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An HSUS Report: Welfare Issues with Selective Breeding for Production in Egg-Laying Hens

Abstract

In less than seven decades, rates of lay for hens have more than doubled, from an annual average of 100 eggs per hen in the 1940s to 260 eggs in 2004. Up to nine out of ten egg-laying hens now suffer from osteoporosis, a disorder largely genetic in origin and exacerbated by the battery-cage system customary in the U.S. egg industry. Intensive genetic selection for increased productivity has jeopardized the welfare of laying hens, as greater output has proven to be at odds with animal health and well-being.

Introduction

In the United States during 2004, 76.2 billion table eggs were produced by approximately 300 million hens, each laying an annual average of 260 eggs(1)—a nearly ten-fold increase to the approximately 25 eggs laid each year by their ancestors, Red Junglefowl,(2) and more than double the average 100 eggs laid annually by hens in the 1940s.(3)

Modern commercial breeding programs have intensively bred farm animals for production traits, often at the expense of welfare. A recent review concluded that "apart from a favorable increase in production, animals in a population that have been selected for high production efficiency seem to be more at risk for behavioral, physiological, and immunological problems."(4)

Leading animal welfare scientists and ethicists have been critical of the selection for productivity over animal welfare: According to poultry welfare expert Dr. Joy Mench: "It is now generally agreed that good productivity and health are not necessarily indicators of good welfare….Productivity…is often measured at the level of the unit (e.g. number of eggs or egg mass per hen-housed), and individual animals may be in a comparatively poor state of welfare even though productivity within the unit may be high."(5) Farm animal welfare expert Dr. Donald Broom states: "[E]fforts to achieve earlier and faster growth, greater production per individual, efficient feed conversion and partitioning, and increased prolificacy are the causes of some of the worst animal welfare problems."(6) And animal welfare expert Dr. Bernard Rollin asserts: "[I]n industrial agriculture, this link between productivity and well-being is severed. When productivity as an economic metric is applied to the whole operation, the welfare of the individual animal is ignored."(7)

These problems have been most pronounced in birds raised for meat and eggs, whose short reproductive cycles have made them especially amenable to intensive breeding. Indeed, these animals now suffer from a variety of health and welfare problems with genetic origins.

In the United States, virtually all broiler chickens (those chickens raised for meat), turkeys, and egg-laying hens now come from strains produced by four, three, and four primary breeding companies, respectively.(8,9) Reforms initiated by these 11 companies could dramatically improve the welfare of more animals in the United States than could any other sector of the animal agriculture industry, as broilers, turkeys, and laying hens represent approximately 95 percent of all domestic farm animals raised and killed annually.(10,11)

U.S. Egg Production

In the United States, 98 percent(12) of the approximately 300 million hens(13) used to produce the nation's egg supply are intensively restricted in battery cages—wire enclosures that normally confine three to ten hens at an average space allowance of 61 square inches per bird,(14,15) which affords each bird an amount of floor space less than a single sheet of letter-sized paper. These battery hens suffer from a number of severe welfare problems, including the thwarting of natural behaviors, bone weakness and breakage, feather-loss, and numerous diseases.

Osteoporosis

A recent review estimated that between 80 and 89 percent of commercial egg-laying hens suffer from osteoporosis,(16) a disease characterized by low bone volume. Osteoporosis is not in itself painful, but it is the principal cause of bone fractures in laying hens and can cause both acute and chronic pain.(17) One study found that 29 percent of battery-caged hens had one or more broken bones by the time they were shackled for slaughter. Remarkably, 98 percent of these birds' carcasses had broken bones by the time they reached the end of the evisceration line.(18) Another study found that 10 percent of hens had one or more broken bones by end-of-lay, while an additional 17 percent experienced fractures during depopulation, transport, and shackling. (19) Fractures of the spine are also reported, which can cause paralysis and death.(20)

Housing systems and forced physical inactivity influence rates of osteoporosis and fracture. However, the problem is largely genetic in origin, a result of intensive selection for laying hen strains able to maintain long periods of continuous egg production.(21) Indeed, as noted above, average annual egg production per laying hen has increased significantly—from 100 eggs in the 1940s to 260 in 2004. This rate of egg production requires considerable amounts of calcium for eggshell formation. At peak egg production over a sustained period, a hen cannot absorb enough calcium from her diet and draws calcium from bone mass. Over a laying year, the amount of calcium that hens deposit in their shells can be up to 20 times that retained in their bodies.(22) One review of osteoporosis in layers concluded, "Our information would suggest that the problem is largely genetic in origin, resulting from the breeding of light weight, energetically efficient birds that remain in a high rate of lay for a prolonged period. Continuous loss of structural bone over the laying period results in weak bones."(23)

Susceptibility to osteoporosis has been shown to be significantly inheritable, and it has proved possible to select hens for stronger bones. Older strains, such as the Roslin J-Line Brown Leghorn, are relatively resistant to osteoporosis, even in battery cages.(24) And new strains have been produced showing a six-fold decrease in humeral fractures after four generations, and two-fold increase in humeral strength after seven generations.(25,26) Moreover, two studies suggest that breeders can select for increased bone strength without necessarily sacrificing egg production.(27,28) A scientific review of skeletal problems in poultry concluded, "Genetic selection seems to offer the best prospects for improving bone quality and resistance to osteoporosis in hens."(29)

Reproductive Problems

Uterine prolapse—a condition causing the uterus to be pushed outside of the hen's body—is also common in modern laying hens and is frequently seen in battery-caged birds, since, without a nest, the birds are exposed after egg laying.(30) Dr. Susan Clubb suggests that because the birds are bred to lay larger eggs in greater quantities, they are more susceptible to uterine prolapse.(31) The hens' uteruses cannot withstand the constant strain of egg-laying, exacerbated by additional factors typical in industrialized egg production, and uterine prolapse often results.(32)

Other Welfare Issues Stemming from Genetic Origins

While osteoporosis is the primary welfare problem with genetic origins among layers, other issues have strong genetic components and can be selected for or against, either directly or indirectly.(33,34) For instance, feather-

pecking is a problem among layers and turkeys in some floor systems. The problem is currently addressed by cutting parts off of the birds' beaks and keeping them in dim light, each of which creates its own welfare problems. Group selection has been used to breed hens less prone to feather-pecking and, if adopted by primary breeding programs, could reduce the need for beak-cutting and poor light in floor systems.(35,36)

Conclusion

As one scientific review of skeletal problems in poultry concluded, "[P]oultry breeding has focused on increasing profitability, with little regard for the effect on the skeletal, respiratory or cardiovascular systems or the well-being of the bird."(37) To significantly improve the welfare of farmed birds, breeding programs must place more emphasis on skeletal and cardiovascular health in their selection of commercial strains. At the same time, there is growing need to select strains well-adapted to cage-free systems, such as aviaries and free-range systems that have significant welfare advantages. This will require breeding for reduced injurious pecking and improved disease resistance. The consolidation of the breeding industry makes it possible for coordinated improvements in poultry welfare to be achieved rapidly.

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