2009 Harvest Questions and Answers

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The wet spring, late planting followed by a cool summer and a rainy fall has created harvest delays and grain quality issues that we have not experienced in several years. According to the Michigan Agriculture Statistics weekly harvest progress report ending November 1, 2009 corn is 10% harvested verse the five year average of 56% and soybeans are 59% harvested verse the five year average of 82%. Farmers that have been able harvest corn in Isabella County are reporting moistures in the high twenties to the mid thirties. Other areas of concern are some ear rots that are showing up in some fields and stalk health. This information is designed to assist farmers in decisions relating to harvest of this years corn and soybean crop.

How Much More Will Corn Dry? Grain moisture content typically decreases very, very slowly from late October onward. Corn will normally dry approximately 1/4-1/2% per day in late October to early November. By mid-to-late November, drydown rates typically drop to about 0-1/4% per day and after Thanksgiving drying rates are usually negligible. The AVERAGE daily temperature statewide for Michigan in November is only 37F, which helps explain why drydown rates decline significantly in November compared to October. The bottom line is that we should not expect much more grain drying in the field from this point forward, unless we experience an unusually warm and dry November.

Estimating Field Losses Stalk health and grain quality continue to deteriorate due to the processes of weathering and disease. Some Isabella County farmers have reported corn already going down. There is always the risk of field loss, but these can accelerate after mid-November. Field losses can range from 0.5% to 2% per week of harvest delay, with actual losses in a particular field dependent on weather conditions, hybrid, and plant health. The loss of one medium-sized ear per 100 feet of row translates into a loss of more than one bushel/acre. Fields showing evidence of poor stalk quality or disease should be prioritized on the harvest schedule.

Handling, Drying and Storing Wet Grain Drying wet grain takes more time, reduces capacity, and increases the power required to operate augers, bucket elevators, and drag conveyors. Given this year's higher moisture levels, farmers using in-bin drying systems will generally need to dry grain in layers, adding only 4-6 ft of depth at a time. Each layer should be almost completely dried before the next layer is added. Adequate, uniform airflow is the key. Given 2009s high moisture levels, airflow rates of 1.0 cfm/bu into a drying floor are generally recommended.
After grain has been dried, cool it to ambient (seasonal outdoor) temperature. If holding it over the winter, eventually cool grain down to around 35F to minimize mold and insect activity. Probe bins regularly checking for hot spots and mold growth. Be careful when storing wet corn before drying. Shelled corn at 28% moisture at 55F should be held no longer than 2 days. However, corn at 22% moisture and 55F can be held up to 10 days. When shelled corn is placed in the bin, fines will generally accumulate near the center of the bin or near bin walls. Concentrations of fines encourage mold and insect growth and inhibit air flow. Low test weight and disease damaged corn, both of which are common this year, will usually have more fines than normal and farmers will want to consider coring bins to alleviate airflow problems. In general, this year's corn crop will not store as well as corn from previous harvests—careful and regular monitoring of grain condition will be essential.

Drying Soybeans 2-3 points of moisture in a bin can be removed with natural air drying, assuming low outdoor humidity. This works best with a drying floor and 1 to 2 cfm/bu airflow. This process may take several weeks depending on grain depth, but can be sped up by adding grain layer by layer and drying each layer before the next is added. Drying soybeans with continuous flow dryers or bin dryers should be approached with caution. If seed quality is not a major consideration soybeans may be dried in continuous flow driers at temperatures ranging from 120 -140F. High temperatures of 160-180F can lead to excessive cracks and splits. Drying will produce fewer splits if the air relative humidity is kept above 40%. For example, if outside air is 60F and relative humidity 80%, it should not be heated above 80F. Also, exposure to these temperatures should be limited to no more than one-half hour, depending on the initial moisture of the beans. Careful monitoring of the bin is important to make sure excessive splits are not occurring, particularly during stirring.

High Moisture Corn Harvest and Storage Considerations

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Even the best plans to ensile high moisture corn at the proper moisture level are sometimes thwarted by weather and time constraints. These types of situations prompt the question, "What can I get away with?" Here are some factors and suggestions to consider when making decisions regarding the harvest and storage of high moisture corn.

Moisture

Consider the type of silo first. High moisture corn can be stored in conventional, oxygen-limiting, bunker, or bag silos. Recommended moisture levels for these silo types are presented in Table 1.

In years when crop maturity has lagged behind normal or frost puts an early halt to the growing season, corn may be wet (or dry slowly) and maximum moisture percentage to preserve corn becomes a primary issue. For corn stored above 40% moisture, an undesirable fermentation may take place and yeast may proliferate along with high ethanol levels. Animal acceptance may be poor with this type of fermentation. Additionally, harvesting high moisture shelled corn above 32% kernel moisture for oxygen limiting silos equipped to handle high moisture shelled corn may result in unloading problems.

Processing

Most high moisture corn is processed (rolled or ground) before going into the storage unit. The two exceptions to this rule are shelled corn being stored in an oxygen limiting unit and corn that is excessively wet (near 35% kernel moisture). Take care not to over process corn that is over the desired moisture level. It is easy to get excessively fine high-moisture corn that may result in rumen acidosis, fat test depression, off-feed problems or an increased incidence of displaced abomasums. As the corn approaches optimum moisture content, increase the degree of processing.

Harvest Recommendations

Check corn kernel moisture from different fields and determine if the grain can be removed from the cob (shelled corn). Harvesting high moisture corn as shelled corn as compared to snaplage or high moisture ear corn may reduce mycotoxin risk. Harvest corn nearest to optimum moisture contents first and place at the bottom or back of storage structures. Corn with higher than desirable moisture levels may more of a problem at feed-out during the warm months and is best to put on the top or front of the silo for winter feeding. Very wet corn may be prone to aerobic instability (heating) upon removal from the silo. Plan to feed higher risk (wet or moldy) high moisture corns during the coldest months to facilitate slow removal rates if needed.

Corn with significant mold on the kernels and cob is best harvested and stored as high moisture shelled corn (rather than ear corn). Some producers have taken moldy corn and dried it down to storable moisture while screening off the fines. Where drying is not an option, propionic acid is recommended. The propionic acid will not lessen any problems from the mold, but will likely prevent mold problems from getting worse.

If high moisture corn is stored in bags, locate bags away from trees, long grass, and keep snow removed from around the bags. For best results, remove bagged high moisture corn during cooler months. Punctures, rips, or tears in the summer can cause rapid and expansive spoilage.

Table 1. High Moisture Corn Storage in Conventional , Bunker, Bag, and Oxygen Limiting Silos

Conventional Top Unloading Silos, Bunkers, and Silo Bags			
	Corn Kernal Moisture, %		
	Minimum	Desired	Maximum
Ear Corn	26	32-36	40
Shelled Corn	26	28-32	36
Bottom Unloading Oxygen Limiting Silos			
	Corn Kernal Moisture, %		
	Minimum	Desired	Maximum
Ear corn-rolled*	26	28-32	36
Shelled corn	24	26-28	32
**OL Silo with Forage Unloader*			

Preservation

High moisture corn offers some unique preservation challenges compared to corn silage because it ferments more slowly and less extensively while containing high levels of starch, which promotes aerobic deterioration. Any aid to hasten fermentation, use up available oxygen, and inhibit yeast growth (once exposed to oxygen) is beneficial in the ensiling process. Several options are currently available to producers. Here's a quick rundown of each:

Standard bacterial inoculants

High moisture corn inoculants have been available for many years. These primarily produce lactic acid during the fermentation process (homofermentative) and increase the speed of fermentation, while reducing dry matter loss. They MAY also increase animal performance. Choose an inoculant that has been specifically developed for ensiling high moisture corn. Specific strains of bacteria may not grow well on all crops and across a wide range of moisture contents. Thus, a corn silage inoculant may or may not work well under the drier conditions of high moisture corn. Most standard high moisture corn inoculants were developed to improve fermentation. For this reason, aerobic stability during and after feed-out may not be significantly improved. In fact, some standard lactic acid producing bacterial inoculants may actually improve fermentation but decrease aerobic stability (heating at feedout). With all inoculants, it is important to follow the manufacturer's application rates. Typical rates are between 100,000 and 500,000 colony forming units (cfu) per gram of high moisture corn.

Feedout

Be careful to plan for variable removal rate from the silo. A removal rate of 3 to 4 inches per day is typically required to prevent heating during feeding in warmer weather. However, if the high moisture corn contains mycotoxins or is wet with rapidly degradable starch, which may induce acidosis, the removal rate may need to be reduced to augment the addition of clean dry corn to the diet. Treating the bottom third to half the silo of high moisture corn with *L. buchneri* or propionic acid (12-15 lb/ton) may be desirable to insure flexible removal rates and maintain quality during warm weather feeding.

2009-2010 Dairy Cattle Feeding Issues with High-Moisture Corn, Snaplage and Dry Shelled Corn

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Mold/Mycotoxins

The risk for mycotoxin contamination in HM corn or dry shelled corn first requires proper identification of the different ear molds. Scouting should occur as soon as possible to identify the type of ear mold and extent of the disease in the field. Based on various reports from around the state, the primary ear molds include Diplodia, Fusarium, Gibberella, and Penicillium. Conditions have been less favorable for the development of Aspergillus. In terms of mycotoxins, there is a lower risk of mycotoxin contamination in ears that have Diplodia or Penicillium, compared with Fusarium and Gibberella.
Symptoms of Diplodia ear rot include a heavy or thick white mass of mold, where the kernels almost appeared "glued" to the husk. These symptoms will most often be observed at the base of ear. Infections of Diplodia occurred during the tasseling to early silking period. Fusarium ear rots can be caused by different species of *Fusarium* and symptoms will vary greatly depending on hybrid and environment. Typically, symptoms are whitish to pink and can also cause a "starburst" appearance on the kernel. Infected kernels are usually scattered throughout the ear. Gibberella ear rot symptoms also appear reddish in appearance, but infected kernels are more likely to be found starting from the tip of the ear. Lastly, Penicillium ear rot is characterized by a powdery green or blue green mold on and between kernels. Areas where damaged has occurred on an ear often show the initial symptoms.

Mycotoxin development is highly dependent on the environment, factors that may cause wounding on the plant, or can occur when resource demand is high or resources are limiting. Temperatures above freezing, moisture above 20%, and oxygen are key factors for mycotoxin contamination. The longer corn remains in the field, the higher the risk for mycotoxin development. Grain that is damaged in the field should not be mixed with good grain. Proper drying ensiling conditions can help reduce the risk of contamination, however, it is important to monitor grain bins throughout the winter period since can be contamination that occurs towards the end of silage use when an infection occurred in the field. It is recommended to test HM corn or dry shelled grain for mycotoxins from any field where there was evidence of ear molds before feeding to animals (Table 1).

Fusarium mycotoxins: These mycotoxins include deoxynivalenol (DON; produced by several species of *Fusarium*, including *F. graminearum*), zearalenone (*F. graminearum*), and fumonisin B1 and T-2 (multiple species of *Fusarium*). Of these mycotoxins, DON is the most common. In silage, DON does not appear to have a significant effect, however, in grain, production of DON is

favored by grain moisture of 21% or more and temperatures from 21-29ºC. It is thought that rumen microorganisms are also able to degrade DON to less toxic form.

Penicillium mycotoxins: In silage, *P. roqueforti* is a common fungus. This organism is a saprophyte that grows well in low oxygen and acidic environments. There are multiple toxins produced by *P. roqueforti*, including, PR toxin, roquefortin C, patulin, and mycophenolic acid. While the effect of these toxins on dairy cattle is not well known, proper harvest timing and ensiling can reduce the risk of toxin development. Refer to the back page of the Blights & Insights article for laboratory locations.

Crop Insurance Considerations

Loss of quality due to disease such as ear rots is an insurable loss for some types of crop insurance. Insurance based on individual farm performance (APH, CRC , RA, and IP) does provide coverage. County-based insurance (GRP and GRIP) do not cover losses due to quality on individual farms. If the county average yield (GRP) or revenue (GRIP) falls below the guarantee level of a producer, then an indemnity may result.

High levels of mycotoxin may be an insurable cause of loss. Insureds should contact their crop insurance provider before harvesting and/or placing harvested grain in storage if their grain is suspected of containing mycotoxins. The Risk Management Agency (RMA) specifies quality discount factors (DF) to be used to compute the "production to count" for insurance purposes.

For corn, there are discounts for test weight, damaged kernels and odors. In addition, there are specific discounts for aflatoxin, vomitoxin, and fumonisin, depending on the level of infestation. Generally samples must be taken by specified professionals and tests run by certified labs before grain is placed in storage. Some corn may be selling at a discount, but limited discounts are unlikely to result in payments by the insurance company. If a producer purchased insurance with a 75% level of coverage, no indemnity would be paid unless “production” was less than the 75% level. Assuming a normal yield, a 20% price discount would still result in “production” being over the 75% level. If corn harvest is delayed past December 10 due to an insurable cause (wet field conditions, etc.), **farmers need to contact their crop insurance agent.**

Marketing Considerations

This fall has been filled with nothing but challenges and they seem to continue even as we get to the late part of the harvest season. We have had a couple price rallies over the past couple months and some down swings in the market that should encourage you to lock in some of your un-priced corn. If this years +13 Billion bushel crop with some carry over of last years crop is real the markets may have trouble maintaining current cash prices

Many farms are looking at selling the crop off the combine to avoid storage risk and the potential of the big corn crop pushing the market even lower. If you sell cash and feel the market has upside potential some farms will consider purchase of a Call Option that will allow you to be part of any rally that would develop later. These options have a real cost if you want to remain in the market over time.

The corn crop is being reported to be very wet, may have mold and is light when we look at test weight. If this describes your corn crop then it is not a crop that you want to put into long term on farm storage bins. If the corn is stored for any extended length of time the condition is very unstable. The corn market was under pressure this week amid improved weather forecasts for the first 10 days of November. Wet soils and rain limited harvest progress this week, which was only 20% complete nationally as of October 25. This is the slowest harvest pace in USDA’s data base, which extends back to the early 1970s. The market is now responding to just a little good weather putting more corn in the market and pushes prices down as the big crop in the field becomes a huge crop in storage.

In the Soybean market it is showing no return to short of long term storing of the crop. This leaves many soybean growers looking to sell the crop off the combine or consider some type of delayed minimum price arrangement that sets the current price as a floor but would allow you to capture improvement in basis. Of they may use a Call Option if they feel the market will go higher in the future.

With any crop in this type of market you need to set some target prices that you set with your grain dealer to get some of your crop sold if the market rallies to that target. With many price forecasts looking for lower corn and soybean prices you may want to also set up some minimum price (floor prices) order with your grain dealer to get you out if the market gets into a down trend.