

## **CAN PRE-TESTING OF NEW TECHNIQUE BE USED TO EVALUATE ACCEPTABLE STOCKING DENSITY FOR TURKEY BREEDER HENS?**

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### **Abstract**

In Sweden systems or technical equipment for the housing and management of farm animals have to be approved by the National Board of Agriculture. The testing is carried out from an animal welfare perspective, and includes both health and behavioural studies. It is normally carried out on a number of commercial farms. Often practical restrictions on the number of study objects does not allow proper extended statistical calculations, neither in relation to the number of farms involved nor to the number of repeated trials. Recently a study including pre-testing of acceptable stocking density levels for turkey breeder hens was undertaken. The trials included only two farms, with two compartments and three consecutive batches each, all in all 12 flocks. The floor stocking densities applied were approx. 2.0 and 2.4 hens/m<sup>2</sup> floor area. The nest box stocking density was approx. 5.0 hens/nest and 4.3 hens/nest respectively. Due to the original set-up in the houses involved, the flocks with the high floor stocking density had the low nest stocking density, and vice versa. The flocks reared at the higher floor stocking density and lower nest box stocking density had a lower prevalence of severe pecking wounds on the back and rump part of the body. Our aim with this paper is to discuss the usefulness of this type of testing, its benefits and limitations, with our turkey breeder trial as an example.

### **INTRODUCTION**

In Sweden systems or technical equipment for the housing and management of farm animals have to be approved by the National Board of Agriculture (SJVFS 1988:539). New systems, like aviary systems for laying hens or mechanical broiler harvesters, have to be pre-examined before they can be put on the commercial market. The testing is carried out from an animal welfare perspective, and often includes both health and behavioural studies. Depending on the complexity of the technical equipment involved, previous experience in other countries and so on, the Board of Agriculture can decide on different levels of evaluation or testing. In simple cases, the Board of Agriculture can base its decision regarding acceptance, modifications or rejection on the information presented by the constructor, manufacturer or retailer of the equipment. In more complicated cases, the Board of Agriculture will contact experts to get more information and maybe ask for a literature review of the relevant areas. Then there are cases where experimental testing is considered necessary. This requires a research plan, which has to be approved by the Board of Agriculture before the testing is initiated. Depending on the nature of the testing, it can be just guided by a scientific expert or run by an entire expert group. Usually in case of experimental testing, scientific staff from the Swedish University of Agricultural Sciences will carry out the testing, after which the Board of Agriculture makes the decision. The testing is normally accomplished on a number of commercial farms, which have been allowed to install the system or equipment in question for the aim of participating in the testing programme. This means that there will inevitably

be differences in management, feed composition, genetic background and so on between the herds or flocks involved.

This paper deals with a pre-testing of acceptable stocking density levels for turkey breeder hens. When the Swedish Board of Agriculture was recently revising its legal standards for all farm animals, there was a need to revise the standards for turkey breeder hens, as current standards were perceived as partly outdated and somewhat incomplete. A literature search for international studies on housing and management in relation to health and behaviour of female turkey breeders gave no result, so it was not possible to base the new standards on earlier research.

## MATERIALS AND METHODS

The project plan for the testing was designed in a way corresponding to that used for the pre-testing of high-density housing systems for loose housed laying hens (aviaries) in the early 1990's (Algers et al., 1995). The method used for the clinical examination of the female turkeys was very similar to the one applied for laying hens, thoroughly described by Gunnarsson and co-workers (1995). Very few turkey breeder farms exist in Sweden, and the trials included only two farms with two compartments and three consecutive batches each, all in all 12 flocks with 507-865 hens per flock. The floor stocking densities applied were 1.9-2.0 and 2.4 hens/m<sup>2</sup> floor area and due to the original set-up in the house, the corresponding nest box stocking density was 4.8-5.0 hens/nest and 4.3 hens/nest respectively. This meant that the flocks with high floor stocking density had the low nest stocking density, and vice versa. For details, see table 1. The birds were not beak-trimmed, as this procedure is illegal in Sweden.

**Table 1.** Flock size, age at the beginning and the end of study, stocking density in relation to floor area and nest boxes, and space at feeders and water cups for turkey breeder hens at two different farms (referred to as K and J respectively, followed by batch number and compartment).

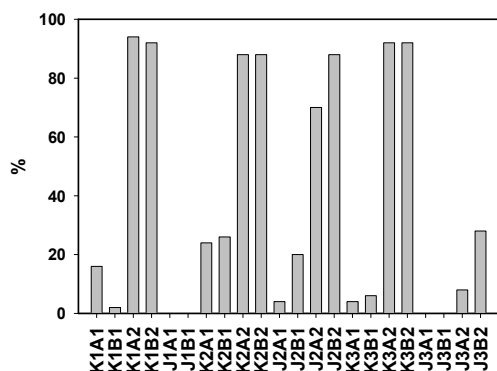
Batch	Flock size	Age at placing (weeks)	Age at slaughter (weeks)	Stocking density (hens/m <sup>2</sup> floor area)	Stocking density (hens/nest box)	Feed (cm/hen)	Water (cm/hen)
K 1 A	865	26	51	2.0	5.0	3.9	3.3
K 1 B	865	26	51	2.0	5.0	3.9	3.3
J 1 B	516	27	50	2.4	4.3	3.5	3.5
J 1 C	516	27	50	2.4	4.3	3.5	3.5
K 2 A	830	30	51	1.9	4.8	4.1	3.4
K 2 B	830	30	51	1.9	4.8	4.1	3.4
J 2 B	517	28	58	2.4	4.3	3.5	3.5
J 2 C	517	28	58	2.4	4.3	3.5	3.5
K 3 A	825	29	59	1.9	4.9	4.1	3.4
K 3 B	727	29	59	1.7	4.3	4.6	3.8
J 3 B	507	30	56	2.4	4.3	3.5	3.5
J 3 C	507	30	56	2.4	4.3	3.5	3.5

The stockperson was instructed to keep detailed records of bird health and production. On two occasions per batch, at approximately 35 and 55 weeks of age, scientific staff from the Department of Animal Environment and Health visited the farms to perform clinical examinations

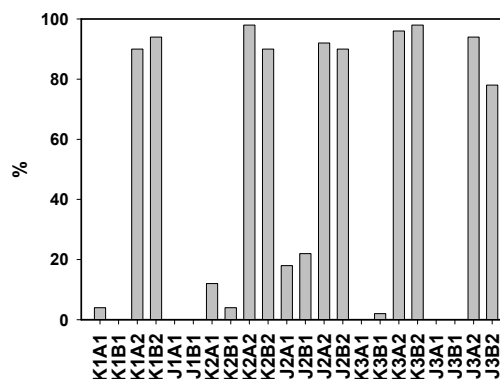
and behavioural studies. The clinical examination included evaluation of general body condition, plumage condition, peck wounds or other skin lesions, foot health status and body weight of 50 randomly sampled hens per flock. The behavioural studies included recording of how the birds utilized the system, their activity level, social and agonistic behaviours and feather pecking. Also, at each visit the house temperature, relative humidity, CO<sub>2</sub> and ammonia levels were measured.

## RESULTS AND DISCUSSION

The general condition of the birds was good in all flocks, with even bodyweights. Feather pecking has led to a relatively high number of birds having naked areas with a diameter exceeding 5 cm. Most naked areas occurred on the back, rump part and tail of the birds, and generally aggravated with age (figures 1 and 2). There was no difference between the two stocking densities. All examined birds had clean plumage.

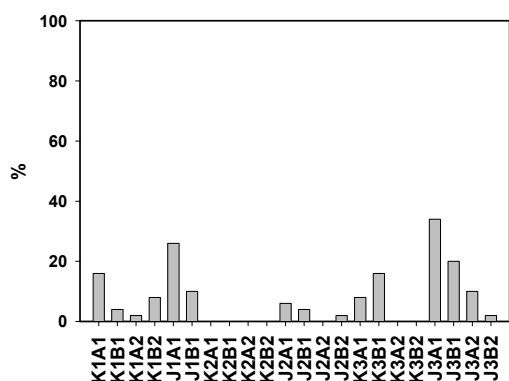


**Figure 1.** Plumage: Percentage of birds with naked areas on the back and/or rump part.

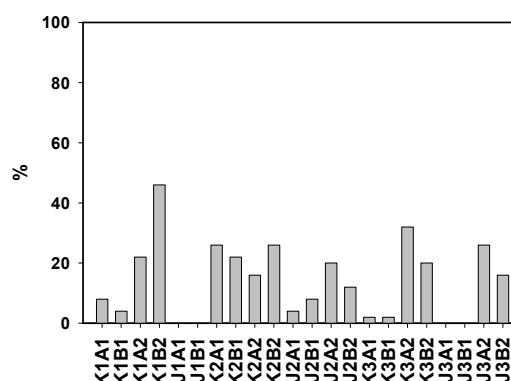


**Figure 2.** Plumage: Percentage of birds with naked areas on the tail.

The major problem found in the investigated flocks was pecking wounds. In the young birds small peck wounds on the head were recorded (figure 3), but these lesions healed without interference from the stockperson and did not result in any severe consequences. This type of pecks is believed to be related to aggressive behaviour. However, most of the flocks experienced severe cannibalism directed towards the lower back or rump part (not the cloacae) of the birds (figure 4). This type of pecks is not considered aggressive but can, nevertheless, result in severe injuries on the birds. Ulcers with a diameter of up to 15 cm were seen. The problem generally aggravated with increasing age.



**Figure 3.** Skin lesions: Percentage of birds with peck wounds on the head.



**Figure 4.** Skin lesions: Percentage of birds with peck wounds on the back and/or rump part.

Here the flocks reared at the higher floor density and lower nest box density had a lower prevalence of severe pecking wounds on the back and rump part of the body. Peck wounds were the major cause of culling and overall mortality in all flocks, but the mean mortality was higher in the flocks with the lower floor density and higher nest stocking density. Regarding most other parameters, including production and air quality, there was no biologically significant difference between the two stocking densities. Preliminary analysis of the behavioural studies showed more severe feather pecks in compartments with the higher nest box density. There was a general increase over time in all compartments, but this increase was larger in the compartments where the stocking density at the nests was higher. The levels of aggressive pecks were low in all compartments, and were observed mainly at the nests and at the feeders irrespective of stocking density. In younger turkey poults, it has been shown that environmental enrichment, such as metal objects and perches, can reduce injurious pecking in both female and male birds (Martrenchar et al., 2001). In the present study the stockperson arranged reflecting objects (CD discs) hanging from the ceiling to attract the bird's attention on both farms.

So, what conclusions can be drawn from this type of testing, where different 'treatments' are applied on different farms with birds from different batches reared at different places prior to placing? Obviously, the semi-experimental testing procedure is means that there are always a number of factors which can not be controlled for, makes it difficult to estimate such as the effects of other management factors, feed supplier, building environmental characteristics factors and so on. Often the tests are not big enough. The practical restrictions in the number of study objects do not allow proper extended statistical calculations, neither in relation to the number of farms involved nor to the number of repeated trials. However, a strong argument for performing this type of on-farm testing is that it gives higher external validity compared to experiments, which rarely mirror the complex situation on commercial farms. There is a risk of confounding in these types of studies (here: floor stocking density – nest box stocking density); often many factors are confounded between farms.

Based on these studies we can assume that the feeding and drinking space provided was probably sufficient, as only low levels of aggressive behaviours were recorded in the vicinity of this

equipment. We can conclude that the levels of cannibalism recorded in the flocks studied is unacceptable from an animal welfare point of view, and that intensive efforts have to be made to reduce the prevalence in future flocks. The influence of factors such as feed composition, light regimen and light type during the rearing period (Moinard et al., 2001) and nest design should be further investigated. We also have reasons to suspect that limited nesting space is a risk factor for cannibalism, possibly of higher importance than floor stocking density. In turkey poults raised for meat, increased floor stocking density has been reported to result in poorer leg and foot-health of the birds, but no consistent effect on behaviour has been observed (Martrenchar et al., 1999). Other authors have reported that feather pecking and cannibalism are major welfare problems in intensively housed turkeys (Hughes & Grigor, 1996), but again this relate to production stock only. Thus, we can conclude that there is a need for more research on the behaviour of turkey breeder hens in general. The full results from this pre-testing project will be reported to the National Board of Agriculture during the spring of 2003, after which the Board may decide to change their legal standards regarding the housing and management of breeder turkeys.

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