



Enhancing Reproductive Performance in Small Ruminants

Part IV. Breed/Selection

Authored by Dahlia O'Brien, Professor, Virginia State University, and Small Ruminant Specialist, Virginia Cooperative Extension; and Stephan Wildeus, Professor, Small Ruminants, Agricultural Research Station, Virginia State University

This series of fact sheets has been designed to assist producers in enhancing reproductive performance in their herd so that overall production can be optimized to promote profitability. Fact sheet topics included in the Enhancing Reproductive Performance in Small Ruminant Series include:

Part I. Biology of Reproduction

Part II. Puberty and Estrous Cycles

Part III. Breeding and Management Systems

Part IV. Breed/Selection

Part V. Nutrition and Health

Part VI. Reproductive Management Techniques

Breed Selection

Breed selection can have an enormous influence on reproductive performance. The characteristics generally impacted most by breed are age to puberty and prolificacy (litter size), and seasonality. Sheep and goat breeds are diverse in their reproductive traits and so, to optimize reproductive efficiency, it is important to consider breed seriously before starting a flock or herd.

Maternal breeds of small ruminants should possess specific traits such as being fertile, prolific, have easy birthing and good mothering ability, good milk production, and the ability to breed out of season. In the U.S., the most popular breeds of meat goats include Boer, Spanish, and Kiko breeds (figure 1). Of these three breeds, research has indicated that Spanish and Kiko breeds are superior in all survival and reproductive traits measured under a semi-intensive pasture management system (Browning, Leite-Browning, and Byars 2011).



Figure 1. Kiko does and ewe walking in pasture. (Reprinted with permission from Susan Schoenian, 2013)



Figure 2. A group of Rambouillet ewes. (Reprinted with permission from Susan Schoenian, 2001)

Dorset, Rambouillet (figure 2), Polypay, and Finnsheep are examples of good ewe breeds of sheep with high reproductive efficiency, milking ability, and longevity. Hair sheep numbers, especially Katahdins, are on the rise in the U.S. for good reason: These breeds are meat

sheep that do not require shearing, are well adapted to most environments, possess excellent parasite resistance traits, and have great mothering ability (figure 3). Different breeds perform best under specific environmental conditions, and the decision on which breed to choose depends on your reason for raising sheep and goats and how well they perform in your environment and farm.



Figure 3. A group of Katahdin ewes. (Reprinted with permission from Susan Schoenian, 2007)

Sire breed selection is also important in optimizing reproductive traits. Good terminal sire breeds excel in traits such as growth and carcass yield. In the Browning et al. (2011) study, data indicated that Boer bucks excelled in these traits compared with Kiko and Spanish bucks. Boer sires used in this study generally produced heavier birth weights and carcasses with heavier muscling.

In sheep, terminal sire breeds commonly used include Suffolk, Hampshire, and Texel for their rapid growth and muscling. There is also some indication that Texel sires have parasite resistance traits, making them more desirable in the wake of increasing dewormer resistance on most farms (Whitley et al., 2007; Bowdridge et al. 2016).

Selecting Sheep and Meat Goats

When selecting individual sheep and goats for breeding, consider not only how the animal looks but also how it performs. Visual appraisal includes an evaluation of their frame/conformation, condition/health, age, teeth, mouth, feet and legs, and testicles and udders. All animals used in a breeding program should look healthy and have a good conformation and body condition, indicating adequate nutrition. Feet and legs should be set squarely under the corners of the body, and hooves

should not have any excessive or abnormal growths. However, even though visual appraisal is important, an evaluation of performance records gives more insight to past, current, and future productivity in the herd.

All attempts should be made to measure and record individual performance on-farm. These typically include breeding and lambing/kidding dates, birth weights, litter size, weaning weights, and number weaned. To do this, a record book, some form of animal identification, and access to a scale is required. Collecting and comparing this data helps to select the best performing animals on the farm. For instance, to retain and select females that are the best performers, select for litter weight of the dam (total pounds weaned/dam weight X 100). This puts emphasis directly on the dam's milking ability.

To select replacements based on weaning weights, the data should be adjusted to a common age, birth type, litter size, and age of dam. Doing so will help identify lambs that are genetically superior rather than those who simply have an environmental advantage such as being born earlier, as a single, or raised by a mature dam.

Feed efficiency and rate of gain can be assessed by having male offspring participate in performance tests. In addition to determining growth and carcass performance, many tests now include a method for determining parasite resistance as well. An advantage of performance testing is that males are compared to others from different flocks and therefore any observed differences during the trial will likely be due to genetic differences. Males that are selected this way have been shown to produce lambs that are heavier and bring greater profits compared with those not selected for increased efficiency and post-weaning gain.

In the U.S., the National Sheep Improvement Program (NSIP) provides what is known as an Expected Breeding Value (EBV) for sheep and some goat producers. An EBV is simply a science-based, industry-tested method of estimating the genetic value of an animal that will be passed down to future offspring. For example, if both parents of a kid had EBVs of +2 for weaning weight, this means that the kids will on average be 2 pounds heavier than the average for that breed.

Having any performance data makes animals more valuable and as such, they should command higher prices.

Acknowledgements

The authors would like to acknowledge Kwame Matthews (Delaware State University), Gabriel Pent (Virginia Tech), James Hilleary (Virginia Cooperative Extension) and Cynthia Martel (Virginia Cooperative Extension) for their time in reviewing all fact sheets in this series.

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Produced by Virginia Cooperative Extension, Virginia Tech, 2025

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VT/1025/APSC-160P (APSC-235P)