

FEED RESTRICTION IN FAST GROWING BROILERS

The problem

Most of the modern broiler breeds are the result of decades of genetic selection to obtain a fast-growing and higher breast yield chicken. This intense selection for performance traits has had negative repercussions on the health and welfare of the birds.

In recent years, interest in chicken welfare has increased and efforts to improve broiler welfare on farm include giving the birds more space, adding environmental enrichment to encourage natural behaviours such as perching and pecking, and providing access to the outdoors. While fast growing birds can benefit from these improvements to the housing conditions, their welfare remains compromised due to their conformation and health problems, resulting in poor walking ability and reduced activity¹.



Feed restriction is a practice commonly performed in broiler breeders. Broiler breeders have impaired reproductive performance when fed to satiety, but they can achieve an optimal hatching egg production under feed restriction². Feed restriction has also become a practice used to reduce the growth rate of fast-growing broilers chickens³. Fast growing broiler chickens may be fed restricted diets for several reasons: to prevent health and welfare issues caused by rapid growth, such as lameness and high mortality; in systems where a higher slaughter age is required; to enhance performance by improving feed efficiency, weight gain, and uniformity; and to offset the increasing cost of nutrition in recent years³.

Animal welfare scientists and NGOs are calling for a shift towards healthier, slower-growing broiler breeds, able to express more natural behaviours. Restricting the feed of fast-growing broilers to slow their growth rate does not bring the same welfare benefits and must not substitute a breed change.

Feed restriction practices

Unlike feed restriction in broiler breeders which is a widespread practice, feed-restricting broiler chickens to slow their growth is a less common practice, and may be done using several methods that have been investigated due to their use in broiler breeders:

- **Quantitative feed restriction:** Consists in the reduction of the quantity of available feed. One of the challenges with this method is to ensure that all animals have access to feed. This method can be especially severe to smaller, weaker, or less dominant animals that may not be able to access feed when the feed quantity available at each meal is small⁴.
- **Skip a day:** Feed is given on one day in higher quantity, and no feed is offered the following day. This method is banned in countries that demand daily feeding such as

in the EU or the UK. Evidence of this practice's impact on welfare is inconclusive but suggests that the birds may still be experiencing hunger, and the unpredictability of the feeding times is an additional stressor for the birds⁵. A combination between this regime and the addition of soybean hulls (qualitative change in the feed, see below) can reduce feeding motivation and other stress indicators.

- **Increasing the time feeding:** A strategy for decreasing the feeling of hunger that has been investigated in multiple studies is to increase the amount of time that broilers dedicate to eat the feed while still restricting the caloric intake by (i) altering the composition of the feed: providing a diet with a lower energy level, providing more insoluble fibre and lower level of protein, and/or (ii) altering the presentation of the feed: scatter feeding vs trough feeding and mashed feed vs pellets. Scatter (spin) feeding instead of providing feed in troughs requires the birds to spend more time foraging and has been shown to reduce object pecking, i.e. stereotypical behaviour, but not other measures of hunger^{6,11}.
- **Decreasing appetite:** Calcium propionate in the feed has been used as an appetite suppressant with the intention to reduce prolonged hunger. However, it can induce negative affective states in broiler breeders due to a sickness feeling⁷.
- **Qualitative change in the feed:** Consists in adding fibre or other non-nutritive substances to the diet and reduce the nutritive ingredients. Adding roughage to the diet improved the welfare of broiler breeders by reducing the feeling of hunger. While the provision of insoluble fibres can have favourable impacts on welfare, soluble fibres can lead to a feeling of sickness, reduced resting comfort⁸, and general discomfort in birds, as well as watery faeces and downgraded litter leading to additional negative welfare consequences (contact pododermatitis, hock burns, breast blisters, etc.). Li et al.⁹ showed that a reduction in protein level in the diet increased litter quality by reducing water intake but may also reduce feather quality and cause frustration due to hunger. A different study concluded that low-density diets could decrease stereotypic behaviours in broiler breeders during the early stages but were associated with higher heterophil to lymphocyte ratios (a physiological stress indicator) during the laying period¹⁰. Differences in behaviour are observed in birds under qualitative feed restriction, for example reduced behaviours indicative of frustration and fear⁸. This could suggest that this practice may improve their welfare, compared to the standard commercial practice of quantitative feed restriction. However, physiological indicators of stress such as plasma corticosterone concentration and heterophil/lymphocyte (H/L) ratio suggest that birds still seem to experience a considerable level of hunger and stress when being qualitatively feed restricted¹⁰.

Welfare consequences of feed restriction

Feed restriction is considered a major welfare concern because it leads to feeding frustration and hunger. Hunger is a negative state that signals the need for food and is considered an important welfare issue⁴. Freedom from hunger is part of the Five Freedoms, which have inspired the definition of animal welfare since the publication of the Brambell report in 1965¹¹.

The negative consequences of feed restriction in broiler breeders have been studied for decades. Feed restricting chickens increase the percentage of time performing locomotor, foraging, and pecking, food-related activities and decrease other important behaviours that are not associated with the search of food¹², such as preening and dustbathing. In experimental conditions, feed-restricted breeders perform tasks and expose themselves to situations that they would normally avoid in order to obtain food, suggesting that the urge to feed is highly unpleasant¹².

Some other behaviours associated with hunger and frustration that are more commonly displayed by feed-restricted birds are pacing, injurious pecking at other birds, object pecking including pecking at empty feeders or drinkers, feather pecking, plumage damage and polydipsia⁴ (excessive thirst). Excessive drinking causes watery faeces and therefore poor litter condition, with the consequent negative effects on the incidence of conditions such as contact dermatitis or breast blisters⁹.

Several physiological parameters are also affected in feed restricted birds and are indicative of hunger, such as gene expression of the orexigenic neuropeptides AGRP and NPY and larger concentrations of non-esterified fatty acids in plasma¹³. Furthermore, feed restricted broiler breeders show elevated levels of stress hormones and immunosuppression^{6,14}, which in turn also increases the likelihood of welfare problems caused by infectious agents, including lameness and contact dermatitis (hock burns, breast blisters, and footpad dermatitis). Additionally, birds exposed to feed restriction show reduced learning capacities¹⁵.

Restricting feed in fast-growing broilers does not appear to improve most welfare outcomes. Nicol and colleagues found that in studies comparing fast-growing birds with restricted diet and slaughtered at an older age with slower-growing birds, welfare indicators such as mortality, leg deformities, contact dermatitis, susceptibility to heat stress, and overall activity levels remained significantly worse in the fast-growing birds¹⁶.

The solution

The [European Chicken Commitment](#) requires companies to adopt breeds able to demonstrate improved welfare outcomes. Those breeds are typically slower growing, as slower-growing breeds are generally healthier, have a better locomotion, are more active and display more natural behaviours than fast growing birds^{17,18}.

The breeds currently approved under the ECC in Europe are Hubbard Redbro (indoor use only); Hubbard Norfolk Black, JA757, JACY57, 787, 957, 987, Rambler Ranger, Ranger Classic, Ranger Gold and Rustic Gold (indoor only). Other breeds that meet the criteria of the RSPCA Broiler Breed Welfare Assessment Protocol, the breeds under the Label Rouge certification and other local breeds used in free-range systems with an average growth rate lower than 40g/day (45 g/day under certain conditions), are also accepted.

Although more research is needed to better understand the impact of feed restriction on broiler welfare, all the feed restriction methods described above seem to have negative repercussions on the welfare of broiler chickens. Slowing down the growth of birds from a

fast-growing strain through feed control may not only lead to additional welfare concerns such as hunger and frustration, but is also an illogical and inefficient strategy, and one that cannot be acceptable on welfare and ethical grounds.

References

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