



Invest in your forage future



MUCH like your farm may invest in young stock, protecting and stimulating their growth and health status, your agriculture business should invest in protecting and maximizing returns from your forages. Investments to protect and preserve optimum nutritive value of freshly chopped and ensiled forages heading into the silo will pay off later when silage is fed out.



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Unfortunately, many silages only offer 75 to 85 percent of their initial value after ensiling. Even worse, some succumb to negative fermentation pathways and can contribute to substantial feed intake drops and/or animal health challenges. Research has clearly shown that forage protection can result in both improved dry matter recovery (ton for ton) and improved feed hygiene.

Yet, you've probably questioned the value derived from investing in crop preservatives and high-quality plastic covers and bags. This is especially true when there may not be enough money in the checkbook and you need to dip into a credit line to cover the cost of the products. There are two core areas to best protect your ensiled crop. Focus on physical and preservative protection. Consider investing in each area with the following discussion points in mind

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and then think of the investment on a per cow per day basis, like we do with feed ingredients.

A physical barrier

A close colleague of mine, Chris Wacek-Driver of Forage Innovations LLC in Bay City, Wis., once commented that we used to protect forage in silos with thick concrete walls, but now we often expect one or two 4- to 8-millimeter plastic sheets to offer the same barrier to oxygen, sun, and the environment. Wacek-Driver's point was that many consider the investment into proven oxygen barrier plastic and doubling up on plastic layers to be fruitless; however, we should think beyond the price tag when it comes to protection.

Brian Holmes, an emeritus professor in Biological Systems Engineering at the University of Wisconsin-Madison, taught that oxygen can work its way into 3 feet or more of well-packed forage (for example, the face) when the forage is exposed to air. The situation worsens with plastic damage along the top of bags, bunkers, or piles as the forage density is much less and air can penetrate more easily.

I've witnessed silage deterioration (to the point it shouldn't be fed) throughout an area that's easily 10 feet from the hole or tear. The situation appears even more grim with an infrared camera's view, where we can better see heating and crop deterioration with feed that appears to still be good to the naked eye. Here two layers can prove beneficial in either preventing an exposure event or limiting the air exposure by minimizing the rip or tear size.

Beyond physical damage, the naked eye also can't see microscopic pores in some lower cost plastics. These physical breaches allow small oxygen particles — invisible to the naked eye — through, much like a fish net keeps large fish in but permits minnows to escape. Lower cost plastics or a single layer of plastic do a good job of keeping rain (large water molecules) off the feed but might not protect against air. Researchers have recognized that both double layers and/or higher quality oxygen barrier covers substantially limit air penetration. This can actually be proved on-farm via an oxygen transmission test.

Returning to the conversation on affordability, the added investment in plastic cost can offer a substantial return on investment when the top 2 or 3 feet of a bunker or pile maintains 85 to 90 percent of its feed value (i.e. less dry matter losses) versus 25 to 50 percent or less feed value captured (through substantial dry matter losses and microbial growth) if air gets through.

Guard what you can't see

Much like yeast are necessary to make beer and wine from grains and fruits, fermenting bacteria are necessary to preserve the crop. Bacterial inoculants range from \$0.30 per ton upwards of \$3 per ton.

Often, I'm consulted as to whether or not bacterial inoculants make sense. Here again is a case where the impact is difficult to see or measure. There are many products available, claiming protection, yet far fewer that can offer valid and published research. Here it makes sense to do your homework, but the

investment return can be immense in both minimizing dry matter losses and maintaining clean feed.

Research-backed bacterial inoculants have shown both fermenting and feed cleanliness improvements over the raw crop. Make sure to ask for the best research the company has to offer to help your evaluation process. There is not a regulatory body that looks over bacterial-based products, so reputable and research-backed products are a must.

Bacterial-based inoculants can prove useful in a few different ways, but the primary mode of action is producing fermentation acids (lactic and acetic) from forage sugars. These acids then preserve the feed. You can alternatively opt to directly preserve your feed with acid-based or sodium benzoate products. There are a variety of food grade preservatives available, and in many cases feed preservation is dose dependent.

Follow research-backed products and their labels. Application costs vary depending on dosages. You can also work through the application math to determine what an effective amount may be using a bacterial fermentation as a measuring stick. During forage fermentation, bacteria commonly produce 3 to 8 percent acid (dry matter basis). With a ton of wet feed and 800 pounds of dry matter (assuming 40 percent dry matter), every 1 percent (dry matter basis) acid equates to 8 pounds per ton.

Does it pencil out?

Up to this point, I've discussed mechanisms to consider in protecting forage. Now, let's briefly consider the investment into your bottom-line in cents per cow, to compare against other nutrition strategies.

For this summary, I've assumed a well-packed bunker silo with plastic along the sidewalls. Further, I've used \$1 per ton and 10 cents per square foot for research-backed preservative and double layer, oxygen barrier plastic protection, respectively. This seems like a sizable investment, but on a per cow per day basis, this equates to only 5 cents per cow per day for every 30 pounds forage dry matter in the cow's diet.

As nutritionists, we'll typically look for and discuss decisions relating to at least 10 cents per cow or more — forage protection is nowhere near that cost. Aside from vitamins, minerals, and a couple additives, there may be no better nutritional investment than forage protection.

Consult with your forage and nutrition advisory team, calculate your forage investment costs per cow per day, and then discuss what returns you could recognize from the investment. 🐮