The behaviour of broiler chickens and its modification by lameness

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Accepted 30 September 1999

Abstract

The behaviour of six replicates of broilers obtained from commercial farms, fed ad-libitum and housed on a 23-h light:1-h dark schedule at 20 lx was observed using scan sampling. Comparisons were made between sound birds and those of varying degrees of lameness between 39 and 49 days of age. Sound broilers averaged 76% of their time lying and this increased significantly to 86% in lame birds (gait score 3). Lying also increased with age. Although sound broilers spent only a minor part of the day on their feet, they spent significantly more time standing idle (7%), standing preening (3.5%) and standing eating (4.7%) than lame birds. Walking declined with age, but occupied an average 3.3% of the time of a slaughter-weight broiler. Again, lameness significantly reduced this to a minimal 1.5% in the worst affected birds. Sound birds predominantly chose the usual standing posture for eating, whereas, lame birds lay down to eat for almost half their feeding time. Detailed observations using video records revealed that lameness altered the feeding strategy of broilers. Whereas sound birds fed over 50 times in 24 h, the number of visits to the feeder was reduced with increasing lameness to an average of around 30 in the lamest broilers. However, meal duration was adjusted to give no overall differences in time spent feeding per day. Time spent drinking was also the same for all birds, averaging 3% of the day. The alterations of the time budget, in particular the reductions in activities performed whilst standing, and the different feeding strategies adopted, are consistent with lameness imposing a cost on the affected broilers to the detriment of their welfare.

Keywords: Chicken-welfare; Lameness; Leg weakness; Time-budgets; Welfare

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1. Introduction

Broiler chickens are probably the most numerous farmed species: worldwide, some 40 billion are produced per annum. They have been subjected to increasingly intensive genetic selection for growth rate and food conversion efficiency during the last four decades. The result of this pressure has been a consistent decrease in the age at which slaughter weight (approximately 2 kg) is reached, by 1 day per year, as well as large relative increases in breast muscle size (Griffin and Goddard, 1994). In the short term, there is no sign of a decline in this rate and it is anticipated that genetic changes resulting in enhanced performance will continue (Albers and Groot, 1998). Such selection practices have resulted in birds both genetically distant and with reduced genetic diversity compared with their Red Jungle Fowl ancestors (Siegel et al., 1992), and in altered physiology. Metabolic disorders are prevalent and include heart failure (Scheele, 1997) and ascites (Julian, 1993; Mitchell, 1997). Major skeletal disorders (Thorp, 1994) and lameness (Sorensen, 1992; Kestin et al., 1992) are also widespread.

The behaviour of broiler chickens is thus of interest from several perspectives. The consequences of attaining virtually adult body size whilst still very immature in many aspects of development may also be reflected in altered behaviour. Further, the metabolic demands of extremely rapid growth may reduce the energy available for activity. Their behavioural repertoire and time budgets may change within a few generations or years to reflect the ongoing, and comparatively rapid, changes in their genetic makeup and physiology.

The observational studies reported in this paper seek to update and extend other earlier studies of broiler behaviour (Preston et al., 1983; Murphy and Preston, 1988; Newberry et al., 1988; Weeks et al., 1994), and to examine the impact of lameness on broiler behaviour. Feeding behaviour is examined in more detail, not only because of its association with selection for growth and enhanced food conversion efficiency, but also to test the hypothesis that accessing feed resources is more difficult for birds suffering from lameness.

Several authorities believe leg abnormalities resulting in lameness, also called leg weakness, to be among the most severe welfare problems in modern broiler production (FAWC, 1992; Webster, 1994; Gregory, 1998). There is increasing evidence that some, if not all, these pathological conditions are painful, by inference (Sorensen, 1989; Duncan et al., 1990; Gregory, 1998; Julian, 1998), or from responses to analgesic agent (Danbury et al., 1997, 1999; McGeown et al., 1999). Thus, standing and moving may cause discomfort and/or pain. Performing such activities may therefore represent a cost to a lame broiler and reduce the time budgeted to perform them. This study aimed to compare the time budgets of sound and increasingly lame broilers for the majority of activities in the broiler ethogram.

2. Methods

2.1. Animals and husbandry

Batches of 5-week-old, mixed sex, Ross 308 broiler chickens were selected from commercial farms using the gait scoring method of Kestin et al. (1992). This six-point
scale categorises birds according to a visual appraisal of their walking ability. Briefly, gait score 0 (GS 0) describes a bird which appears ‘dextrous and agile’ with no detectable gait abnormality; GS 1 birds have a slight walking defect; GS 2 birds have a definite and identifiable defect; a GS 3 bird has an obvious gait abnormality that affects its ability to move about, particularly its manoeuvrability, acceleration and speed of movement; GS 4 birds have a severe gait defect, only walking when driven or strongly motivated and a GS 5 bird cannot walk at all. It was considered unethical to select birds whose disability categorised them as GS 4 or 5.

A batch of birds was assigned to four pens (2 × 3 m). Each pen contained 25 birds of a single GS (0,1,2,3). Two pens were arranged either side of a 1.5-m wide passageway, used for access and observations, within a larger room. Adjacent pens were visually isolated from each other. Broilers were housed on a deep litter of wood shavings (8 cm), with continuous access to water and feed (standard broiler finisher pellets, BOCM Pauls, Radstock, UK; containing 3.5% oil, 17% protein, 4.5% fibre, 5.5% ash and 0.37% methionine). Water was provided via two bell drinkers (20–25 cm above litter), which birds could only reach when standing. Two hopper feeders per pen were fixed low enough (10 cm above litter) to be accessed from a standing or lying posture. Air temperature was maintained between 16–28°C and 24–28°C using fan ventilation and heaters. A lighting regime of 23-h light:1-h dark was used. These conditions were similar to commercial husbandry in the UK. Birds were allowed a minimum of 2 days to recover from the stress of transport and acclimatise to their new environment. The walking ability of birds was re-assessed twice per week and any bird whose GS changed was removed from the trial. Any bird developing severe lameness (GS 4) was humanely killed.

2.2. Observational scan sampling

The behavioural states of groups of birds were recorded using scan sampling (Altmann, 1974). The major behaviours in the broiler ethogram were chosen from preliminary observations and defined as a list of 16 states. The observer sat or stood in a position outside the pens, but with each in clear view. The number of birds in a pen performing each of the listed activities was sequentially recorded as a series of instantaneous scans. Similar scans were then recorded for the other three pens in turn. Each pen (and each activity) was scanned at 5-min intervals for a period of 1 h, thus giving 12 records. Previous work showed that activity patterns of broiler chickens on this lighting regime, cycle approximately hourly throughout a 24-h period and show very little diurnal variation (Weeks and Davies, 1995). Observations were repeated on 6 days between the ages of 39 and 49 days.

The study was replicated with six batches, each of approximately 100 commercially reared broilers from different farms, over a period of 2 years.

2.3. Analysis of observational scan sampling data

The number of birds performing each activity was summed for every 1-h period and adjusted to account for any deaths in a pen. The percentage number of birds performing
each activity was fitted to a repeated measures general linear model. The transformation of the square root was used to normalise the data when required. The effect of time over the six experimental days was analysed using the Greenhouse–Geisser test, before looking at effect of GS on the data. The data presented in the results are the mean ± SEM percentage time spent performing an activity.

2.4. Video records

In two separate experiments, further analysis of feeding behaviour was performed using video recording. A colour camera fixed above the feeder recorded 23 h data onto a 3-h tape using time lapse technique. Broilers aged 40–49 days old were kept in pens of 20–25 birds. Housing and husbandry were similar to the scan observations. Initially, a total of nine sound (GS 0) and nine lame birds (GS 3) were selected at random from two different flocks and marked with colour spray and wing tags so that they could be individually identified on film.

Subsequently, feeding behaviour of broilers of mixed walking ability was studied. A total of 16 birds, four of each GS (GS 0, GS 1, GS 2 and GS 3) from two pens were identified for 23-h filming as above.

2.5. Analysis of video data

The tapes were analysed to give the start time and duration of every feeding bout for each bird and hence also time between feeds. Separate feeding bouts were defined by an interval of greater than 1 min to allow for the short pauses that often occur when a bird is eating. The data were normally distributed. Feeding behaviour between lame (GS 3) and sound (GS 0) birds was compared using Students paired t-test, and across the range of walking abilities (GS 0–GS 3) using two-way analyses of variance (ANOVA).

3. Results

3.1. Observational scan sampling

Time budgets for each recorded activity for birds of GS 0, 1, 2 and 3 are shown in Table 1.

Overwhelmingly, the greatest part of a broiler’s day (76–86%) was spent lying, of which more than a quarter was apparently asleep and over half idling (inactive, i.e., not participating in any other listed activities). Not only did the proportion of birds lying increase with age during the 10-day study, but there was a highly significant increase as walking ability deteriorated (Fig. 1). Lame birds also spent significantly more time lying with one leg extended at approximately right-angles to their body (Fig. 2).

Of the relatively minor proportion of the day spent on their feet, broilers idled a substantial amount, but this halved from approximately 7% in sound birds to only 3.5%
Table 1
Number of birds, expressed as a percentage of total number of birds in particular gait score category, performing different activities. Statistics column gives results of ANOVA with age, across the 6 days birds were observed, and across walking ability where gait score 0 = sound, and gait score 3 = lame.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Times spent performing different activities by birds of different walking abilities (Gait Scores)</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GS 0</td>
<td>GS 1</td>
</tr>
<tr>
<td>TOTAL lying</td>
<td>76.31 ± 1.64</td>
<td>79.59 ± 1.27</td>
</tr>
<tr>
<td>Lie sleep</td>
<td>19.53 ± 1.41</td>
<td>19.07 ± 1.32</td>
</tr>
<tr>
<td>Stand idle</td>
<td>7.2 ± 0.81</td>
<td>5.9 ± 0.45</td>
</tr>
<tr>
<td>TOTAL eating</td>
<td>5.28 ± 0.48</td>
<td>5.41 ± 0.34</td>
</tr>
<tr>
<td>Stand eat</td>
<td>4.7 ± 0.36</td>
<td>4.52 ± 0.29</td>
</tr>
<tr>
<td>Lie eat</td>
<td>0.61 ± 0.13</td>
<td>1.07 ± 0.18</td>
</tr>
<tr>
<td>Stand drink</td>
<td>3.36 ± 0.26</td>
<td>3.38 ± 0.33</td>
</tr>
<tr>
<td>Walk</td>
<td>3.31 ± 0.32</td>
<td>2.77 ± 0.27</td>
</tr>
<tr>
<td>TOTAL preening</td>
<td>10.33 ± 0.69</td>
<td>9.96 ± 0.53</td>
</tr>
<tr>
<td>Stand preen</td>
<td>3.53 ± 0.39</td>
<td>2.69 ± 0.22</td>
</tr>
<tr>
<td>Lie preen</td>
<td>6.80 ± 0.44</td>
<td>7.28 ± 0.47</td>
</tr>
<tr>
<td>TOT ground peck</td>
<td>2.92 ± 0.33</td>
<td>2.79 ± 0.25</td>
</tr>
<tr>
<td>Stand ground peck</td>
<td>0.95 ± 0.29</td>
<td>0.36 ± 0.10</td>
</tr>
<tr>
<td>Lie ground peck</td>
<td>2.35 ± 0.33</td>
<td>2.46 ± 0.31</td>
</tr>
<tr>
<td>Leg extend</td>
<td>0.63 ± 0.01</td>
<td>0.83 ± 0.15</td>
</tr>
<tr>
<td>Dustbathe</td>
<td>0.34 ± 0.09</td>
<td>0.37 ± 0.12</td>
</tr>
<tr>
<td>Agonism</td>
<td>0.34 ± 0.07</td>
<td>0.41 ± 0.13</td>
</tr>
<tr>
<td>Run</td>
<td>0.41 ± 0.08</td>
<td>0.40 ± 0.13</td>
</tr>
</tbody>
</table>
Fig. 1. Proportion of time broilers spent lying down, and the effect of lameness ($p < 0.05$) and age ($p < 0.001$). Birds were from six different flocks, aged 39–49 days old, and their walking abilities ranged from sound (GS 0) to lame (GS 3).

Fig. 2. Proportion of time broilers spent standing idle, or ground pecking, and lying with one leg extended, and the effect of lameness on these behaviours. Birds were of mixed walking ability, ranging from sound (GS 0) to lame (GS 3) from six different flocks, aged 39–49 days old.
Fig. 3. Proportion of time broilers spent walking, and the effect of lameness ($p < 0.01$) and age ($p < 0.05$). Birds were from six different flocks, aged 39–49 days old, and their walking abilities ranged from sound (GS 0) to lame (GS 3).

Fig. 4. Proportion of time broilers spent preening, from either a standing or lying position and the effect of lameness on preening behaviour. Birds were of mixed walking ability, ranging from sound (GS 0) to lame (GS 3) from six different flocks, aged 39–49 days old.
Fig. 5. Proportion of time broilers spent eating, from either a standing or lying position and the effect of lameness on feeding behaviour. Birds were of mixed walking ability, ranging from sound (GS 0) to lame (GS 3) from six different flocks, aged 39–49 days old.

Fig. 6. Proportion of time broilers spent eating whilst lying down, and the effect of lameness (p < 0.05) and age (p < 0.05). Birds were from six different flocks, aged 39–49 days old, and their abilities ranged from sound (GS 0) to lame (GS 3).
in GS 3 birds (Fig. 2). There was also a significant decrease in time spent idling with increasing age for all birds. Similarly, the time allocated to walking significantly declined both with age and increasing lameness (Fig. 3). Sound (GS 0) broilers were very seldom observed running and GS 3 birds almost never (Table 1). Scan observations do not give a good estimate of such minor activities, but there was a trend for lameness to reduce the amount of time spent on most standing activities, including standing ground pecking (Fig. 2), where ground pecking is defined as pecking at inanimate, non-food objects. Unsurprisingly for such juvenile birds, agonistic behaviours were very seldom observed (<0.5%).

Most parts of the body can be preened from the lying posture. All broilers preferentially chose to preen whilst lying rather than standing (Fig. 4). Sound broilers preened significantly more whilst standing than lame birds. Lame broilers did not,

Table 2
Feeding behaviour of 40–49-day-old sound and lame broiler chickens recorded on video over a 23-h period, (n = 9 per GS)

<table>
<thead>
<tr>
<th></th>
<th>Sound (GS 0)</th>
<th>Lame (GS 3)</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of feeding bouts</td>
<td>53</td>
<td>27</td>
<td><em>p = 0.016</em></td>
</tr>
<tr>
<td>Time between feeds (s)</td>
<td>1959</td>
<td>3634</td>
<td><strong>p = 0.003</strong></td>
</tr>
<tr>
<td>Duration of feeding (s) — per bout</td>
<td>88</td>
<td>199</td>
<td><strong>p = 0.004</strong></td>
</tr>
<tr>
<td>Duration of feeding (s) — per day</td>
<td>4256</td>
<td>4546</td>
<td><em>p = 0.34 ns</em></td>
</tr>
</tbody>
</table>
Table 3
Feeding behaviour of 41–47-day-old broiler chickens of varying degrees of lameness, from 23-h video recordings, (n = 4 per GS)

<table>
<thead>
<tr>
<th></th>
<th>GS 0</th>
<th>GS 1</th>
<th>GS 2</th>
<th>GS 3</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of feeding bouts</td>
<td>54</td>
<td>70</td>
<td>38</td>
<td>39</td>
<td>p = 0.007**</td>
</tr>
<tr>
<td>Time between feeds (s)</td>
<td>1483</td>
<td>1115</td>
<td>2060</td>
<td>1704</td>
<td>p = 0.043*</td>
</tr>
<tr>
<td>Duration of feeding (s)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>— per bout</td>
<td>110</td>
<td>96</td>
<td>162</td>
<td>237</td>
<td>p = 0.003**</td>
</tr>
<tr>
<td>— per day</td>
<td>6073</td>
<td>6658</td>
<td>5763</td>
<td>8897</td>
<td>p = 0.160 ns</td>
</tr>
</tbody>
</table>

however, compensate by increasing preening whilst lying down, resulting in an overall trend for a decline in grooming behaviour with lameness. It should be noted that there were significant changes in levels of preening from day to day.

Feed hoppers were set so that broilers could eat from either a standing or lying position. Sound broilers ate more from the normal, standing position (Fig. 5), but increasingly lay down to eat with age (Fig. 6). Lame broilers spent almost half their feeding time lying down (Fig. 5) and this also increased significantly with age (Fig. 6). Standing to eat proportionally decreased with age (Fig. 7) so that the total time spent eating did not vary significantly with either age or gait score.

Whilst eating and drinking are both essential activities, drinking could only be performed whilst standing, and time allocated to drinking remained at around 3% for all birds (Table 1).

3.2. Video records

Feeding behaviour over 24 h is compared for lame (GS 3) and sound (GS 0) birds in Table 2, and also for birds of intermediate lameness (GS 1 and GS 2) in Table 3.

4. Discussion

Apart from preliminary reports of some of these data (Weeks and Davies, 1996; Weeks and Kestin, 1994, 1997; Weeks et al., 1997), this is the most comprehensive quantitative description of all the main behavioural states of intensively reared broiler chickens close to slaughter age and weight.

The repeated observations of groups of broilers from six commercial farms enable us to be confident that the described patterns of behaviour are representative for birds of this genotype kept in a prevalent husbandry system. Unlike layers and adult chickens, there is little evidence that group size alters the behaviour of broilers. Although stocking density was lower than in a commercial unit, the effects may have been mitigated in part by small pen size and close proximity of feed resources. Bessi (1993) found no significant differences in broiler behaviour over a wide range of stocking densities. Otherwise, our experimental husbandry was similar to commercial husbandry and observations of commercial flocks (unpublished) indicate that behaviour was typical.
Thus, these observations may provide a basis for future comparisons of other genotypes and husbandry conditions.

The scan sampling technique enables large number of observations of many birds, resulting in accurate estimation of the main activities. The majority of possible behavioural states can be observed simultaneously, but this method gives a less precise estimate of the incidence of infrequently performed activities. These, having been identified by this study, may warrant future investigation using more appropriate techniques.

A further benefit of quantifying behaviour is that activities may be ranked according to the amount of time spent on them. In the context of welfare, the dominant activities are of greatest importance. For broilers, lying (also described as sitting by some authors) predominates, with much of this time spent idling and sleeping. It is therefore important for good welfare that the birds are comfortable and there are no health problems associated with a high incidence of lying. Unfortunately this may not always be the case: skin lesions and musculo-skeletal problems may be associated with too much contact with poor-quality litter and inadequate exercise (Hester, 1994) to take just two examples.

In this study, 39–49-day-old broiler chickens spent 76–86\% of their time lying down. This proportion significantly ($p < 0.05$) increased as the birds grew heavier and older during the 10 days over which they were observed. Similar studies have found age-related increases in lying behaviour (Blokhuis and Van Der Haar, 1990; Bessei, 1992; Weeks et al., 1994). It is likely that the high levels of lying down are related to the body weight and fast growth rates of broiler chickens.

In the 1980s, observations of broiler chickens revealed 64–73\% of the day was spent lying down (Preston et al., 1983; Murphy and Preston, 1988; Newberry et al., 1988). More recent studies have found that resting accounted for 80–90\% of the time budget (Bessei, 1992), and that 6–to 10-week-old broilers, respectively, spent 79–89\% of their time lying down including those birds reared more slowly and given access to pasture (Weeks et al., 1994). Difficulties arise when comparing studies of broiler behaviour that use different husbandry conditions and birds of different age, sex and genotype. However, we postulate that selecting for improved feed conversion efficiency inevitably favours the less active animal.

Rest and sleep are strongly associated with energy conservation, tissue restoration and growth (Blokhuis, 1983, 1984). It could be expected therefore that fast-growing broilers would rest and sleep more than other fowl. However, the 19–24\% of the time spent sleeping (defined as eyes closed and/or head tucked along back or under wing) by broilers in this study was less than the comparable ‘dozing-2’ and sleeping of adult male and female layers and Red Jungle Fowl which averaged 36\% of a 24-h day (Blokhuis, 1994). It has been found that broilers on some lighting programmes, including the long photoperiod of this study, have disturbed rest (Gordon, 1994), which might explain these reduced levels. Murphy and Preston (1988) found broilers lay in short bouts and were often disturbed by other birds.

The work reported here gives evidence that lameness, with its associated disability and probable pain, significantly increases the time spent lying. Selection for high breast meat yield has moved broilers’ centre of gravity forward, which may unbalance them and predispose them to sitting behaviours. It is likely that sternal recumbency (here
termed lying) is the most comfortable, and least physically demanding, posture for a bird with leg problems.

The practice of extending one leg at right angles to the body may be observed for many minutes at a time in broilers, increasing significantly with increasing lameness (Fig. 2), yet it was not described in the ethogram for Red Jungle Fowl (Kruijt, 1964), regarded as applicable to domestic fowl by Wood-Gush (1971). This posture can be seen occasionally in layer strain chicks under a brooder, where it is a short duration event, similar to wing-flapping or to a wing and leg stretch. The long-duration leg extension appears to be abnormal. We suggest that this posture is adopted by lame broilers to relieve pain or discomfort in their legs. Note that broilers with obvious leg deformities were not used in our study for ethical reasons and thus leg extensions observed were not determined mechanically.

Inhibition of activity, including reduced grooming and exploratory behaviours, are often noted in animals experiencing chronic pain (Vierck and Cooper, 1984). Lame birds in this study preened significantly less than sound birds whilst standing and did not compensate with increased preening whilst lying (Fig. 4). Although deemed an important activity for both layers and Jungle fowl (Blokhuis, 1984), dustbathing occupied less than 0.5% of time by broilers in this investigation. This agrees with low levels of dustbathing reported in previous studies with broilers (Murphy and Preston, 1988; Blokhuis and Van Der Haar, 1990; Bessei, 1992; Weeks et al., 1994). Vestergaard and Sanotra (1999) found that dustbathing was significantly reduced in broilers with leg disorders, and hypothesised that this was associated with fear. They also considered it possible that reduced dustbathing activity in lame broilers is a function of pain.

Overall, levels of time spent ground pecking by broilers of under 3% are dramatically less than the 60% seen in their genetic ancestors, Red Jungle fowl, by Dawkins (1989). In addition, ground pecking whilst standing tended to decrease with increasing lameness (Fig. 2). Unquestionably, the behaviour of poultry can be altered by genetic selection (Faure, 1980; Seigel, 1989). In most cases, the balance of the genetic-environment contribution to the observed behaviour is unclear. It seems highly likely that the drive to forage may have been considerably reduced in broilers that are more efficient and less wasteful feeders than layer strains (Masic et al., 1974).

The amount of walking was low and reduced with both age and increasing lameness (Fig. 3). It is probable that the mean 1.5% time spent walking by lame (GS 3) broilers is close to the minimum needed to access resources such as feed and water. Surveys have previously shown that the growth rate of broilers up to GS 3 is not affected by lameness, however, GS 4 and 5 birds, more severely disabled than those used in the present studies, are lighter in weight than sound birds (Kestin et al., 1994). There was no effect of lameness on the total time spent drinking as this is an essential maintenance behaviour like feeding which in total was also unaffected by age or lameness. In contrast, the non-essential idling whilst standing, halved in lame birds (Fig. 2).

Not only is eating essential for life, but broilers are genetically especially motivated to feed (Seigel, 1989). Thus, the alterations in feeding behaviour seen in this study are particularly interesting. Scan observations showed that overall, lamer birds (GS 2 and 3) spent about half their feeding time lying, whereas those with little or no lameness (GS 0 and 1) preferred the usual standing position for eating (Fig. 5). There were, however,
significant changes with age with all broilers increasingly lying to eat between the ages of 35 and 45 days (Fig. 6) and correspondingly, with the exception of totally sound birds, substantially reducing the time spent standing whilst eating (Fig. 7).

The most dramatic impact of lameness on broiler behaviour was revealed by the continuous observations of feeding during a whole day (Tables 2 and 3). Broilers reduced the number of visits per day to the feeder in proportion to their degree of walking disability. Those with substantially impaired walking ability (GS 3) approximately halved the number of visits but doubled the length of time spent feeding at each visit so that overall time spent feeding was the same compared with sound (GS 0) birds. Both the number of bouts and the length of time spent feeding per day were comparable with the mean of 49 and 7415 s, respectively, reported 25 years ago by Masic et al. (1974) in 10–11-week-old broilers weighing 2.2 kg and housed individually in cages on a 14-h photoperiod. There was also good agreement between the methods of observation in estimating the time spent feeding.

The behaviour of broilers in our studies is indicative of a cost to the lame bird in getting up and walking over to the feeder. In the commercial situation, this cost might be even greater, as having reached the feeder, a lame bird would either have to remain standing or get up and down to complete its feeding bout: we have observed the latter particularly in the lamest birds. Another consideration, as yet unresolved, is whether those birds that prefer to eat lying down, or choose to make fewer visits to a feeder, are, as a consequence, more likely to develop lameness.

Finally, it is interesting to note that many of the activities showed little distinction between birds that appeared to walk well or with only a slight impairment of gait (GS 0 and GS 1). Some, particularly those illustrated in the figures, also revealed little distinction between moderate and substantial lameness (i.e., between GS 2 and GS 3) from the birds’ point of view as expressed by their behaviour. Our current experimental programme is refining methods of evaluating lameness and any associated pain.

5. Conclusions

These observations of the behaviour of broiler chickens agree with previous similar studies (e.g., Murphy and Preston, 1988; Blokhuis and Van Der Haar, 1990; Bessei, 1992; Weeks et al., 1994). Overall, these results characterise broilers as an extremely inactive strain of chicken, quite distinct from their Jungle fowl ancestors. Whilst some of the alterations in their time budgets may be directly linked with intensive genetic selection for faster growth rate and better food conversion efficiency, others are more likely to be a consequence of altered physiology and morphology rather than altered motivation. The nature of the apparent relationship between lameness and reduced activity levels is unclear, but husbandry and lighting patterns are thought to have an effect on both (Hester, 1994). Lameness significantly changes the time budgets of many behaviours and dramatically alters feeding strategy. In selecting for improved feed conversion efficiency, birds less inclined to be active may be chosen. The selection pressures that have resulted in altered time budgets and apparently abnormal behaviours are continuing and may result in further health and behavioural changes to the detriment of broiler chicken welfare.
Acknowledgements

We appreciate the financial support of MAFF and the RSPCA for this work. Our grateful thanks to Toby Knowles for statistical advice.

References


