

Novel Walking Platform to Assess Lameness in Broilers

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Summary and Implications

Leg lameness is a significant welfare concern in commercial broiler chickens, with up to 30% of birds severely affected. The National Chicken Council (NCC) animal welfare guidelines and audit checklist for broilers recommend gait scoring 100 birds/flock using a 3-point scale within one week of slaughter. This 0-2 scale was adapted for use with a unique walking lameness assessment platform to provide a more exact measurement on a consistent walking surface. Through trial and error, a successful method for simultaneously scoring two to three individual birds was tested. A similar structure is recommended for use on-farm to consistently and efficiently assign lameness scores in commercial broilers.

Introduction

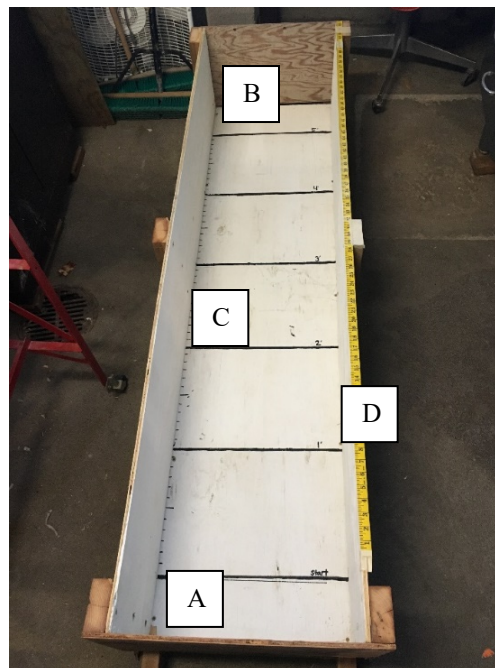
Leg lameness is one of the largest welfare concerns commercial broilers face today. A combination of factors, but mostly genetic selection for a fast rate of growth causing a top-heavy phenotype, has led to leg abnormalities causing lameness. The condition has been proven to be painful for birds. As a result, broilers become increasingly inactive compared to laying hens or their jungle-fowl ancestors, and ultimately spend 80% of their time lying down as they near market weight. Due to the negative impact of lameness on broiler welfare, the National Chicken Council (NCC) recommends that an audit includes measuring lameness prevalence. In the NCC audit, the U.S. Gait Scoring technique is used, whereby lameness is scored on a 0-2 scale; 0 indicates a bird is able to walk 5 ft with no signs of lameness, 1 indicates a bird is able to walk 5 ft but is uneven in steps, and 2 indicates a bird who cannot walk 5 ft without sitting down or shows obvious lameness. It is challenging to precisely score distance walked in a home pen or open broiler barn due to different litter qualities and textures, conspecific interference, or the bird's motivation to walk. Therefore, the aim of this study was to design an objective walking lameness platform to score broiler lameness using an adapted version of the U.S. Gait Scoring technique

Materials and Methods

All animal procedures were overseen by the project Principle Investigator, Laboratory Animal Resource attending veterinarian, and the Iowa State University (ISU) Poultry Research and Teaching Farm manager. All protocols were approved by the Iowa State University Institutional Animal Care and Use Committee (approval number 8-17-8597-G).

Walking lameness platform: A 6 ft by 1.5 ft platform was built out of plywood with four 1 ft high walls. There was 5 ft of walking space with two 6 in start and stop sections. The inside of the structure was painted white, with each foot and inch delineated in black paint. Additionally, a measuring tape was affixed to the top of the right side of the walkway (Figure 1).

Figure 1. Walking lameness platform (6 ft long, 1.5 ft wide, 1 ft height) with 6 in. start (A) and stop (B) sections, 5 ft (C) of walking space, and a measuring tape (D) for reference along the top of the right side.



Animals and housing: Six-hundred straight-run Ross 308 broiler chicks were transported from a commercial hatchery the day of hatch to the ISU Poultry Research and Teaching farm where they were housed in pens of 30. Five randomly selected birds from eight pens (four pens on each side of the barn) were wing-banded and marked with different colors of animal-safe food coloring for identification on day 0 (n = 40).

Gait scoring system: The gait scoring system was adapted to a score 0 defined as a bird walking 5 ft with no visible lameness signs, score 1 was defined as a bird walking 5 ft but presented unevenness in steps or sat down at least once, and score 2 was defined as a bird that could not walk 5 ft.

Lameness scoring: One day weekly for six consecutive weeks, 40 broilers were removed from their home pens during the afternoon and scored using the walking lameness platform. On week 1, chicks were scored in groups of five due to small size of birds and ease of scoring. For weeks two through six, birds were scored in groups of two or three. Birds moved forward with less human assistance when they had a conspecific, but groups larger than three were not viable with increasing size of birds. Once placed in the starting section, (A-Fig. 1), birds were encouraged to walk by (1) a researcher slowly moving their hand back and forth directly behind the bird (2) a researcher gently tapping the bird on the vent region with a gloved hand or (3) a researcher both waving and gently tapping the bird with a ping-pong paddle. Individual birds were considered to have completed the task when both feet had crossed into the end section (B).

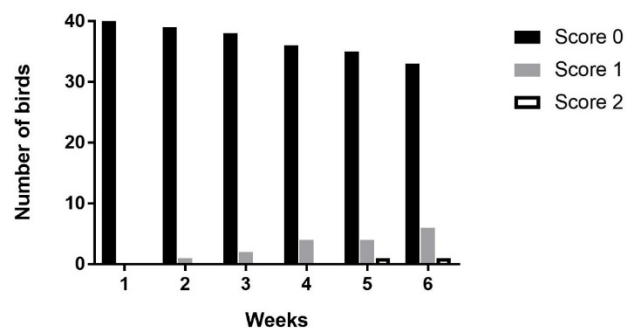
Data analysis: A total of 240 data measurements were collected. Data were analyzed for distribution of scores using PROC FREQ of SAS version 9.4.

Results and Discussion

The walking lameness platform described here used a simple but effective design that aimed to contain the birds and efficiently score ability to walk 5 ft. Additionally, it was simple and inexpensive to build. The platform was built entirely of plywood and lightweight, with two handles on each end for ease of movement from one side of the barn to the other. Using an enclosed environment to carry out gait scoring meant birds could not get out of sight (without flying over a 1 ft high wall) or be confused with another bird. The delineations drawn onto the floor of the walking lameness platform made it easy to ensure that each passing bird truly walked 5 ft and to record the stopping point of each lame broiler exactly.

Regarding lameness distribution scores, 221 birds were scored 0, 17 scored 1, and two scored 2. The two scores of 2 came from the same bird on weeks five and six. Over one-third of the birds whom scored 1 received this score on week 6 (Figure 2).

Figure 2. Distribution of lameness scores by week. A total of 40 straight-run Ross 308 broilers were lameness-scored using a 0-2 scale (0; bird walked 5 ft with no signs of lameness, 1; bird walked 5 ft but was uneven in steps or sat down at least once, 2; bird could not walk 5 ft) once weekly over six consecutive weeks.



The low lameness prevalence in our flock is likely due to the high cleanliness of the research environment and the use of fresh pine shavings as litter. These conditions are not reflective of a commercial broiler barn, where litter would be reused several times over, potentially harboring more common pathogens, and there is a much higher turnover of flocks and number of birds in each house.

Application of a walking lameness platform could be useful in a commercial environment, and would provide greater accuracy compared to a traditional gait score methodology. Additionally, up to three market-weight broilers can be successfully scored in one session using this structure (100 birds scored/flock recommended by current welfare guidelines). Scoring birds in small groups was very efficient because if one broiler was motivated to move forward the other birds would “follow the leader.”. The few lame birds we did assess were easy to identify because the motivation to follow was superseded by the inability to keep up with conspecifics due to lameness. In conclusion, this walking lameness platform was successful in our research conditions and is a viable option for use in commercial broiler welfare audits.

Acknowledgements

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