Don’t let fungal disease rob your forage quality

Katie Raver for *Progressive Forage*

AT A GLANCE

Forage is a key component of all rations, and maximizing tons and quality of forage will arm dairies with more tools to withstand low milk prices.

When milk prices are low and purchased feed costs are high, maximizing the quality and availability of farm-grown feeds is critical. Fungal disease, which can impact yield, quality and, in some cases, produce mycotoxins, is one major threat to such forages. Although the industry has been studying fungal diseases and their impact on feed for decades, it still fascinates me how much we continue to learn on the topic. As technology advances, we can gain a deeper understanding of disease impacts and explore further avenues for fungal disease prevention and mycotoxin presence in our fields and feed.

When considering the risk of fungal infections in crops, mycotoxins often take center stage, as they can have major impacts on cattle health, productivity and well-being. Aflatoxin contamination in feed can lead to milk dumping, resulting in further losses.

While the risks of mycotoxins and the species that produce them have been well defined, we are still learning about their origin in the field, as well as their fate in the bunker. Fusarium, which has long been thought of as an ear rot, has now been identified as a stalk rot.

Additionally, these two infections can exist independently of each other but can both contribute to deoxynivalenol (DON) contamination of feed. It has been suggested for many years that visual evidence of fungal infection alone may not be sufficient to determine mycotoxin risk, and the aforementioned study is another credence to this statement.

It is important to remember that fungal diseases that aren’t associated with mycotoxin production can still have a major economic impact on a dairy operation. Tar spot is a relative newcomer to the fungal disease scene; however, the effects of this pathogen can be devastating. Advanced infections can affect yield and can also cause increases in dry matter (DM), decreases in sugar and decreases in digestibility – adding up to a difficult fermentation situation.

Even though the effects of tar spot can be intimidating, fungicide application between tassel and milk stage has proved to be effective in controlling this fungal disease. Tar spot has been identified in Wisconsin, Illinois, Indiana, Pennsylvania, Ohio, Iowa, Mississippi, Missouri, Florida, Minnesota and Nebraska, as well as parts of Canada. Researchers from the University of Wisconsin have suggested that this pathogen favors cooler temperatures coupled with high humidity. Other diseases, such as southern rust, have also been shown to decrease fiber digestibility in corn silage. Northern leaf blight can decrease plant moisture levels and have an increased risk of lodging – decreasing potential yields and challenging ensiling.

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Controlling both toxin-producing and nontoxin-producing fungal pathogens in crops begins in the field. Hybrid selection for disease and insect resistance can help decrease the risk of pathogen infection. Fungicides can also be a valuable tool to prevent and stop the progression of fungal pathogens. The Integrated Pest and Crop Management program at the University of Wisconsin – Madison has developed and released an application to help producers determine the risk of tar spot in a particular location. However, even though technology can help us understand the risk, scouting fields is still essential to assessing risk and understanding which pathogens may be present and when to treat. Once a fungal pathogen is found, fungicides

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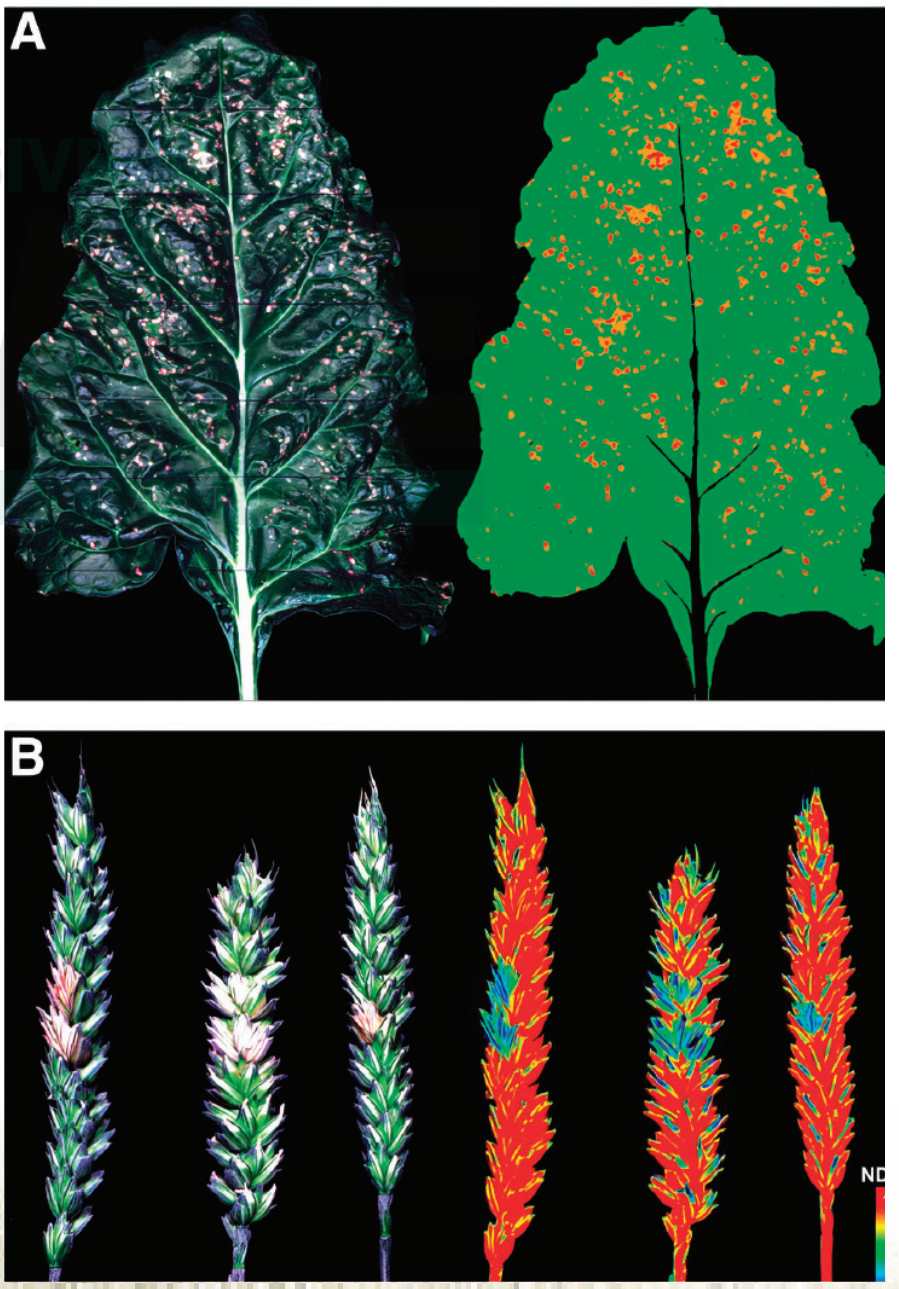
are an effective tool for controlling diseases with proper selection and application timing.

As we look to the future, there are sure to be more developments in management and monitoring mycotoxins in the field. Unmanned aerial vehicles (UAVs) are already being used for crop scouting for certain diseases and pests in some fruit crops. These UAVs use spectral imaging to show areas of the plant exhibiting signs of damage (**Figure 1**). This helps decrease the time, labor and cost associated with scouting. Early research has been done evaluating the use of this technology for scouting fungal disease in corn crops, and results have been promising. One recent study found moderate to high correlations between actual and estimated disease severity of tar spot in corn.

Mycotoxin research hasn't stopped in the field, as more studies are aiming to understand the dynamics of mycotoxin production in ensiled feed. Recently, quantifying the changes in mycotoxin levels after ensiling has been the focus. While the fungal species that produce mycotoxins are often classified into pre- or post-harvest groups, depending on when mycotoxins are produced, the fate of mycotoxins after ensiling remains relatively blurry. While many studies have suggested that mycotoxin levels can increase in poorly managed silages, the degree of this increase varies across types of mycotoxins. Recent work has demonstrated that DON levels may actually rise during the ensiling phase; however, the exact reason why these levels rise in ensiling is yet to be determined. As mycotoxins remain a prevalent issue in animal feeding operations, more research is needed to understand the dynamic nature of these compounds in the ensiling phase.

I tend to be a bit biased toward mycotoxin and fungal research, as this comprised a large portion of my time during my graduate studies, but I find it interesting how much we are still learning about such a well-known topic. I'm certain that technology will help us further understand these fungal diseases and the extent to which they impact forage and cereal crops. One thing we know quite well is that forage is a key component of all rations, and maximizing tons and quality of forage will arm dairies with more tools to withstand low milk prices.

FIGURE 1 Example of how hyper spectral imaging can show fungal disease in different plant species



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