

Decades of balanced breeding promote poultry welfare, performance and sustainability

Poultry genetics company Aviagen® Inc. touts a remarkable history of successful breeding. Favorable bird qualities such as robustness and performance have been consistently advanced in a responsible and sustainable way, always keeping the welfare of birds in sharp focus while applying sound environmental practices.

Balanced breeding promotes customer success and bird welfare, simultaneously. A sophisticated, balanced breeding program enables beneficial traits to be developed simultaneously, which means that one trait isn't selected at the expense of another. Genetic progress begins with sufficiently large pedigree poultry lines in which a wide range of traits can be selected and combined. The result is healthy and robust birds with improved characteristics such as biological efficiency, favorable meat yield, skeletal health, livability, adaptability and metabolic and reproductive fitness. These traits are balanced to promote the success of customers, meet

a varied range of poultry market demands, and support the well-being of the birds.

Industry innovations advance poultry industry in a healthy way. Through an abundance of innovations along a consistent timeline, Aviagen has revolutionized the poultry industry. It has done so by coupling a long-term tradition of research and development with novel technologies and selection approaches to its global breeding program.

Breeding for leg health since the 1970s. Leg strength is critical to overall bird health and supports market-appealing qualities such as high breast meat yield. Improving leg health involves breeding only birds with the best leg health within the population, free of any clinical or sub-clinical leg defects and with the lowest genetic propensity to develop a leg health issue. This practice has led to a tremendous improvement in leg health over the past quarter century in all Aviagen brands, including the Ross® 308 and 708 breeding stock, which are most popular in the U.S.

Feed Conversion Rate (FCR) improvements promote biological efficiency while reducing environmental impact. A major breakthrough for the poultry industry was the incorporation of genetic selection for FCR in 1979. FCR measures an animal's efficiency in converting feed to body weight. As a result of FCR improvements, poultry growth rates have increased along with the robustness of the birds. Today's farmers can raise a 5.3-pound (2.4 kg) chicken in 35 days using 7.9 pounds (3.6 kg) of feed, as opposed to 30 years ago, when it took 7.1 pounds (3.2 kg) of feed to raise a 3-pound

AVIAGEN R&D INDUSTRY FIRSTS

- **1989** Introduced X-ray technology for detection of sub-clinical Tibial Dyschondroplasia
- **1989** Applied ultrasound technology to increase efficiency of selection for meat yield
- **1991** Used Oximeter to measure blood oxygen levels for improved heart and lung function
- **1999** Implemented family selection for performance in commercial environment
- **2004** Began Lifetime FCR testing using proprietary technology
- **2005** Introduced specific selection environments to better target global market segments
- **2007** Initiated Cocci evaluation into broiler selection
- **2012** Implemented genomic selection in the commercial breeding program

(1.4 kg) bird over the same time span.

Aviagen pioneered the development and implementation of feed stations to improve FCR in conditions similar to commercial environments. Feed stations enable feed intake to be recorded throughout the lifetime of individual birds by applying transponder technology, providing critical information on the feeding behavior of birds under different feed types. Knowledge gained from feed stations contributes to further improvements of biological efficiency and the environmental adaptability of the modern broiler.

FCR improvement is not only key to the industry from an economic point of view, but it also has major environmental benefits. It significantly diminishes the environmental impact of poultry production in two ways. First, it lessens the requirement of agricultural land to produce crops for feed. And, it reduces the environmental footprint in terms of global warming potential and pollutant emissions.

Meat yield. In 1989 Aviagen was the first poultry breeder to apply ultrasound technology to increase efficiency of genetic selection for favorable meat yield. Since then, Aviagen has led the incorporation of 3D imaging technology used in medical science to predict yield and body composition in live birds. This advancement ensures sustained improvement of carcass yield and body composition in a harmonious way.

Genomics technology. Aviagen was the first poultry breeding company to use genomics information for selection purposes. Since 2012, Aviagen has used the naturally occurring variation in a bird's genetic code to predict genetic merit more accurately for a wide range of traits. Genomics information has enabled Aviagen to select stronger, healthier and more productive birds.

Sustainability of progress. Aviagen continuously evaluates new, non-invasive medical technologies and other scientific innovations for use in its balanced breeding program to help

improve bird performance, health and welfare. Aviagen makes ongoing investments in research and development for its breeding program. As a result, genetic selection techniques will continue to develop and improve, sustaining genetic progress for years to come.



Breeding for leg health: Aviagen was first to use x-ray technology to examine bones and joints. One innovative way that Aviagen has applied technology to enhance its breeding program is its use of the low-intensity x-ray imaging scope (lixiscope) for improved leg health. The lixiscope is a portable, hand-held x-ray device used to produce an instant image using a low-energy and low-intensity gamma source. This device was originally developed by NASA to study the effects of zero gravity on the bones and joints of astronauts in space (ntrs.nasa.gov). Applied to poultry, the lixiscope can safely and non-invasively detect and accurately identify clinical and sub-clinical incidences of Tibial Dyschondroplasia (TD). Thus, the lixiscope elevates selection against these issues to another level. First, birds that display TD can be identified, and furthermore, the risk of TD development in healthy birds can be determined.

This pioneering work by Aviagen, which includes a very focused leg health selection policy, has contributed to a significant reduction in the incidence of leg health issues at the industry level.



LEADING THE POULTRY INDUSTRY IN ANIMAL WELFARE PERFORMANCE & SUSTAINABILITY

Aviagen's successful and well-established genetic selection program promotes continuous improvements in robustness and overall health while providing the birds with the highest quality care and welfare standards. The focus for Aviagen is on maintaining balanced progress in each branded product line. The application of new technologies and advanced selection techniques combined with data analysis means greater selection accuracy and improved rates of genetic progress. For more information visit Aviagen.com.

