

Targhee

NSIP Notebook

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David Notter
Department of Animal and Poultry Sciences
Virginia Tech

The 2008 Targhee Genetic Evaluation

Introduction

The US National Sheep Improvement Program (NSIP) is pleased to release results of the 2008 Targhee genetic evaluation. The delays associated with the 2007 NSIP software rewrite appear to largely be behind us now, and we are gradually returning to the schedule that was maintained in previous years. New listings of ewe Producing Abilities (discussed below) now add rankings of breeding ewes productivity to the genetic information provided by the EPDs, allowing prediction of future rates of lamb production by individual ewes.

The Data

Data for the 2007 lamb crop included records on 1,843 breeding ewes from 21 flocks: 14 from Montana, two each from South Dakota and Wisconsin, and one each from Michigan, Minnesota, and Oregon. Records were received for 2,841 live lambs produced by 73 Targhee rams. Following editing, valid records for 2007-born lambs were received for 956 60-day weaning and/or preweaning weights, 2,049 120-d weaning weights, 364 yearling gains, 663 yearling fleece weights, 312 fiber diameter (fleece grade) measurements, 528 staple lengths, and 1,741 litter sizes. Fleece records for lambs born before 2007 added an additional 547 fleece weights, 406 fleece grades, and 482 staple lengths.

Means for reported traits are shown in Table 1. Weaning and preweaning weights (both 60- and 120-day) were adjusted to a twin birth and rearing, adult dam, and ewe lamb basis. Yearling gains were not adjusted, but male and female lambs were placed in separate contemporary groups. Yearling fleece weights and staple lengths were adjusted to an age of 365 days. Fleece weights and staple lengths for older animals were adjusted to an adult animal and 365-day shearing interval basis. Fleece grades for yearlings did not receive any adjustments. Fleece grades for older animals were adjusted to an adult animal basis. For fleece traits, yearling and older animals, and males and females were placed in separate contemporary groups. Litter sizes were adjusted to an adult ewe basis.

The 2007 Targhee performance records were received at the Genetic Evaluation Center on June 2, 2008. EPDs (without prediction errors) were provided to breeders consigning animals to summer sales on July 9, 2008 and the full EPD list was returned on August 10. EPDs were calculated for a total of 54,193 animals, including 11,097 ewes with recorded litters and 971 sires. Many of these animals are no longer active, but their pedigree connections with currently active animals still contribute to current EPDs. Mean EPDs for each trait for 2007 Targhee lambs are shown in Table 2. As agreed upon last year, the genetic base (zero EPD point) for each trait was set equal to the mean of all lamb born in 1997, providing for a rolling genetic base reflecting the average genetic merit of the breed 10 years prior to the current year.

Table 1. Numbers of records and overall means for recorded traits in the Targhee database

Trait	Number of records	Mean
60-day weaning weight, lb	17,537	45.7
120-day weaning weight, lb	33,521	73.2
Yearling ADG, lb/d:		
Rams	4,876	0.38
Ewes	3,048	0.13
Yearling weight, lb:		
Rams	4,876	169
Ewes	3,048	103
Fleece weight, lb	17,401	8.7
Fiber diameter, microns	12,839	22.0
Staple length, inches	11,152	3.4
Litter size	28,629	1.80

Table 2. Mean EPDs for 2007 Targhee lambs

Trait	Mean EPD
120-day Weaning Weight, lb	0.71
120-day Maternal Milk, lb	0.04
120-day Milk plus Growth, lb	0.40
Yearling Weight, lb	1.35
Fleece Weight, lb	0.11
Fleece Grade/Fiber Diameter, microns	-0.02
Staple length, inches	0.03
Percent lamb crop	1.69

EPD Reports

This year's EPD report generally follows our standard format, but with the addition of Producing Abilities for ewe weaning weight and percent lamb crop. Animals are listed in the following order: breeding ewes, yearling ewes, breeding rams, and yearling rams. The listing should contain all breeding animals listed on the preprinted data entry spreadsheet, any breeding animals that were added to inventory, and all surviving lambs from the current lamb crop. Animals that were culled or died will be identified; EPDs will be provided for these animals, but they will not appear on next year's inventory.

Ewe Producing Abilities for Weaning Weight and Percent Lamb Crop

This year's genetic evaluation report also provides listings of ewe **producing abilities** for weaning weight and percent lamb crop. These producing abilities are calculated only for ewes that have weaned lambs (for weaning weight) or produced litters (for percent lamb crop). The producing ability of a ewe is an index of her expected future performance as a commercial ewe. This is in contrast to the EPDs, which predict the genetic merit of future offspring. The two measures are clearly related, but differ in subtle ways (discussed below) and clearly differ in the way they should be used.

Most of you are already familiar with the EPDs. The EPD measures the expected performance of offspring of an individual. It is derived from measurements on the animal itself, its relatives, and, particularly, its progeny. It is clearly the best indicator that we have of the genetic merit of the individual. All animals have EPDs. Those of baby lambs are based on the performance of their parents, and can be calculated at birth. The initial EPDs are then updated as the individual has offspring or as more records accumulated on other related sheep. Selection to improve the genetic merit of the flock should clearly be based on EPDs.

In contrast, the producing ability uses only previous records of individual ewes to predict their future performance. Records of relatives and progeny are not considered. The producing ability includes both genetic and nongenetic effects, and is thus less useful than the EPDs as a tool for genetic improvement. However, the producing abilities are quite useful as a culling tool to remove ewes with low predicted future performance or as a merchandising tool in selling adult ewes for breeding in commercial flocks (where current performance may be more important than progeny genetic merit). Only ewes that have produced lambs can have producing abilities calculated. Since the producing abilities include both across-flock information (the EPDs) and within-flock information (the nongenetic, within-flock effects), producing abilities should only be used for within-flock comparisons.

Producing abilities and EPDs are clearly related. This is most easily seen by comparing the EPDs and producing abilities for percent lamb crop. Producing abilities spread out more than EPDs. This happens for two reasons. First, the EPD represents only the sample one half of the animal's genes that are transmitted to its offspring, whereas the producing ability reflects the full genetic merit of the ewe. Second, the producing ability includes nongenetic, but repeatable, effects that may influence ewe performance but not be transmitted to her offspring. Thus we find that ewe producing abilities for percent lamb crop are often approximately twice the EPD, but are not exactly twice the EPD because of the additional influence of the nongenetic effects.

For weaning weight, the producing ability includes twice the maternal milk EPD, the weaning weight EPD, and nongenetic permanent effects on mothering ability. To understand some of the reasons why EPDs and producing abilities may differ, consider a ewe with high genetic merit for maternal milk, but that experiences mastitis as a ewe lamb, with associated permanent damage to her udder. Her genetic merit is unaffected by the disease, but she will never give as much milk as she otherwise would and the future weaning weights of her lambs will suffer. Thus her producing ability may not be very good; her lambs will not be very heavy because of the damage to her udder. But her genetic merit is unaffected and her daughters are still expected to milk well. In order to decide what to do with such a ewe, you will have to study your priorities. If sale of heavy commercial lambs is a priority, you will react to her low producing ability by culling her out of the flock. But if production of breeding stock with high genetic merit for milk production is a priority, you may choose to keep her around.

Means and 95% ranges for weaning weight and percent lamb crop for currently active Targhee ewes are shown in Table 3. The range is considerably larger than that for the EPDs because the producing abilities include both genetic and nongenetic differences.

Table 3. Means and 95% ranges for producing abilities for currently active Targhee ewes.

Trait	No. of ewes	Mean Producing Ability	Lower 95%	Upper 95%
120-d weaning weight, lb	1,928	0.7	-4.4	5.7
Percent lamb crop	2,419	2.2	-20.6	25.0

Just remember: EPDs are the best indicator of the expected genetic merit of future progeny and selection on EPDs will result in the most rapid genetic progress. Selection on producing abilities will assist in removing less productive ewes from the flock and in maximizing short-term (i.e., next year's) performance of the ewe flock but will not maximize long-term genetic improvement. Practical selection decision will consider both pieces of information, depending on your own production and breeding priorities.

The 2008 Targhee Sire Summary

The 2008 NSIP Targhee Sire Summary is also now available for distribution to breeders and other interested parties. In order to be eligible for the Sire Summary, a ram must have at least five progeny with weaning weight records or at least 10 daughters with litter size records. Rams listed in the Sire Summary must also have prediction errors that did not exceed 1.7 lb for weaning weight, 1.1 lb for maternal milk, 3.2 lb for yearling weight, 0.2 lb for fleece weight, 0.3 microns for fiber diameter, or 0.09 in for staple length. This year's sire summary listing contains EPDs for 118 rams that met the accuracy requirements and were born after January 1, 1999. This is a 19% increase over the number of rams listed in the 2007 sire summary.

Genetic Trends in the Targhee Breed

Numbers of lambs recorded by birth year since 1986 are shown in Figure 1, and patterns of change in EPDs since establishment of NSIP in 1986 are shown in Figure 2. These results document the traits that have received emphasis in participating Targhee flocks. Each point represents the average EPD of all animals born in each year since 1986. For 2008, the genetic base for reporting genetic trends has been set at 1997. All points in Figure 1 are thus expressed as deviation from the mean EPDs of all animals born in that year. In future years, all reported EPDs will be reported as deviation from the genetic base, and the genetic base will be updated to correspond to the mean of animals born 10 years prior to the current year.

Consistent and significant increases have been observed for weaning weight, yearling weight, and milk plus growth EPDs. Percent lamb crop has likewise trended upwards since 1998. Fiber diameter EPDs show a long-term downward trend, while EPDs for fleece weight and staple length have generally trended upward, demonstrating the power of EPDs to allow progress in all three of these traits, despite the antagonistic genetic relationship between fleece weight and fiber diameter. The observed patterns of change in EPDs are consistent with the primary role of the Targhee as a dual-purpose breed, attempting to make balanced improvement in a number of economically important traits.

Submitting Data for Next Year

There will be no major changes in submitting data for next year. Each NSIP Targhee breeder will receive a preprinted data entry spreadsheet for reporting data. All active animals from the flock, including breeding ewes, ewe lambs, breeding rams, and ram lambs should appear on that spreadsheet. Use of the preprinted spreadsheet to report data is mandatory. Errors in animal identification (birth dates, tags, registration numbers, parents) can be corrected as needed and newly registered animals can have their registration numbers added. Newly purchased animals can be added at the bottom of the spreadsheet with identification information and performance records.

Figure 1. Numbers of Targhee lambs recorded by year of birth.

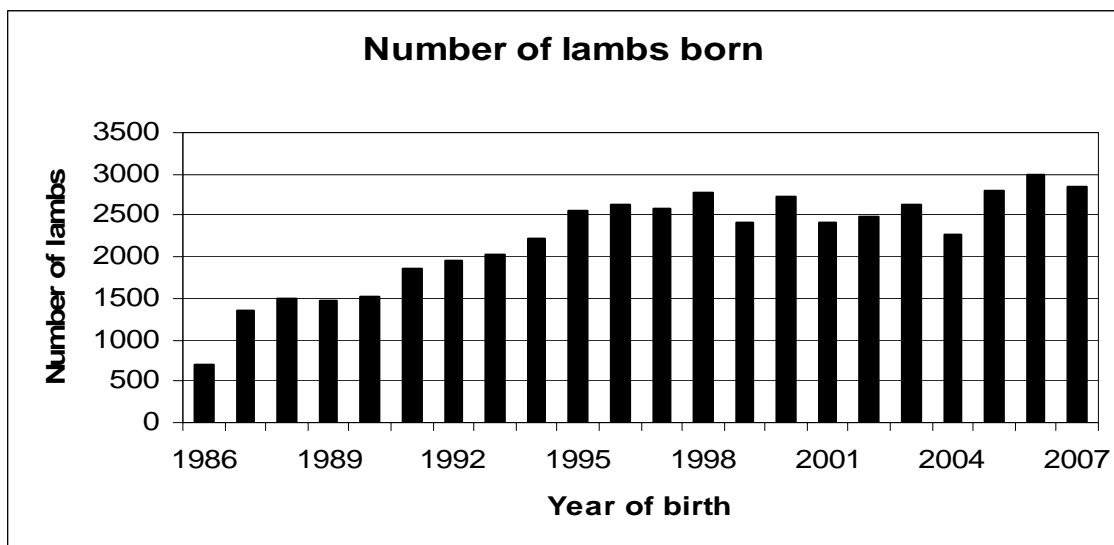


Figure 2. 2008 Targhee Genetic Trends

