WHAT IS A HERITAGE BREED?

"Heritage" is a relatively new term being applied to various breeds of livestock that were raised before the commercialization of agriculture in the mid 1900's.

Breeds classified as "heritage" have historic significance and useful traits for small farming practices. Many of these breeds fell out of favor when mass commercial farming became prevalent. However, commercial birds are not usually the best suited for backyard production. Many useful and interesting breeds of poultry have become desperately rare in recent decades.

Why is it important to save heritage breeds? Well, first off, for genetic diversity. A large variety of different breeds essentially provides a gene bank of different traits that can be used for unknown future breeding needs such as disease resistance.

Second, for their unique and useful traits and tremendous variety. There are dozens of unique and useful poultry breeds with many different purposes and niches. These birds are usually better suited to backyard flocks. Having many different breeds allows everyone to choose the perfect bird to fit their situation or personal tastes.

BREEDING MISCONCEPTIONS

Some people advocate raising crossbreds to increase genetic diversity, since inbreeding is often associated with unhealthy or negative traits. This belief is based partly in fact; occasionally, purebred breeders will use inbreeding temporarily to achieve a desired trait or eliminate an undesirable trait. However, good breeders know how to inbreed selectively and maintain genetic diversity in their flock as a whole.

Raising crossbreds can sound fun since random color patterns can appear, but there is never any predictability in crossbreeding long-term. It is difficult to breed toward any useful trait (including egg or meat production) since the genes are too varied and mixed. Wild animal populations usually have decent genetic diversity, but are not random crossbred bunches - they are often isolated local populations that are specially adapted to their local ecosystem. Similar to wild animals, a purebred breeding program will provide predictable, useful traits, while maintaining sufficient genetic diversity.

Some people believe show chickens are useless and inbred, and not suited for backyard production. While there are breeders who ignore production qualities, they are the minority. Most show breeders want birds that are useful as well as beautiful. After all, it's hard to have a successful breeding program if your birds don't lay many eggs.

If you want to help save and preserve heritage breeds, then you will need to follow similar guidelines to other breeders, or risk losing the original traits of your breed. This is exactly why the American Poultry Association (APA) was founded in 1873: to provide guidelines for each breed such that farmers from one end of the country to the other could breed to the same standard.

STANDARD-BRED POULTRY VS COMMERCIAL POULTRY

The APA is the oldest livestock breeds association in America, and publishes the *American Standard of Perfection* as a guideline for breeders to preserve and improve traditional breeds. Without the *Standard*, there can be no heritage breeds, since these guidelines are what ensure they retain their traditional, unique, and useful qualities.

Hatcheries generally produce birds that are substantially different than the breeds they were originally derived from.

Mediterranean breeds like Buttercups and Leghorns have long been bred for high egg production, and remain some of the best layers. Commercial White Leghorns have recently been developed to produce even higher rates of lay than their Standard-Bred counterparts, but have lost some of their important traits.

Commercial leghorns have been bred for smaller body size to reduce feed consumption, but larger egg size. This often results in problems such as prolapse and internal egg breakage. They also have a shorter production life. In the commercial industry this is not a problem, since hens are kept for less than two years. Traditional strains of laying breeds have been widely known for hens that continue laying until nearly ten years of age with few health problems.

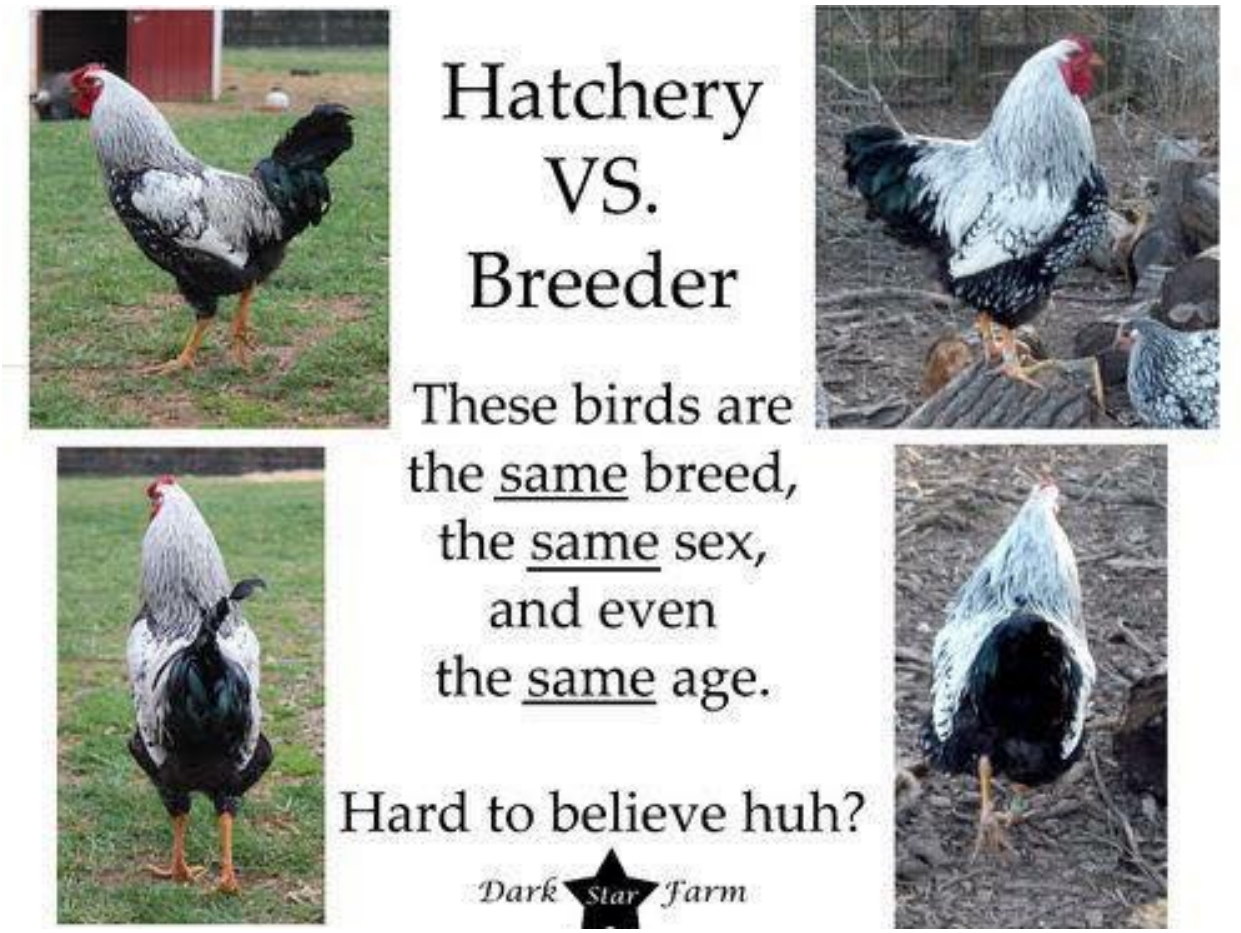
Meat breeds have followed another path. Originally, birds of English and Asiatic origin were bred primarily for meat production. Orpingtons, Cornish, Brahmas and Cochins are a few examples. These birds achieved large sizes with nicely fleshed carcasses.

Today, commercial meat production birds are hybrids. Using two established breeds to create a first-generation hybrid is the most effective method to achieve high rates of growth. However, simply keeping a crossbred flock is not enough. A second or third generation crossbred is not as productive. Only by keeping two separate purebred flocks can a breeder achieve the spectacular growth rates of a first-generation hybrid.

Most backyard breeders do not have the space to keep three separate flocks of birds to produce hybrids. However, if you purchase an old-style meat breed from a hatchery, you will discover that they typically only reach half the size of their original ancestors.

Similar dilutions of quality have taken place in dual-purpose breeds. Wyandottes, Langshans, Plymouth Rocks, and Rhode Island Reds are a few examples. In the days of our pioneering forefathers, most people focused their effort on breeding birds that were a compromise between egg and meat production. If you buy a dual-purpose chicken from a hatchery, it will not be truly dual-purpose, but merely a decent egg layer that grows too slowly and too small to offer much meat.

It is critically important that more breeders are found for many of these rare heritage breeds. Even if you only want a small flock of a few birds, your efforts can make a huge difference in breed recovery and preservation.



Silver-laced Wyandottes are a traditional dual-purpose breed. Hatchery bird on the left, and heritage bird on the right. Note the difference in body depth, width, and overall size.



New Hampshires are another traditional dual-purpose American breed. The hen on the left is standard-bred, and the hen on the right is a hatchery bird. Note the difference in width and depth of body, and breast size. Note also the difference in color.

The Livestock Conservancy
The Livestock Conservancy works to preserve rare heritage livestock breeds for future generations. They have a breeders directory on their website with contact information as well as lists of rare breeds and information about them.
livestockconservancy.org

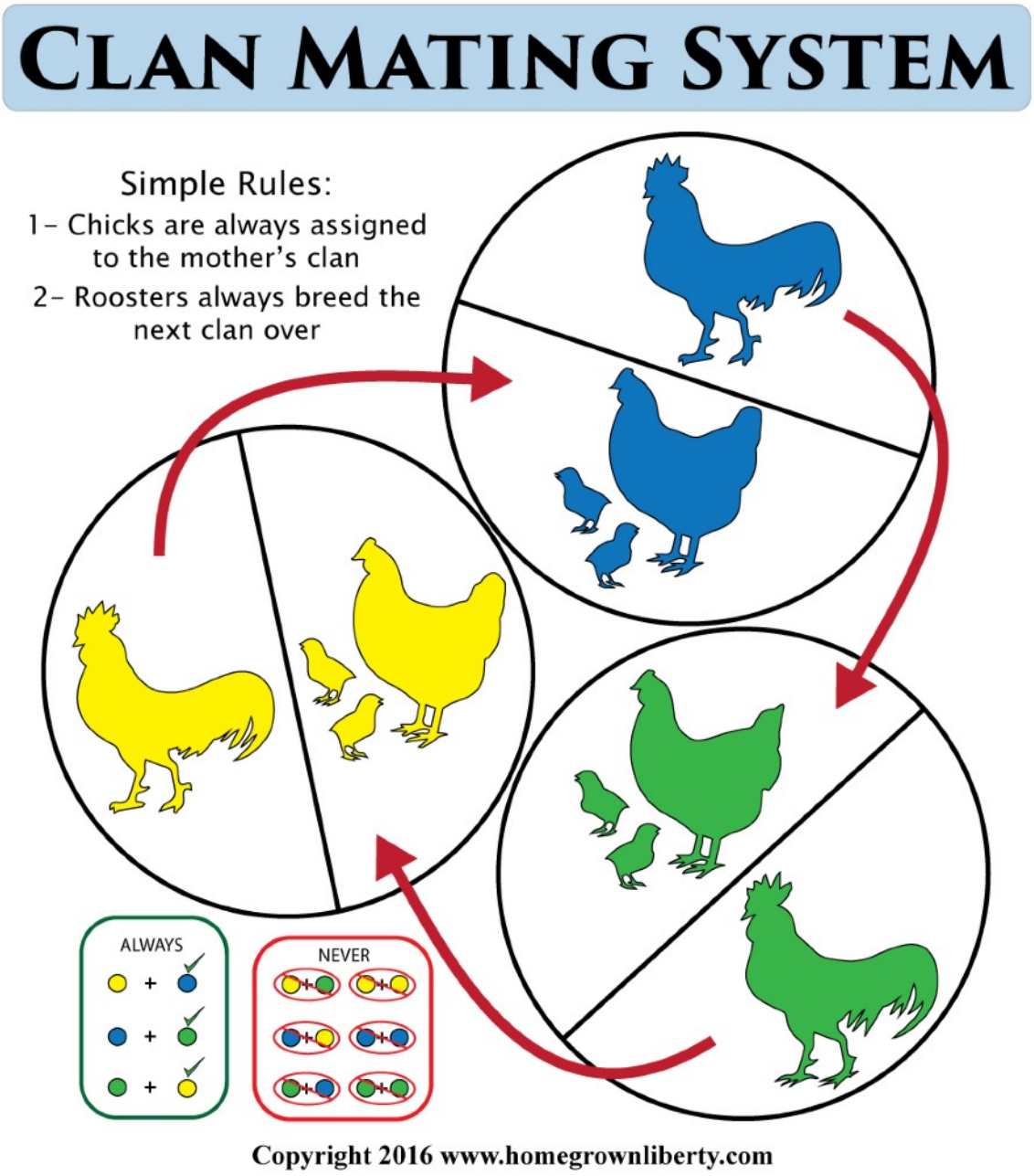
American Poultry Association
The APA was founded in 1873 to provide guidelines for the breeding of poultry, which they publish in the *American Standard of Perfection*. This book is essentially the poultry keeper's bible, and is a must-have for any breeder. It is also a great reference book for anyone interested in poultry, new or experienced. You can buy it from their website.
www.amerpoultryassn.com

The APA divides birds into classes, and the following guidelines are generally useful for knowing what purpose the birds have been bred for. This is ***not*** a complete list.

	Chickens						
Class	American	Asiatic	Mediterranean	English	Continental	All Other Breeds	Bantams
Use	Dual	Meat	Eggs	Meat	Eggs	Misc.	Show
Breed	Rhode Island Red, Wyandotte, New Hampshire, Plymouth Rock	Brahma, Cochin, Langshan	Leghorn, Ancona, Blue Andalusian, Sicilian Buttercup, Minorca	Orpington, Sussex, Cornish, Redcap, Dorking, Australorp	Hamburg, Campine, Polish, La Fleche, Faverolle	Phoenix, Sumatra, Old English Game, Aseel, Araucana, Ameraucana	Bantams have five classes. See APA *Standard of Perfection*.
	Ducks				**Geese**		
Class	Heavy	Medium	Light	Bantam	Heavy	Medium	Light
Use	Meat	Dual	Eggs	Show	Meat		
Breed	Peking, Rouen, Muscovy	Buff, Cayuga, White Crested, Blue Swedish	Runner, Khaki Campbell, Magpie, Welsh Harlequin	Call, East Indie, Mallard	Embden, Toulouse, African	Buff, Pilgrim, Sebastopol, Saddleback Pomeranian	Chinese, Canadian, Tufted Roman
	Turkeys						
Variety	Bronze, White Holland, Narragansett, Black, Slate, Bourbon Red, Royal Palm						

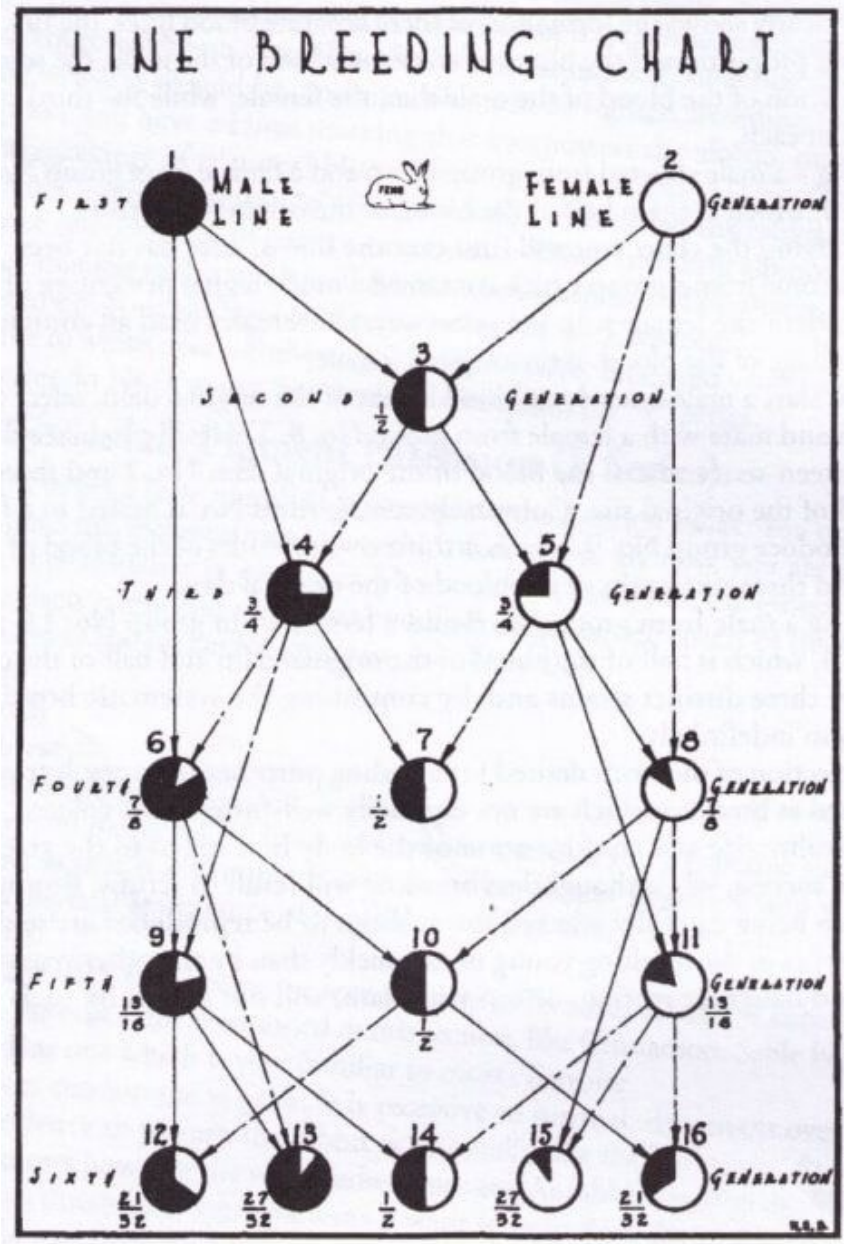
Please contact me for more information, or if you are looking for a certain breed.

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A clan mating system allows you to avoid inbreeding while still mixing bloodlines between your various birds. Works with three or more pens.

Hens and their daughters stay in the pen they were born in. The best of their sons are moved to be bred to the next pen over. In this way, it takes three generations before blood from the first pen returns to the first pen, and by then, it has been diluted.

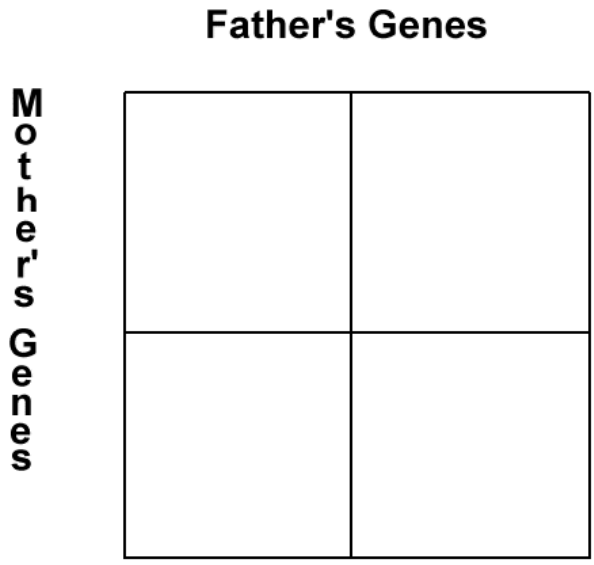


What if you only started with two birds? One male and one female from different lines. How would you maintain genetic diversity moving forward? All the offspring in the first generation would be full siblings. Do you breed them together or back to the parents?

The answer is: back to the parents initially, and then you have more options. Why? Because by breeding offspring back to the parents, even though those new individuals are more inbred than before, the flock as a whole has more genetic diversity. Half of the new offspring are 75% the male bloodline, and half are 75% the female bloodline. You can repeat the process to create birds with a variety of percentages of bloodline.

Punnet Squares

Punnet Squares are a useful visual aid to understand how genes are distributed to offspring, and why full siblings can sometimes have a wide degree of variation.



Above is a blank Punnet Square for your own use, and to explain how they work.

A 2x2 Punnet Square is designed to explain the heritability of the genes on one locus.

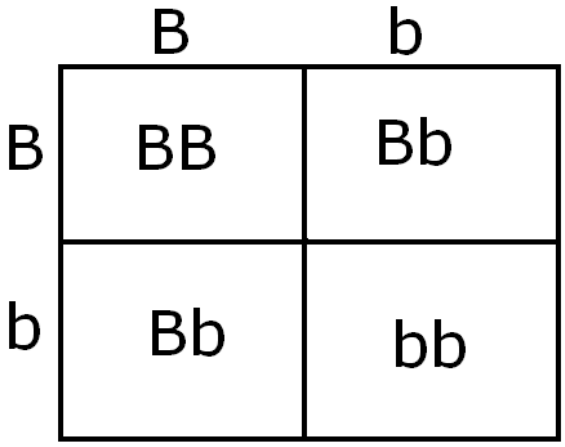
For any given gene locus, an animal will have two gene options. Sometimes they will have two copies of the same gene, in which case they are homozygous (pure) for that gene, and sometimes they will have one copy each of two different genes, in which case they are heterozygous (split) for those two genes.

The mother’s genes are listed on the side, and the father’s genes are listed on the top.

In the four squares in the middle, the genes of the various offspring are listed, based on which of two genes they inherited from each of their two parents.

Organisms pass on 50% of their genes to their offspring, but not always the same 50%. That is what the Punnet Square studies - how to predict what the offspring will inherit. Since the mother and father each have two genes, and each have a 50-50 chance of passing that given gene on to their offspring, there are a total of four different genotype options for the offspring when considering any given gene.

Below is an example of a punnet square of two heterozygous animals being bred. On the side is the mother's genes, and on the top is the father's genes. Both are genotype Bb, which means they have one copy of B and one copy of b on that gene locus.



Since each sperm cell from the rooster and each egg cell from the hen each have a 50-50 chance of getting either gene, there are four different options for what the offspring could inherit:

1) B from father and B from mother. This offspring is homozygous (pure) for BB.
2) b from father and B from mother. This offspring is heterozygous for both genes.
3) B from father and b from mother. Also heterozygous.
4) b from mother and b from father. Homozygous (pure) for bb.

B and b could represent any gene you want.

In humans, B could be for brown eyes, and b could be for blue eyes. In this case, both parents have brown eyes, but carry the hidden recessive gene for blue eyes. 25% of their children end up homozygous for brown eyes, 50% end up heterozygous like the parents (brown eyes but carrying recessive blue), and 25% end up homozygous for the recessive blue, and actually have blue eyes.

In chickens, B could be the splash gene, and b could be the black gene. The splash gene is incompletely dominant, so genotype Bb gives you birds with blue feathers. This Punnet Square above could show two blue birds breeding, and explain why only 50% of their offspring are blue, while 25% are black and 25% are splash.

Why Is Genetics Useful?

Why do we bother with all this Punnet Square business? Because it is useful to understand genetics and heritability in order to make informed breeding decisions.

If you ever hear a breeder say something like “Well he’s a nice bird, but his offspring are all over the place”, that is a sign that the bird is heterozygous on at least some of its genotype pairs, and therefore throws different genes to some offspring than others. The same might be true of the hens that breeder is using for the mothers.

If you hear a breeder say “This is my best looking bird, so I’m going to use his parents again this year.” Why? Why not just move on to the better bird? Because those parents are proven to produce good offspring, and may do so consistently. They may be homozygous for the genes that produce a quality bird, and therefore don’t throw any outliers.

This is also the reason breeders will selectively inbreed. If you only have one good bird with a certain trait you are looking for, and that trait is recessive, how will you ever get an offspring that displays the same trait? You need to double up the genes to get them homozygous again, and if no other bird has that trait, you will need to do some intelligent inbreeding. Once you have multiple birds with those traits, then you can start bringing in new blood again to widen the gene pool, but you need to be strategic about it to avoid bringing in negative traits or diluting the good traits you worked so hard to develop.

This is why most breeders say not to bring in new blood every year. Breed with your own stock, and only bring in new blood when you really need it for genetic diversity or a particular outside trait that your stock lasts. People who bring in a new rooster every year will see the general quality of their stock decrease every year, because there is no homozygosity in the genotypes of their birds anymore - they are essentially crosses of a bunch of different lines.

Sometimes breeders will cross to another variety or breed to bring in a new trait or new blood. Knowledge of genetics and heritability helps them to breed these crosses back into their line and eliminate the genes that are like the other breed, while bringing in the good genes that made the cross worth doing in the first place.

Breeding for Egg Production

There are several characteristics to be focus on when breeding for egg production:

1) Early maturity - age at first egg laid.

2) Frequency of lay - how many eggs per week.

3) Length of lay - how long the bird lays consistently before taking a break.

4) Size of egg.

It is important to not only select hens who fit this criteria, but also to keep cockerels from your best laying hens and breed them to the rest of the flock. Even though roosters don't lay eggs, they carry the egg production genes from their mothers, and pass them along to their daughters. It helps to keep track of which hens keep laying through the winter, which lay the biggest eggs, and who lays the most eggs total. Cull the hens who are lazy, and keep sons from the best layers.

Breeding for Meat Production

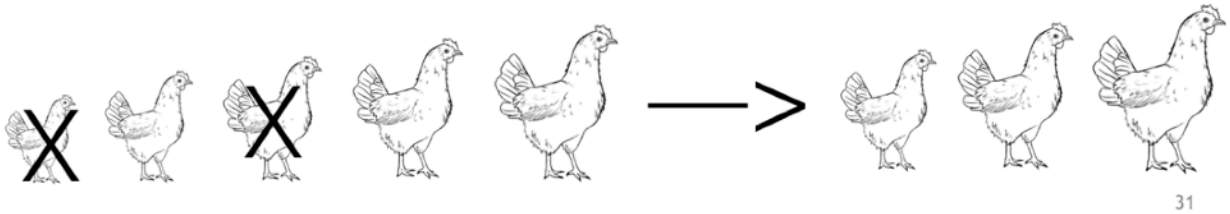
At butcher time, feel the body of every bird. Even if they are closely related, you will notice a substantial difference between the heaviest, best muscled bird, and the scrawniest, wimpiest bird. Eat the skinny ones, and breed from the best muscled birds.

It helps a great deal to make sure all of your meat birds are exactly the same age. Then you can fairly compare their growth rate, and ensure age has nothing to do with it. Make sure they are all fed well, and have enough room to grow properly so that mean birds don't bully the weak birds into eating less - because then you'll just be breeding for mean birds without knowing it. Some breeders literally weigh all of their birds every 4-6 weeks and cull the bottom 20% each time. In this way, they ensure that they select for the fastest growing, earliest maturing birds.

Pay special attention to muscling and growth on the females. Many breeders keep more females than they need. Remember, half the genetics comes from the female side. If you keep the biggest turkey tom, and all the hens, then you aren't selecting your flock very quickly. You should be culling all the hens that are the scrawniest, just as you would with the males.

Requirements for Artificial Selection

1. Variation among individuals in a population
2. The differences are inherited
3. More individuals are born than survive to reproduce
4. Some variants survive and reproduce at different rates than others



Humans have been selecting domesticated animals for thousands of years, but modern understanding of genetics accelerates this process to a previously unheard-of degree.

It is more important to cull heavily than to hatch lots of individuals.

If you hatch 100 birds each year and keep 20 of them, that's an 80% cull rate.

If you hatch 40 individuals and keep only 4 of them, that's a 90% cull rate. The cull rate is more important than the total number of individuals you hatch and raise.

Do not hatch more birds than you have room to raise. The crowded birds will not grow well, and you will have a higher mortality rate.

Culled birds can be used for meat, egg production, or sold off as pets. Just do not use inferior birds for breeding. These culled birds can help pay for the entire operation.