Valuation of Residual Feed Intake as a Selection Tool for Northeastern Wyoming Range Sheep Producers

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One way for sheep producers to increase profitability is to lower costs associated with feed consumption of their flocks. To reduce feed consumption, producers may use feed efficiency as a selection tool when making replacement decisions for breeding stock. A practical tool for range sheep producers may be the selection of replacement ewes based on their residual feed intake (RFI) value. RFI is the difference between actual feed intake and feed intake predicted for maintenance and production by linear regression. Using enterprise budgets, we examine how increases in a flock’s feed efficiency impact a sheep producer’s profits over time. There has been previous research on sheep RFI and the economics of feed efficiency; however, most of the previous data collected and analyzed have been on males or on sheep fed a concentrate diet. Our study focuses on RFI for females fed a forage-based diet, which may be more realistic for Wyoming producers.

Objectives
The objective is to determine if selecting replacement ewes with a desirable RFI value is a profitable sheep production strategy for Wyoming range-flock producers.

Materials and Methods
We developed range sheep production enterprise budgets to assess the ranch-level economic impacts of selecting for feed-efficient replacement breeding ewes. Using these budgets, we examine how increases in the flock’s feed efficiency impacts a sheep producer’s profits over time.

In the model, we assume producers select for, and replace, ewes with low RFI values over a seven-year transition period. This strategy simply adds RFI as an additional selection criterion at normal herd replacement rates. Selecting for RFI may allow producers the option of either: 1) using feed sources longer and using less additional feed to maintain their flocks, or 2) choosing to stock additional ewes on current available feed.

Three different flock sizes are modeled to determine differences in potential profit from using RFI as a selection trait. Flock sizes are broken into large (1,500 bred ewes), medium (500 bred ewes), and small (250 bred ewes). The different flock sizes were analyzed to gauge if selecting for RFI is more profitable for producers with different numbers of breeding stock.

The profitability of using RFI as a selection tool is analyzed using a Monte Carlo simulation. The simulation randomly chooses (over 10,000 iterations) input prices (e.g., hay) and output prices (e.g., lamb, cull ewe, and cull ram [Figure 1]) based on historical datasets to capture a wide range of economic situations. By utilizing this approach, results are valid over a range of net returns, rather than on a simple average of historical prices.

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Results and Discussion

Preliminary results suggest a minor benefit to producers by using RFI as a selection tool when making female replacement decisions. The benefit is due mainly to reduced costs in feed expenses over time, as a flock’s total feed needs decline as more efficient ewes are introduced to the flock. The potential benefit is greater for producers with larger flocks.

Once results are finalized, the per-head benefit will be calculated for each flock size. The per-head benefit represents the producer’s maximum willingness to pay for a genetic test that could be used to identify low RFI ewes.

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