

High-Tech Sheep and Goat Breeding

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Last month, I wrote about performance-based genetic selection. This topic is a rather complex concept to understand. Lets expand some on this. Specifically, I'm talking about the National Sheep Improvement Program (NSIP) and estimated breeding values (EBVs).

If you have any experience with the beef industry, you probably have heard of EPDs (expected progeny differences). For sheep and goats, NSIP performs the same services as beef breed associations but NSIP produces EBVs. They are very similar to EPDs. Multiply an EPD times 2 to get an EBV.

EBVs are incredibly complex to calculate, but simple to use. They are calculated by measuring the difference in an animal's performance from the average of the animals it is raised with. Also, an animal's EBVs are influenced by the performance of its relatives and their correlated traits. And EBVs are corrected for factors that are not genetic, such as type of birth, age of lamb at weaning, age of dam, etc. In essence, this program finds animals that are above and below average and predicts how much above or below average the animals are compared to breed average.

NSIP is a program used by sheep and goat ranchers selling breeding animals to commercial ranchers. These breeders collect performance data on their animals for traits important to their customers. This data is used to calculate EBVs on their livestock. They then market breeding animals based on their EBVs. For instance, if Ram A has a weaning weight EBV of 10 (lb) and Ram B has a weaning weight EBV of 0 (lb). The offspring of Ram A would be 5 pounds heavier than the offspring of Ram B. To calculate this, measure the difference in EBVs between the two rams, then divide by 2 because an offspring only gets half the genetic potential from sire. **Note: most EBVs are in metric units.**

In the example above, if a ram sires 50 lambs annually for 3 years, 150 lambs that are 5 pound heavier at weaning would result in an additional 750 pounds of lamb sold. At current market prices (\$2.00/lb), this trait alone could generate \$1,500 of additional profit.

Below are a variety of traits that can be measured and EBVs calculated. Ranchers should identify the traits most importance to them and seek breeders with rams that excel in these traits. Personally, I buy rams that have high EBVs for reproduction and parasite resistance!

Growth Traits:

Birth Weight (Bwt) EBV (kg): Weight at birth.

Weaning Weight (Wwt) EBV (kg): Weight at weaning, ~60 days of age.

Maternal Weaning Weight (Mwwt) EBV (kg): Weight at weaning from milk production and maternal instinct.

Postweaning Weight (Pwwt) EBV (kg): Weight after weaning, ~120 days of age.

Yearling Weight (Ywt) EBV (kg): Yearling weight, ~365 days of age.

Reproduction:

Number of Lambs Born (NLB) EBV (%): Lambing rate or prolificacy

Number of Lambs Weaned (NLW) EBV (%): Weaning rate or lamb survival

Carcass Traits:

Loin Eye Muscle Depth (Pemd or Yemd) EBV (cm): Loin muscle depth at 6 or 12 months of age collected via ultrasound.

Fat Depth (Pfat or Yfat) EBV (cm): 12th/13th rib fat depth at 6 or 12 months of age collected via ultrasound.

Wool Traits:

Fleece Weight (Ygfw) EBV (%): Yearling greasy fleece weight.

Fiber Diameter (Yfd) EBV (um): Yearling wool fiber diameter.

Staple Length (Ysl) EBV (mm): Yearling wool staple length.

Parasite Resistance:

Fecal Egg Count (Wfec or Pfec) EBV (%): Fecal egg count at weaning or postweaning.

It takes time to understand this information. Don't get discouraged if you feel overwhelmed with data at first. It took me many years of being around EBVs to get a good handle on how they work. Also, I had to stop thinking that I could look at a ram and tell which was the best. Not to discredit visual appraisal, livestock should be structurally sound. But a ram must have good EBVs before I even give it a second glance.



Much more information about this topic is available at <http://nsip.org>. You can also find breeders that use this technology on the webpage. Unfortunately, there aren't many NSIP breeders in Texas. This was a major focus of at the Texas Sheep and Goat Expo (Aug. 18th/19th). There was ram sale specifically for performance-tested rams. Hopefully, it motivated the Texas sheep and goat industry to start using this technology.

If used properly, this technology could have an enormous impact on the genetic potential of our sheep and goats. Let me know if you have any interest in NSIP as a seedstock producer or commercial buyer. Texas A&M AgriLife Extension Service personnel are more than willing to help.

To provide feedback on this article or request topics for future articles, contact me at reid.redden@ag.tamu.edu or 325-653-4576.