Storing Corn from the Fall 2009 Harvest

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The wet conditions that created challenges for farmers during the fall harvest have also increased the potential for problems with storing the fall 2009 corn crop. Higher moistures mean there was more physical damage to many of the kernels during shelling along with more fine material. Both these factors increase susceptibility to invasion by storage mold and insects. Corn also had to be dried more aggressively to remove the extra moisture. That further increased the susceptibility of the corn to breakage and to storage mold while increasing the potential for wet pockets of corn in the bins. Higher levels of ear rot damage also make corn more susceptible to invasion by other storage molds and contribute to above normal percentages of fine material. The "bottom line" is that this year's corn crop will be more difficult to store and it should be monitored more closely. There are several steps that farmers can take to reduce the risk of mold growth during storage or to detect mold growth early so that losses can be minimized.

Moisture Monitoring and Drying: The moisture content of the corn in storage should be checked to ensure that it is being stored at the proper moisture. There are several reasons why the moisture may be higher than expected. When 5 to 10 points of moisture are removed during high temperature drying, the moisture distribution within kernels is uneven. Immediately after drying moisture meters can read as much as 2 points below the actual moisture, which can be determined more accurately after waiting at least 24 hours for the moisture to be distributed evenly throughout the kernels. Other conditions may have developed that caused condensation of moisture on the grain surface. Or there may have been condensation on the bin roof that dripped down onto the grain surface. Now that ambient temperatures are increasing, corn that is above 15% moisture should be marketed or dried as soon as possible. When stored beyond late April, corn should be dried to 14.5% or below. Storing corn 0.5 to 1.0 percentage points below these levels will further reduce the potential for fungal growth.

Monitoring and Temperature Control: Mold growth produces heat which in turn increases grain temperature. Therefore, the temperature of stored grain should be checked once every two weeks during the winter and once each week starting in early March. For bins without temperature cables, a temperature probe can be purchased that can be pushed into the grain to a depth of several feet. Or a metal rod can be inserted into the grain and allowed to equilibrate for several hours. If the rod was in contact with grain in which there was significant microbial activity, it will feel warm when it is removed. The rod should be inserted many places in the bin because grain is a good insulator and grain several feet from a hot spot may still be cool. Greater attention should be given to regions of the bin where fine material tends to collect such as the center beneath the spout line. The corn should have been aerated during the fall and early winter to reduce its temperature to between 30 and 40ºF. Many farmers hold their corn at this temperature unless it will be stored into mid-summer. Condensation can develop on cold grain in contact with warm humid air. Therefore it should be monitored for mold growth by regularly checking grain temperatures until the grain is utilized or sold. Corn being held for long term storage can be aerated to increase its temperature to 50ºF. One note of caution: if cold grain is aerated with warm, humid air moisture may condense at the point where ambient air first enters the corn (at the bottom of the bin when positive pressure aeration systems are used).

Fine Material Management: Fine material inhibits the movement of airflow during aeration allowing hot spots to develop within the grain mass. If mycotoxins are present in the corn, fines will often contain higher levels of these toxins. One reason for this is that the mold damaged kernels tend to break up more during harvesting and handling. Therefore removal of fine material prior to binning will reduce the threat of grain spoilage. Fine material collects beneath spout lines and is usually higher near the center of the bin, even when a centrifugal grain spreader is used to fill the bin. For this reason it is good practice to "core" each and every bin by opening the center well above the unloading auger and removing one or more loads of corn. This is even more important if there is a "peak" at the top of the bin. This peak will interfere with aeration and compound problems caused by concentrations of fine material, which are usually found beneath that peak. Coring will also give the farmer an opportunity to examine the quality of corn in the bin and detect deterioration if it is developing. When corn is removed from the bin it should always be removed from the center first because uneven distribution of corn during loading can cause the bin to shift or even to buckle.

Additional information on managing and monitoring stored corn can be found at Purdue's Grain Quality website www.grainquality.org. Publications that discuss grain storage practices include AE-90 Managing Grain for Year-Round Storage and AED-20 Managing Dry Grain in Storage.