PEDIGREE ANALYSIS

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Introduction

The registration certificate from a breed association provides valuable information for the breeder. The certificate usually details an individual’s information such as sex, color, breeder, owner, tattoo, or ear tag number. See Figures 1 and 2 for examples of registration certificates. Ancestry information is usually listed back through grandparents or great grandparents. In certain instances, production data or production related data is listed for ancestors.

Production Data

Using two the example registration certificates found in Figures 1 and 2, we will concentrate upon production related data. In Figure 1, a 1*M designation can be seen under the paternal granddam. There are several ways in which a doe can earn a star. One way a doe earn a star is to earn 18 or more points at a recognized official milking competition. Points are calculated based upon quantity of milk, period of time since last kidding, and butterfat content. For each pound of milk, one point is earned. For each complete 10 days, the goat has been in milk since last kidding, one tenth (0.1) of a point, with a maximum of 3.6 points, is earned. For each 0.05 pound of butterfat yielded in the two milkings, one point is earned. Another way a doe can also earn a star is by meeting minimum requirements for production of milk and(or) butterfat for their age while on test under official supervision. These requirements are based on lactations of 305 days or less and begin with a base of 1500 lb of milk and(or) 52.5 lb of butterfat for does freshening at age 2 years or
less. For every day the doe exceeds 2 years of age at the time of kidding, up to the time she becomes 5 years of age, the requirement is increased by 0.2 lb of milk and 0.007 lb of butterfat. At the age of 5 years or more, a doe must produce 1716 lb of milk and (or) 60 lb of butterfat in the 305 day or less. The number of stars represents the number of generations of tested females in the immediate ancestry. For example, 1*M indicates that a doe has meet the star requirements but that her dam has not. 2*M indicates that a does has meet the star requirements and that her dam was a 1*M, 3*M indicates that a does has meet the star requirements and that her dam was a 2*M and her granddam was a 1*M, etc.

Also in Figure 1, a star designation can be seen under the paternal and maternal grandsires. A +*B for the paternal grandsire and a ++*B for the maternal grandsire. A buck can obtain one star by having a dam who is a star milker and a sire who is a + buck or has a dam who is a star milker and his sire’s dam is a star milker. Stars in themselves are never a sufficient indicator of an animal’s worth but are extremely useful as a quick guide to those animals with production records on themselves or their ancestry that can be looked up. For a complete description of the star program, please consult the Rules Governing the ADGA Star Program section of the American Dairy Goat Association Guidebook (ADGA, 2001).

A buck can receive a star on the basis of his parentage, the plus (+) prefix before his name is always earned by siring worthy offspring. A buck that has sired at least three daughters by three different dams who have qualified as star milkers. He may also earn the +B prefix by having two sons who are Advanced Registry Herdsires. If he qualifies by having both three qualifying daughters and two qualifying sons he is entitled to the + +B designation. A buck may have a total of only one star (*) and two pluses (++) before his name which looks like this: + +B. There is no such thing as a 5-star buck. If a buck has a prefix of + +B it means he has at least three daughters (from different dams) who are star milkers, two sons who are AR Herdsires, and parentage with qualifying production records. Since both ancestry and progeny have been proven desirable for production, such a buck can be considered a valuable asset in a breeding program.

In Figure 2, the term Ennobled can be seen under paternal great-grandsire. In 1996, ABGA established the Ennobled

![Figure 2](image_url). Example of registration certificate from the American Boer Goat Association.
Herdbook. To obtain the title of "Ennobled," a fullblood or purebred Boer goat passes an inspection and earns a total of eighty (80) points, with no less than thirty (30) of these total points having been earned by combining points from at least three (3) of his/her progeny (sons and daughters). Upon attainment of the required points, either through performance testing, show ring, or a combination of both, the Boer will be registered in the "Ennobled Herd Book" (ABGA, 1999). For points earned through performance testing, a Boer buck to be a nominee for "ennoblement" should pass a pre-performance test inspection conducted by one (1) or more ABGA approved breeders. Because of age requirements, the bucks will not have passed an official inspection before the performance test. Ten (10) points will be awarded a Boer buck who shows an average daily weight gain (ADG) in the top five percent (5%) of the animals on test. Five (5) points will be awarded a Boer buck who shows an average daily weight gain (ADG) in the next fifteen percent (15%) of the animals on test. All bucks must gain at least three-tenths (0.3) lb per day to be awarded any points.

Inbreeding

The ancestry information or pedigree is a useful tool to assess inbreeding. As is seen in Figure 3, the pedigree is divided into upper (sire) and lower (dam) halves. To facilitate the process, animal names are replaced by unique numbers. The sire and dam are given the letters, S and D, respectively. Usually the animal to whom the pedigree belongs is given the letter X. As can be seen, two animals, #15 and #22, appear twice in the pedigree. The next step is to determine which individuals appear in both the sire and the dam halves of the pedigree. These individuals are called common ancestors. That is they are common to both the sire and dam family lines. In this example, #15 and #22 appeared twice but neither #15 or #22 was in both the sire and dam halves. Therefore, there are no common ancestor(s) and the animal to which this pedigree belongs is not inbred. The rule is that the parents must be related for the progeny to be inbred.

If we examine the sire’s half of the pedigree (Figure 4), we see that #15 appears in both the sire and dam halves. Therefore, #15 is a common ancestor, the sire and dam of S are related, and S is, therefore, inbred. If we were to do the same for the dam half of the pedigree, we would see that #22 appears in both the sire and dam halves. Therefore, #22 is a common ancestor, the sire and dam of D are related, and D is, therefore, inbred. In this example, we have two inbred individuals mated to produce a non-inbred progeny.

As was stated earlier, inbreeding results in the mating of related individuals and increases the homozygosity in a population. Is inbreeding bad? In dairy cattle, increased inbreeding decreases
milk, fat, and protein production, lactation length, productive life, and survivability. In beef cattle, increased inbreeding decreases birth weight, preweaning daily gain, and weaning weight. In sheep, increased inbreeding decreases birth weight, litter weight weaned, ewe fertility and prolificacy, % lambs born alive, lamb viability (survivability), and fleece weight.

In goats, no studies have examined the effects of inbreeding. So we can only assume that they would be detrimental in goats as well.

![Figure 4](image)

**Figure 4.** Evaluation of sire pedigree from Figure 3.

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**References**


The proper citation for this article is: