CAN A MODIFIED LATENCY-TO-LIE TEST BE USED TO VALIDATE GAIT-SCORING RESULTS IN COMMERCIAL BROILER FLOCKS?

C Berg* and G S Sanotra[†]

* Department of Animal Environment and Health, Swedish University of Agricultural Sciences, PO Box 234, SE-532 23 Skara, Sweden

[†] Department of Animal Science and Animal Health, The Royal Veterinary and Agricultural University, Grønnegårdsvej 8, DK-1870 Frederiksberg C, Copenhagen, Denmark

* Contact for correspondence and requests for reprints: Lotta.Berg@hmh.slu.se

Abstract *Animal Welfare 2003,* ***12***: 655-659

Bodily contact with water is a novel and aversive experience for broiler chickens, and this has been used when designing the Latency to Lie (LTL) test. The original testing procedure, in which the birds are tested in groups, involves a certain settling period, which makes the test time-consuming to carry out on commercial broiler farms. Our modifications of the LTL test for on-farm use mean that a) the birds are tested individually without visual contact with other birds; and b) the water tub is already filled with water when the birds are placed in it. The results from the LTL tests can then be compared with the scores achieved for each individual bird on the commonly used 'gait scoring' procedure. At 14 farms participating in a larger survey, we used three birds of each gait score from 0 to 4 (when available) for LTL testing. The time spent standing before making the first attempt to lie down was recorded. The results show a clear negative correlation (r = –0.86, P < 0.001) between time spent standing and gait score. The mean LTL values for the different gait scores were all significantly (P < 0.01) different. There was no significant difference in LTL results between flocks. The method described appears to be well suited for on-farm use. If further developed, it could become a useful tool in monitoring programmes for the ongoing efforts aiming at decreasing the levels of leg weakness in modern broiler production.

Keywords: *animal welfare, chicken, lameness, latency to lie, leg weakness, poultry*

Introduction

The general term 'leg weakness' in broilers (*Gallus gallus*) usually refers to joint problems in hips, knees or intertarsal joints. There are many different causes of leg problems — either skeletal, such as tibial dyschondroplasia (TD) and other forms of developmental disturbances or deformities, or infectious, such as femoral head necrosis or joint infections (Lynch *et al* 1992; Thorp *et al* 1993; Butterworth 1999). Leg problems, manifested as reduced walking ability, are related to the rapid growth rate of the birds and are influenced by the birds' genetic background and by nutrition, housing and management (Rennie & Whitehead 1996; Kestin *et al* 1999; Su *et al* 1999, 2000; Sanotra *et al* 2001). Leg weakness leads to behavioural changes (Vestergaard & Sanotra 1999; Weeks *et al* 2000), and severe leg weakness, regardless of the cause, is generally regarded as one of the most important welfare problems in modern broiler production (Anon 2000).

The prevalence of leg weakness in live birds is usually evaluated using a type of visual assessment of the birds' walking ability known as 'gait scoring', a method originally developed for experimental studies by Kestin and co-workers (1992). It is nowadays widely applied in different settings, with various modifications. This method is, as yet, the only one practically applicable, but as it is subjective its repeatability has been questioned, and it is not recommended for comparing prevalence results from different studies carried out by different people.

Recently, Weeks and co-workers developed a method known as the Latency to Lie (LTL) test (Weeks 2001; Weeks *et al* 2001, 2002). This test is based on the fact that bodily contact with water is a novel and aversive experience for broiler chickens. A group of birds is placed in a plastic pen and allowed to settle for a certain time; the pen is then flooded with temperate water until a depth of 3 cm has been reached. The time it takes until each bird lies down is recorded, according to the principle that the better leg health a bird has, the longer it will stand up to avoid body contact with the water.

This original version of the test has been shown to work well, but it is slightly complicated and rather time-consuming to carry out in commercial broiler houses. There is also a certain risk that the birds in the group will influence each other, which may distort the results. Social facilitation (ie the increase in frequency of an already-known behaviour at the sight of others performing this behaviour [Clayton 1978]) is a well-known phenomenon in poultry. Although it has not been investigated in this particular setting, it is likely that the behaviour of one bird in terms of either remaining standing or choosing to lie down will affect surrounding birds in the group.

The aim of this study was to evaluate whether a modified version of the LTL test can be used to validate gait-scoring results in commercial broiler flocks. Another aim was to test whether this modified LTL test is simple to carry out under on-farm conditions.

Materials and methods

As part of a leg weakness survey project, we conducted gait scoring at a number of farms. These were all commercial broiler farms, where male and female birds were reared in climate-controlled houses, fed standard broiler feed *ad libitum*, and intended for slaughter at 35–45 days of age. This study, which was approved by the local council for research animal ethics, included weighing, sexing and gait scoring of 50 birds per flock at 34 days of age. Only one flock per farm was included. At 14 of these farms the first three birds of each gait score from 0 to 4 (when available) were selected for LTL testing. In total, 42 birds each of gait scores 0, 1, 2, and 3, and 22 birds of gait score 4, were tested. The testing was blind (ie the person supervising the LTL test was not aware of the gait score results for the individual birds). A stopwatch was used to record the time spent standing before making the first attempt to lie down. If the bird was still standing after 600 s, the test was interrupted. All LTL testing was carried out by the same person.

Our modifications of the LTL test meant that the birds were tested individually, without visual contact with other birds. This was achieved by putting the birds in small plastic tubs measuring approximately 50 × 35 × 25 cm (width × length × height), surrounded by disposable corrugated cardboard sheets (Figure 1). The tubs were placed in a corridor or room just outside the rearing compartment.

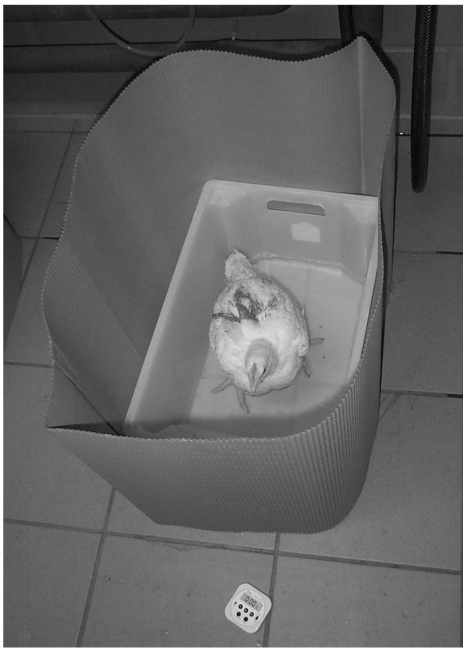

Figure 1 Bird during the modified LTL test.

Our second, and most important, modification of the test was that the water tub was already filled with 3 cm of water when the bird was placed into it. This way, the settling period was omitted. The water temperature at the beginning of each test was 32°C.

As only a very small proportion of birds were still standing after 10 min (five out of 190), the results were analysed as normally distributed data. Statistical analyses were carried out using the SAS software package (SAS version 6.12). The SAS general linear model procedure was used to compare means (Duncan's Multiple Range test, alpha = 0.01), and a pooled within-class correlation coefficient was calculated using the SAS DISCRIM procedure, correcting for any possible influence of farm/flock.

Results and discussion

The results showed a clear negative correlation between seconds spent standing and gait score, with a correlation coefficient of –0.86 ($P < 0.001$). The minimum and maximum LTL values (seconds standing) recorded were 139–600 s for gait score 0, 76–556 s for gait score 1, 19–379 s for gait score 2, 5–189 s for gait score 3, and 1–33 s for gait score 4. The mean LTL values for the gait scores investigated were all significantly ($P < 0.01$) different (Figure 2).

There was no significant difference in LTL results between flocks, which suggests that the surroundings did not influence the results. This is in accordance with results reported when applying the original version of the LTL test (Weeks 2001) and indicates that the test is reasonably robust.

Neither litter material (wood shavings versus straw) nor hybrid (Ross versus Cobb) when analysed at flock level significantly influenced the correlation between gait scoring results and LTL test results. This means that birds reared on different types of litter substrates reacted in a similar way when placed in water. It also means that both hybrids were equally predisposed to stand up or lie down, and they both showed the same pattern of reluctance to lie down in water. This is encouraging when considering wider applications of the LTL test.

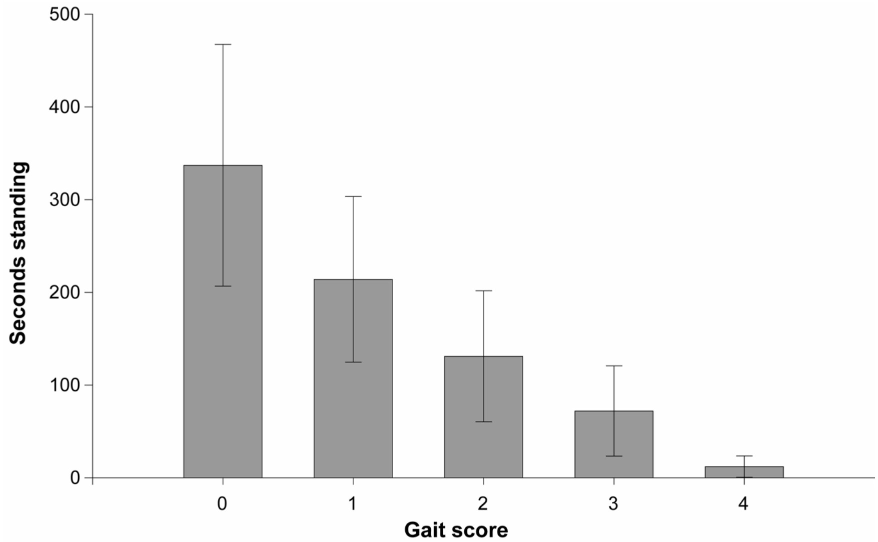

Figure 2 **Latency to Lie test results (s) for each category of gait scoring results (score 0 to 4). Error bars indicate standard deviations.**

No correlation was found between the presence of footpad dermatitis lesions and LTL test results at the level of individual birds within each gait score stratum. There are two possible explanations for this: either footpad lesions simply do not affect the birds' willingness to stand up, or the lesions influence the birds' walking ability strongly enough to also affect the gait scoring results.

The modified LTL test took 1–10 min per bird to execute. One person could easily handle and supervise the testing of four birds simultaneously. In our study, testing 12–15 birds per flock never took more than 30 min in total.

Conclusions

We found the modified LTL test simple to carry out under on-farm conditions. The necessary equipment is inexpensive to purchase, easy to transport and possible to disinfect to an acceptable level between farms.

We conclude that the modified LTL test can be used as a method of validating gait score results. Further studies will have to be carried out to evaluate whether LTL testing can also be used as a tool to screen for leg weakness in commercial flocks. Investigations involving several different persons will then be necessary to estimate the inter-rater agreement level for this type of test.

Animal welfare implications

In accordance with the original LTL test, the modified LTL test does not force the birds to walk or to stand for any longer than they choose, and thus causes less suffering than many other methods of assessing lameness (Weeks 2001). It is our hope that this method will be a useful tool for the ongoing efforts aiming at decreasing the levels of leg weakness in modern broiler production.

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