From Wild Birds
to
Modern Broilers and Layers

CELEBRATING 50 YEARS OF POULTRY PRODUCTION IN THE CARIBBEAN

Karen Christensen, PhD
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The Red Jungle Fowl is the predecessor of the modern layer and broiler.
Chickens were prized for plumage and fighting. Breeding birds for exhibitions was a popular activity.

Metal spurs that were attached to the legs of fighting cocks.
Raising chickens for eggs was women and children’s work. Any money made from selling eggs was pocket money or “pin money” for women.
Chicken meat was considered a delicacy.
During the 1940’s people were moving to the cities. The demand for eggs was increasing.
Also during the 1940’s, chicken and egg production increased to feed soldiers during World War 2.

Chickens and eggs were shipped to processing facilities. It was difficult to ship processed chicken so birds were shipped live!
Moving Hens indoors lowered the 40% mortality rate. Cages solved the problems of “pecking order” and allowed all chickens an equal ration.
Advances in nutrition including the discovery of Vitamin D and the importance of using light to stimulate egg production resulted in a significant increase in performance.
Cages improved efficiencies and larger flocks were more common. Cages kept birds safe from predators and away from fecal material. The first egg belts reduced labor even more.
Medicines were developed to improve health. Coccidiosis, gut health and mites were common problems.
Genetic selection increased performance. Selecting breeders based on performance of progeny was revolutionary!
A New Type of Selection for Rapid Improvement was Developed

Art Heisdorf, H & N International. How we developed the “Nick Chick”

“... in October, 1936 I received an offer from John Kimber of the Kimber Poultry Breeding Farm in Niles, California to work for him as geneticist at $18 per week. My association with John Kimber continued until August, 1945.” At this point, Mr. Heisdorf left Kimber Farms to start his own poultry breeding company in the Seattle, Washington area of the northwest United States.

Mr. Heisdorf commented that “We started out selling Kimber strain Leghorns... These were trap nested, selections made and thus began our poultry breeding program. At the same time we began importing samples of stock from many of the leading breeders of this country as well as from Europe and Japan. These we tried in crosses with pure Kimber stock hoping to find a combination which was superior...” He goes on to say “...very early we found one that nicked (combined well) with the Kimber blood. That was the foundation of the HN ‘Nick Chick’ Leghorn.”

In 1947, two brothers named Bert and Cliff Nelson became partners in the business with Mr. Heisdorf. These are the origins for the names Heisdorf, H for Heisdorf, N for Nelson. According to Mr. Heisdorf, “In 1952 we bought out their interests. In 1955 we incorporated as Heisdorf & Nelson Farms Inc. By this time our breeding program had changed from one of pure line breeding to that of recurrent reciprocal selection...”

This breeding system was based on information Mr. Heisdorf obtained during a conference on genetics and breeding at Iowa State College in 1950. It involved the selection of pureline families based on the performance of their commercial offspring. This was a revolutionary departure from the basic poultry breeding techniques being used at that time. Today, recurrent selection programs similar to RRS are commonly used, while inbreeding programs have been discontinued.
Reciprocal Recurrent Selection has replaced Single Line Selection

RRS:

• Increases the frequency of additive and non-additive genes
• Uses offspring as selection criteria
• Replaces pure line selection especially where continued improvement has ceased!
Egg Layers’ Performance has come a long way!
Interest in breeding a chicken specifically for meat became a national contest.
Atlantic and Pacific Tea Company Sponsored the contest

- Each contestant provided 2 cases of hatching eggs.
- Chicks were hatched in Maryland and Reared 12-weeks in Delaware under identical conditions.
- Moved to battery cages at the processing plant and fed a milk based diet for three days before processing.
- Winners were based on Feed Conversion, Hatchability, Egg Production (Breeding Purposes) and Livability.
- A wax model was used to demonstrate the type of meat bird that was desired.
The Best Carcasses from each group was evaluated for breast shape and meatiness of the legs.
Winners of the contest included: Vantress Hatchery and Henry Saglio (Arbor Acres), Other participants included Hubbard, Peterson and Cobb.

Cornish X New Hampshire Cross

White Plymouth Rock - Pure Line
How were these changes in Broiler performance possible?
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If we adjust the FC to a common weight of 1.4 kg of 1950, today’s FC would be closer to a 1.46!
How were these changes in Broiler performance possible?

Today we grow a broiler that is 1.4 kg heavier in 23 less days!
How were these changes in Broiler performance possible?

Geneticists had the foresight to preserve the 1950’s genetics
Comparison of Market Age Broilers from 1950 to 2008.
The most dramatic change is the amount of Breast Meat present in the modern broiler.
How were these changes in Broiler performance possible?

10 – 15% of the change is from Nutrition!

Vitamin D
Methionine
Lysine
Protein
Energy
Pelleting

Havenstein et al, 2003
How were these changes in Broiler performance possible?

85 – 90% of the change is genetic selection!

Havenstein et al, 2003
Selection is Done on 30 – 60 Traits

- **2010**: Genetic Improvement
- **2011**: Primary Breeder
- **2012**: Pedigree Selection
- **2013**: 1 Male X 10 Females
- **2014**: Selection on 30 – 60 Traits

- **GGP**: 150 GGP’s
- **Grandparent Stock**: 7500 GP’s
- **Parent Stock**: 375,000 PS
- **Broilers**: 48,750,000 Broilers
- **Processing**: 68,750 Tonnes of Meat
- **Consumers**
As a Result of Selection and Nutrition Consumption has increased!

Per Capita Consumption in the Caribbean > 46 kg!
Was Herbert Hoover Right?
Population shift is also part of the story.
Population shift is also part of the story.
The amazing improvements in poultry performance is only part of the story! Changes in demographics have left people disconnected from where their food comes from. As a result it is imperative that producers get the information out to the public! We must be transparent in what we do!
Hormones!

No wonder there is confusion about hormones in chicken production??!!
Hormone Use in Poultry is Illegal in Most Countries

Besides being illegal, there is no logical reason to use hormones in the production of poultry!
Hormones are not effective.

Growth Hormones does not lead to increased growth in chickens. Growth requires very complex metabolic functions.
Growth Hormone, like insulin for diabetes, is a protein. It cannot be ingested but must be injected. The logistics of injecting millions or billions of individual chickens is not feasible!
The cost of handling individual birds multiple times would be cost prohibitive and more than the value of the chicken!
Performance is at a high level now. Sometimes we need to restrict performance rather than enhance it!
Anabolic steroids, abused by athletes, will increase muscle mass but must be combined with rigorous physical training. The breast muscle of a chicken has not been used to fly for thousands of years!
Hormones... Simply Not Needed!

Rapid growth due to genetic selection, healthy environment, high-quality feeds and expert management allow broilers to meet their genetic potential.

Nick Dale and Adam Davis, U of GA
“The Evolution of the modern broiler from the original Jungle fowl has taken around 5000 years but by far the greatest development in meat birds has taken place in the last two centuries with massive advances in the last 50 years. These have been closely linked to advances in the science of Genetics”

*Ken Laughlin, Aviagen*
Questions?

It is not important which came first...
It is what comes next that is important!