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CHOOSING BREEDS WITH HIGHER WELFARE OUTCOMES

Decoupling growth rate as the only genetic determinant for higher welfare chicken production

A fundamental component of the Better Chicken Commitment for improved broiler welfare is the adoption of chicken strains that show higher welfare outcomes. The chicken breeds typically used in intensive production have been heavily selected for performance traits, such as rapid growth and greater feed conversion, but at the cost of the health and welfare of these birds. Therefore, additional traits must be considered when selecting for higher welfare broilers to ensure these chickens can have a good quality of life – including good health, positive mental wellbeing, and the ability to express natural behaviors.

Research has primarily framed fast growth rates (i.e., measured as average body weight gained per day) as one of the most important genetic causes of poor chicken welfare, but achieving a higher welfare chicken is not as simple as transitioning from fast to slow-growing breeds. This challenge is already reflected in the daily growth limits of some animal welfare labeling schemes, where the criteria for a higher welfare broiler breed includes growth rate along with other physical or behavioral measures, such as walking ability. For instance, both the Global Animal Partnership[a] and Animal Welfare Approved[b] ratings set a maximum limit on average daily growth rates, but also determine breed suitability for their certification programs based on additional measures, including mortality rates, perching ability, and range use in pasture-based systems. Efforts to improve broiler chicken welfare need to prioritize selection for traits that show clear improvements to bird health and welfare, which can be measured as positive changes to meaningful animal -based outcomes. Some examples of higher welfare outcomes for broiler chickens include better leg health, fewer mortalities from cardiovascular and pulmonary disorders, and an increased capacity to express highly-motivated natural behaviors, such as foraging, perching, and dust-bath ing.

To ensure chickens are bred for good physical and mental wellbeing throughout their lives, comprehensive selection for broiler strains with higher welfare outcomes requires consideration of growth rates along with other physical and behavioral selection criteria, including:

[a] Global Animal Partnership Step 1 – Maximum Average Daily Growth (ADG): 0.150 lb/day (68 grams/day) https://globalanimalpartnership.org/wp-content/uploads/2018/04/GAP-Standard-for-Meat-Chickens-v3.1-20180403.pdf
[b] Animal Welfare Approved – Maximum ADG: 0.088 lb/day (40 g/day) https://agreenerworld.org/certifications/animal-welfare-approved/standards/meat-chicken-standards

BREAST MEAT YIELD

In the last century, breeding efforts have heavily focused on producing broilers with a larger yield of white breast meat.[1] This feature is not entirely linked to growth rate, as some slower growing strains can still have breast meat yields close to the fast-growing strains. However, these selection efforts have dramatically changed the bird's overall body conformation and shifted their center of gravity forward, which has made it physically difficult for these breeds to remain active and express behaviors, like perching, throughout their lives.[2,3]

In addition, larger breast meat yields are associated with a higher incidence of breast muscle myopathies (e.g., white striping and wooden breast).[4,5] New research indicates wooden breast represents both a meat quality and welfare issue, with affected chickens having poorer walking abilities, impaired wing movement, and higher incidence of pulmonary disease and mortality.[6-8] In addition, the muscle tissue degeneration and inflammation associated with this condition appears in broilers as young as two weeks of age.[8]

LEG HEALTH

Improving the welfare outcomes of broilers requires selection for better leg health, including improved bone strength, leg confirmation, and integument integrity. Chickens require strong bones to allow them to access feed and water resources, remain active, and engage in natural patterns of foraging, perching, play, and self-maintenance comfort behaviors over their entire lifetimes.[3,9,10] Additionally, broilers require good leg health to fully use many types of enrichment, including perches, platforms, and suspended vegetable matter, without risking injury.[12] Breeding for strong bones and good skin quality also reduces the incidence of lame birds with painful skeletal conditions[11] (e.g., tibial dyschondroplasia, valgus/varus deformities)[13] and skin dermatitis lesions (i.e., foot pad dermatitis, hock burn, and breast blisters[10,14]) from prolonged contact with the litter.

ORGAN SIZE & DEVELOPMENT

Selection for greater muscular output has significantly shifted the allocation of nutrients from the development and function of other organs, such as the heart, lungs, and kidneys. The size of a chicken's vital organs needs to have the capacity to fully meet the oxygen and nutrient requirements of their body size to maintain good health, as well as the breed's ability to remain active and express natural behavioral patterns. Chickens with a reduced cardiovascular capacity are at a much greater risk of mortality from ascites and sudden death syndrome.[15,16]

HEAT STRESS & COPING CAPACITY

The increased metabolic rates of modern broilers – along with a reduced heart and lung capacity – can put them at a serious risk of heat stress during hotter temperatures or increased physical activity.[10,12,17] To ensure broilers are bred for good health and behavioral expression, including the capacity to engage with enrichment opportunities, selection efforts should focus on how chickens physiologically cope with environmental heat stress and variation in activity patterns.

IMMUNE FUNCTION

The increasing public demand for reduced use of antibiotics in animal production means focus is shifting towards breeding livestock with stronger natural immune function and disease resilience. Broilers bred with improved natural immunity will have better welfare outcomes throughout their lives. These chickens will have a better overall health status, which reduces the risk of mortality, impaired health, and negative impacts on mental wellbeing from the pain and stress of fighting off disease challenges.[18,19] In addition, birds bred for improved immunity will also represent a reduced biosecurity risk for producers to manage, due to the lower probability of contracting and spreading disease.

GROWTH CURVES

Solely focusing on average daily weight gain can mask the impact of rapid growth on a chicken's development. Examining variation in a breed's growth curve can provide better insight on the capability of a strain to achieve a good health and welfare status. For instance, rapid growth at the beginning of a broiler's life is especially detrimental to proper bone mineralization and development,[2,20] which then results in poor leg health and painful movement for these chickens as their weight increases over time.[11,13,21] Therefore, breeding efforts should include rates of weight gain from several points along the strain's overall growth curve to ensure chickens have higher welfare outcomes throughout their lives.

ACTIVITY & EXPRESSION OF NATURAL BEHAVIORS

A good quality of life for a broiler chicken is dependent on the capacity to maintain activity levels throughout life that allows them to fully engage with their environment, including the enrichments (e.g., perches, outdoor runs) provided to them. A high-wel-

ACTIVITY & EXPRESSION OF NATURAL BEHAVIORS, CONT'D

-fare broiler breed should also show increased expression of highly-motivated natural behaviors, such as foraging, scratching, perching, play, and dust-bathing, which indicates greater cognitive stimulation for the chickens and more opportunities to experience positive welfare.[3,9,22,23] As discussed previously, several factors can influence the activity and behavioral expression of broiler chickens. For instance, behavioral time budgets can vary by breed, with some strains showing a greater intrinsic willingness to move.[3,9,22,23] Therefore, it is important to monitor for variation in an individual strain's activity levels and behavioral time budget throughout its life and include these behavioral findings as criteria when selecting for higher welfare chickens.

Evaluating the suitability of a broiler strain based on their comprehensive performance on these health and welfare parameters is fundamental to achieving balanced selection for chicken breeds that truly demonstrate higher welfare outcomes. By focusing on only some of these criteria, breeding efforts may fail to produce strains of broiler chickens with good physical and mental wellbeing along with enhanced natural behavioral expression.

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