



CANADIAN  
MEAT GOAT  
Association

CANADIENNE  
de la CHEVRE  
de BOUCHERIE

**Selective  
breeding  
is how  
you  
improve  
genetic  
quality.**

# Defining Breeding Goals

Improving the genetic quality of your goats can improve production, efficiency and profit. Selective breeding is how you improve genetic quality. You need to identify the traits that are important to your operation and your market – i.e., you need to define your breeding goals. Limit the selection of breeding goals to one or two traits – you cannot improve all traits in one season. Then, identify the goats which are superior for the traits defined.

The genetic makeup of an individual animal is called its genotype, but this is rather hard to know and to measure. What we can observe and measure is called the phenotype. An animal's phenotype is based on two things: its underlying genotype, and the environment it is kept in. For example, an animal may have all the genetic potential in the world (genotype), but if it is not fed properly (environment), then the actual rate of gain (phenotype) will be poor.

The overall environment affecting meat goat production includes a whole host of factors: feed, housing, weather, nutrition, bedding, health, etc. The production environment is typically the easiest area for a producer to control and improve.

Goats which are kept in a similar environment can be considered a contemporary or management

group. You can have two or more management groups which have common genetics (sire) – e.g., does which have kidded the first time compared to mature does which have previously kidded -- but that you would manage differently. In our example, you might keep the young does on a higher nutritional plane or in the barn – any environmental change. Comparison based on phenotype can be useful within management groups.

Some of these traits include milking ability, average daily gain, conception rate or prolificacy, ease of birthing, etc. While environment has a large effect on some traits such as fertility, it has no effect on others such as colour. The heritability of a given trait is the degree to which that trait is under genetic (as opposed to environmental) control. Heritability values range from 0 to 100% for various traits. Thus, if the heritability is high, the majority of the phenotypic differences between animals are due to differences in genotype and less subject to environmental factors. Average daily gain has a high heritability factor, and thus is a trait which can be most affected by genetic selection.

## KEEPING RECORDS

All animals do not have the same genetic value. The actual breeding value or genetic value of an animal cannot be measured directly, it must be estimated through evaluation of performance data. Accurate performance records are required for the evaluation and comparison of animals.



Individual performance records themselves have a limited value, but when all animals in a herd are recorded, the comparison of those herd records becomes a very valuable production tool. The more information a producer keeps the better – but only if kept on the entire population and only if it is kept current. I would caution a breeder who has not kept performance records in the past against deciding to record a multitude of factors; the task may some become overwhelming and be discontinued. Keep it simple and keep it up.

Assuming a breeding goal is to increase weight gain, you should record birth weights, weaning weights and post-weaning weights on contemporary groups. The comparison of these records will identify animals with superior genetic value. To improve the overall genetic merit of the herd for a given trait, only those goats with superior genotype should be selected as parents.

**BIRTH WEIGHT:** Birth weight is the earliest growth measurement for a kid and depends on age of doe, breed of sire and dam, sex of kid(s), number in litter, length of gestation, nutrition level of doe and other environmental factors plus genetics. Increases in birth weights for does kidding for the first time have resulted in dystocia. Kids which are heavier at birth are expected to be heavier at weaning provided all other management factors are positive. Due to the difficulties at kidding associated with larger kids, the emphasis should be for an optimum, not maximum, size. In our herd, we like to have does producing twins, with birth weights of 8 to 10 lb (3.5 to 4.5 kg) for doe kids and 9 to 11 lb (4.0 to 5.0 kg) for buck kids. In addition, we prefer litters in which the kids have less than 1 pound (0.5 kg) difference in body weight.

**WEANING WEIGHTS:** Weaning weight is one of the most important weight/size traits

affecting productivity. Like all traits, it is determined by two factors: the kids' genetic potential to grow or its own growth impetus and the maternal environment (milking ability). At least 50% of the variation in weaning weight is due to the milk production of the dam and the kid's ability to obtain its share of that milk. Weaning weight is 40-50% repeatable, suggesting that a doe which weans heavier kids one year will do it again next. Thus, culling does which produce kids with lower weaning weights will improve the breeding herd. However, an adjustment is required for age of doe, size of litter and age of kids at weaning before you make this selection. A host of environmental factors may influence weaning date, which subsequently need to be applied as an adjustment factor to weaning weights. Comparison without adjustment is limited to contemporary groups.

**POST-WEANING WEIGHTS:** This trait is usually taken 30 to 60 days post weaning and is a further measure of the kid's potential to grow or its own growth impetus. It is important that only contemporary groups with common environments be compared. Nutritional values in natural forage can vary substantially between spring and summer. Protein levels in the nutrition available will affect growth rates and size. As this is a critical period for growth, progress through selection of contemporary groups should be expected.

**PERFORMANCE WEIGHTS:** These weights will be an indication of each goat's ability to add to the overall value of the herd, throughout the year.

Genetic progress will enhance production. Identify your breeding goals, evaluate production by reviewing your production records, and select the goats which are superior for the traits defined.

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