



Poultry Genetics for Pastured Production

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While most pastured poultry producers in North America raise the same fast-growing Cornish-and-White-Rock-cross broilers used in conventional confined production, many producers are interested in alternative genetic types that may be more suitable for outdoor production or for niche markets. This publication provides information on the Cornish Rock crosses in outdoor production, discusses several slower-growing breeds, and provides information on hatcheries that offer these alternative breeds.

Most pastured poultry producers in North America raise the same Cornish-and-White-Rock-cross broilers used in conventional poultry production. These are the standard meat birds of the industry, and essentially all broilers produced commercially in North America are Cornish crosses.

This has been true since meat became a primary focus for chicken genetics in the 1940s,

and confinement-rearing became the dominant form of production for the U.S. poultry industry. A 1950s contest, sponsored by the Atlantic & Pacific Tea Company, called “The Chicken of Tomorrow” encouraged the development of meatier birds. Cornish crosses became the birds of choice at that time. Since then the conventional poultry industry has genetically refined them for rapid growth, efficient feed conversion, broad-breastedness, limited feathering (for ease of plucking), and other traits considered desirable for rearing very large numbers of birds in confinement. Because of their rapid growth, they reach a market weight of five pounds (live weight) in six to seven weeks.

However, most pastured poultry producers today use the Cornish crosses because they are readily available, not because they are ideally suited to rearing on pasture. Many of the characteristics that make the Cornish-cross broiler strains good for industrial confinement production are not well-suited for alternative production systems. Many pastured poultry producers see the Cornish crosses as having weak legs, excessive rates of heart attacks, a high incidence of congestive heart failure (ascites), poor foraging ability, poor heat tolerance, and other liabilities when raised on pasture. While most producers value their rapid growth, others find it unnaturally fast. In most pasture-based production systems, Cornish crosses usually produce a five-pound bird in eight weeks. Keeping the birds longer than eight weeks and allowing them to get larger can contrib-



Photo by Keith Weller©ARS

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Breeding Companies

Aviagen
www.aviagen.com

Arbor Acres
www.aaf.com (includes downloadable management guides)

Ross Breeders
www.rossbreeders.com (includes technical manuals)

Nicholas Turkeys
www.nicholas-turkey.com

Cobb-Vantress
www.cobb-vantress.com

Peterson Farms
www.petersonfarms.com

ute to even greater leg problems.

Many pastured poultry producers would like to raise birds that are better suited to range production than the Cornish crosses. Therefore, the purpose of this publication is to identify the genetic options available to producers who do not want to use the conventional confinement-production model.

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The Conventional Industry Dominates the Scene

Many pastured poultry producers would like to raise birds that are better suited to range production than the Cornish crosses, but their alternatives at this time are extremely limited. There are several different strains of Cornish crosses, but there is very little difference among them. No other type of chicken

that is widely available in North America produces as much meat as economically as the Cornish crosses. This economic fact makes it very difficult for producers to consider other breeds, even though there is abundant variety in the poultry world. Color photos and descriptions of many poultry breeds can be seen at www.feathersite.com/Poultry/BRK-PoultryPage.html#Chickens.

The primary breeding companies for broilers in the U.S. are Aviagen (which includes the formerly separate companies of Arbor-Acres, Ross Breeders, and Nicholas Turkeys), Cobb-Vantress (which now includes Avian Farms and is owned by Tyson Foods), Hubbard-Isa, and Hybro. Most of these companies are multi-national enterprises, and they dominate the world market for conventional broiler production, as shown in the table below.

These companies work constantly to produce genetic improvements in their breeding stock. They typically use a system of four-way crossing to produce the parents of the birds that are raised as broilers. They select and develop certain strains to use as their male line, with emphasis on growth performance and body conformation, while at the same time developing different female lines, with emphasis on reproductive performance. This cross-breeding system protects each company's genetic research, because the genetics of the original grandparents cannot be reproduced from their offspring.

Most of the primary breeding companies produce more than one strain of Cornish cross. They try to meet the needs of their customers by producing a heavier-breasted bird for producers focused on white meat, a thriftier bird that has a slightly better feed conversion ratio, or a heavier strain for the roaster market. Some also offer slower and faster growing strains of Cornish-cross birds. The slower-growing strains may be of interest to pastured poultry producers, because they may have fewer heart and leg problems.

The different strains of birds that the breeding companies offer are described at their Web sites. Some of these sites also include technical manuals and guides for raising their birds.

World broiler production is estimated to be 32 to 42 billion birds per year.

Estimated global market shares for the different broiler breeder companies (SOURCE: WATT Poultry USA)

Company	Percent
Aviagen	35-45
Cobb	30-40
Hubbard	10-20
Hybro	5-10
Other	10-20

The breeding companies sell crossbred parent stock to vertically-integrated poultry producers, independent hatcheries, and others who produce the hatching eggs that will ultimately become the broilers we eat. Most independent hatcheries do not keep their own flocks to produce hatching eggs. Instead, they buy their hatching eggs from a few very large suppliers (such as the Keith Smith company in Arkansas, www.keith-smith.com, or CWT Farms in Georgia, www.cutfarms.com). Therefore, all the chicks available from hatcheries throughout North America are mostly the same strains, and they are the same strains being used by the vast majority of the conventional industry.

Producer Preferences

Even though the differences in the Cornish-cross strains are small, some pastured poultry producers do have preferences. Over the years they may see that one strain performs better for them than others. These differences may be things such as fewer leg problems, slightly faster (or slower) growth, or lower mortality. Therefore, while most pastured poultry producers do not know exactly which strains they are raising from batch to batch, a few producers always try to purchase a particular strain of chick.

Yet even those producers who express a preference for one strain may have had their opinions unduly influenced by factors that are not related to the genetics of the birds they have raised. For example, the age of the breeder flock influences the size of the hatching eggs and the chicks that result. Young breeder flocks produce smaller hatching eggs and smaller chicks than mature flocks. Older flocks nearing the end of their productive lives also produce chicks with greater inconsistencies in their size and vigor than a flock at the prime of its life. Therefore, some producer preferences may not be objectively justifiable.

The Importance of Access

Because the differences between modern Cornish-cross strains are so small, most pastured poultry producers use other crite-

ria when deciding which birds to raise and where to get their day-old chicks. Many have concluded that a hatchery's customer services and location are more important than the precise strain of broiler chicks available. They have learned to get their birds from the most reliable hatchery, one that can get the chicks to the farm with the least shipping stress. Usually this means the hatchery that has the shortest delivery time. Death losses and slower rates of growth that result from shipping stress are often more significant than the performance differences between strains. The liability of shipping stress is also confirmed by the practices of the major conventional industrial producers. They use their own employees and vehicles to deliver chicks directly to their contract growers; they try to control the chicks' shipping conditions as much as possible and minimize their shipping stress. This is an argument for having more (rather than fewer) hatcheries, and having them located as near as possible to the producers who will raise the chicks.

Here are the Web sites of several hatcheries. These are not given as recommendations, but simply as examples of what independent hatcheries have to offer and how they present themselves. A more complete listing of hatcheries throughout the U.S. can be found at www.aphis.usda.gov/vs/npip/ and at www.poultryconnection.com/hatchery.html.

Shipping constraints beyond the control of the hatcheries can be an important factor, as well. During the early and mid-1900s, the practice of sending day-old poultry by mail from hatcheries to customers all over the country became very popular and commonplace. In recent years, however, the number of airlines willing to carry day-old poultry as U.S. mail has declined, even to the point that the chicks-by-mail service appeared to be in jeopardy. Then in 2001

Samples of hatchery Web sites

www.belthatchery.com
559-264-2090

www.esteshatchery.com
800-345-1420

www.mcmurrayhatchery.com
800-456-3280

www.moyerschicks.com
215-536-3155

www.mthealthy.com/index.html
800-451-5603

www.privethatchery.com
877-774-8388

www.townlinehatchery.com/chicks.html
616-772-6514



and 2002, the U.S. Postal Service and several airlines modified their mail-carrying contracts and the regulations governing the shipment of live animals through the mail. These new arrangements have apparently stabilized the situation, and the chicks-by-mail service continues. The latest information on the postal regulations governing the shipping of live animals as mail can be found by visiting the Web site of the U.S. Postal Service, www.usps.com, or www.birdshippers.com.

Other Decision Factors

Some pastured poultry producers also make decisions about which chicks to raise based on other non-strain factors. For example, some producers choose to raise all females, because that eliminates the problem of cockerels harassing the pullets as they mature, resulting in a more tranquil flock and presumably better feed conversion. Or they will raise all males because their customers want large birds, and producers want greater uniformity in their product.

Uniformity is tremendously important for the conventional poultry industry. Birds are managed as a unit instead of as individuals, and birds that are not nearly identical to the others are problems. For example, pullets are brought into lay at the same time, so they all need to achieve the appropriate body weight at the same time. For broilers, much of the conventional industry's processing equipment is automated, and odd-sized birds may not process well because they are not the size the equipment is designed to handle. Variations in carcass size cause real problems for automated equipment.

Most pastured poultry producers do not seek this much uniformity, however, because their market does not require it. Using straight-run chicks gives a range of carcass sizes at butchering time because the cockerels grow faster. Most pastured poultry producers are glad to have some variance in size, because some of their customers prefer smaller birds and some prefer larger birds. Some will even choose to produce Cornish Game Hens (which are the same Cornish cross birds, just butchered younger and smaller), while other

producers have customers who want very large roasters and are willing to pay a premium price for them. Uniformity certainly can become more important, however, as producers move beyond on-farm processing and direct marketing. A spread-out harvest that is advantageous on a small scale may become a distinct problem at larger scales of production.

Some customers prefer colored birds (red or black) over white-feathered ones. This kind of preference also influences producer decisions about which birds to raise.

Beyond Cornish Crosses

North American producers of range poultry who want options other than those offered by the conventional Cornish crosses do not have very much to choose from at present. Their options may be increasing, however.

The Noll family is working to make medium-growing genetics more widely available in North America. Henry Noll offers a Silver Cross that grows to five pounds live weight in nine weeks.

Noll's Poultry Farm
Kleinfeltersville, PA 17039
717-949-3560
717-949-3722 FAX

Joe Cebe, Sr. offers a Cebe Red and Cebe Black meat variety that grows to 5 pounds live weight in 9 to 10 weeks.

Cebe Farms
P.O. Box 1404
Ramona, CA 92065
760-789-8221

Matt John of Shady Lane Poultry Farm, Inc. is currently developing a new hatchery and plans to introduce several alternative broiler lines during the next several years.

Shady Lane Poultry Farm, Inc.
520 Agawam Road
Winchester, KY 40391
859-737-2636

Please send further information on other breeding flocks of commercial meat birds to Anne Fanatico at annef@ncat.org.

There are genetic options in other countries. In France, in particular, there are lines that are bred for France's range production systems. These lines have been developed during the past 30 years for pasture rearing, and they deserve side-by-side comparison trials in this country.

These distinctive lines are used primarily by producers who are raising birds to be marketed under the quality-labeling program known in France as *Label Rouge* (Red Label). Food products carrying the *Label Rouge* logo are highly valued by French consumers.

The *Label Rouge* program focuses on high-quality products, mainly meats, with poultry as the flagship product. The program emphasizes quality attributes such as taste, food safety, and free-range production. The average consumer can easily tell the difference in taste between *Label Rouge* poultry and conventional poultry—in fact, regular taste-testing is a certification requirement to prove that these products are “vividly distinguishable” from conventional poultry.

The main reason for the superior taste is the use of slow-growing birds harvested close to sexual maturity, instead of the fast-growing birds used in the conventional U.S. industry. The meat is flavorful and firm, but not tough.

Slow-growing birds are the key to *Label Rouge* production—birds grow to 5 pounds live weight in 12 weeks. In comparison, the fast-growing broilers (Cornish cross) of the conventional industry reach five pounds in six to seven weeks. The slow growth allows the organs, muscles, and bones to grow in harmony. The carcass is generally more elongated, with a smaller breast and larger legs than conventional carcasses.

Using slow-growing genetics and the low-density *Label Rouge* production system also offers distinct health advantages—ascites, leg problems, and sudden death are minimal, and birds have good immunity. Mortality for conventional broilers in France is 6% during the 6-week grow-out; it is half that for *Label Rouge* production (3%), even during a much longer grow-out (12 weeks).

In Europe the slow-growing strains are mainly supplied by the breeding companies SASSO (www.sasso.fr) and Hubbard-ISA (www.hubbard-isa.com). They do not sell the actual broiler chicks, but only the parents; however, many pastured poultry producers have hatching capabilities. SASSO's typical *Label Rouge* cross is a T44N male and a SA51 female. (Using a different male—the T44NI—results in white under-feathers in the offspring.) A typical Hubbard-ISA cross is a S77N male and a JA57 female. Broilers from both of these crosses will have red feathers, yellow shanks, thin skin, and a naked neck. Other parents are available for broilers with white feathers and skin, black feathers, barred feathers, feathered neck, or faster growth. These color combinations are possible because the female parents are red, but this is recessive. Therefore, depending on the male used, you can choose the color of the feathers (red or black), skin (yellow or white), shanks (yellow or white), and naked neck or not. The ability to choose these characteristics is important to French poultry farmers, because their customers have personal preferences about these things.

Some of the proven European genetics are available from B & B Agriculture, a small year-round hatchery recently established in Canada. The hatchery offers medium- and slow-growing birds that are adapted for outdoor production and a gourmet market. Some of these breeds grow out in 12 weeks and qualify for the *Label Rouge* program. B & B Agriculture has extensive experience with these specialty breeds, having raised birds in the U.K., and also offers workshops and housing options on free-range production.

B & B Agriculture
Box 30, Station Main
RR2 Brandon
Manitoba
Canada
R7A 5Y2
204-729-8868
204-729-8779 FAX
baaron@mts.net
www.bandbagriculture.com
Contact: Barbara or Brian Aarons





In the U.S., the S & G Poultry Company (formerly Rainbow Breeder Company) is developing similar genetics and offers Free Range (FR) Broiler parents. FR Broiler offspring (day-old chicks) are also available. Male chicks are regularly available; female chicks are available only occasionally, since they are used more in breeding (females grow at 85% the rate of the males).

S & G Poultry
P.O. Box 2363
Clanton, AL 35046
205-280-3771
dceiland@hiwaay.net
Contact: Danny Eiland

Redbro is a Hubbard-ISA Shaver product that is currently available in the U.S. via a Canadian company that imports parents from France. It is not slow-growing but rather a medium-growing broiler—it grows out in 9 to 10 weeks. Jerry Srednicki at a Connecticut hatchery ships day-old chicks.

Yankee Chicks, Inc/Hall Brothers Hatchery
P.O. Box 1026
Norwich, CT 06360
860-886-2421 or 860-608-1389
860-889-6351 FAX
Contact: Jerry Srednicki

Importing live birds and hatching eggs from other countries is not a simple task, but those who are interested in pursuing this approach can learn more by visiting the Web site of the USDA Import and Export Center, www.aphis.usda.gov/vs/ncie/.

There is also some interest in standard American heirloom chicken breeds for gourmet poultry production. In general, however, heirloom breeds have not yet been selected for commercial production, and the carcass will be very small at 12 weeks. Contact the American Livestock Breeds Conservancy (ALBC) for more information about the American heirloom breeds.

American Livestock Breeds Conservancy (ALBC)
P.O. Box 477
Pittsboro, NC 27312
919-542-5704

919-545-0022 FAX
www.albc-usa.org

Turkeys are native to the Americas, and there are several slow-growing breeds available. These are naturally-mating turkeys and do not require artificial insemination. Some have ties to the regions in which they were developed (e.g., the Bourbon Red is from Kentucky, and the Narragansett is from Massachusetts). Walters Hatchery offers eight heirloom turkey breeds, some of which have been selected for commercial production.

Walters Hatchery
Rt. 3, Box 1490
Stilwell, OK 74960
918-778-3535
turkeylink@intellex.com
www.historicalturkeys.com

Developing more poultry breeds with geographical ties could be an opportunity for small North American poultry breeders.

For more information on poultry genetics, contact Anne Fanatico.

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