AGRONOMIC ALERT
Technology Development by MONSANTO

GRAIN STORAGE CONCERNS

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The conditions that the 2009 crop was exposed to may predispose it to grain storage issues. Checking bins regularly will be critical to help minimize losses.

Several farming operations are managing grain with low test weight and high moisture. Some are also managing concerns related to corn ear rots. These conditions can result in grain that may be more susceptible to storage rots, hot spots, and spoilage. Understanding management options and precautionary actions can help protect grain after harvest.

Why Grain May Be at Increased Risk for Storage Issues

- Frost and freeze damage can cause premature plant death affecting grain moisture and test weight.
- Harvesting fields containing a mixture of plants, or areas of the field, that have either died prematurely or matured normally often results in variability of grain moisture for storage.
- Pockets of wet grain in bins encourage storage molds.
- Grain with test weight of 54 pounds per bushel or less may be more susceptible to storage molds. Test weight increases by 1 pound per bushel for every 4 points of moisture drydown. However, corn that dies prematurely usually does not increase in test weight.
- Ear rots can encourage growth of storage molds.

Storage Molds. Grain stored in bins from 12.5% to more than 20% moisture can develop mold damage. The most significant mold damage occurs at 18 to 20% moisture. Storage molds produce heat and moisture, which accelerates spoilage, insect reproduction, and insect feeding. Generally, higher temperatures and moistures accelerate spoilage.

Mold and Mycotoxin Concerns for Feed Value. Under some conditions, moldy corn may result in lower nutritional values and palatability for feed. Some storage molds produce mycotoxins, which can lead to decreased productivity and reproductive issues in livestock and possibly be harmful to humans. Not all molds produce mycotoxins. Under some conditions, mycotoxins may be present even in the absence of visual symptoms of storage molds. Testing is available for feed to evaluate the nutritional value and presence of mycotoxins. Addresses of labs are listed at the end of this publication. Additional resources are available with information on how to interpret the test results as well as treat livestock that may have consumed feed with mold or mycotoxins. One such publication is "Mold and Mycotoxin Feeding Problems in Livestock Feeding" by Richard S. Adams and others, and published by Penn State University. To help ensure accurate results, make sure to communicate with the lab and find out the best way to take, store and ship samples for the tests that you would like to have done.

Identifying Storage Concerns. Multiple moisture samples should be taken when filling bins and during grain storage. Use the highest value to make management decisions to reduce the risk for storage molds, hot spots, and spoilage. Averaging sample values may not adequately address pockets of grain with higher moisture content.

Signs of storage molds include crusting, embryo discoloration, grain hot spots, and moisture condensation on the top of the bin. Generally crusting occurs at the top center of bins due to moisture and air movement.

Management Options.

1) Grain with low test weight and/or ear rot damage is more susceptible to storage rots. It should be sold soon after harvest or monitored carefully.
2) Natural air drying and low temperature drying is not recommended for corn above 21% moisture. Keeping the grain depth in the bin to 20 feet or less can help maintain good airflow. To help minimize the amount of moisture coming into the bin, consider turning the fans off when it is foggy or during extended rainy or snowy periods.
3) Consider pros and cons of high temperature drying. Drying corn at 200ºF is more efficient in terms of dryer capacity and energy consumption. It takes approximately

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20% less energy to remove a pound of water drying at 200ºF compared to 150ºF. However, due to the increased time it takes to dry high moisture corn, some of the risks of drying using higher temperatures include increased kernel breakage and browning, and lower final test weights.

4) To help optimize drying potential of high temperature driers and minimize the risk for stress cracks in grain, consider cooling grain in the bin versus in the dryer. Cooling grain to 90ºF in the drier (before moving it to the bin where the grain can cool to 20ºF) can help minimize condensation complications.
5) Bins should be assigned based on expected storage time and grain quality at harvest. Bins should be cleaned and checked for leaks and insects before filling.
6) Grain moistures should be 12 to 13% for storage.
7) Aeration should be used to move small amounts of air through grain. Grain that is more susceptible to storage problems should be stored with good aeration of 2 cubic feet per minute (cfm) per bushel or more. Storing wet grain without aeration for 1 to 2 days before drying can decrease storage life by 2 to 3 months.
8) Stirring the grain may help maintain uniform temperature and help prevent the development of wet spots due to moisture migration.
9) Bins should be sampled frequently to find potential hot spots.
10) If hot spots or crusts are found, rotten corn should be removed. The moisture content of remaining grain should be checked. The remaining grain should also be turned and mixed to redistribute moisture and allow heat to escape.
11) Please remember to be safe when monitoring and managing stored grain in bins.

Sources: Storage Rots of Corn. 1992. Univ. of Illinois. RPD 206.

Storage and Handling Recommendations for Flood Damaged Grain. 2007. Iowa Ag Connection.

K. Hellevang. 2009. 2009 Post Harvest Tips for Later Maturing Corn. NDSU Ext.

Adams. Richard S. et. al. Mold and Mycotoxin Feeding Problems in Livestock Feeding. Penn State University Ext.

Laboratories for Nutritional and Mycotoxin Testing for Livestock Feed

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