Literature Featherpecking - Signs

Bilcik, B. and L. J. Keeling (1999). "Changes in feather condition in relation to feather pecking and aggressive behaviour in laying hens." British Poultry Science **40**(4): 444-451.
> 1. The aim of this experiment was to describe and examine the relationship between pecks received by individual birds and the feather and skin damage of those birds at different ages. The effect of group size was also studied. 2. Laying hens were raised in floor pens in group sizes of 15, 30, 60 and 120 birds, each with 4 replicates. Behavioural observations were performed at the ages of 22, 27, 32 and 37 weeks. Detailed feather scoring was carried out at the ages of 18, 23, 28 and 33 weeks. 3. Behavioural observations focused on the number of feather pecks (gentle and severe) and aggressive pecks received, and on the past of the body that was pecked. Scoring of feather and skin damage focused on the same 11 parts of the body 4. Increasing numbers of aggressive pecks received were associated with decreased body weight and increased feather damage at the ages of 27 and 32 weeks. 5. The number of severe feather pecks received was significantly related with feather damage at all ages; however, no relation with gentle feather pecks received was found. 6. Group size had a significant effect on feather condition, with large group sizes hating most feather damage.

Dawkins, M. S. (1989). "Time budgets in Red Junglefowl as a baseline for the assessment of welfare in domestic fowl." Applied Animal Behaviour Science **24**(1): 77-80.
> A study of the way in which semi-wild junglefowl allocate their time between different activities showed that in 60% of all minutes during the active part of the day, hens were seen to be ground pecking and in 34%, ground scratching. The fact that such a high proportion of time was spent in foraging activities is discussed in relation to the welfare of domestic fowl unable to perform such activities.

de Jong, I. C. and T. G. C. M. van Niekerk (2014). Verkorte protocollen voor het meten van de effecten van niet-snavelbehandelen bij leghennen, vleeskuikenouderdieren en kalkoenen. Wageningen, Wageningen UR Livestock Research.
> Met ingang van 1 september 2018 zal in Nederland snavelbehandelen bij leghennen, vleeskuikenouderdieren en kalkoenen verboden worden. Doel van dit onderzoek was om op basis van beschikbare literatuur, ervaringen van onderzoekers en ervaringen uit de praktijk protocollen op te stellen waarmee op relatief eenvoudige, maar wel betrouwbare wijze een monitoring van het effect van niet-snavelbehandelen uitgevoerd kan worden. Op basis van literatuuronderzoek, expert consultatie en een beknopt haalbaarheidsonderzoek bij praktijkkoppels zijn protocollen ontwikkeld voor het vastleggen van het effect van het niet-snavelbehandelen bij leghennen (opfok en productie), vleeskuikenouderdieren (opfok en productie) en kalkoenen (vleeskalkoenen). Deze protocollen staan vermeld in de bijlage van dit rapport.

Lee, H. J., et al. (2011). "Prediction of feather damage in laying hens using optical flows and Markov models." Journal of the Royal Society Interface **8**(57): 489-499.
> Feather pecking in laying hens is a major welfare and production problem for commercial egg producers, resulting in mortality, loss of production as well as welfare issues for the damaged birds. Damaging outbreaks of feather pecking are currently impossible to control, despite a number of proposed interventions. However, the ability to predict feather damage in advance would be a valuable research tool for identifying which management or environmental factors could be the most effective interventions at different ages. This paper proposes a framework for forecasting the damage caused by injurious pecking based on automated image processing and statistical analysis. By frame-by-frame analysis of video recordings of laying hen flocks, optical flow measures are calculated as indicators of the movement of the birds. From the optical flow datasets, measures of disturbance are extracted using hidden Markov models. Based on these disturbance measures and age-related variables, the levels of feather damage in flocks in future weeks is predicted. Applying the proposed method to real-world datasets, it is shown that the disturbance measures offer improved predictive values for feather damage thus enabling an identification of flocks with probable prevalence of damage and injury later in lay.

Manteuffel, G., et al. (2004). "Vocalization of farm animals as a measure of welfare." Applied Animal Behaviour Science **88**(1-2): 163-182.
> Emotionally relevant external events, hormone concentrations affecting mood and appetitive behaviour, thirst and hunger are able to stimulate a complex central nervous network that regulates endocrine feedback and behaviour in order to maintain or regain homeostasis. Particular states of mood or emotion may thus be accompanied by specific behaviours, vocalization being one of them. Hence, in farm animals vocalizations may supply us with hints on their well-being in an easy way, given that the meanings of the respective calls are well-established. Then, it is possible to judge acoustically uttered current needs and impaired welfare by non-invasive, continuous monitoring. Vocalizations may also modulate emotions of the receivers such that welfare may also be affected in conspecifics hearing distress utterances, e.g., in an abattoir. For these reasons, the analysis of farm animal vocalization has gained increasing interest in the last years and a variety of attempts to decode the meaning has been made. Concentrating on important farm animal species (pig, cattle, poultry) an overview of the present state-of-the-art in this discipline is given and present problems as well as

possible future developments are discussed. Modern techniques of sound analysis have provided tools to discriminate, analyse and classify specific vocalizations. Taking advantage of this, future bioacoustical research for welfare assessment should focus on comprehensive studies of a broad spectrum of species specific distress vocalizations. Increasingly precise attributions of such utterances to environments, behavioural contexts and relevant physiological parameters will lead to a deeper understanding of their meaning and significance with respect to well-being of farm animals. The result will offer applicable acoustic tools for farming environments where non-invasive techniques for welfare judgements are urgently needed. (C) 2004 Elsevier B.V. All rights reserved.

Mielenz, N., et al. (2010). "Analysis of ordered categorical data with threshold models exemplified by plumage damage scores from laying hens differing in their genotype and rearing environment." Poultry Science **89**(11): 2521-2534.

> Plumage damage scores (PDS) were assessed in laying hens of 2 genotypes (Lohmann Tradition and Lohmann Silver) at the 45th and 70th weeks of age, with scores ranging from zero (no damage) to 6 (completely denuded). This ordinally scaled categorical characteristic was recorded from different body regions of 365 hens that had experienced different housing environments (2 enrichment levels) during their rearing and laying periods. The so-called threshold model is an option for analyzing repeated ordered categorical data from individual animals. This model represents a generalized linear mixed model if the linear predictor additionally includes the animal as a random effect. This paper is intended to fill the gap between the theoretical aspects of generalized linear mixed models and their practical application in animal science. A cumulative probit model was adapted for analyzing plumage damage. The variation among birds was considered as a random effect for the analysis of cumulative probabilities. The numerical implementation of the methodology was done based on the NLMIXED procedure of the SAS statistical program. A threshold model with inhomogeneous residual variances for the latent variable was used because less plumage damages were observed up to the 45th week of age compared to the 70th week of age. Differences in PDS were evident between genotypes, age, and enrichment levels during housing periods. However, neither of the 2 enriched environments proved consistent superiority or inferiority across all traits. Major plumage damage (PDS larger than or equal to 5) was observed for the breast region in 56.6% of all birds with the Lohmann Tradition genotype and in 34.4% with the Lohmann Silver genotype when we look at the mean over all treatments. The most severe plumage damage was observed at the 70th week of age for the traits breast and housing environment without additional enrichment.

Savory, C. J. (1995). "FEATHER PECKING AND CANNIBALISM." Worlds Poultry Science Journal **51**(2): 215-219.

Scott, G. B. and P. Moran (1993). "Effects of visual stimuli and noise on fear levels in laying hens." Applied Animal Behaviour Science **37**(4): 321-329.

> Conveyors have been proposed to improve bird welfare during handling procedures. Speeds of conveyors have been recommended, though the effects on bird welfare have not been addressed. During travel no horizontal forces are applied. Therefore visual perception of speed may play an important role if birds find movement frightening. Stationary birds were subjected to moving stimuli of 0.33, 0.67 and 1.00 m s−1 by being placed between side-wall conveyor belts to present a moving background. Fear levels were measured using tonic immobility and were compared with the fear levels of birds receiving no moving stimulus. The effect of the noise of the conveyors was also investigated. No significant difference was found between birds exposed to the noise of the conveyors compared with those receiving no noise. Similarly no significant differences were found in fear levels for groups exposed to the different visual stimuli, suggesting that fear does not increase with increased perceived speed. In fact trends in the data indicate that fear levels might decrease with the increased perceived speed. Further investigations could determine whether there is any real effect of perceived motion on induced fear levels and whether there is a maximum speed beyond which birds may become frightened.

Tauson, R., et al. (2005). "Applied scoring of integument and health in laying hens." Animal Science Papers and Reports **23**(Suppl. 1): 153-159.

> Different methods for scoring of birds' integument are often used to describe the effects of various treatments in research on the health and welfare of laying hens. Also in commercial egg production and breeding there is a need for having a tool to describe the status of a certain flock of birds or a pure line. Among the main traits to score are plumage and foot condition and pecking wounds on different parts of the body. Scores for these traits may describe problems of feather pecking, perch design and litter condition and cannibalistic or aggressive behaviours, respectively. There are important characteristics of a scoring system, such as the simplicity of the system for users to learn and to use at the same time being descriptive enough in details. This paper describes a scoring method for six body parts with regards to plumage condition, pecking wounds on comb and rear part of the body, and the condition of the foot with regards to bumble foot syndrome. The intention is that this system should be easy to use by scorers of different background, e.g. scientists, administrators, welfare inspectors, breeders and producer organizations. When used to the system, scoring a bird for all characters will not exceed 30 seconds for one person.