Grain quality and handling issues for 2006

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Abstract
The erratic rainfall patterns across Iowa have affected both yield and quality for corn and soybeans. Because more corn is likely to be stored for local use through the entire crop year, attention to harvest and storage management details will be very important.

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matter what we do, we can never reproduce the dynamics of the 2006 growing season. The environment that the seed is placed into next year will certainly be different than this year. This is why we must always look at multiple-location data when looking at hybrid performance. If a hybrid performs consistently among the top hybrids at every location it is tested, then it will likely do well next year. But if it is not consistent across numerous locations, then we would not necessarily expect it to do well next year—even if it did well in one field, in one county, etc.

It is critically important to wait in purchasing seed until research results are posted and studied. Iowa State University posts yield results at www.croptesting.iastate.edu within a few days of the harvest date. There are more than 380 hybrids in this year’s research trials. Selecting hybrids using these data will give you a much greater probability of having good hybrids next year.

Let’s look at an example of how this pencils out:

If we are purchasing a bag of $200 seed and receive an early seed discount of 10 percent, this bag of seed now becomes $180 (savings of $20 per bag). If that bag of seed has 80,000 seeds it will plant approximately 2.3 acres (at a 35,000 seeding rate).

Therefore, we are saving $8.70 per acre by purchasing our seed early. If we figure that we will receive $2.00 per bushel for our corn, then this equates to a final yield difference of only 4.3 bushels. One way of looking at this is if your yield goal is 200 bushels per acre, then you have paid for seed for 196 bushels of that corn crop, while the company paid for 4 bushels.

As mentioned above though, 2005 research data showed that selecting the wrong hybrid could cost you at least 30, and possibly up to 54, bushels per acre. So even if we select the low end of this yield loss estimate, we would have to receive an early cash discount of nearly 70 percent to account for the loss in overall yield that a poor hybrid would cause.

The monetary disadvantage from purchasing poor-performing hybrids is significant. It is far better to use current yield trial data to select consistently high performing hybrids than to select one based on hearsay or company promotions. In the next ICM newsletter, we will describe how to select proper hybrids based on examples from 2006 harvest data.

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Crop Production

Grain quality and handling issues for 2006

by Charles R. Hurburgh, Jr., Iowa Grain Quality Initiative Management Team

The erratic rainfall patterns across Iowa have affected both yield and quality for corn and soybeans. Because more corn is likely to be stored for local use through the entire crop year, attention to harvest and storage management details will be very important.

Soybean quality

Soybeans are uneven in maturity, even within the same field, with many instances of dry seed on green stalks. Areas that received late August rains will have fewer small seeds but may still be variable in maturity (and moisture). Seed beans from long-term drought areas will be small; otherwise, seed size should be average with a lot of variation.
The 2006 soybeans overall should be average or higher than average in protein because late-season rains occurred before the plants started to turn color. Conditions that lengthen the growing season increase protein levels. Normal protein content for Iowa soybeans is about 35 percent, and about 35.5 percent for the United States as a whole.

Oil content is likely to be about average, around 18.5 percent (on a 13% moisture basis). The major soybean processing issue will be nonuniformity within lots in seed size, moisture, and probably composition. Fall weather conditions will determine average moistures; first indications are that moistures will be low after the first week or so of harvest, when the effect of uneven maturity is most pronounced.

If bean leaf beetles were prevalent, there may be considerable mottling and brown staining. Discoloration does not affect oil and meal yields, but food-grade soybean users prefer normal-colored beans and have a higher percentage of cleanout from discolored lots. The impact of aphids on soybean color and quality is not known.

Watch out for the “pumpkins,” oversize beans from greener pods, in the first few days of harvest. Frost will magnify this effect, as will the uneven maturity. They will test 2–3 percent too low in electric moisture meters and will be a storage problem. Aerate as you would for corn. Moistures equalize well in soybeans, and most greenness from frost will subside after several weeks of aeration.

**Corn quality**

Corn quality is also affected by drought, but quality often recovers with August rainfall more than does yield. Protein and other quality traits are determined early in the growing season. Corn protein should be average (8% at 15% moisture) in most areas. Areas with favorable growing conditions all summer should have lower protein with the high yields, but lower protein means higher starch. August weather reduced the threat of aflatoxin considerably in 2006, whereas in 2005, the heat persisted through early October, which was very favorable for mold growth.

Test weight is a good indicator of corn storability. Corn that is below 54 lb/bu after drying should not be stored into warm weather and should be dried to less than 14 percent moisture before storage of any duration. Lighter corn also will break more in handling. Corn normally gains 0.25 lb/bu per percent of moisture removed, but drought-stressed corn normally does not experience as much, if any, test weight gain. Test weight is not likely to be a problem this year, but selection of corn to put in longer term storage based on test weight is a good management practice.

Be selective about what corn is placed in storage versus moved at harvest. Low test weight corn should not be put in temporary storages or outdoor piles. It is also not wise to mix corn of different crop years in the same storage bin; the mix is generally much less stable than each year’s crop stored separately.

**Corn management tips and concerns**

The rapidly growing local ethanol market creates storage challenges. More of the Iowa crop will have to be kept here, within delivery distance of its market; that means having good condition grain available all 12 months of the year. Direct delivery to ethanol plants, which are inherently quality sensitive, sharply reduces the potential to blend off quality problems. Additionally, an increasing percentage of corn will be used locally at No. 2 grade standards, rather than in the export market at No. 3 grade. The demands for quality maintenance will intensify, and the potential for revenue from blending will decrease rapidly.
Grains have a shelf life just like any food product. Shelf life is primarily determined by moisture content and temperature. It is gradually used through the time before use, and each operation or storage regime consumes a portion of the life. Grain that starts to heat or get moldy has essentially used its storage life. The goal of grain storage management is to reduce the rate at which the life is lost. **Every action taken after harvest affects the ultimate length of time grain can be stored and the quality at the time of use.**

Try to harvest corn with moistures below 20 percent and dry without excessive corn heating to 15 percent. Dryers vary considerably in the temperature that the grain reaches; drying air temperature is not a good indicator of grain temperature. Check combine settings between fields because fines and cracked kernels spoil much faster than whole, sound kernels.

Holding wet grain, especially without aeration, shortens shelf life considerably. Fungi grow very fast in corn above 20 percent moisture. Overnight storage of wet corn in a wagon or truck can have a marked effect on future storability. Always get wet corn into an aerated storage immediately. Likewise the practice of holding medium moisture corn (16–20%) for future blending or feeding opportunities will cause problems for any of that corn that is stored (even after drying) into the following summer.

Aerate periodically to match grain and air temperatures. An airflow rate of 0.1 cfm/bu is sufficient for dry grain; more is needed if drying as well as temperature control is needed. The goal is to keep grain and air temperatures within 10 to 15 degrees of each other in the fall and winter. Once warming the corn in the spring is started, don’t stop partway through the bin. You can keep cold corn into March or April if it is clean and has had the center core of fines removed.

For best storage management, deliberately decide which corn and bins are going to be kept into the summer. This should be your best (highest test weight) corn, harvested below 20 percent moisture with careful combine settings to minimize trash and placed in storages with good aeration rates/airflow distributions. Remove the center core and use a grain distributor if possible. Check your grain at least every two weeks, with some way to take grain temperatures. If a slow rise is noted, aerate. If a hot spot starts, make that the next corn to be moved out; one storage problem always leads to another.

Check handling systems for worn or jagged parts; these increase broken grains, which then increase spoilage. Auger systems are particularly prone to breaking or cutting grain. A worn portable auger (flighting sharp and smaller diameter than the tube) can create 1–3 percent broken kernels in a single elevation. Downspouts and cushion boxes should be inspected for wear and sharp edges.

Precision and care will be more important now that the entire crop will be used locally. Attention to small details will make a big difference. These details compound each other; the goal should be to minimize quality deterioration after harvest so that local users can maximize corn value over the entire year.

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