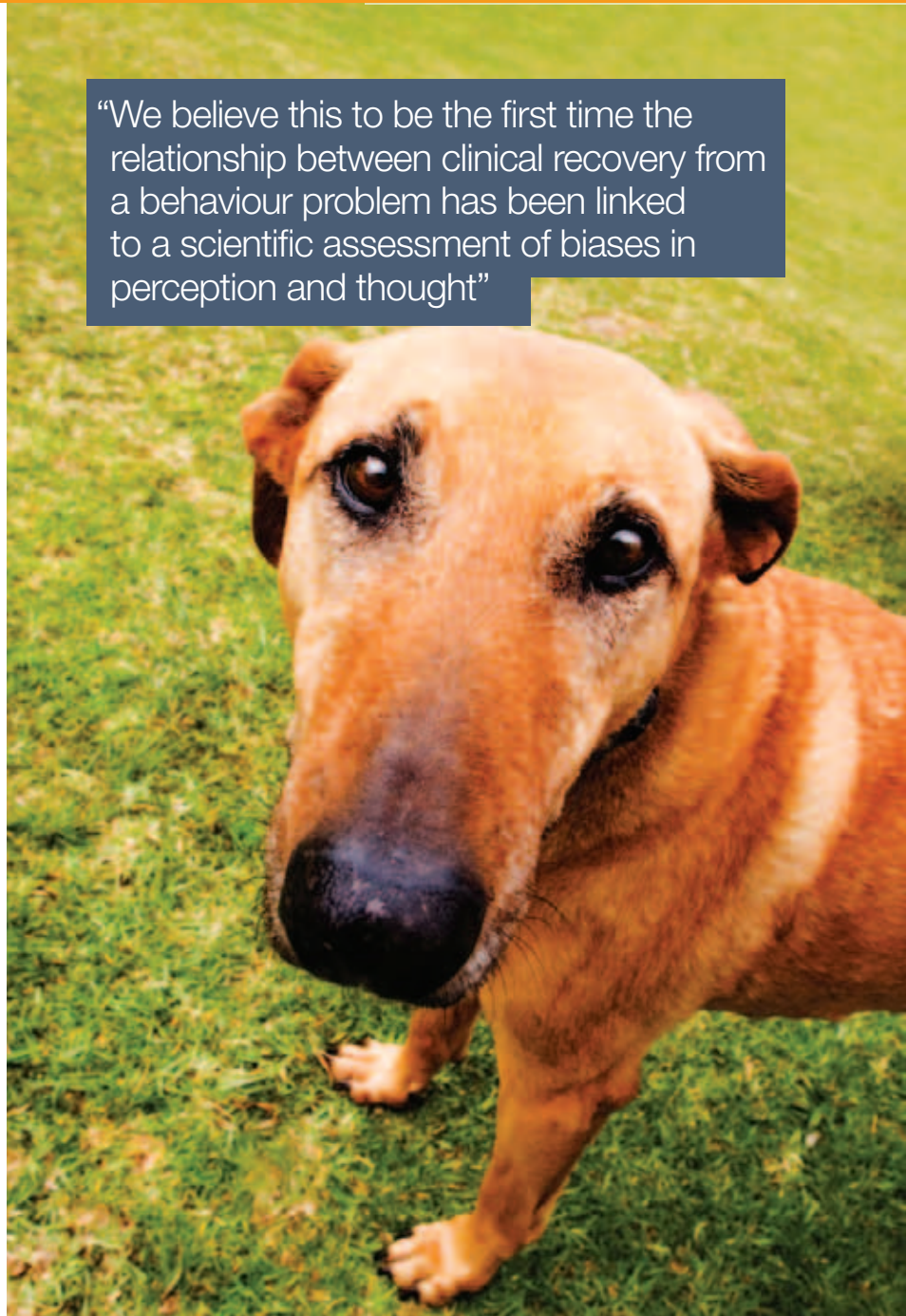
Veterinary surgeon, Christos Karagiannis, is undertaking the research as part of his Masters degree in Clinical Animal Behaviour, under the supervision of Professor Daniel Mills, one of the world's leading authorities on companion animal behaviour problems.

Christos said: *"It is well known that happy people are more likely to emphasise the positive aspects of an ambiguous context, relative to sadder or more anxious people. On the other hand, people in negative emotional states attend more to threats, retrieve negative memories, and make negative judgments about stimuli more than happier people. Putting it simply, people who are happy tend to 'look on the bright side' whereas anyone experiencing a stressful time or feeling 'down' will tend to see everything negatively."*

"We want to find out if this is the same for dogs. To do this we need to devise methods of investigating it scientifically."

The study seeks to tie together not just the emotions of dogs suffering from a specific behaviour problem commonly known as separation anxiety, but also to monitor it during recovery. Christos said: *"If you find that when you leave your dog for any length of time it howls or whines, or scratches and chews at objects or furniture, it's very likely that it is suffering from separation anxiety."* ●

"We believe this to be the first time the relationship between clinical recovery from a behaviour problem has been linked to a scientific assessment of biases in perception and thought"



Bursary Funds Beetle Fertility Study

Drs Paul Eady and Rachel Neville have secured a Nuffield Science Bursary for Richard Sands, a 2nd year BSc Conservation Biology student, to study the relationship between antioxidants and sperm function.

Sperm cells are thought to be highly vulnerable to oxidative stress, resulting in poor sperm function and a reduction in male fertility. A recent study in birds has shown a link between carotenoid supplementation (a known antioxidant) and increased sperm quality. To test the ubiquity of this relationship, the team is going to examine sperm quality in control and carotenoid supplemented beetles belonging to the genus, *Bruchidae*. Sperm quality will be assayed via sperm competition experiments - essentially females will mate with both control and carotenoid supplemented males, with the male fertilizing the most ova being judged to have the best sperm. ●



Game Bird Study Produces Positive Results for Welfare

Dr Charles Deeming and Professor Jonathan Cooper secured funding to employ Holly Hodges (a Conservation Biology graduate in 2009) as a research assistant to examine the effects of environmental enrichment on the welfare of pheasants.

Funded through a combination of money from the Game Farmers' Association, Marsden's Game Feeds and the Universities Federation for Animal Welfare, the project was carried out over the spring and early summer of 2010 on a commercial game farm near Newark. The effects of straw bales and metal sheets as sight barriers in the breeding pens (see picture) were examined in relation to bird health, welfare, behaviour, and reproductive performance.

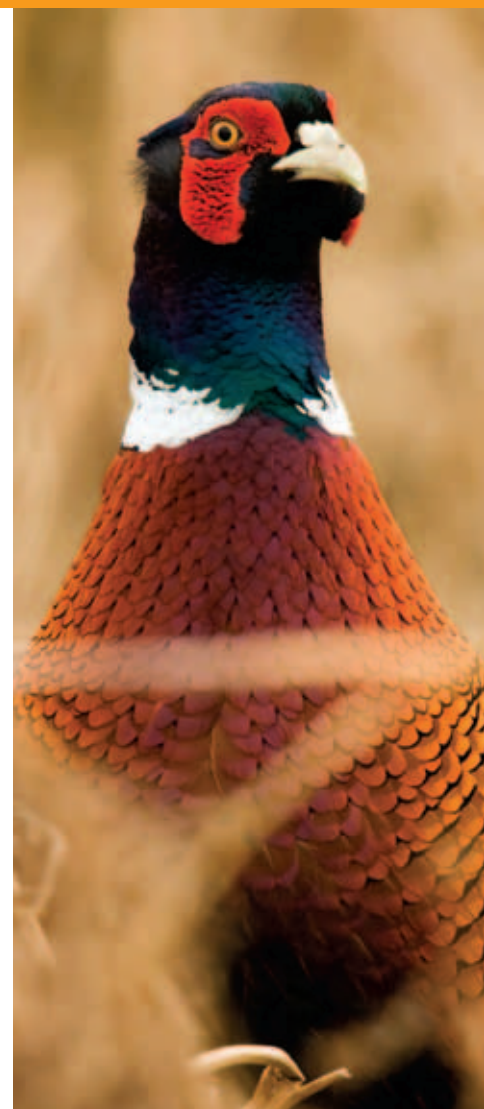
Results showed that the barriers reduced damage to the birds' plumage and reduced the level of aggression observed in both male and female pheasants. This improvement in welfare was accompanied by an average of 3% increase in fertility in the barrier pens, which meant a 2.7% increase in hatchability.

The presence of barriers not only improved the environment for the birds but also increased productivity and profitability of the game farm. It is hoped that this link will encourage other game farmers to adopt this simple system of environmental enrichment.

This research project provided insights into the basic behaviour of pheasants, their welfare requirements, and helped develop research links with this rarely studied aspect of agricultural production. ●



Straw bales and metal sheets as sight barriers in the breeding pens



Spatial Needs of Pet Rabbits

Professor Jonathan Cooper has recently presented a report to the RSPCA on the results of a study to investigate the spatial needs of pet rabbits, to help inform the advice the RSPCA gives to rabbit owners.

The RSPCA awarded a £50,000 research grant to the University of Lincoln, so that Professor Jonathan Cooper, Dr Laura Dixon and Jessica Hardiman could investigate the effects of enclosure size on rabbit behaviour. At present there are no legal minimum standards of pet rabbit housing, and conventional hutches can lead to restrictions on movement, rearing and even lying fully stretched out. Restriction on movement can lead to poor body condition and ill health, whilst housing in a small enclosed hutch may increase fearfulness of human contact. For these reasons, the University of Lincoln has housed its rabbits in large, open, environmentally enriched floor pens for many years, and the aim of this study was to assess the benefits of larger enclosures as well as inform RSPCA guidelines on rabbit housing.

The University used its resident population of pet rabbits, plus rabbits loaned by students and local owners to cover the range of sizes of rabbit breeds. Their behaviour was recorded 24 hours per day in enclosures that represent the average 1.5 x 0.6m hutch, and in larger enclosures of 1.8 x 0.9m and 1.8 x 1.8m. The effect of varying enclosure heights from 45cm (the average height of hutches) to heights of 60 and 90cm was also investigated.

The study concluded that traditional rabbit housing may jeopardise rabbit welfare, a report which coincided with Rabbit Awareness Week earlier this year. Results suggested that larger enclosures increase time spent hopping and time spent lying on side, whilst taller enclosures allow more rearing. In the traditional hutch sized enclosures, rabbits occupy smaller areas when sitting, lying and rearing, suggesting that they can not adopt the full range of natural postures in smaller enclosures. The research also looked at how hard the rabbits work for additional floor space and the effects of enclosure size on stress physiology. ●



Rare Breeds at Riseholme

Riseholme welcomed three new foals to its family this summer.

Bracken was the first foal to be born at Riseholme this year, in April. He is a Cleveland Bay and is a rare breed horse – so rare in fact that the breed is on the endangered species list. It is believed only 500 Cleveland Bay horses exist worldwide.

Emily Williams, Stud Groom at Riseholme, said *“We tend to have two or three foals a year, some part bred and some pure bred. Bracken (pictured) is Nettle’s second foal and she is already pregnant for a new foal next year. Horses have an 11 month term of pregnancy so she is likely to give birth again this time next year.”*

Max was the second foal to be born, at the end of May, out of a home bred mare, Lindon Minerva (Hope) by a thoroughbred stallion Groomsbridge May I. He was closely followed by Petal, a filly out of Bright Poppy by the University’s Cleveland Bay stallion Lindon Principal.

Emily comments, *“The breeding programme here forms an essential part of the student’s learning experience. They have foaling duties and spend time handling young stock and foals. They also learn about the insemination process.”*

Cleveland Bays originated in England during the 17th century and are named after the Cleveland district in Yorkshire. They are thought to be the oldest established horse breed in England, and were originally bred specifically as pack horses. The Royal family has a close connection with the breed and has used them to pull the royal carriage. ●



“The breeding programme here forms an essential part of the student’s learning experience. They have foaling duties and spend time handling young stock and foals. They also learn about the insemination process”

Exciting Equine Courses at the University of Lincoln

The higher education equine programmes at the University of Lincoln are benefitting from new content, and new programmes have been introduced to train the horse industry employees of the future.

New themes have been introduced to full-time BSc programmes. Equitation science is a relatively new discipline which looks at how a firm under-pinning knowledge of equine behaviour and learning theory can enlighten horse trainers, giving them the science behind their training methods. Daniel Mills, Professor of Veterinary Behavioural Medicine and co-author of *Equine Behaviour: Principles and Practice* said, *“We are not trying to change the way horses are trained for change’s sake but we want to give trainers the scientific principles so they can apply their methods, in what ever approach works for them, more effectively to the benefit of the horse.”*

Several new programmes have been introduced, including the foundation degree in Equine Management and Training. This two year vocational programme is designed to produce competent graduates that will have a good understanding of the equine industry.

To support these academic developments, there has been further investment in resources at the Riseholme campus where the programmes are taught. As well as the yard of more than 50 horses and the facilities required to manage and work them, the high speed treadmill is a highly valued resource and the University has just purchased a fully interactive mechanical horse. ●

Student Success

We like to keep in contact with our students once they have completed their course at Lincoln, and here are a few highlights of what some of our alumni are up to now.

Evelyn Guyett

Course: Animal Behaviour Science

Graduated: 2006

Working at London Zoo, Evelyn has had the opportunity to travel to Antarctica to assist on a conservation research project, collecting feather samples to track the migration of populations of Gentoo, Chinstrap and Adelie penguins. This was a project based at the Zoological Society of London. Evelyn has also just completed an ANC in the Management of Zoo Animals (Sparsholt College and set up by ABWAK, the Association of British and Irish Wild Animal Keepers).

Emily Newport

Course: Animal Behaviour Science

Graduated: 2005

Emily has set up her own business using complementary therapy (energy healing), where she works alongside veterinary treatment to improve the health and wellbeing of animals. Her business also runs a number of workshops and short courses including the first academic course in the country to teach people to become fully qualified Animal Healers (BTEC Professional Diploma in Animal Healing). Emily is also a part-time lecturer, teaching animal management and animal science, and is about to start studying for an MSc in Parapsychology.

Claire Mitchell

Course: Animal Management and Welfare

Graduated: 2006

As Regional Development Assistant for Cats Protection, Claire ensures that the network of fosters in the London region follow all cat care standards, and heads up volunteer recruitment in London.

Delphine Suty

Course: Conservation Biology (*Animal Behaviour*)

Graduated: 2008

Delphine worked for Natural England in Nottingham before moving on to work for Sites of Special Scientific Interest at the Lincoln office. Her role involves site visits to assess for biodiversity and features of interest, before discussing management options with the land owners.

Sophie Bennett

Course: Conservation Biology (*Animal Behaviour*)

Graduated: 2008

Having worked for over a year for the Institute of Environmental Management and Assessment base in Lincoln, Sophie joined Biological Sciences in the autumn of 2009 as a PhD student to study the relationship between hedgerow structure and invertebrate biodiversity.

Holly Hodges

Course: Conservation Biology (*Animal Behaviour*)

Graduated: 2009

In the summer of 2009, Holly did an internship in Biological Sciences working with Jonathan Cooper on a project studying behaviour of free-range chickens. Over the spring of 2010, Holly was a Research Assistant working with Dr Charles Deeming and Professor Jonathan Cooper on the project examining the effects of sight barriers on the behaviour, welfare and reproduction of pheasants.

Anna Pyrah

Course: Equine Science

Graduated: 2009

Anna works as an equine nutritionist for The Pure Feed Company, and has recently formulated the company's first joint supplement. Her role also involves writing articles and editorials for magazines, and generating feeding plans for customers.

Simon Daniels

Course: Equine Science

Graduated: 2007

After 2 years of working for Allen and Page, Simon moved to Wales to run a parasitology laboratory as a KTP Associate with the Philip Leverhulme Equine Hospital, the University of Liverpool and EPLA Ltd (Intelligent Worming). Simon post will also involved him studying towards a NVQ Level 4 in Management and a Masters by Research.

Laura Steley

Course: Equine Sports Science

Graduated: 2010

Laura works at Shadwell Stud on their racehorse rehabilitation yard, and is responsible for the riding, swimming, treadmill use and cold water spa, as well as assisting with physiotherapy and medication.

You can see full details on our website at:
www.lincoln.ac.uk/dbs/studentsuccess.htm

New Senior Lecturer in Animal Sciences

We welcome Dr Oliver Burman to the Faculty, who started in his post earlier this year as Senior Lecturer in Animal Behaviour and Welfare.

The University has funded a number of posts across the institution using monies secured through our success in the last Research Assessment Exercise (RAE). Oliver will play a key role in helping to build the research capacity of the University in readiness for our submission to the next Research Excellence Framework (REF). ●



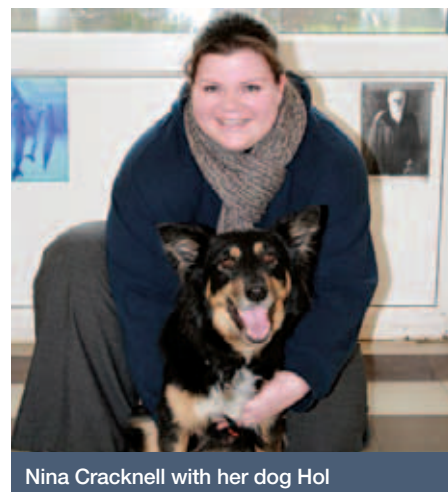
PhD Success for Postgraduate Researchers

Three of our postgraduate researchers have become doctors this summer, after successfully defending their PhD theses.

Nina Cracknell recently completed her PhD thesis, for which she carried out an investigation into the use of homeopathy in dogs that are sensitive to firework noises. Nina undertook a series of clinical trials in order to systematically test whether any specific effect of a homeopathic remedy could be found for this behavioural problem. A further aspect to the project looked at whether the type of behavioural signs shown by a noise sensitive dog can predict how severe the owner considers their dog's noise sensitivity to be.

Emma Hardy obtained university funding to study at the University of Lincoln where her chosen subject was 'Protein profiling in equine skeletal muscle and erythrocytes.' Glycogen storage disorders (GSDs), associated with protein defects, have been diagnosed via blood or skeletal muscle analysis in humans. Indeed, the clinical signs of some GSDs appear consistent with those of the equine disorder exertional rhabdomyolysis, yet the human - equine link has received little attention. Thus, Emma's work has provided an insight into 'normal' equine tissue protein content to enable further investigations into equine GSDs. Emma is now devoting her time to equine nutritional supplements, and we wish her every success in this new career.

Claire Corridan successfully defended her PhD thesis on "The Role of Owner Expectation in the Development of a Successful Human:Dog Bond". Her external examiner, Dr Simona Normando from the Veterinary Faculty of Padua, commended Claire on the quality of her work. ●



Nina Cracknell with her dog Hol

New Chair in Animal Behaviour and Welfare

Jonathan Cooper of the Department of Biological Sciences has been appointed Professor of Animal Behaviour and Welfare in recognition for his contributions to animal welfare research.

Professor Cooper has worked on a number of challenging projects including the causes and effects of abnormal behaviour and the behavioural requirements of captive animals, studying a wide range of laboratory, farm and companion animals. Professor Cooper said,

"I look forward to continuing to work with pet species such as rabbits and dogs and to expanding our work in more traditional areas of animal welfare research, particularly the welfare of farmed animals such as laying hens, ducks, pigs and cattle." ●