

January 2000

LAMENESS OR LEG WEAKNESS PROBLEMS IN BROILER CHICKENS

A RESUMÉ OF THE LATEST SCIENTIFIC RESEARCH

Introduction

Lameness or leg weakness is the most serious health and welfare problem affecting modern broiler chickens.

In their 1992 Report the Farm Animal Welfare Council (FAWC) stated that their Working Group found leg problems of varying degrees of severity on nearly every farm visited (FAWC, 1992). The Report stressed that in the worst cases birds were only able to move with great difficulty. Such birds, added the Report, were obviously distressed and had problems in reaching food and water.

A major cause of leg problems lies in the fact that the modern broiler reaches its slaughter weight in just 41/42 days. This is twice as fast as 30/35 years ago. These accelerated growth rates have been achieved by selective breeding, together with rich diets and growth-promoting antibiotics.

The problem is that what grows quickly is the muscle, which is what is eaten as meat. The bones of the legs, however, fail to keep pace with the rapid body growth and so cannot support the overdeveloped body. As a result, many broilers suffer from painful leg disorders.

In a 1992 paper, Kestin et al (1992) described a method – gait scoring – for measuring the prevalence of leg weakness by assessing the walking ability of broilers. Walking ability is divided into six categories ranging from completely normal (category 0) to immobile (category 5).

In their study of commercial intensively reared broilers, Kestin et al (1992) found that the welfare of 26% of the birds was compromised as a result of leg weakness; the authors stressed that there was likely to be chronic pain and discomfort for these birds. Of the 26%, most (19%) were gait score (GS) 3.

4% were GS 4; these birds were affected to the point where they could only walk with difficulty and when strongly motivated. The final 2% were GS 5; they were incapable of sustained walking and could only move with the help of their wings or by crawling on their shanks.

Recent research

Su et al (1999) have pointed out that “leg weakness is a serious problem in fast-growing broilers, giving rise to economic losses as well as reduced animal well-being”.

Sørensen et al (1999) have drawn attention to concerns that disabled birds may not be able to reach feed and water and thus die from inanition. They stated that the conditions responsible for leg weakness can be divided into two categories: those of infectious origin, which are largely responsible for very severe lameness, and those caused by skeletal abnormality, which results in less severe lameness. They added that preliminary estimates indicate that the non-infectious causes of leg weakness are probably responsible for the bulk of lameness seen in commercial flocks.

There is broad agreement that the non-infectious causes of lameness probably result from the intensive genetic selection for live weight gain and breast meat yield to which broilers have been subjected. Recently, husbandry methods have been used to try and address the problem of lameness as the industry is anxious not to reverse its ever-increasing growth rates.

One husbandry approach has been to change the light/dark pattern provided from the commonly used 23 hours light : 1 hours dark to a more natural light : dark pattern in the hope that this would limit skeletal deformities. A recent paper, however, has concluded that

moderate photoperiods (i.e. a more natural light : dark pattern) applied during the first three weeks after hatch “have little beneficial effect on the overall prevalence of leg weakness” (Sørensen et al, 1999).

Two methods of manipulating the birds’ feeding patterns have also been tried. Normally broilers are given feed *ad libitum*. One alternative approach is to restrict the amount of feed given in the birds’ early days of life. Whilst we would welcome a reduction in the level of lameness in broilers, Compassion in World Farming Trust (CIWF Trust) is concerned that severe restrictions of feed are likely to be stressful in themselves.

Su et al (1999) found that early feed restriction led to better walking ability, but that adjusting the observations for differences in body weight removed many of the significant differences. In fact, the authors concluded that only limited improvements in walking ability can be achieved by early feed restriction. They pointed out that making the feed restriction more severe (i.e. giving the birds even less feed) or applying it for longer, did not lead to improved walking ability. They concluded that the limited improvement that can be achieved by early feed restriction “can be achieved by the least severe and shortest period of restriction applied in this study” (i.e. feed restriction lasting 5 days and calculated to achieve 75% of the predicted growth of *ad libitum* birds).

Another approach is to give the birds two, three or four meals per day rather than feed them *ad libitum*. Su et al (1999) found that birds fed fewer meals per day had better walking ability, less hock burn and less tibial dyschondroplasia than those fed more meals or *ad libitum*. These findings remained the same even the data were adjusted for body weight; in other words, the major part of the improvement in leg weakness is independent of changes in body weight.

Birds fed fewer meals also had improvements in feed conversion ratio (FCR). The authors stress that “the improvements in FCR and leg weakness achieved in this trial were substantial If the improvements in FCR are maintained until slaughter, and there is no reason to believe they would not be, meal feeding may provide a viable method for improving production efficiency and limiting leg weakness”.

Kestin et al (1999) stated that the studies referred to above showed that alterations to husbandry practices lead to only relatively minor improvements in leg weakness, but “that progress can be made in reducing and eliminating leg disorders by genetic means”. CIWF Trust’s view is that the most sound approach to addressing leg disorders would be to reverse the extremely fast growth rates. Indeed, Kestin et al (1999) point out that a large proportion of the leg weakness seen in broilers “is related to the rapid juvenile growth rate” and that “there is a strong correlation between leg weakness and growth rate”. That said, selecting for good leg structure and walking ability is a key element in any strategy for dealing with leg disorders.

In their 1999 paper, Kestin et al reported on a trial which was conducted to investigate the susceptibility of different genotypes of broilers to leg weakness. Four crosses of commercial broiler lines were assessed, most of which are commonly used in the UK and are available world-wide. One of the crosses was found to have substantially worse walking ability than the others. There were large and significant differences in gait scores with Crosses 1 and 2 (both these categories being Ross birds) having the best gait scores and Cross 3 (Cobb birds) the worst. Cross 3 also had the highest foot pad burn scores and the highest hock burn scores.

In the studies referred to above, when looking at the effect of husbandry changes on walking ability, the largest difference in gait scores achieved was what Kestin et al (1999) refer to as “a highly significant 0.240 gait score units”. The body weight penalty for this improvement was 109 grammes. In Kestin et al’s own study on the impact of genotype on walking ability, there was a difference of 0.509 gait score units between two of the Crosses (1 and 3), with there being no difference in body weight between the two Crosses. In short, a much bigger difference in walking ability was found between genotypes than was achieved by any changes in husbandry methods.

It is clear that genotype has a major influence on lameness, a much greater influence than any husbandry changes that have been studied to date.

Since the problem of leg disorders was first brought to the public’s attention in the mid-1990s, the UK industry has claimed that it has made strenuous efforts to tackle the problem. Clearly one would expect the industry, faced with the widespread leg disorders which had

been exposed, to halt or even reverse the increase in growth rates and also, in its selection policies, to select for improved leg strength and walking ability.

However, Kestin et al draw attention to a review by Hardiman (1996) showing that selection against leg disorders came only 9th out of 12 factors taken into account by the breeders of broilers, with improved growth rate and feed efficiency being first and second. So at the very time when, if they really wished to address leg problems the industry would select for walking ability and/or choose genotypes with slower growth rates, they are in fact selecting for ever faster growth rates and giving a much lower priority to selecting against leg disorders.

And things are set to get worse. Hardiman (1996) indicated that breeders predict an increase in broiler growth rate of 600 grammes to 40 days of age over the next ten years. In the light of this, Kestin et al predict that an increase in growth rate of this size would lead to a deterioration in walking ability of approximately 1.1 units of gait score, assuming that no active selection to improve walking ability is undertaken.

Another recent paper has provided evidence that birds who are lame do indeed suffer pain when they walk (McGeown et al, 1999). Indeed even earlier, Weeks & Kestin (1997) showed that lame birds spend less time in activities requiring them to stand, behaviour which is consistent with them suffering chronic pain when they do stand. Moreover, Danbury et al (1997) have shown that lame broilers self-select more feed containing an analgesic agent than sound birds.

The 1999 paper by McGeown et al reports a study which tested the ability of lame and normal broilers to traverse an obstacle course. Some of the lame birds were treated with carprofen, which is a non-steroidal drug with analgesic and anti-inflammatory properties. The sound birds traversed the course in approximately 11 seconds. Lame birds, however, needed approximately 34 seconds to traverse the course, except that those which were treated with carprofen completed the course in 18 seconds. The authors commented: "Carprofen increased the speed and walking ability of the lame birds so much that there was no significant difference between the time they took to complete the course and the time taken by the sound birds". The carprofen improved the ability of the lame birds to walk both because of its anti-inflammatory and its analgesic effects. The authors conclude that the

results of the study “provide good evidence that moderately lame birds, as defined by a gait score of 3, suffer pain when they walk”.

No recent study has been published as to the level of lameness in the UK broiler flock. In the study reported in 1992, Kestin et al found that the welfare of 26% of the broilers was compromised as a result of leg weakness, i.e. their gait scores were 3, 4 or 5, and the authors emphasised that there was likely to be chronic pain and discomfort for these birds.

Since that study the UK industry has asserted that the proportion of broilers suffering from leg problems has fallen dramatically. However, a 1999 Danish study casts some doubt on this. The Danish industry uses the same broilers as are used in the UK. Indeed, the birds used in the Danish study were Ross 208, which were one of the better crosses used in the 1999 study by Kestin et al referred to earlier.

In the Danish study the Danish poultry industry, in collaboration with an animal welfare organisation, had the prevalence of lameness in a large and representative sample of their commercial flocks assessed by independent scientists.

Appallingly, the Danish study found that 30.1% of the chicks had gait scores of 3, 4 or 5, scores which indicate that they are suffering from chronic pain. It must be stressed that the Danish birds were the same as Cross 1 in the study by Kestin et al, which found Cross 1 to have the second best gait scores. The Danish study also reported that they found development of tibial dyschondroplasia in 57.1% of the chicks. 42% had foot pad burns.

To our dismay, the Danish study indicates that there has been no improvement in lameness during the 1990s, and indeed that things may have got worse: the Danish figure of 30.1% of birds having gait scores of 3, 4 or 5 is even higher than the 26% found by Kestin et al in 1992.

The disturbing results from Denmark mean that it is vital that a similar, independent study should be carried out of the UK broiler flock. There is no good reason to assume that the level of leg problems in the UK would be significantly lower than that found in Denmark.

The 1992 FAWC report concluded that:

“The current level of leg problems in broilers is unacceptable. Steps should be taken to ensure that there is a significant reduction in the numbers and severity of leg problems. It will be the responsibility of the industry to achieve this objective and the Council intends to look at this aspect of broiler production again in five years time, when significant improvement should be apparent. If no reduction in leg problems is found, we may recommend the introduction of legislation to ensure the required improvements.”

In short, in 1992 the FAWC concluded that there was a major problem with leg weakness in broilers and that it was incumbent on the industry to take steps to ensure that, in five years time, there was a significant reduction in the numbers and severity of leg problems. The five years given by the FAWC elapsed in 1997, two years ago. We believe that the time has now come for the industry to show what steps it has taken to achieve the goal laid down by the FAWC. In the seven years that have elapsed since publication of the FAWC’s recommendations, no independent study has been published; all we have is the industry’s own assertion that they have improved the level of lameness in the UK flock.

CIWF Trust calls on the government:

- 1. To commission an independent study of the level of leg weakness in the UK flock.**
- 2. To introduce legislation designed specifically to effect a substantial reduction in the level of leg weakness in broilers.**

CIWF Trust calls on the broiler industry:

- 3. To place selection against leg disorders first among the factors they take into account in their selection policies.**
- 4. To halt, and then reverse the trend towards increased growth rates.**
- 5. To show what steps it has taken in response to the FAWC report in order to achieve the significant reduction in the numbers and severity of leg problems required by the FAWC.**

PETER STEVENSON

REFERENCES

- Danbury, T.C., Chambers, J.P., Weeks, C.A., Waterman, A.E. and Kestin, S.C., 1997. Self selection of analgesics by broiler chickens. *Animal Choices*. Occasional Publication No. 20. Eds. Forbes, J.M., Lawrence, T.L., Rodway, R.G. and Varley, M.A. British Society of Animal Science.
- FAWC, 1992. Report on the Welfare of Broiler Chickens.
- Hardiman, J.W., 1996. Broiler breeding by the year 2006. Pages 461-467 in: Proceedings of the XX World's Poultry Congress. Vol. 1. New Delhi, India.
- Kestin, S.C., Su, G. and Sørensen, P., 1999. Different commercial broiler crosses have different susceptibilities to leg weakness. *Poultry Science* 78: 1085-1090.
- McGeown, D., Danbury, T.C., Waterman-Pearson, A.E. and Kestin, S.C., 1999. Effect of carprofen on lameness in broiler chickens. *Veterinary Record* 144: 668-671.
- Sanotra, G.S., 1999. Registrering af aktuel benstyrke hos slagtekyllinger. (Velfaerdsmonitoringsprojekt). Pub: Dyrenes Beskyttelse.
- Sørensen, P., Su, G. and Kestin, S.C., 1999. The effect of photoperiod : scotoperiod on leg weakness in broiler chickens. *Poultry Science* 78: 336-342.
- Su, G., Sørensen, P. and Kestin, S.C., 1999. Meal feeding is more effective than early feed restriction at reducing the prevalence of leg weakness in broiler chickens. *Poultry Science* 78: 949-955.
- Weeks, C.A. and Kestin, S.C., 1997. Effect of leg weakness on the behaviour of broilers. Proceedings of the 5th Poultry Welfare Symposium, Wageningen. The Netherlands. Eds: Koene, P. and Blokhuis, H.J. p.117.