



## 60 years of engineering the perfect chicken: meatier, cheaper, faster growing

chicken image.JPG

M. J. Zuidhof, B. L. Schneider, V. L. Carney, D. R. Korver, and F. E. Robinson Growth, efficiency, and yield of commercial broilers from 1957, 1978, and 2005 Poultry Science 2014 93: 2970-2982.

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"We really know now more about feeding chickens than we do any other animal, including humans."

Sixty years ago, it could take up to 16 weeks to grow a three-pound chicken fit for eating.

The breasts would be very small. The meat itself would be tougher because of the bird's age.

Today, things have changed. Poultry farmers are growing larger, five-pound chickens in about six weeks. That's on less than 10 pounds of feed. The modern result is the type of breast "you can make a really good Chick-fil-A sandwich out of."

"It would have probably taken three or four breasts off of that 1950s chick to come up with a Chick-fil-A sandwich" today, said Mike Lacy, department head and poultry science professor at the University of Georgia in Athens.

Today, Americans eat chicken more often than any other meat. Alabama's \$3.6 billion in annual poultry sales dwarfs all other agricultural revenue combined. It wasn't this way two generations ago.

So what changed? How did chicken become the booming business it is today?

### **The dawn of the modern broiler industry**

In the early 20th century, chickens were mostly kept in small-home farm flocks, roaming the yard and scavenging for food. The birds were typically dual purpose, meaning they were used either for meat production or laying eggs.

When a chicken was needed for supper, the farmer plucked one from the flock. In the eyes of Auburn University poultry science professor Sarge Bilgili, the entire process -- unorganized, loosely done -- was "kind of like having a bunch of wild cats roaming around."

It wasn't until Mrs. Wilmer Steele of Ocean View, Del., decided to buy a few hundred chicks, raise them and sell

them live for meat purposes that the commercial poultry business we know today was born.

This single act was "sort of the dawn of the broiler industry," Bilgili said.

Early on, broiler chickens were sold live. By the late '40s and early '50s, chickens would be killed, bled, plucked, iced and shipped to urban centers like New York with the organs still intact inside the body.

Bilgili said the sale of these "New York-dressed" chickens in large metropolitan areas was a major development for the industry.

The turning point, however, came in the late '40s when the Atlantic and Pacific (A&P) supermarket chain sponsored a nationwide contest called the Chicken of Tomorrow.

The contest looked for broader breasted birds with bigger drumsticks, plumper thighs, and layers of white meat, which Heritage Food USA writer Janani Lee said "grew quickly with a high feed-to-weight conversion -- a contrast to the slower growing, leaner hens that had been used mostly as laying hens in years past."

The Chicken of Tomorrow contest continued for several years and helped spur several breeding companies that are still around today, said Lacy.

"It just brought a tremendous amount of interest and pressure on competition and on trying to produce chickens that grew faster, that were meatier, that were cheaper, less expensive, so that the supermarkets like A&P could meet the consumer demand that was increasing for chicken at that time," he said.



## **Poultry integration**

In the '50s, Bilgili said, the broiler industry became more integrated as feed companies took ownership of the hatcheries. These businesses produced the chicks and sold them to farmers, so they would buy the feed from them.

The system later evolved to where the companies owned everything and began contracting to the farmers to raise the chickens.

Today, farmers own their facilities, chicken houses and equipment, but the birds and feed are delivered by a company. When a chicken reaches market slaughter weight, the farmer is paid for his efforts on a per-pound basis, Bilgili said.

"The industry, while it became integrated, was able to standardize many aspects of production and processing," he said. "In doing so, the cost of producing a pound of meat or a dozen eggs started going down."

Over time, Bilgili said farmers learned there was a negative correlation between chickens used for egg production and meat. Egg-type chickens were leaner because they were putting all of their resources into laying eggs, while broiler chickens were laying fewer eggs because they had more muscle and flesh.

While there are a number of egg, meat and multi-purpose chicken strains available today, Bilgili said breeding companies continue to develop birds for the best possible growth and performance.

"They select for good immune response, disease resistance, strong legs, good feathering, meat quality traits, and improved feed efficiency, so that they would convert the feed nutrients more efficiently to meat and eggs," he said.

## **Broiler technologies**

Many technologies were developed over decades to grow chickens faster and bigger. Construction of large slaughter and processing facilities, automation, lighting programs, ventilation, air quality and cooling/freezing systems were a few advances that helped improve quality and extend the chicken's shelf life.

In addition to genetic improvements, Lacy said better nutrition has been key in producing optimal broiler chickens.

"We really know now more about feeding chickens than we do any other animal, including humans," he said. "It's just really down to a science now."

Lacy said all U.S. broiler chickens are raised cage-free, but the tight quarters can be hard for some birds. Some die from heart attacks, have metabolic issues, suffer leg problems and experience other growth-related maladies, but geneticists have "done an amazing job" of breeding those weaker characteristics out of flocks over the years, he said.

Because antibiotics are largely frowned upon by consumers, Lacy said most companies stopped feeding chickens sub-therapeutic levels of the medicine years ago. However, if a chicken or flock gets sick, a farmer still uses antibiotics to kill bacterial diseases and prevent them from spreading.

"Poultry companies, poultry vets, growers don't like to use antibiotics because they're expensive, but it's the right

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The chickens seen here are 5-week-old broilers on Wednesday, Nov. 5, 2014, at the Auburn University Poultry Science Department barns in Auburn, Ala. (Julie Bennett/ jbenett@al.com)

thing to do if you're concerned about the welfare of your birds," Lacy said.

## Antibiotic resistance

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A Tyson truck drives through Albertville, Ala., on Thursday Feb. 5, 2015. (Sharon Steinmann/ssteinmann@al.com)

Biligili said there was some concern over antibiotic resistance and the potential for resistance transfer among bacteria, but those theories were never fully proven.

A **2014 internal records investigation by Reuters** found some of the top U.S. chicken producers are using antibiotics when sickness arises and as a standard practice throughout the birds' lives. Donald Kennedy, former U.S. Food and Drug Administration commissioner and president emeritus of Stanford University, told the news service widespread use of antibiotics over a lengthy time can create a "systematic source of antibiotic resistance" in bacteria.

"This could be an even larger piece of the antibiotic-resistance problem than I had thought," he said.

If you see the words "no growth hormones" on a package of chicken at the grocery store, Lacy said it's just marketing. "There are no hormones added to any chickens in the U.S.," he said.

A **study by Mississippi State University** in 2013 on growth hormones in poultry denies the use of hormones in chicken breeding, saying hormones have been banned in U.S. poultry production since the '50s.

"Some of the confusion and misunderstanding may stem from the fact that the poultry and beef cattle industries operate under different regulations," the report said. "While growth hormone use is banned in poultry production, it is a perfectly legal and accepted practice in the beef cattle industry."

## Genetic selection

Because a chicken's life cycle is shorter than a dairy cow, the results of genetic selection are seen much faster than in other species, said Aviagen North American President Kevin McDaniel. And methods for guiding that selection have improved.

In the old days of chicken farming, McDaniel said a bird would have to die for growers to look at all of its attributes. Now, the industry can examine birds noninvasively through CT scans that analyze the physical health and condition of the animals.

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Chicken processing at the Auburn University Poultry Science department. (Julie Bennett/ jbennett@al.com)

"Then we used that information to further improve the selection process -- that's revolutionary," he said. "This technology assists in determining body condition early on and aids in the selection of desirable traits in the breeding stock such as breast muscle volume and shape."

Aviagen was responsible for several other poultry industry firsts, including the use of lixiscopes, another noninvasive technology that enables workers to look at a bird's leg strength. The company also introduced oximeters, which inspect a chicken's respiratory system.

By incorporating these technologies into the selection program, Aviagen is able to more effectively and quickly realize performance changes in birds.

"It's not just throwing corn or soybeans down and the birds pick it up and eat it like the old days," McDaniel said. "The technologies have grown so much."

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