

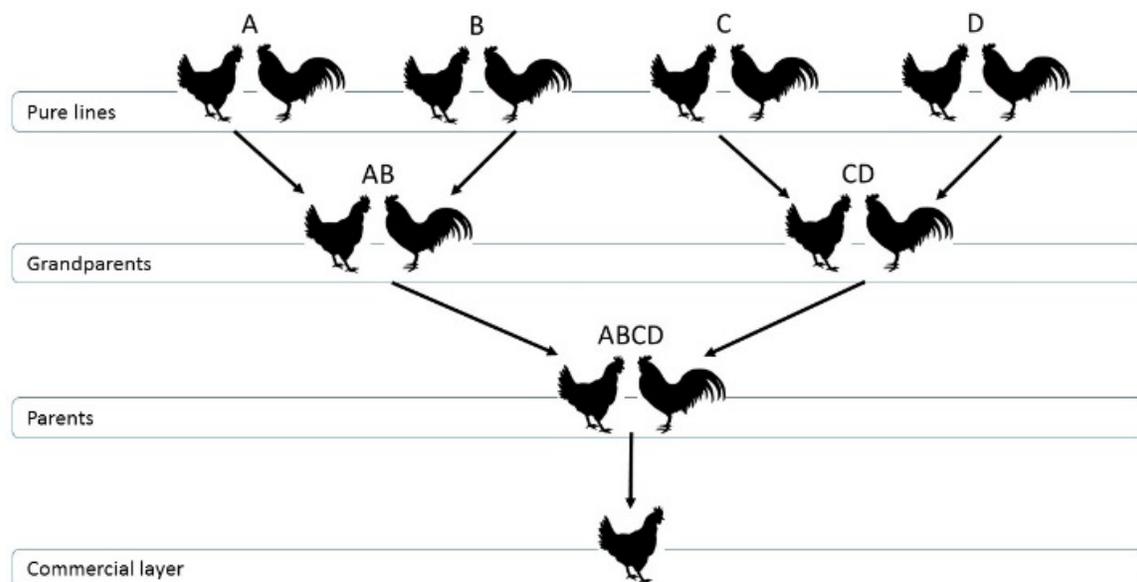
# Breed Selection for a Small-Scale Egg-Production Enterprise

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Once you have decided you are going to go into egg production, you need to determine what breed of chicken will best suit your needs. A variety of commercial breeds are available for use in small-scale commercial egg production operations. Most lay a brown-shelled egg, which typically is preferred by the people purchasing eggs produced in alternative production systems. Most of these commercial chickens are hybrids selected specifically for these systems. All hybrids are developed following a similar breeding schedule as shown in Figure 1. This is important, since you will not be able to hatch your own replacement pullets from the hens you will be using for egg production. In

such breeding programs, the breeding companies maintain several pure lines selected for specific traits such as egg production rate, peak egg production, duration of production, feed efficiency, livability, etc. Different breeding lines are selected and crossed to produce the grandparent stock. A male line and a female line from the grandparent stock are then crossed to produce the parent stocks. These lines are used to produce the hatching eggs for the replacement pullets which will eventually make the laying flock.

Specific breeding companies produce commercial laying hens. Some of the commercial lines include Hy-Line, ISA, Shaver, Hisex, DEKALB,



**Figure 1.** Typical breeding scheme used for the development of commercial egg production stock incorporating lines of chickens selected for different characteristics such as production level, egg size, livability, etc.

Bovans and Babcock strains of laying hens.

For some smaller operations, sex-linked crosses may be the preference. They are not as productive as the commercial strains, but they may be more adaptable to small-scale egg production systems. In sex-linked strains, specific crosses are used to allow for sexing day-old chicks based on down color. To understand how this works, you need to understand how gender is determined in birds. As with mammals, gender in birds is determined genetically by two sex chromosomes. In mammals these are the X and Y chromosome, with males having XY chromosomes and females having XX. Each parent contributes one of their sex chromosomes to their offspring. As a result, it is the male mammal that genetically determines the gender of the offspring. In birds, however, the sex chromosomes are Z and W. The females are ZW and the males ZZ. In birds, therefore, it is the female that determines the gender of the offspring.

In addition to determining gender, sex chromosomes carry genes that can affect other traits, such as plumage color. These genes are used in sex-linked crosses. Sex-linked crosses can only be produced with male and female chickens of different breeds in specific combinations. For example, black sex-links are produced by crossing a barred hen with a non-barred rooster, typically a Barred Plymouth Rock hen with a Rhode Island Red rooster (Figure 2). It must be this cross. The

reverse cross of a Rhode Island Red hen and a Barred Plymouth Rock rooster will not work. The barring gene is on the Z chromosome which is contributed by the barred female. The non-barred male contributes Z chromosomes with the non-barring gene. All the female offspring will feather out non-barred like the father and the male offspring will be barred like their mother. At hatch both sexes have black down, but the males can be identified by the white dots on their heads (see Figure 3). The females from most sex-link crosses lay brown eggs. Other breeds can be used for the black sex-link cross. The male must not have the barred or dominant white gene. This could be the Rhode Island Red, Black Australorp or Buff Orpington. The female must be barred like the Barred Plymouth Rock or Cuckoo Maran.

Red sex-links are another popular cross for small-scale egg production operations. They are created with a cross between a Rhode Island Red or New Hampshire male and a White Plymouth Rock, Silver-laced Wyandotte, or Delaware female.

Some smaller operations may prefer to produce a dozen eggs made up of a variety of different colors (Figure 4). Selecting a variety of breeds will be necessary to allow for this production. The Araucana (Figure 5) is a South American breed that lays light blue colored eggs. The gene for the shell color is dominant and passed on to offspring in the cross between the Araucana and other



**Figure 2.** Rhode Island Red rooster (left) and Barred Plymouth Rock hen (right).



**Figure 3.** Chicks from a black sex-linked cross—female on the left, male on the right.



**Figure 4.** Eggs from a flock of different chicken breeds.

breeds. This was how the Ameraucana breed was produced (Figure 6) (when not up to the standards for the American Poultry Association, often referred to as an Easter-egger). Ameraucana hens lay a light blue, pink or green egg. Maran (Figure 7) hens lay a dark chocolate colored shell (Figure 8). Popular breeds for backyard flocks also include Silver-laced Wyandotte (Figure 9), Barred Plymouth Rock (Figure 10), Rhode Island Reds (Figure 11), and Buff Orpingtons (Figure 12).

While such dual-purpose breeds will provide a variety of colors to your dozen eggs, it is important to note that their level of egg production will be considerably lower than for the commercial strains and more feed will be required for each dozens of egg produced. This must be taken into consideration when determining the price of eggs.

For whichever breed you select, it is important to source your flock from a hatchery participating in the National Poultry Improvement Plan (NPIP). If bringing the chickens in from out of state, it is required that the chickens come from an NPIP hatchery that is certified avian influenza clean.



**Figure 5.** Araucana hen (rumpless and with tufts of feathers projecting from the face).



**Figure 6.** Ameraucana hen (with a tail and muffs and a beard rather than feather tufts).



**Figure 7.** Maran hen.



**Figure 8.** Dark brown eggs from the Maran breed



**Figure 11.** Rhode Island Red.



**Figure 9.** Silver-laced Wyandotte.



**Figure 12.** Buff Orpington.



**Figure 10.** Barred Plymouth Rock.

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