10-24-2008

Corn Quality Issues in 2008 - Moisture and Test Weight

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Abstract
Weather this fall has benefited the corn crop by allowing late planted corn to mature. Much of the state recently experienced its first killing frost. The USDA October yield estimate of 172 bushels per acre in Iowa surprised many. If this is the final yield, 2008 will produce the third highest yield recorded, behind the 173 bushels per acre of 2005 and 181 bushels per acre in 2004.

Keywords
Agricultural and Biosystems Engineering, Agronomy

Disciplines
Agricultural Science | Agriculture | Agronomy and Crop Sciences | Bioresource and Agricultural Engineering

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Corn Quality Issues in 2008 - Moisture and Test Weight

By Charles Hurburgh, Department of Agricultural and Biosystems Engineering; Roger Elmore, Department of Agronomy

Weather this fall has benefited the corn crop by allowing late planted corn to mature. Much of the state recently experienced its first killing frost. The USDA October yield estimate of 172 bushels per acre in Iowa surprised many. If this is the final yield, 2008 will produce the third highest yield recorded, behind the 173 bushels per acre of 2005 and 181 bushels per acre in 2004.

Although high grain yields are expected, reports of quality issues are surfacing. A cool, long, growing season will often result in high yields with high grain moisures and low test weights. The lower test weight is the result of more starch and lower protein on a relative basis, a condition that also reduces field dry down rates and increases drying costs.

Corn that has not dried early in the harvest period often stops at 17 to 18 percent. This may well be the case this year, as the number of favorable drying hours is much less after Oct. 20. Moisture contents on that date were hovering around 20 percent, with some in upper teens and many up to 23 or 24 percent moisture. At this time, with the cool wet near-term forecast, there will not be much additional field drying.

Expect drying to cost about 5 cents per point of moisture removed. Eight points removed, down to 15 percent moisture, would cost about 40 cents per bushel plus the weight shrink. For this reason, there will be an incentive to hold corn at higher moistures, awaiting better drying conditions in the spring, blending opportunities, or higher moisture feeding.

Test weight

Test weight is expressed as pounds per volumetric bushel. Corn test weights can range from 45 to over 60 pounds per bushel. The market standard is 54 pounds per bushel, the grade limit for No. 2 Yellow corn. Kernel size, shape, and density all affect test weight.

Higher test weights mean better filled kernels with a higher percentage of hard endosperm. Low test weights frequently imply that the crop did not mature entirely or that it was subjected to some stress conditions. In 2008, dry corn test weights of 52-54 pounds per bushel (compared with the more typical 55-57 pounds per bushel) are indicative of incomplete maturity.

Food processors are especially sensitive to lower test weight. Product yield and quality is reduced. Ethanol processors may not be greatly affected by the somewhat lower test weight this year, lower protein and higher starch yields more ethanol, but does reduce DDGS quality. Pay attention to the moisture limits of ethanol plants; most stop taking corn at either 17 or 18 percent.

Some researchers report that early-season hybrids grown in their area of adaptation have lower test weights than later-season hybrids grown in their area of adaptation. Early planting dates, higher N rates or less N loss, lower plant populations, and years with better growing conditions all contribute to
higher test weights. Loss of N from extreme rainfall may be a contributing factor to lower test weight this year.

**Corn storability issues**
Test weight is a good indicator of corn storability. Corn that is below 54 pounds per bushel after drying should not be stored into warm weather and should be dried to less than 15 percent moisture before storage of any duration. Lighter corn also will break more in handling.

Corn normally gains about 0.25 lb/Bu per percent of moisture removed, more with low temperature drying and less if corn temperatures exceed 150F. We are also learning that corn that has reached 150F or more in drying is more difficult to ferment in ethanol plants. A discount for test weight in wet corn can be simply an extra discount for moisture, depending on the actual values for moisture and test weight.

*Charles Hurburgh is a professor of Agricultural and Biosystems. Roger Elmore is a professor of agronomy with research and extension responsibilities in corn production.*

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