ANIMAL WELFARE SCIENCE CENTRE

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SCIENCE CENTRE

Australian Poultry Welfare Research Seminar

OCTOBER 29TH 2010

LECTURE THEATRE

DPI ATTWOOD

Program

10.00 **Paul Hemsworth**, Director, AWSC, The University of Melbourne
Introduction

10.15 **Phil Glatz**, SARDI
Update on beak trimming research and alternatives

11.00 **Joanna Engel**, AWSC, The University of Melbourne
Non-invasive measures of stress in poultry

11.30 **Greg Cronin**, The University of Sydney
Nest boxes for laying hens and their effects on hen behaviour and stress physiology

12.15 *LUNCH*

13.00 **Lauren Edwards**, AWSC, The University of Melbourne
Opportunities to improve the human – animal relationship in poultry

13.45 **Peter Groves**, The University of Sydney
Lameness in meat chickens

14.30 Close

Update on beak trimming research and alternatives

Phil Glatz, Senior Research Scientist, Welfare Research
South Australian Research and Development Institute

Abstract:

Beak trimming

The infrared method of beak trimming developed in the USA is an innovative procedure and is the most popular method of beak trimming worldwide. The treatment involves the use of an infrared energy source to treat the beak. Immediately following treatment, the beak looks physically the same as it did before and the bird is able to continue to use its beak. Welfare and production aspects of the infrared process were examined to determine if the method was sustainable compared to hot blade beak trimming. Mortality of layers trimmed with the infrared method is relatively low indicating the method is acceptable for use in Australia to control cannibalism. However further refinement of the infrared method is required to reduce the incidence of neuromas in the beak stump.

Alternatives to beak trimming

In the EU the risk of feather pecking in free range layers can be reduced by allowing bird's access to an outdoor range which provides vegetative and artificial cover. Work was undertaken in Australia to examine if alternative methods could be used to avoid beak trimming or at least to eliminate the need for re-trimming. More birds were attracted into the outdoor range when they were provided pasture, shaded areas and shelter belts. Landscape architects should be utilised to design outdoor range areas which cater for the behavioural needs of birds to reduce feather pecking.

A range of different products were examined to determine if they could be used as repellents in poultry to suppress feather pecking. Initial exposure of chicks to repellents associated with feathers resulted in a reduced incidence of cannibalism and should be considered as another option in a multiple strategy approach to achieve a reduction in cannibalism in commercial poultry.

Notes:

Non-invasive measures of stress in poultry

Joanna Engel, PhD Student, AWSC
School of Land and Environment, The University of Melbourne

Abstract:

One of the most accepted ways of measuring stress in animals is by measuring corticosteroids, particularly corticosteroids in the plasma of the animal. However, blood sampling of laying hens using the most common procedure, venipuncture of the brachial vein, is invasive and can potentially cause a rapid corticosteroid response if the sample is not collected quickly enough.

In laying hens, corticosterone can be measured non-invasively in both the egg and faeces. Most studies investigating non-invasive measures of stress have studied the relationship between non-invasive measures of corticosterone and plasma corticosterone following an intra-muscular injection of adrenocorticotropic hormone (ACTH) to induce a maximal response of corticosterone. In contrast, this study aimed to study the relationship between non-invasive measures of corticosterone and plasma corticosterone in conditions in which modest differences in baseline corticosterone concentrations were expected, that is, between hens of different ages. HyLine brown laying hens (n=154) of two ages (34 and 47 weeks) were housed in groups in cages in two commercial poultry sheds. Plasma was collected from each bird on the 1st day of the study, and eggs and faeces were collected on this 1st day as well as the 3rd and 4th days. Plasma, egg and faeces samples were pooled for each cage on each day and analysed for corticosterone concentration.

There were few significant correlations between non-invasive measures of stress and plasma corticosterone. While the predicted differences in corticosterone concentration between hens of different ages were observed to be significant in some but not all measures, the lack of relationships between plasma corticosterone and the various non-invasive measures of stress in laying hens clearly warrant further investigation. In particular, these relationships should be studied under conditions in which differences in baseline concentrations are expected, such as birds of different ages or birds exposed to the presence and absence of chronic stressors, rather than under conditions in which large corticosterone changes are expected such as following an ACTH challenge.

Notes:

Nest boxes for laying hens and their effects on hen behaviour and stress physiology

Greg Cronin, Lecturer in Animal Behaviour and Animal Welfare Science
Faculty of Veterinary Science, The University of Sydney, Camden NSW 2570

Abstract:

The pre-laying behaviour, egg laying characteristics and stress physiology of Hy-Line Brown laying hens were studied in a series of experiments, to investigate the importance of nest boxes for the welfare of laying hens in cages. Four experiments were conducted, although only the results from the first (main) will be presented here.

For the main experiment, we continuously recorded hens in cages to provide a digital video "life history" record of each hen. We developed a technique to mark hens, enabling individual identification so that their behaviour around oviposition could be quantified. The egg-laying behaviour and stress physiology of 112 laying hens were studied from 15 to 38 weeks of age. The factors investigated were the presence of a nest box in the cage (present versus absent), group size (2, 4 or 8 birds per cage) and light schedule (treatment applied from 24 weeks of age). From the video records, the date, time and location of each egg laid was recorded to calculate age at first egg and consistency of egg laying site per bird. Corticosterone concentrations were measured in blood and egg albumen to assess physiological stress response. Heterophil to lymphocyte ratio was measured to estimate immune competency.

While consistency of nest box laying was achieved by about the tenth egg laid, the presence compared to absence of a nest box in the cage resulted in an acute stress response in young laying hens around 23 weeks of age. However, there was no evidence of elevated stress as birds approached their peak of lay around 30+ weeks of age, suggesting that the earlier event was an acute stress response, possibly associated with social behaviour and the competition for the nest box resource.

Statistical analysis of the data for consistency of nest box use and stress physiology parameters, found no evidence of a relationship between nest box use and improved welfare. Thus, while the majority of hens chose to lay in the nest box when one was provided, consistency of egg-laying site, including non-nest box layers, was generally not related to plasma and egg albumen corticosterone concentrations. Higher levels of activity by hens before egg laying are suggested as a behavioural indicator of frustration and thus elevated stress. However, increased total activity in the 2 h pre-laying was not associated with elevated plasma corticosterone concentrations (released within 4-6 hours after egg laying). Rather, increased pre-laying activity was associated with reduced plasma corticosterone concentrations after egg laying, suggesting that increased pre-laying activity may have been adaptive for the hens.

These results suggest that while the nest box was used by the majority of hens as their preferred egg laying site, the choice to not lay in the nest box did not seem deleterious to hen welfare. Indeed, the results would suggest that the relationship between pre-laying behaviour and hen welfare is not well understood. For example, increased pre-laying activity seemed to be indicative of reduced stress in laying hens in cages, rather than the intuitive relationship of being indicative of poor welfare.

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AUSTRALIAN EGG CORPORATION LIMITED

Opportunities to improve the human – animal relationship in poultry

Lauren Edwards, Post-doctoral Research Fellow, AWSC
School of Land and Environment, The University of Melbourne

Abstract:

The human-animal relationship has important consequences for the welfare of animals being cared for by humans. This presentation will review two of the major welfare challenges that arise from the human-animal relationship in the poultry industries, which are fear and injury. Fear of humans occurs innately in the domestic fowl from a young age, but this fear can be manipulated through experience with humans. Positive or neutral interactions will ameliorate this fear, while negative interactions will exacerbate it. Unfortunately, the majority of human-animal interactions that each bird experiences during its life are biased toward aversive experiences such as beak trimming or transport. Thus, fear of humans is widespread in the poultry industries. This has important implications for industry, as fear of humans has been shown to be detrimental to both the welfare and productivity of laying hens and broiler chickens due to the stress response and aversive subjective experience that it elicits. A review of the current research investigating the impact of fear of humans, and the types of human-animal interactions that have been found to be aversive for laying hens and broiler chickens, will be presented. Opportunities for improvement will be highlighted.

In addition to influencing the degree of fear that the birds experience, the human-animal relationship also has the potential to influence bird welfare though other means. In particular, the manner in which birds are handled during shed depopulation and transport can have drastic impacts on bird welfare due to the potential for injury and subsequent pain to be experienced by the birds. Whilst there are few studies that investigate the impact of depopulation on bird welfare, variation in the incidence of broken bones between batches of hens, and differing mortality rates between catching crews used to depopulate spent hens, have been reported. These studies indicate the opportunity for further research and improvement in this aspect of the human-animal relationship.

In conclusion, improving the human-animal relationship during the day-to-day husbandry of broilers and laying hens provides the opportunity to improve the welfare of these birds by reducing their fear of humans. Research has shown that reducing fear of humans in laying hens also reduces the escape responses and injury rates that these birds experience during depopulation from their home cages. Thus, reducing fear of humans may improve the welfare of these birds not only during their lives on farm, but also reduce the risks to bird welfare during shed depopulation.

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Lameness in meat chickens

Peter Groves, Senior Lecturer in Poultry Health
Faculty of Veterinary Science, The University of Sydney, Camden NSW 2570

Abstract:

The aetiologies of leg weakness and lameness in the modern broiler chicken are complex, including factors relating to genetics, nutrition, infection, management and environment. The welfare implications of broiler leg weakness include pain, frustration (inability to walk), reduced ability to eat and drink and consequent risk of dehydration or starvation. Birds which have difficulty in moving are also more at risk of excessive disturbance by other birds which can disrupt their sleep/ rest patterns. Immobile birds are also more prone to skin damage from scratches which may result in cellulitis and death.

Bone is a complex, dynamic tissue. For a bird to grow rapidly, bone growth must also be rapid and it is believed that this can lead to developmental problems in the modern rapidly growing broiler chicken. The conditions which we recognise associated with lameness or leg are many and varied and include bacterial chondronecrosis (femoral head necrosis), pododermatitis, rickets, tibial dyschondroplasia, varus-valgus deformity, rotated tibia, spondylolisthesis, snapped gastrocnemius tendon and a "soft bone" condition which is not well described. The major problems will be discussed briefly with an emphasis on the risk factors associated with them. Researchers have incriminated genetic differences, rapid early growth rate, lack of exercise, long photoperiod and wet litter as being important in some or all of these leg weakness problems. Recent research has also indicated that variations in egg incubation conditions may also be associated with bone and tendon development and the later appearance of some of these skeletal problems (Genin *et al*., 2008, Oveido-Rondon *et al*., 2008, 2010). Some recent research in this vein at the University of Sydney will be outlined. While genetic improvement of the modern broiler continues to deliver better skeletal strength, in the meantime the industry must aim to minimise leg problems through management and nutrition; fine tuning of incubation conditions may be an extra method to add some improvement to the welfare of the broiler.

Historically, the main general measure of broiler leg weakness has been gait scoring. This however is a subjective measure and involves forcing birds to walk some distances to evaluate their leg locomotory ability. A newer approach to this has been the Latency To Lie test, which uses the chickens natural aversion to water as a means of assessing it leg comfort or pain (Weeks *et al*., 2002; Berg and Sanotra, 2003). This is objective and simple to perform.

Selected References

Berg & Sanotra, 2003. *Animal Welfare*, **12**: 655-659.
Genin, O. *et al*., 2008. *Proceedings World's Poultry Congress*, Brisbane. P258
Oveido-Rondon *et al*., 2008. *Proceedings World's Poultry Congress*, Brisbane. P258
Oveido-Rondon *et al*., 2010. *Proceedings AAAP meeting*, Atlanta.
Weeks, C.A. *et al*., 2002. *The Veterinary Record* **151**:762-764

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The Animal Welfare Science Centre

www.animalwelfare.net.au

The Animal Welfare Science Centre was established in 1997 by the University of Melbourne as a collaborative centre for research, teaching and training in animal welfare, with the two organisations Monash University and the Victorian Department of Natural Resources and Environment.

In 2009, a long-standing collaborative arrangement with the Department of Animal Sciences of The Ohio State University (OSU) was formalised by admission of the Department and the College of Veterinary Medicine at OSU as full partners of the Centre.

The AWSC currently comprises 4 collaborative partners – DPIV (through the Future Farming Systems Research Division), The University of Melbourne (School of Land and Environment and Faculty of Veterinary Science), Monash University (School of Psychology and Psychiatry and Department of Physiology) and OSU (Department of Animal Sciences and College of Veterinary Medicine).

In 2009, the AWSC together with the Centre for Animal Welfare and Ethics of The University of Queensland (CAWE), the Animal Welfare Unit of CSIRO and 2 New Zealand organisations, (Massey University's Animal Welfare Science & Bioethics Centre and AgResearch) were designated as an OIE Collaborating Centre for Animal Welfare Science and Bioethical Analysis.

The Centre has considerable research and teaching capacity in animal welfare science and has made a number of important national and international contributions to research, teaching and training.

The Centre conducts research across 3 programs areas:

1. Welfare methodology.
2. Housing and husbandry effects on animal welfare.
3. Attitudes to animals and animal welfare, and farmer, consumer and community behaviour.

These programs support the fourth program area:

4. Tertiary and post-graduate education and training

The Centre's activities are guided by our vision and mission:

Our Vision

"Animal welfare and its constant improvement are societal and cultural norms"

Our Mission

"To contribute to improved animal welfare as a world leading provider of expert information, advice and education underpinned by rigorous research"

For further information on Centre RD&E activities, please email Jeremy Skuse, Executive Officer at:

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