



A Monthly e Magazine
ISSN:2583-2212

Sept, 2023; 3(09), 2245-2247

Popular Article

Recent Advancements in Commercial Poultry Breeding

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<https://doi.org/10.5281/zenodo.8337578>

Advancements in genetics have enabled simultaneous improvements in multiple traits, and ongoing investments aim to enhance measurement accuracy to further improve breeding outcomes. Breeding companies play a vital role in managing genetic resources to produce animals with predictable performance and high health standards. This implies a commitment to producing poultry that meet specific criteria for performance and health. To avoid inbreeding and ensure the long-term sustainability of breeding programs, it is crucial to maintain sufficient population sizes. This helps preserve genetic variation, which is essential for making genetic improvements over time.

Over the last twenty years, there have been significant developments in the field of genetics, particularly in the ability of breeding programs to bring about coordinated improvements in multiple traits simultaneously. This means that selective breeding can lead to animals with better skeletal quality, heart and lung function, growth, feed efficiency, and reduced incidences of skeletal defects and ascites all at once. Breeding companies are investing heavily in improving the accuracy and relevance of the measurements they use in their programs. This increased precision in data collection allows for more efficient and accurate selection of animals based on their genetic traits, which, in turn, leads to progress in various desired traits.

Welfare Traits:

Poultry breeding companies recognize their responsibility to ensure the welfare of the animals they breed. This involves not only focusing on traits that enhance productivity but also on traits that contribute to the well-being of the birds. For example, in the case of layers, group selection methodologies have been implemented to address issues related to the livability of birds when housed together in populations. By reducing aggression within groups, breeders have been able to simultaneously improve both the welfare and productivity of layers. This approach underscores the

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importance of balancing productivity goals with the welfare of the animals.

Robustness:

Poultry production encompasses a wide range of environments and challenges, including variations in environmental conditions, nutritional requirements, and disease pressures. To ensure the success of their breeding programs, companies are now selecting for robustness in their poultry breeds. Robustness refers to the ability of birds to perform consistently well across diverse environments and under various stressors. A crucial aspect of this is selecting for disease resistance, as disease challenges are a primary concern in poultry production. Additionally, changes in production systems, such as transitioning from traditional cages to non-cage systems, necessitate that birds continue to perform predictably under these new conditions.

Genomics:

Advancements in genomics have had a profound impact on poultry breeding. The sequencing of the chicken genome has provided breeders with a wealth of genetic information. This includes the identification of over three million single nucleotide polymorphisms (SNPs) across the genome. This genomic data has enabled breeders to establish associations between specific genetic markers and desirable traits. As a result, selection for multiple traits has become more accurate. However, it's important to note that genomics is not intended to replace traditional selection methods but rather to enhance them. Genomic information allows breeders to better understand the genetic variation within populations and make more precise selection decisions.

Ethics:

Breeding companies in the poultry industry hold a significant role in ensuring ethical practices. They influence various aspects of the industry, including food safety, animal health, animal welfare, and food supply security. Ethical considerations extend to the sustainable management and conservation of genetic resources. As breeding companies continue to expand their product offerings to meet different production systems and consumer demands, they must operate within an ethical framework. This includes giving due attention to animal health, welfare, and the efficient utilization of resources. The ultimate goal is to achieve balanced and rapid genetic progress while upholding ethical standards.

Molecular Tools:

Modern molecular tools have provided powerful means to preserve the genetic diversity of endangered poultry breeds. These tools, including DNA profiling techniques and DNA fingerprinting using VNTR sequences, allow for the efficient evaluation of genetic worth and the maintenance of endangered breeds without further erosion of genetic variability. By utilizing DNA fingerprinting, breeders can determine genetic relatedness between individuals and breeds. This information aids in estimating population parameters such as average heterozygosity and the coefficient of genetic



differentiation. These tools empower breeders to design custom breeding programs for the conservation of endangered poultry breeds based on scientific principles.

Broiler and Layer Improvements:

In the poultry industry, significant advancements have been made in improving both broiler and layer characteristics. Modern broilers have demonstrated remarkable growth rates, with the ability to reach market weight in a fraction of the time compared to vintage broilers. These improvements are largely attributed to genetic enhancements, which have contributed to faster growth, higher carcass yield, and improved feed efficiency. However, these positive changes have come with challenges, including an increased incidence of skeletal problems, elevated mortality due to physiological changes, and issues related to reproductive fitness. For modern broilers, the management of excess fatness, which can affect reproductive fitness, involves feed restriction programs.

In contrast, modern layers have shown substantial improvements in egg production, egg mass, egg weight, and feed efficiency over the years. Despite these advancements, certain aspects like eggshell strength and albumen quality have remained relatively stable. The selection focus in layer breeding primarily revolves around fitness traits, which has helped avoid some of the issues seen in broilers. However, the pace of change in layer genetics has generally been slower than in broilers.

Conclusion

Poultry breeding is a complex field that requires a delicate balance between improving productivity, ensuring animal welfare, and upholding ethical standards. Advancements in genetics and breeding practices have transformed the poultry industry, enabling breeders to achieve holistic improvements in multiple traits while ensuring the welfare of the birds. Ethical considerations, robustness, and the integration of genomics and molecular tools contribute to responsible and sustainable poultry breeding practices. These advancements are crucial for meeting the demands of modern poultry production while upholding ethical standards and ensuring the well-being of the animals.

Acknowledgement:

We acknowledge ChatGPT, an AI-powered chatbot (<https://www.openai.com/chatgpt>) for language modulation.

