by John Goeser

Silage quality doesn't play out like a textbook

COMING out of graduate school over a decade ago, I had sound academic training from the University of Wisconsin-Madison. The university instruction in agronomy, plant breeding and genetics, and animal science and nutrition provided a basic understanding of how seed genetics and agronomic and crop management practices can impact forage quality.

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But I quickly learned the added letters behind my name meant little, and in reality, I still had much to yet learn. I recognized an experience gap. I needed a few years of experience in the fields and agriculture industry to begin having an impact, starting with building trust and relationships with those I was seeking to help.

I'm sure many of you can empathize with this story of personal growth. As the days, months, and years have passed, farming and agribusiness experience continues shaping my views and recommendations in animal nutrition and dairy farming.

This year proved no different, where in June and July, Mother Nature was seemingly setting up to produce poor quality corn silage. I made this observation based upon prior experience and stated as much in webinars and conversations. However, as the season unfolded and silage quality was reviewed in hindsight, we found quality contrasted expectations.

Ultimately, the quality was much better than we had anticipated. This was a great outcome; however, I was left wondering what we really know about the interaction between growing conditions and forage quality.

Growing conditions matter

Cornell University's Joe Lawrence, University of Wisconsin's Joe Lauer, and others skilled in agronomy and forage have shown that growing conditions will impact forage quality. The impact can be profound.

For example, when working with a dairy in western New York, we recognized that brown midrib (BMR) mutant corn silage grown in the prior season was feeding like the conventional corn silage grown in the current year's season. The BMR mutation is known to substantially reduce lignin content in the corn plant, equating to above average fiber digestibility. Hence, BMR silage fiber digestibility is usually exceptional.

However, in this situation, Mother Nature muted the BMR genetic impact. This forage quality example was due to the interaction between growing conditions and plant physiology and growth. The phenomena is real, and heading into this year we generally thought that a growing season with adequate moisture, coupled with exceptional heat units and growing degree days, equated to below average forage fiber quality.

History flipped on its head

This past year's growing season and quality experience was like driving down the highway with a stack of organized papers and then opening the truck windows only to watch the papers fly out the window.

Consider these papers a representation of our prior views about the growing environment and seed genetics interaction. Forage seed genetics' interaction with the environment can be positive or negative. Drought and water stress are known to affect forage quality, with fiber digestibility improving dramatically during severe drought conditions.

On the other end of the spectrum, as noted previously, adequate rain coupled with heat has historically equated to lower silage fiber quality. Yet, that outcome did not materialize this past season. Hence, I went to the literature recently to try and better understand environmental and agronomic impact factors ahead of giving a talk for the 2020 Penn State Dairy Cattle Nutrition Workshop about seed genetic impact on silage quality.

Unfortunately, I didn't uncover much, finding some field studies evaluating irrigation and moisture and a number of other references evaluating soil fertility in agronomy and crop journals. My colleague Antonio Gallo and collaborators studied irrigation level impact on forage quality with a couple of studies in Italy. Their observations suggested little, or even a negative effect, attributed to restricted irrigation and contrasted with our understanding of how drought affects quality. Studies investigating soil fertility impact on quality were more rare and fairly inconclusive.

According to Lauer's research, plant population is recognized to negatively affect quality, with a linear reduction noted and plant populations in excess of 40,000 per acre correlating to lesser fiber digestibility. Back to the original point . . . when reflecting back this year, I recognize we have much yet to learn about the agronomic and environmental impact on forage quality.

While some may argue that much is beyond our control with silage quality, there are still many key decisions we can make to influence quality. Soil fertility and crop protection inputs, harvest timing, cutting height, kernel processing, optimizing fermentation with a research-backed inoculant, pack density, and covering or sealing are all under our control . . . along with seed choice. These factors affect silage quality.

Understanding that a typical dairy invests around $50,000 per year in silage for every 100 cows milked, your dairy and advisers may opt to step up efforts in selecting seed and these management decisions. Regardless of growing conditions, exceptional seed genetics and hybrids will tend to outperform their peers within the season. Lauer has taught that hybrid repeatability is often in excess of 90%, meaning that 90% of the time a high-quality hybrid will rank as top-performing in plots grown in different regions or years.

We still know this — growing conditions have an immense impact, and the outcome may be difficult to project. However, take comfort in knowing your dairy can influence quality compared with others in your area. Carry the conversation with your agronomist and advisory team this off-season to put your agribusiness in a stronger competitive position next year.

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