



The lowdown on dirty feed

WHEN thinking about feed contaminants, many think of hardware, dirt, or something more recognizable within the feed by the naked eye. Yet, the dairy industry is more clearly understanding contamination on a microbial level, that which can only be viewed with a microscope's help.



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Disease outbreaks within the barn or the field can impact one another and can have a lasting effect on the farm's ecosystem. As the industry better understands contamination from the field to the barn, agronomists, nutritionists, and veterinarians are better collaborating for the dairy's benefit.

Feed, grain, and total mixed ration (TMR) hygiene, or feed cleanliness, has hence become a common topic.

So-called dirty feed, as discussed in this first article of a three-part series, results from pathogen infestation. Pathogens as discussed here can be fungal or bacterial, with both yeast and mold being fungi. *Clostridium*, *Salmonella* spp., *Listeria*, and *E. coli* spp. are all examples of infecting bacteria. It is important to differentiate between fungi and bacteria and recognize that both can be good and bad. Harmful pathogenic species will directly affect animals and may also produce toxic compounds (i.e., mycotoxins).

Often healthy dairy cattle will fight off pathogens thanks to the rumen and a capable immune system. Yet, when the pathogenic load grows or the condition becomes favorable for growth, performance and health may start to lag.

Production and health can take a further negative turn when immune suppression occurs. Under circumstances of immunosuppression (where feed mycotoxins are present, during stress or transition), fungal and bacterial pathogens can take hold, resulting in abortions or reproductive challenges, digestive upsets, or even death.

Bacteria or fungi in the field?

When health and performance are compromised at any level, your farm needs to investigate the pathogen sources and then determine where the pathogen originated. Do not stop at the silo, as many feed pathogens can be traced back to the soil and field. Ensure your agronomist is part of the feed hygiene conversation and begin proactive planning with crop scouting and manure

management to harvest cleaner feed in the future.

Stalk and ear rots are fungal diseases understood to cause challenges and lead to mycotoxins in feed. Often these diseases are not considered until harvest, but Damon Smith, plant pathologist with the University of Wisconsin-Madison, has shown that diseases can be identified well before harvest.

There are several different types of rots, including *Aspergillus*, *Fusarium*, *Gibberella*, and *Diplodia* ear rots according to the Crop Protection Network.

Work with your agronomist and crop advisers to identify these fungal pathogens well before harvest. If specific mycotoxins are found in the prior year's feed, trace the toxin back to the appropriate rot. Then, manage fields according to past infections. Some hybrids offer improved stalk and ear rot resistance.

Here are a few valuable quick informational points:

- **Aspergillus rot** (olive-green, powdery) favors hot, arid growing conditions and can produce aflatoxin, a potent carcinogen. This mold survives in both the soil and on crop residue and can be spread by insects and wind.
- **Fusarium rot** (white-purple, cotton-like) can break during a wider range of growing conditions and produce mycotoxins (fumonisins). *Fusarium* molds survive on the crop residue between growing seasons and infect the plant by wind or root infestation. It's more prevalent in damaged and stressed crops. The mycotoxins may concentrate with warm, wet conditions during harvest.
- **Gibberella rot** (red-pink) is more common in the northern U.S. and Canada. This rot can produce deoxynivalenol and zearalenone mycotoxins. The mold inoculum survives on corn and small grain residues and can also be found on soybean roots.
- **Diplodia ear rot** (dense white mold at ear base, eventually becomes gray-brown) is also common but does not produce known mycotoxin compounds in the U.S. and Canada. *Diplodia* overwinters on the corn residue and soil. When infections are present, the mold robs the feed of starch, reducing the energy content.

Manage the soil and field for optimum plant health, and consult with your agronomic advisers as to whether or not a fungicide makes sense for your farm. Nutritionists and agronomists are only starting to recognize potential fungicide impact for feed cleanliness and are not yet making broad recommendations. Access the Crop Protection Network for additional management

information (<http://cropprotection-network.org/corn/>).

Beyond fungal and mycotoxin contamination, we also need to recognize pathogenic bacteria that ties back to the field. Many of these may actually start with the cow! Potent pathogenic enterobacteria, such as *Clostridium* spp., *Salmonella* spp., *Listeria* spp., or *E. coli* spp., can be harbored and shed by animals.

Slurry contaminates

After shedding, these potentially toxic bacteria survive in manure, separated solids, or grey water and then subsist in the soil and growing environment when spread back on the field.

Salmonella spp., for example, can survive for five years in the environment (soil, water, or moist areas away from direct sunlight), and *Salmonella* Dublin, a potent pathogen, can survive for a year in dry manure. In 2003, researchers at the University of Wisconsin-Madison, McGuirk and Peek, also pointed out that bacteria infested irrigation water can contaminate forages and water sources by inoculating the crop as it grows and matures.

Consult with your veterinarian, nutritionist, and agronomist if you suspect bacterial challenges are field-borne. Recent experience with several large dairies that irrigated with grey water confirmed substantial field-borne bacterial challenges. Consider checking for aerobic or *Clostridium* bacterial counts on green or fresh forages during harvest. Do not spread manure or contaminated water on a live, growing crop.

Enterobacteria counts should be reduced by aggressive fermentation, but greater counts from the field, coupled with less than ideal fermentation, can lead to feedout challenges. Bacterial impact on health and performance can be difficult to understand, but both *Clostridium* spp. and *E. coli* spp. have been implicated in hemorrhagic bowel syndrome in dairy cattle. Generally speaking, enterobacteria are undesirable in feed.

Understanding and managing microscopic microbial contamination may be the next area our industry focuses on in order to gain an additional 5 pounds of milk per cow. Build the terms feed hygiene or cleanliness into your vocabulary. Bring your entire advisory team, from those in the field to those working cowside, into the discussion and manage for cleaner feeds and a high-performing TMR. 🐄

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