MOST FARMS HAVEN'T FULLY EVALUATED THE OPPORTUNITY COST of reducing shrink. Losses due to fermentation can be lessened by harvesting forage at the appropriate dry matter, avoiding extended fill situations and utilizing preservatives.

Recapture forage shrink dollars

For every 100 tons of feed you harvest, how much are you actually feeding?

by John Goeser

FIND the hidden profit margin. Opportunities are out there for your dairy, but they're not always readily apparent. Recently, dairy and beef producer margins have bounced around like a ping pong ball, ultimately trending below breakeven cost per hundredweight based on milk and commodity futures. Finding hidden margin opportunities will help a portion of dairy farms stay in the black.

GOESER

The author is the director of nutritional research and innovation with Rock River Lab Inc., Watertown, Wis., and adjunct assistant professor, dairy science department, University of Wisconsin-Madison.

Feed shrink has become a hot topic when discussing hidden margin opportunities, with producers looking to minimize on-farm shrink to less than 3 or 5 percent. Shrink from a truckload of protein or mineral mix is fairly easy to rationalize. Purchased feed is typically dry, reasonably consistent and weighed. If 48 tons are delivered, then the wind blows or rain washes feed away, and TMR management software logs that only 46 tons are fed out, shrink is measured at 2 tons, or about 4.2 percent. These 2 tons represent $300 to $2,000 in lost income, depending on the feed's value.

Homegrown feeds shrink, too

Beyond purchased feed, substantial shrink can occur with farmgrown feed and forages. A number of researchers have clearly portrayed the impact of forage shrink (also referred to as forage dry matter [DM] loss). Yet, we often ignore homegrown feed shrink because assessing losses is difficult and/or forage inventory is plentiful.

Borrowing measures from published research, forage shrink can add up to nearly 30 percent; meaning that 30 tons out of every 100 tons harvested just disappears. While this is the extreme, using average research values of 6 to 14 percent shrink, and $35 to $75 per ton value, shrink costs can range between $210 and $1,050 per 100 tons of forage harvested!

How it happens

Here's how 25 tons or more can disappear from field to feedout:

1. **Field and harvest losses** — feed grown but not ultimately delivered to the silo. These losses can amount to 1 or 2 tons per 100 tons harvested, and represent protein, fiber, starch and sugar losses.

2. **Fermentation (ensiling) losses** — feed delivered to the silo that disappears during ensiling and preservation. These losses can amass to over 25 tons per 100 tons harvested.

Fermentation shrink costs us high-quality sugar and carbohydrates. These losses must be replaced with sugar or starch in high-performing cattle diets. To put it into bushels, 3 percent shrink with a corn silage crop represents roughly one-half bushel corn grain lost per ton.

3. **Feedout losses** — feed deteriorated, or discarded, after the silo is opened. These losses can also be substantial, nearing 10 tons of loss for every 100 tons.

Estimating shrink in these areas is difficult. Simply measuring wet feed into and out of the bunk often doesn't work because losses occur on a dry matter basis. We have not yet been precise enough with scale weights and dry matter measures to accurately characterize hundreds to thousands of tons. Further, many dairies do not take the time and effort to truly assess refusals.

Lacking a concrete fermentation shrink estimate hasn't stopped the industry from striving to improve, however. Honing in on fermentation losses, forage and dairy consultants have used fermentation product measures to roughly benchmark dairy forage fermentation and margin opportunities. One can interpret pH, lactic and other fermentation acids, and ammonia-N (nitrogen) to gauge desirable (efficient) versus undesirable (inefficient) silage preservation. However, accurately discerning 2 percent from 6 or 8 percent fermentation shrink utilizing this approach can prove difficult.

Moving the precision needle

Understanding we need to aim for further precision, and assign real value to opportunity costs, I've recently collaborated with colleagues and published a research effort to assign more precise value to forage shrink. Our efforts found that crop type, dry matter and fermentation product measures, and preservative treatment could explain over 80 percent of fermentation dry matter loss. Results from this project are publicly available with an aim to advance the industry and lessen losses to fermentation.

Based on the research and predictive equation applied to real farm feed analyses, the table shows a summary of forage shrink predictions over the past several years. This data comes from thousands of commercial dairy forages across the U.S. In interpreting the table in terms of tons harvested but lost during preservation, on average, roughly 96 tons out of every 100 tons harvested are effectively preserved. More alarmingly, similar to the extreme research benchmark mentioned above, some dairies are feeding out less than 70 tons per 100 tons (a mere 70 percent of the original harvest)!

For every 100 tons harvested, how many tons is your dairy feeding out? Not many dairies or growers truly know the answer, but we will continue to better quantify as our research and tools in this area to foster precision. If fermentation shrink on your corn silage is greater than 3 percent, opportunities are evident for your business.

Practices such as using wide hay swaths have helped limit harvest losses by conserving more forage sugar, relative to prolonged drying and preservation. Fermentation shrink can be lessened with the following practices:

- Harvest within the appropriate dry matter range: 33 to 37 percent DM for corn silage and 40 to 50 percent DM for haylage crops.
- Avoid extended silo filling: Harvest and seal the silo in less than seven days, when possible.
- Utilize research-proven forage preservatives such as bacterial inoculants, acids or other oxygen scavenging compounds.
- Make great effort to exclude oxygen: Pack, pack, pack and aim for as-fed densities greater than 50 pounds per cubic foot. Keep oxygen out of the top layer with research proven plastic or other research backed oxygen limiting strategies.

Feedout losses at the silo can be reduced by intensely managing and aggressively feeding from the exposed silage surface, limiting oxygen exposure or reducing oxygen's negative impact. Lastly, feedout losses at the feedbunk can be limited by managing the TMR delivered and feeding to less than 4 or 5 percent TMR refusals.

There are dollars to capture by limiting shrink in all forages. Consider incorporating this new shrink estimate to uncover hidden margin opportunities related to forage and realize the potential to benefit your dairy's bottom line.

Feed losses to fermentation shrink vary widely*

Parameter	Forage shrink (as a percent of original forage DM)				
	Legume	Mixed forage	Grass	Corn silage	Small grain
Average	4.3	4.8	4.4	3.2	3.9
Median	3.0	3.4	3.0	2.4	3.1
Goal (less than)	2.2	2.7	1.8	1.5	2.1
Maximum	45.2	41.4	18.5	48.3	35.8

*Over 3,000 samples were summarized to yield these benchmarks