

Leg problems in broilers

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Introduction

Leg problems in domestic chickens are multifactorial in origin; causes include genetic predisposition, nutrition, age, management and environment (Hall, 2001). In 1992, the UK's Farm Animal Welfare Council (FAWC) declared leg problems to be a major welfare problem in broiler production. The council encouraged increased research in this field and recommended that producers take steps to ensure a reduction in the incidence and severity of leg problems. Leg problems include tibial dyschondroplasia, varus/valgus deformations, crooked toes, femoral head necrosis and ammonia burns. This essay outlines three papers that describe recent developments with regard to leg problems in the broiler industry.

Discussion

In relation to animal welfare, Sanotra et al, (2001) conducted an investigation that included 28 commercial broiler flocks in order to examine the prevalence and extent of leg problems in broiler chicks reared in conventional production systems in relation to animal welfare. The flocks were similar in size and the same hybrid, Ross 208, was used. Houses (1600-1800 m²) were well-built and stocking densities varied from 21.5-28.9 chicks/m². One hundred chicks from each flock were collected at random. They were weighed and assessed for walking ability (scale from 0-5), occurrence and severity of tibial dyschondroplasia (scale from 0-3) as well as incidence of twisted legs, crooked toes and ammonia burns on the footpads.

The results showed that 75.0% of the chicks had impaired walking ability and 57.1% had tibial dyschondroplasia (TD), i.e. score >0. The incidence of twisted legs, crooked toes and ammonia burns are 37%, 32.6% and 42.0% respectively. In addition, higher body weights significantly increased the occurrence of these leg problems. The authors concluded that the prevalence of leg problems in broilers reared in conventional production systems is very high and compromises welfare. One of the main factors responsible is their rapid growth rate, which results in abnormally high loads being placed on relatively immature bones and joints (Webster, 1995).

To understand the relationships in broiler chickens between lameness, liveweight, growth rate and age, Kestin et al, (2001) studied the development of lameness in a wide range of poultry genotypes. Thirteen genotypes with a very wide range of growth profiles were chosen and were fed either a non-limiting or Label Rouge diet ad libitum. There were two replicates of each combination of genotype and feed, therefore there were 52 pens, with 70 chicks per pen. The birds' degrees of lameness in each replicate were assessed after 54 and 81 days.

The results demonstrated that the modern genotypes are more inclined to be more lame than the traditional, slower growing genotypes reared on the same feeding programme. An interesting finding was that when liveweight was included as a co-variable in the analysis, most of the differences disappeared. Thus, feeding regimen and genotype did not significantly affect the birds' walking ability. Liveweight, however, was an important determinant of lameness in the wide range of genotypes tested.

All the birds were less lame at 54 days than at 81 days irrespective of their genotype or feeding routine. However, at a particular liveweight, the walking ability of the birds was approximately 0.6 gait score units worse at 54 days of age than at 81 days. This indicates that growth rate is also significant in determining lameness. The regression coefficient between gait score and liveweight was 1.262 at 54 days and 1.128 at 81 days. In previous studies, Sorensen et al, (1999) obtained

a score of 1.4 at 35 days. This trend suggests that younger birds are more sensitive to differences in liveweight than older birds. This study supports the findings of the previous study in this essay; lameness that develops in modern genotypes of broilers is mostly the result of selection for high liveweights and rapid growth rates.

Not all leg problems are caused by high liveweights and rapid growth rates. The objective of the third study (Hall, 2001) was to compare the effects of two levels of house stocking density (34kgm⁻² and 40kgm⁻²) on broiler welfare and behaviour. This experiment was carried out on a commercial broiler farm using a total of 121,900 broilers. The birds were divided into four groups and placed in identical houses. Each house measured 15x100m, was insulated, had concrete floors and controlled humidity. Each house was partitioned by a barrier so that stocking density at one end was 34kgm⁻² (treatment A) and 40kgm⁻² (treatment B) at the other end. Food and water were provided ad libitum. Percentage mortality and birds culled for leg problems were recorded daily. Birds were humanely killed if they exhibited an obvious gait defect that was likely to compromise welfare.

The results revealed that daily mortality was greater at the higher stocking density for part of the rearing period ($P < 0.05$). The percentage of birds culled each day for leg problems was significantly greater at the higher stocking density ($P < 0.01$). Hester (1994) found that increasing stocking density results in an increase in the prevalence of hock burns and breast blisters. This is attributed to crowding and the production of large amounts of faeces that act as a substrate for micro-organisms, resulting in high levels of ammonia. In severe cases, the birds displayed signs of distress and had trouble walking and reaching food and water.

Hall (2001) suggested that stimulation of activity to develop leg strength through lower stocking densities might help reduce the incidence of leg problems. However, the practicality of this practice is debatable, as the economic outcome of broiler production is highly dependent on stocking density.

Conclusion

The prevalence of leg problems in broilers is very high and has raised concerns in animal welfare. Causes are multi-factorial but the main determinant is selection for rapid growth rates which result in high liveweights within a short period. A consequence of high stocking density is increased incidence of leg problems. The use of slower growing genotypes reared at lower stocking densities may improve the welfare of broilers but this has serious economic complications. It is essential that further research be conducted to determine an ideal growth rate and an optimum stocking density.