Keynote Symposium welcome and introduction

G. R. Huff

USDA, Agricultural Research Service, Poultry Production and Product Safety Research Unit, Fayetteville, AR 72701

This year’s Keynote Symposium “Tomorrow’s Poultry: Genomics, Physiology, and Well-Being” brought together industry and academic leaders in poultry genetics and prominent researchers studying the biology of stress and well-being for the purpose of improving the future of poultry production and welfare.

Over the past 50 yr, the commercial poultry industry has made monumental gains in production efficiency through a combination of improved breeding, nutrition, and advances in disease control. The intensive selection of poultry for superior growth rate and feed efficiency has been the primary method for increasing productivity and has resulted in birds that are very different from their ancestors (Havenstein et al., 2003).

It has also become clear that commercial selection for superior production has been accompanied by changes in the physiology and anatomy of today’s commercial poultry species that can affect the behavior and well-being of these birds and result in conditions such as ascites, leg problems, feather pecking and cannibalism, and increased disease susceptibility (Craig and Swanson, 1994; Hester, 2005; Julian, 2005; Huff et al., 2007).

Today’s consumer has voiced a concern about the ways in which animal well-being can be improved and optimized in the commercial meat animal industry (Swanson, 2008). It seems clear that tomorrow’s consumer will be even more concerned about the perceptions of suffering and abuse that accompany food animal production. It is imperative that today’s animal industries be proactive in improving the well-being of food animals, and particularly that the poultry breeding industry look ahead for ways in which poultry species can be economically produced with the highest level of well-being.

Such measures include both improvement of the production environment and also the potential utilization of new genomic tools to select birds that are more stress-resistant and better able to adapt to commercial production conditions. The development of these new selection measures will require reliable indicators of stress and well-being. These measures must also be cost-effective for the continued viability of the industry.

A major and historical change in breeding programs is occurring due to the availability of the avian genome sequence and the growing ability of functional genomics and proteomics to provide relevant molecular markers to poultry breeders (Cogburn et al., 2007). This approach appears to have much potential for improving well-being in poultry (Muir and Craig, 1998; Jensen et al., 2008). New scientific data concerning the biology of brain function, the genetics of behavior, and the development of objective physiological indicators of stress and well-being will provide new tools to enable future geneticists to incorporate welfare-related traits into their selection strategies. The objective of this approach will be to ensure that production animals that are raised under intensive conditions will remain healthy and retain behaviors indicative of well-being.

The genetic selection of animals that are best able to adapt to the stressors of food animal production seems a logical and ethical pursuit; however, it is not without criticism. The deliberate modification of an animal’s capacity to suffer under production conditions may attract criticism from animal activists who object to “violating the integrity of the animal” (Thompson, 2007). It is essential to understand these arguments to successfully plan for the future of poultry production. It appears that a coordinated approach between selecting the best animal for the production environment and the optimization of that environment for the welfare of the bird will be necessary.

The purpose of this symposium was to clarify this issue and to provide a dialog between the major poultry
breeders and the scientists who are investigating avian functional genomics, the biology of brain function, the genetics of behavior, and the development of objective physiological indicators of stress and well-being to improve the welfare of tomorrow’s poultry.

The topics in the program were organized into 3 sessions. In session 1, two arguments were made. The first is an argument for changing the animal, entitled “Breeding of tomorrow’s chickens to improve well-being.” Heng Wei Cheng, a USDA-Agricultural Research Service ethologist working on genetics and behavior of laying hens, presented this argument. The second argument is for changing production practices to improve well-being. Paul Thompson, an ethicist who holds the W. K. Kellogg Chair in Agricultural, Food and Community Ethics at Michigan State University, countered this argument with cautionary advice concerning the acceptance of genetic modification by the animal activist community and the need to improve the production environment to the fullest extent possible.

In session 2, four poultry geneticists from companies representing the major poultry commodities provided the industry viewpoint and answered the question “How can we integrate the best science from both of these welfare arguments and still stay in business”? Manouchehr Katanbaf from Cobb-Vantress addressed balancing the welfare needs of broilers and productivity. Neil O’Sullivan from Hy-Line International addressed balancing the welfare needs of layers and productivity. Ben Wood from Hybrid Turkeys addressed balancing the welfare needs of turkeys and productivity. Finally, Derek Emmerson from Aviagen Ltd. discussed the common research needs to address animal welfare for all poultry species.

In the final session, researchers investigating functional genomics, the biology of brain function, and the development of objective physiological indicators of stress and well-being in poultry provided their respective solutions to the problem of selecting more stress-resistant birds. Catherine Beaumont from INRA in Nouzilly, France, presented “The European experience in poultry welfare: A decade ahead,” with an overview of SABRE research. SABRE is a European Union consortium of scientists who are addressing the issue of animal well-being, genomics, and welfare. Wayne Kuehnz from the University of Arkansas discussed new discoveries in brain biology and the molecular physiology of stress in poultry that may have an effect on animal welfare. Shaniko Shini from the School of Animal Studies at the University of Queensland, Australia, presented research on genomic tools for understanding and controlling stress-induced immunosupression. William Muir from Purdue University discussed his current research applying functional genomics to improve understanding of the physiological mechanisms associated with aggression and stress in poultry layers. The symposium concluded with a summary and discussion led by Sammy Aggrey, a poultry geneticist from the University of Georgia.

ACKNOWLEDGMENTS

The Keynote Symposium Committee is very grateful to the USDA-Cooperative State Research, Education, and Extension Service Agriculture and Food Research Initiative (AFRI) for their generous support of this symposium.

REFERENCES


