Lameness is consistently better at predicting broiler chicken performance in mobility tests than other broiler characteristics

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Abstract

To determine whether lame broilers are in pain it is necessary to compare measures of lameness and mobility before and after analgesic treatment. Such measures should not be unduly affected by other bird characteristics. This study assessed the performance of lame (gait score, GS 3–4) and non-lame (GS 0–1) broilers using two mobility tests: (i) a novel test to assess broiler ability to access resources when housed in groups (Group Obstacle test); and (ii) a Latency-to-Lie (LTL) test. Outcome test measures included number of obstacle crossings, latency to cross an obstacle, and time taken to sit in shallow water. Associations between outcome test measures and other bird characteristics (established lameness risk-factors), including strain, sex, age, mass, contact dermatitis and pathology, were also investigated. The performance of high-GS and low-GS broilers differed in both mobility tests and no other bird characteristics were as consistent a predictor as lameness. This demonstrates that mobility impairments are closely related to lameness assessed using GS, and that there is a component of lameness that cannot be explained by other bird characteristics (e.g. being male and heavy). This component may represent pain or discomfort. Both mobility tests are suitable for further application with analgesic testing to classify lameness-associated pain in broilers.

Keywords: animal welfare, broiler, lameness, latency-to-lie, obstacle test, pain

Introduction

There have long been concerns about the welfare of broiler chickens, primarily relating to their leg health (Bradshaw et al 2002; Gentle 2011). A recent and comprehensive survey found that by the time they reach slaughter age almost 30% of intensively reared broiler chickens in the UK are, at least moderately, lame (Knowles et al 2008). This conclusion was reached using the widely employed Bristol six-point Gait Score (GS) system (Kestin et al 1992), which utilises a qualitative, and relatively simplistic, assessment of walking style; individual birds are allocated a score on a scale ranging between GS 0 (no detectable walking abnormality) and GS 5 (unable to stand). Although the system is well suited for conducting welfare assessments on-farm it provides no direct information on broiler pain, and suffers from drawbacks as a research tool; gait scoring cannot discriminate unilateral from bilateral lameness and there is little evidence to link lameness severity (as determined by GS) with internal leg pathology (McNamee et al 1998; Sandilands et al 2011; Fernandes et al 2012). Lameness-associated pathologies can be infectious or non-infectious, and may involve bones, joints, ligaments and tendons (Bradshaw et al 2002). Since gait abnormalities are likely to arise from a combination of pathological influences, and individual adaptation to regain mobility, there is inherent difficulty in inferring whether a gait pattern is due to pain or to biomechanical factors. The enhanced body mass of modern broiler strains may reduce motivation to walk (regardless of a pain component) due to increased energy expenditure associated with locomotion; however, it is also possible that poultry, as prey species, do not display overt pain-associated behaviour as this could increase predation risk (Livingston 1994). There is a distinct possibility that some pathologies (e.g. those associated with inflammation and necrosis) are more likely to have a pain component than others (e.g. mild skeletal deformity). The welfare implications of failing to differentiate pain from other causes of gait abnormality are substantial.

Quantitative measures relating to broiler lameness have been developed, but these have not been applied in such a way as to address the potential complications summarised above. Such measures include an assessment of inactivity, which revealed that low-GS broilers spent less time lying than high-GS broilers (Weeks et al 2000), and a measure of latency-to-lie (LTL), which established that low-GS broilers will stand for longer to avoid contact with shallow tepid water (Weeks et al 2002). Neither GS nor quantitative measures provide direct evidence of pain but they can be utilised in assessments that do. The provision of analgesic drugs can provide indirect evidence for pathological pain if