GRAIN QUALITY
Task Force

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Purdue University

Outlook for This Fall Harvest
Preparing for the 1992 Corn and Soybean Crops

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Current Indicators

The current indicators point to a fall harvest with both good and bad prospects for the 1992 corn and soybean crops. On the positive side, Indiana corn and soybeans look better than initially expected after the spring drought, the June frost, and the July rains. In the state, near-record yields are predicted, with an average of 130 bushels of corn per acre (compared to 92 bu/acre in 1991 and a record high of 135 bu/acre in 1987) and an average of 41 bushels of soybeans per acre (compared to 39 bu/acre in 1991 and 41.5 bu/acre in 1985). High yields are also predicted for most other Midwestern states.

On the negative side, this season's field conditions have raised concerns about possible grain quality problems. Crop planting was delayed in the spring, and this summer has been comparatively cool, with growing degree days for corn almost too far behind to catch up before fall harvest. The delayed maturity of the corn crop is expected to push the 1992 Indiana harvest back by about 2 weeks. Additionally, plant pathologists are concerned about the potential for corn stalk rot (partially due to the after-effects of the June frost) and about ear rot caused by the fungus *Giberella zeae* (due to the cool and moist July weather). Last but not least, climatologists are warning of the potential for an early fall frost.

The combination of delayed maturity and near-record yields means higher crop moisture contents at harvest. This will result in greater wear and tear on harvest and transportation equipment, as well as heavier use of grain handling and drying facilities than in the last several years. Higher moistures at harvest also generally mean more fines and broken corn, more difficult conveying, slower drying, and higher fuel consumption.

Preparing for Fall Harvest

In advising farmers and elevator managers it is important to remember that they are generally locked into an existing post-harvest system. Thus, for the most part they are limited to replacing individual system components. Examples of weak system links are a low capacity auger, an old burner, a worn-out fan, an undersized power supply, or a dryer that is too small. Part of a good planning strategy is for a farmer or elevator manager to recall last year's problems and replace now those components that previously gave them problems. On some farms and elevators, current post-harvest equipment has been overextended by 5 to 8 years beyond its normal life-cycle and is in urgent need of replacement. Good equipment performance is essential for maximum product quality, processing capacity, and worker safety.

Taking the time now to develop a strategy to harvest, dry, and store the 1992 corn and soybean crops is essential in reducing potential problems. Proper combine settings and dryer operation during harvest and proper storage management after harvest can improve efficiencies while minimizing losses. Proper techniques also help to avoid costly on-farm losses as well as discounts at the elevator due to breakage susceptibility, low test weight, poor storability, and reduced livestock feeding value.

There are three critical steps that need to be followed to adequately prepare for a crop harvest: (1) establish a harvest strategy, (2) determine crop drying needs, and (3) maintain a good storage management routine. All three

steps will be addressed briefly below from the perspective of concerns farmers and elevator managers may have.

1. Establish a Harvest Strategy

Spot check each field to determine the apparent quality of the crop. Since the outside rows are atypical, walk through the field in a pattern. For example, walk in about 10 rows, then down 10 paces, over 10 rows, then down 10 paces until the field is thoroughly criss-crossed. An examination of the plants combined with, when necessary, collection of ear samples will help to decide when and where to harvest first. Due to the late planting of many fields this spring, the moisture content at harvest is expected to be higher than in previous years. However, when deciding whether to delay harvest to save fuel, consider that an increase of about 2% in field losses is equal to the cost of the extra drying fuel needed to dry wet corn from 25% to 20% moisture. Relative to the price of corn, energy for drying is cheap! Your harvest strategy ought to focus on minimizing field losses rather than fuel costs. Never allow the handling and drying system to become the bottle-neck during harvest.

Corn or soybeans that are at risk of serious lodging (due to the presence of rotted stalks) or quality loss (as may occur when pods split due to exposure) need to be harvested promptly. Since the harvest date may be pushed back by about two weeks this fall, conditions for field drying are expected to be less favorable than in previous years. The field drying rate diminishes significantly as the weather cools, and field drying essentially stops by mid to late November. A strategy that combines timeliness of harvest with proper operation of equipment will go far to minimize field and harvest losses.

2. Determine Crop Drying Needs

High-temperature in-bin and column dryers are best for rapidly drying high-moisture crops from above 20-22% to safe storage levels below 15%. Low and natural air drying systems are not recommended for moisture contents above 20-22%, unless the bins are layer-filled or have additional airflow capacity. (See MWPS-22, "Low Temperature & Solar Drying Handbook" for more information.) A recent survey of farmers indicates that many are not aware of the option to layer-fill their low-temperature drying bins. Since drying takes much longer, grain that is of poorer quality will be more likely to spoil before the crop is dry.

Electronic moisture meters are generally not reliable at moisture contents of 26-30%, unless they have been specifically calibrated for this range. The values can easily vary by 1.5 to 2 points from the actual value. Check the sample with several meters to get an idea of the range. It is better to base your drying needs on the worst case, i.e., the higher values. If a moisture meter is unavailable, an approximate moisture test can be accomplished using food scales to weigh out a wet corn sample of about 1/3 to 1/2 pounds, a cookie pan to spread out a single layer of the wet corn, and a kitchen oven set at 212°F for a period of 12 hours (overnight). After 12 hours the dried corn needs to be removed and reweighed using the same container as was used to weigh the wet corn. After recording the dry weight of the corn (do not include the container weight), the moisture content of the wet corn is calculated according to the following formula:

% - moisture = 100 x (wet weight - dry weight) / (wet weight)

For example, if the wet corn weighs 16 ounces and the dry corn weighs 11 ounces, the approximate moisture content of the wet corn is:

% - moisture = 100 x (16 - 11)/(16) = 31%

It is important to realize that there are inaccuracies in the food scale and the time allowance in the oven. However, these results may be as reliable for high moisture content corn as some commercial moisture testers.

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3. Maintain a Good Storage Management Routine.

Gib-infected corn and fall frost-damaged corn should be managed and aerated in storage the same way as normal dry shelled corn. The important requirements are proper drying, correct aeration system design (providing a minimum of 0.1 cfm/bu airflow), and aeration at the right times. Remember that at this airflow rate it normally takes 400-600 hours of fan operation to completely cool to 35-40°F during the fall and winter. The most common mistake is to stop the aeration fans before the cooling front has moved through the entire grain pile. This can lead to condensation and layers of spoiled grain in the bulk. Always move the cooling front through the entire pile before shutting off the fan.

Expect more fines and trash in poor quality grain. Pre-cleaning before drying and storing adds a safety and quality margin. Wet fines do not separate out as well as dry ones, and they can only be stored safely for a few hours. Rotary screen-type cleaners have adequate farm capacity and are fairly inexpensive. They clean out large trash as well as fines. Perforated auger sections help, but they remove a relatively small percentage of fines. Be careful when feeding screenings. Toxins from mold development are usually more heavily concentrated in broken kernels and fine material than in whole, cleaned grain. Consider test-feeding to a few animals first, if mold problems are suspected. Never feed moldy fines to dairy, poultry, young, or pregnant animals.

One final word of caution: Storing grain that was of poor quality at harvest into the next summer is risky. Remember that grain quality can never be improved during storage. The best one can do is to maintain quality. Also, try to keep poor-quality grain in separate bins from good-quality grain. This gives more flexibility in terms of special management, feed mixing, and marketing options. Never blend grain that has been contaminated by mold development with clean grain when it is to be sold commercially. Blending is illegal, and contaminant residues are a serious health hazard. If the grain cannot be sufficiently diluted with clean grain to feed to one's own livestock, it should be spread on the ground and plowed under.

Edited by Linda Mason, Department of Entomology