

Check Stored Corn for Potential Problems – Spring 2012

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For many Midwest farmers, the mild weather this past winter was a welcomed change from the normal. It has led to lower heating bills for homes and shops, and favorable road conditions for hauling last year's crop to market. However, the lack of extended periods of freezing temperatures also created some unique storage challenges. One such challenge was finding enough cold days to adequately cool grain stored at moistures above 15% to prevent mold growth.

In recent weeks there have been reports surfacing about producers finding spoiled grain in their bins or higher than normal percentages of heat damaged kernels in corn they are selling. When storing corn over the winter, it is best to cool grain to near freezing temperatures and maintain the cold temperatures as long as possible into the spring. Corn that will be stored into summer months should be at 45 to 50°F in June as air temperatures climb higher. Depending on bin and fan sizes, a cooling front may move through a bin in a matter of days while in other situations it may take several weeks. For example it may take up to 200 hours for a cooling front to move through the bin if airflow is 0.1 cfm/bu and up to 80 hours if airflow is 0.25 cfm/bu. If corn is above 15.0% moisture, it would be best to market it soon or dry it below 15% as soon as possible. At the very least you should inspect the stored corn frequently. The higher the moisture, the less time before there is significant mold growth.

If a bin has not been properly cored and leveled it will be difficult to evenly cool the grain mass. Coring is a process of removing one or more truckloads of grain from a bin after it is filled. Coring a bin removes the accumulation of fine material that often builds up in the center (core) of the bin during the filling process. Even with state of the art grain spreaders, fines can accumulate in the core and must be removed. In a grain bin, air finds the path of least resistance. A buildup of fines fills the air pockets between kernels and increases air flow resistance. Some studies indicate that if a bin has 3% fine material the airflow in that region of the grain mass would be reduced by 40%. This simply means that if the core of a bin that has 3% fine material it will take longer (40% or more) to cool the core than the rest of the bin. After coring is completed, the top of the grain mass should be leveled. The airflow resistance will be greater wherever the grain depth is greater and this will make it more difficult to get air to that portion of the grain mass.

You need to inspect your stored corn, searching for signs of mold growth. You should be checking your bins weekly as the outside air temperature increases. Prior to entering the bin turn the fan on and let it run for 5 to 10 minutes. This should push musty odors, which are indicative of mold growth, to the headspace of the bin. Be sure to lock-out and tag-out unloading equipment before entering the bin and let someone know you will be in the bin or, even better, ask them to accompany you and stand outside the bin while you enter. Once inside the bin, smell for mold and walk the surface of the bin looking for crusted grain. Regardless of what you see and smell, use a metal rod to probe the grain and search for hard spots. Be sure to check the core and edges of the bin where fines tend to accumulate. Even if the bin is equipped with temperature cables it is still important to physically check the bin. Grain is a very good insulator and temperature cables are only effective in detecting temperature increases within 2ft in any direction of the cable. This means a hot spot can grow to a large size before it is detected. You can also purchase a temperature probe and track and record grain temperatures at various locations in the bin so you can detect increases in temperature not caused by aeration. A less sophisticated approach is to insert a metal rod into the corn and leave it for 15 to 30 minutes. If the rod is warm when you quickly remove it from the grain mass, you probably have mold activity in your corn. If mold growth

is found the best thing to do is immediately remove corn from the bin until all the moldy corn has been removed.

Insects are also more active at higher grain temperatures (above 55°F), so producers should also be looking for signs of insect activity such as Indian meal moth webbing in the headspace or insects near the center surface of the bin. Insects can survive from one year to the next in the fine material beneath perforated floors and then migrate into the grain mass after grain is added to the bin in the fall, so there may also be activity near the bottom of the bin. This would be more difficult to detect. Removing a small amount of corn with the unloading auger, which should draw corn from the bottom center of the bin, may reveal this type of insect activity. Using a grain probe to obtain a sample from beneath the grain surface followed by careful inspection of the sample for insects should also be helpful.