

Assurance schemes as a tool to tackle genetic welfare problems in farm animals: broilers

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Abstract

Farm assurance schemes can set standards to assure compliance with specific requirements relating to animal welfare. As such, standards can be set to address genetic-related welfare problems in farm animals, such as those associated with fast growth rates in meat chickens (broilers) (*Gallus gallus domesticus*). Based on discussions with broiler breeding companies, broiler producers and in line with published research, the RSPCA placed a maximum limit on the genetic growth rate potential of broilers that could be used within its own farm assurance scheme — Freedom Food. Despite the introduction of this requirement, the number of birds reared on the scheme increased from 25 million to 55 million per year over a three-year period, with all of these birds meeting the genetically slower growing requirement. In addition, the two largest global broiler breeding companies responded to this change in the market by each developing a genetically slower growing bird. This demonstrates that assurance schemes can have a pivotal role in tackling genetic welfare problems in farm animals, such as those associated with fast growth in broilers.

Keywords: animal welfare, assurance schemes, broilers, fast growth, genetics, selective breeding

Introduction

Farm assurance schemes can set standards to assure compliance with specific requirements relating to animal welfare. For example, schemes can prohibit the use of certain systems and require the implementation of certain management practices and the provision of specific resources that have been reliably shown to improve welfare. The standards set, however, can not only prescribe requirements relating to the animal's physical environment, including the way it's managed, but also relate directly to the animal itself, such as its genetics. As such, the standards implemented by assurance schemes can require the use of specific breeds, such as certain slower growing strains of bird, or they can specify the compliance with specific genetic-related attributes concerning the animal, such as its potential growth or production rate.

If an assurance scheme is successful, the proportion of animals reared that will benefit from the scheme's standards will increase. Therefore, through the implementation of standards that relate to the genetics of an animal and that have a positive impact on its welfare, assurance schemes can make a positive contribution towards tackling the genetic-related welfare problems in farm animals. A case study is presented here to demonstrate this. Specifically, this article focuses on how the UK's Royal Society for the Prevention of Cruelty to Animals (RSPCA) took steps to tackle the genetic welfare problems associated with fast growth in meat

chickens (broilers). This was achieved through its farm assurance scheme, Freedom Food, by introducing limits on the genetic growth-rate potential of broilers.

Genetic selection for fast growth in broilers

Broilers have been heavily selected to grow very quickly — to produce the maximum amount of meat in the shortest amount of time. This specific focus on increasing the rate of growth is a result of the drive to reduce the cost of production and, in turn, enable the price of chicken meat to be kept low or reduced. Although this reduction in the time taken to reach slaughter weight has been brought about through the process of genetic selection, improvements in nutrition and management have also played a part by allowing for greater exploitation of the birds' genetic potential for fast growth.

The impact of this selection process can be clearly demonstrated by looking at the number of days it has taken for a broiler to reach a weight of approximately 1.8 kg. In 1956, it took a broiler on average 84 days to reach this weight (Hafez & Hauck 2005). Ten years on, in 1966, this had reduced to 60 days, and by 2000 this figure had nearly halved — taking only 34 days (Hafez & Hauck 2005). In 2007, a male from the Ross 308 breeding line could reach this weight in around one month (31 days) (Aviagen 2007a). Therefore, over the last 51 years, the time taken for a broiler to reach 1.8 kg has reduced on average by one day per year.

Similarly, this impact of selecting for increased growth rate can be illustrated by examining the average amount of weight gained by a broiler per day. Using the figures above, in 1956 the average daily weight gain of a broiler was 21 g. Ten years on, in 1966, this had increased to 30 g, and by 2000 was 53 g. In 2007, the male Ross 308 averaged 58 g per day. The average slaughter weight of a broiler today is 2.2 kg, which can be achieved in 35 days (5 weeks) and equates to an average daily weight gain of 63 g (Aviagen 2007a).

Fast growth and broiler welfare

Genetic selection for increased performance does not necessarily result in poorer welfare. However, there can come a point at which intense and disproportionate selection for individual production-related traits begin to have an increasingly negative impact on the animal. In the case of genetic selection for fast growth in chickens, an abundance of published research clearly demonstrates that this point has been reached and passed.

The high growth rate of commercial broilers has been shown to be a major contributor to a number of physical and metabolic disorders. For example, rapid growth rates (eg 57 g per bird per day) can significantly contribute to the development of ascites (Scheele *et al* 1997; SCAHAW 2000; van Middelkoop *et al* 2002), sudden death syndrome (Maxwell & Robertson 2000; SCAHAW 2000; van Middelkoop *et al* 2002) and leg disorders (SCAHAW 2000; Kestin *et al* 2001; van Middelkoop *et al* 2002). In fact, after a review of the scientific literature, the European Union's Scientific Committee on Animal Health and Animal Welfare (SCAHAW) concluded, in their scientific report on the welfare of broilers, that fast growth was not only responsible for most of the welfare problems seen in broilers, but also for the most severe (SCAHAW 2000).

Focusing on leg problems, Knowles *et al* (2008) conducted a comprehensive survey of five major UK producers, which accounted for 50% of UK production, recording the prevalence and severity of lameness in commercial broiler flocks. The walking ability of a representative sample of approximately 51,000 birds was scored on a scale of zero to five: a score of zero represented birds with normal walking ability and birds with a score of five were regarded as being unable to stand. The study estimated that 2.2% of broilers had a normal walking ability (score zero). Therefore, the remainder (97.8%) had a detectable leg problem (scores one to five) (Figure 1), with approximately one in three (27.6%) broilers having a gait score of three or above. This is significant, as birds with gait scores of three or higher are likely to be experiencing some degree of pain (Danbury *et al* 2000). Over 3% of the broilers were unable or almost unable to walk (scores four and five). The survey presented a conservative estimate of the prevalence of leg disorders in chickens and these levels occurred despite the implementation of culling policies designed to remove lame birds from the flocks.

The study examined the relative impact of various risk factors, such as stocking density and bird age, on bird loco-

motion and demonstrated that fast growth rate was a primary risk factor responsible for lameness in broilers. The study indicated that modern genotypes, biased towards fast growth rates, have been detrimental to poultry welfare in compromising the ability of chickens to walk.

Fast growth and broiler breeder welfare

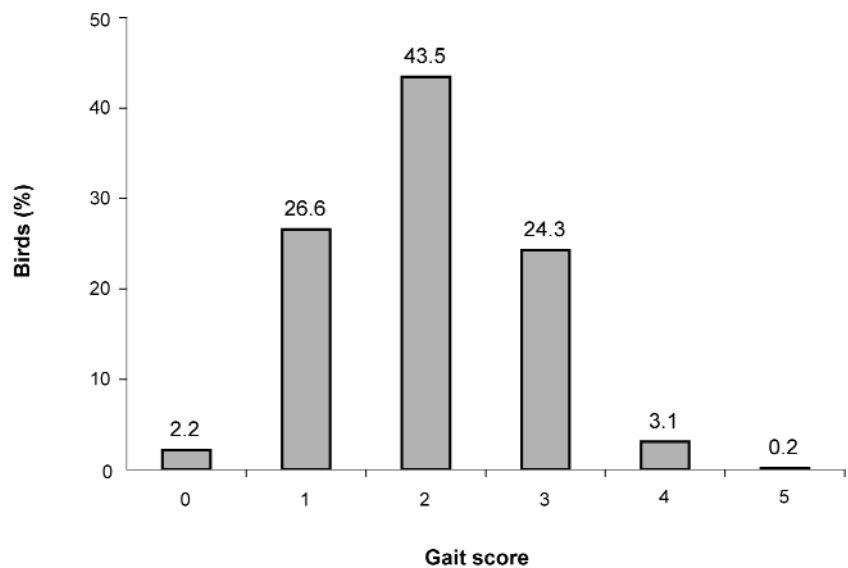
The intense genetic selection for growth rate in broilers can also have a severe impact on the welfare of the broiler breeder birds — the parents of the broilers. These parent birds have a similar growth rate potential to their meat-producing offspring. However, as they are required to live for a considerably longer period (over a year) to lay the next generations, their growth rate has to be managed to prevent them from growing as fast and succumbing to the health and welfare problems described above for broilers. If broiler breeders were fed *ad libitum* many would become lame and mortality would be excessively high (SCAHAW 2000). For example, one study reported a mortality level of 46% at 60 weeks of age in *ad libitum*-fed female broiler breeders (Hocking *et al* 2002). As food restriction is the major means by which producers attempt to control and limit the rate of growth of broiler breeders, this means the birds are subjected to severe levels of feed restriction. During rearing, broiler breeders can be fed as little as one-fifth of the quantity of their *ad libitum* intake, and feed restriction of up to 50% may continue during the laying period (Mench 2002).

The impact of this severe level of feed restriction can be illustrated by comparing the bodyweights of the breeder birds with broilers of the same age. The following data are taken from the most recent Aviagen performance objectives booklets for their Ross 308 breeding line (Aviagen 2007a,b). At 39 days of age, the female broiler will weigh 2.2 kg (representing typical slaughter weight), whereas the feed restricted female broiler breeder at the same age will weigh approximately 615 g, ie approximately one-quarter of the broiler's bodyweight. Similarly, at 35 days of age, the male broiler will weigh 2.2 kg, whereas the feed-restricted male broiler breeder will weigh 900 g. In fact, under this limited feeding regime, it would take 140 days for the female broiler breeder to reach the same weight as the broiler at 39 days, ie 2.2 kg. Similarly, it would take 105 days for the male broiler breeder to reach a weight of 2.2 kg, a weight achieved by the male broiler in just 35 days.

As a result of this practice, many studies have concluded that feed-restricted broilers are chronically hungry, frustrated and stressed (Savory *et al* 1993). This state of compromised welfare in broiler breeders has been acknowledged by the UK government (Defra Code of Recommendations for the Welfare of Livestock: Meat Chickens and Breeding Chickens 2003), the UK Farm Animal Welfare Council (Report on the Welfare of Broiler Breeders 1998) and the EU Scientific Committee on Animal Health and Animal Welfare (The Welfare of Chickens kept for Meat Production 2000).

Figure 1

The estimated proportion of commercial UK broilers in each gait score category (Knowles *et al* 2008).



Tackling the broiler growth rate issue

Despite the awareness of the genetic-related welfare issues in both broilers and broiler breeders, selection for increased rates of growth has been a primary focus for breeding companies over many years and it is predicted that growth rates will continue to increase (Walker *et al* 2005). The inverse relationship between growth rate and cost of production, along with chicken being a primary source of protein, not only in UK but worldwide — around 51,000 million broilers are killed each year (FAO 2009) — makes it a difficult issue to tackle. Any decrease in growth rate will add cost, as the birds have to live longer to reach the same market weight. This increased cost can come from factors such as the increased food consumed by the birds, increased labour, the increased energy requirements of the birds, and fewer flocks being produced per building per year.

How to tackle the issue: approaches

Presented below are a number of options available that could be pursued in an attempt to tackle the issue of fast growth in chickens. For each of the approaches presented, the authors acknowledge that the reasons primarily preventing a company or group from tackling this issue may be more complex than those described. The authors also acknowledge that there may be other approaches available.

Broiler breeding companies

To help resolve the issue, it may be logical to consider approaching the major broiler breeding companies to improve the welfare of their fast growing breeds. However, such companies tend to be driven by volume and market demand and, as such, may be unlikely to spend time, money and effort in developing a genetically slower growing breed of bird without sufficient demand from their customers. The companies in themselves do not create market demand.

Therefore, there would need to be a market, or at least the potential of a market, before the interest of these companies can be engaged.

Broiler producers

Another option is to encourage producers to rear slower growing breeds of chickens. However, as previously discussed, there is likely to be an economic impact associated with rearing slower growing birds. In order to remain competitive it is likely that this additional cost would have to be absorbed by the producer. This, in a market that already operates to very tight margins, is unlikely to be economically viable for a business. As with the breeding companies, for the producers to pursue such an approach relies on there being a demand for such birds from the market.

Retailers

A potentially more successful strategy could be achieved through the retail sector. As retailers have a choice over what they offer their customers, they can, to a certain extent, influence or even drive consumer preference and, as such, create a market for a product. However, retailers report that they supply the consumer with what they want and claim that what they want is low cost food. Although retailers may consider providing an alternative option to their standard offering, eg a higher welfare chicken in addition to standard chicken, the standard product tends to be considerably lower cost and when positioned next to what appears to be an identical but higher cost option the latter can fail to sell in sufficient quantities. Retailers are also generally reluctant to increase the cost of what they consider to be key, price-sensitive products, such as bread, milk, certain meats — especially chicken and pork — and eggs. Retailers believe consumers have a

good knowledge of the cost of such products and would choose to shop elsewhere if they believed they could get the same product for less.

Government

A longer term approach is to lobby for new and effective legislation. Interestingly, however, there is already a legal requirement that should address this issue under the Welfare of Farmed Animals (England) Regulations (2007). Paragraph 29 of Schedule 1 in the Regulation states: “Animals may only be kept for farming purposes if it can reasonably be expected, on the basis of their genotype or phenotype, that they can be kept without any detrimental effect on their health or welfare”. This would seem to be perfectly good and adequate wording, but the welfare problems associated with fast growth in broilers still exist despite this. Clearly, for legislation to be effective it must be enforced.

Public and consumers

It is also possible to call directly on the public to help create change. This could be achieved through effective campaigning, for example. If the public can be made aware of an issue, they can be very effective at driving change. A problem with this approach is that it is often difficult to explain complex issues to the public and expect them to take these on. It can also take a long time to achieve the desired outcome. Nevertheless, change may be bought about by targeting those members of the public who are consumers of chicken meat, because they will have an interest in the issue, or can have an interest generated. Where there is consumer interest in an issue — or consumer interest can be generated — and this is combined with the provision of information and a suitable alternative purchase, ie the opportunity to purchase a slower growing chicken, this can be a very successful strategy. Assurance schemes offer an effective way to deliver this.

Farm assurance schemes

The standards of a farm assurance scheme are essentially a number of requirements that producers must fulfil to be accredited under the scheme and to sell their products with the assurance scheme’s logo. The standards can relate to aspects of the animal’s environment, or to the animal itself, such as its genetics. Use of the scheme’s logo, supplemented with other information about the scheme itself, communicates to the consumer something about the provenance of that product. The consumer can then purchase such products with the assurance that it came from animals reared on farms inspected to a set of standards that they find desirable or, at least, have a greater preference for. The more people that purchase the schemes’ products, the greater the demand for the product, the greater the incentive for a producer to join the scheme and therefore the greater the number of animals likely to be reared according to the scheme’s standards.

The RSPCA Freedom Food assurance scheme

The purpose of the RSPCA Freedom Food assurance scheme is to improve the welfare of farm animals. This is achieved through the delivery and implementation of species-specific welfare standards that are produced and maintained by the RSPCA Farm Animals Department. The standards are set at the limit of what is achievable, from an animal husbandry and commercial viability point-of-view, and aim to deliver improved welfare above and beyond ‘standard’ or typical UK production.

The RSPCA recognised that the fast growth rate issue in broilers could be addressed through its Freedom Food scheme and, prior to 2002, entered into discussions with broiler breeder companies to discuss possible ways forward. The potential to develop, and opportunity to use, slower growing breeds were discussed. In 2002, the RSPCA added the following wording to its chicken welfare standards to highlight the growth rate issue and call upon breeding companies to start tackling it: “The RSPCA believes that breeding companies must address effectively the welfare issues associated with the fast growth rate of broilers, which can lead to physical and metabolic disorders, before further changes are made to production efficiency...”. This was presented within the standards as supplementary information only, with the aim of raising awareness of the issue, and not written as a compulsory requirement.

Between 2003 and 2005, the RSPCA continued discussions with broiler breeding companies. Discussions were also held with producers who were rearing slower growing breeds to determine the productivity and welfare of such birds in comparison to faster growing strains. The RSPCA also examined the published research available that compared the productivity and welfare of faster versus slower growing breeds of chicken. Based on the discussions with the breeding companies and producers and on a review of the research, the RSPCA placed a maximum limit on the genetic growth rate potential of broilers that could be reared within the Freedom Food scheme. The standard, which was published in the September 2006 version of the RSPCA Welfare Standards for Chickens, stated that the genetic growth rate potential of a bird must not exceed 45 g per day, on average. This meant it would take 49 days, ie an additional 14 days compared to the male Ross 308, for a broiler to reach the average slaughter weight of 2.2 kg. Existing members of the Freedom Food scheme were given a three-month period, prior to publication of this requirement, to comply, though key players had been advised of the Society’s intention to move to this situation some time before that.

The main factors that influenced the decision to set the maximum genetic growth rate potential at 45 g per day were as follows: (i) birds with this growth rate demonstrated better welfare when compared to birds of a faster growing strain (van Middelkoop *et al* 2002); (ii) there were birds with this growth rate available on the market for use by

producers; (iii) birds with this growth rate, which were being used by some producers at the time, had shown demonstrable improvements in welfare, on-farm, compared to other faster growing breeds; and (iv) producers were demonstrating that rearing birds to this growth rate was economically viable to continue supply into the UK market.

Impact of the growth rate standard

In 2006, ie the year in which the new growth rate requirement was introduced into the RSPCA standards, around 25 million chickens were reared under the Freedom Food scheme, which represented 2.9% of all broilers reared in the UK. The majority of these birds were faster growing breeds, such as the Ross 308. At this time, only one of the three major global broiler breeding companies, Hubbard, offered a commercially viable bird (the JA[7/9]57) that could satisfy the new growth rate requirement (ie one that most closely matched 45 g per day) (Hubbard 2004).

Approximately one year after introducing the requirement, the number of birds reared under the scheme had increased by 19 million per year (up to 44 million in 2007), which represented 5.3% of all broilers reared in the UK that year. In addition, all of these birds were genetically slower growing in accordance with the requirement. In April 2008, the joint largest global broiler breeding company Cobb-Vantress launched a new strain of bird called the CobbSasso150 (Cobb 2008). This bird was developed specifically in response to the new growth rate requirement and had a genetic growth rate potential of 43.1 g per day to 49 days of age (Cobb 2008). In 2008, the number of birds on the Freedom Food scheme increased further to around 55 million, equating to 6.6% of the broilers reared in the UK.

In 2009, Aviagen, the other joint largest global broiler breeder company, stated they had also developed a bird — the OW708 — to fulfill the RSPCA growth rate requirement (Aviagen, personal communication 2009). If this is indeed the case, then all three of the major global broiler breeder companies now have a commercially viable bird that would meet the requirement and therefore be accepted for production within the Freedom Food scheme.

Conclusion

Despite the requirement for genetically slower growing birds to be used within the RSPCA Freedom Food scheme, the number of birds reared on the scheme increased from 25 to 55 million per year. This occurred over a three-year period from when the requirement was first introduced. During this period there was a complete transition from the faster to the genetically defined slower growing breeds of bird, so the number of genetically slower growing birds on the scheme increased by nearly 55 million per year. In addition, the two joint largest global broiler breeder companies responded by each developing a genetically slower growing broiler specifically to fulfill the growth rate requirement. This demonstrates that successful assurance schemes that are supported by the public can play a pivotal role in tackling genetic welfare problems in farm animals, such as those associated with fast growth rates in broilers.

It is suggested that the advantage that assurance schemes have over other potential approaches in creating change is that they address and engage the whole foodchain, from the producer (or in this case the breeding company) through to the consumer. They also offer a useful communication tool to the consumer, providing information to them regarding the provenance of the product. This can be achieved, not only at point of purchase, but also via other media, such as newspapers and radio, and also through information sources developed by those marketing the scheme. Such materials can be used to inform the consumer and further reinforce their purchasing decision. In such a way, assurance schemes can create a market and demand for products from animals that have been produced according to certain criteria. This can be to the benefit of all the parties involved in the production and supply of such products.

It is acknowledged that the setting of a limit on the maximum genetic growth rate potential of a bird does not necessarily present an ideal long-term solution to the problem. A more preferable long-term approach is for breeding companies to tackle the health and welfare issues currently associated with fast growth in broilers and broiler breeders through their genetic programmes for all their existing strains.

It is also acknowledged that the approach presented does not represent a total solution to all the problems identified for both the broilers and the parent birds. However, it does go some way to addressing them and has been shown to offer a significant improvement to their welfare compared to current commercially available faster-growing breeds, as well as offering a viable, practical way forward for all sectors of the foodchain involved in assurance schemes. This approach could also have potential for addressing similar issues for other species and in other countries.

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