Targhee
NSIP Notebook

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Genetic Analysis of Staple Length in Targhee Sheep

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Introduction

A genetic analysis of staple length in Targhee sheep has been completed. Results are available for distribution to NSIP Targhee breeders, as a supplement to the 2002 National Genetic Evaluation Report distributed on August 27, 2002. Adjustment factors and genetic parameters were derived from NSIP Targhee staple length records and used to derive EPDs for staple length for over 7,000 active Targhee animals.

The Targhee Staple Length Analysis

The Targhee NSIP database included staple length records for 7,357 animals. Of these, 6,269 were yearling staple length records and 1,088 were from older animals. Staple length records were available from 23 total flocks. Fourteen of the 15 flocks that were active in 2002 had contributed staple length data at some time in the past, and seven of these flocks contributed staple length data on lambs from the 2001 lamb crop.

Staple lengths in yearlings were adjusted to a shearing age of 365 days using the following regression equation:

Adjusted staple length = Actual staple length -.0091*(Shearing age - 365).

The estimate of the average daily increase in staple length around 1 year of age (.0091 inches/day) indicates that staple length is increasing slightly more rapidly at this time than the average increase in staple length from birth to first shearing. No other adjustments were made to yearling staple lengths.

In older animals, staple length was adjusted to a shearing interval of 365 days as:

Adjusted staple length = (Actual staple length) / (Actual shearing interval) X (365).

The increase in staple length in the older animals was found to be essentially constant during the year, as reflected in this formula. Staple length measurements in older animals were also adjusted for the age of the animal at shearing using the following multiplicative factors:

Ewe Age, yr	Adjustment factor
2	1.00
3	1.03
4-5	1.00
6-7	1.06
>7	1.14

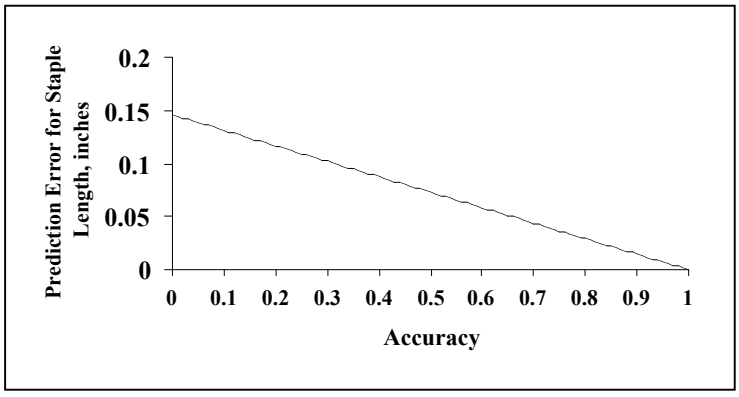
Somewhat surprisingly, these factors did not indicate a consistent increase in staple length with increasing ewe age. Two-year-old animals had longer staple, on average, than 3-year-olds, perhaps because most of the wool growth in 2-year-old ewes had occurred before their first lambing. The older (>7 years old) ewes also had a fairly large reduction in mean staple length. These adjustment factors may merit further study, but since most of the Targhee staple length records come from yearling animals, their impact on the final genetic evaluations should be minor.

The mean adjusted staple length in the Targhee data set was 3.35 inches. The heritability estimate for Targhee staple length was .42, consistent with most literature values for this trait. Corresponding estimates of heritability for other fleece traits are .40 for fleece weight and .50 for fiber diameter (fleece grade). Staple length is thus a relatively highly heritable trait, and relatively rapid genetic improvement should be possible. Genetic correlations between staple length and other Targhee performance traits were:

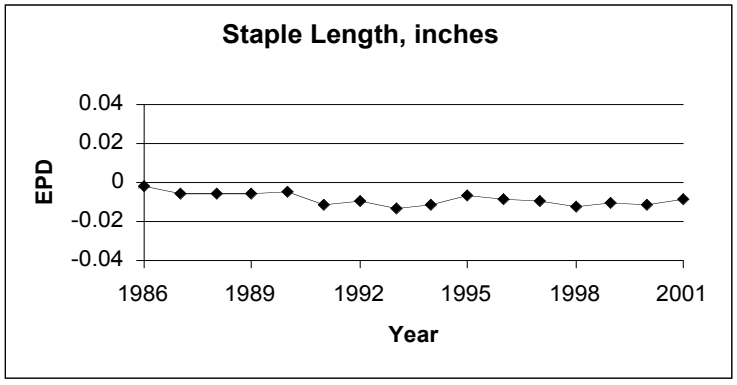
Trait	Genetic correlation with staple length
Weaning weight	.10
Yearling weigh	.30
Fleece weight	.44
Fiber diameter	.30

Staple length thus had only a weak association with weaning weight, but a somewhat larger genetic association with yearling weight. The genetic correlation with fleece weight was positive and modest in size. The genetic association with fiber diameter was also positive, which is undesirable, indicating that animals with longer staple also tended to have coarser fleeces. Staple length was assumed to be uncorrelated with maternal milk and percent lamb crop.

The relationship between accuracy and prediction error for Targhee staple length is shown below.



The genetic trend in Targhee staple length is shown below. There may be some tendency toward shorter staple lengths, but the absolute size of the cumulative change is very small, only about 0.01 inches since 1986.



This year's staple length EPD report is being provided as a supplement to the main EPD report, but were derived from a multiple-traits analysis including all the Targhee performance traits. In the future, staple length EPDs and prediction errors will be included in the main EPD listing.