Cool Season Effect on Harvest Timing and Storage of Corn and Soybean

- Crops should be monitored this fall as maturity approaches.
- A light frost may cause slight damage that varies across a field.
- Corn and soybean grain should be quickly dried to a uniform moisture.
- Grain bins and dryers should be prepared for a late, wet harvest and the variability of grain moisture.

Corn and soybean development is approximately two weeks behind in many areas. The cooler August temperatures has many growers concerned about crop maturation rates, frost dates, and storage of the harvested crop.

CORN

Harvest Timing. Growing degree days (GDDs) accumulation has been below normal in the first part of August. Given the late year for planting, the rate of maturation may continue to fall behind with cool temperatures in the second half of the growing season. This is unlike the trend where fewer GDDs would be needed for a late-planted corn product. Physiological maturity (black layer) can occur approximately 62 days after silking.4 Table 1 gives an estimate of calendar days and GDDs for a 100 day and 120 day relative maturity corn product.

Corn height and moisture variability within a field can be a challenge during harvest. Plants more than one to two weeks late likely have higher whole-plant and grain moisture.7 These late plants are likely to have smaller stems, fewer brace roots, and weaker stalks. Fields with variable plant sizes and maturities should be scouted for lodging and require proper combine adjustment.

Frost. Fall frost dates range across the Midwest, and many areas have a 50 percent frost date around mid-October. A mid-season corn product planted in early June may mature before a hard frost in October. It becomes important to know the difference between a light frost and a killing frost. A killing frost occurs when temperatures near 32°F last a few hours or when temperatures near 28°F last a few minutes.5 Frost damage from temperatures between 32° and 40°F can be greatly variable depending on small terrain differences and atmosphere conditions that are favorable to rapid heat loss. Fields with light frost damage may have reasonable grain yield potential if growing conditions improve after the frost event.

Drying. Immature grain can be a concern in fields that receive an early hard frost and with late or replanted corn fields. Drydown rates slow from 0.8 percentage points per day in late August to about 0.4 percentage points per day in late September.1 However, on any given day, drydown is affected by temperature, humidity, sunshine, or rain conditions. For instance, drydown could be as much as 1.0 percent on warm, sunny, windy, and dry days or zero to 0.3 percentage points on cool, cloudy, rainy days.2

Going from moisture at maturity (30%) to ideal harvest moisteres between 15 to 20% may take two to four weeks. If September weather is “normal” or follows the current weather patterns, a four to five week drydown period may be needed before corn reaches a harvestable moisture. Scouting for stalk strength and lodging during drydown can be helpful to determine harvest order.

### Table 1. Relationship between kernel growth stage and development for a 100 day1 and 120 day2 relative maturity corn product.

<table>
<thead>
<tr>
<th>Growth Stage</th>
<th>Average calendar days to maturity</th>
<th>Growing Degree Days to maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100 Day Product</td>
<td>120 Day Product</td>
</tr>
<tr>
<td>Silking (R1)</td>
<td>55—60</td>
<td>57</td>
</tr>
<tr>
<td>Blister (R2)</td>
<td>45—50</td>
<td>44</td>
</tr>
<tr>
<td>Late milk-dough (R4)</td>
<td>35—40</td>
<td>28</td>
</tr>
<tr>
<td>Early Dent (R5)</td>
<td>25—30</td>
<td>24</td>
</tr>
<tr>
<td>Fully Dented (5.5—5.75)</td>
<td>13—17</td>
<td>20</td>
</tr>
<tr>
<td>Physiological maturity (R6)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

2 Hall, R.G. Corn growth stages with estimated calendar days and growing-degree units. South Dakota State University.
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Storage. With variable corn maturation across the field and farm, it will be important to monitor differences in grain moisture. The way grain is treated shortly after harvest may determine the storability of a crop. Grain with high moisture should be separated from dry, earlier maturing grain. Crop yield potential may be good this fall, but growers should be prepared for a late, wet harvest. Bins should be cleaned, and driers prepared to handle the daily capacity of grain coming from combines.

Uniform temperature and moisture levels are important for maintaining quality of grain in storage. Regardless of the dryer system, (bin dryer, column dryer, or combinations of these) high-moisture corn should be dried to 16 percent moisture in 24 hours and cooled to outside air temperatures within two days. Full-bín drying can take several weeks when grain moisture levels are above 18% due to diminished fan capacity when a bin is filled, but is not recommended. The capacity of a high temperature in-bin dryer or column dryer is greater for high moisture corn (30%) and may offer more flexibility with drying times between 0.5 to 2 hours.

Soybeans

Seed Filling. Pods may still be initiated in late August, but seed filling rates would continue to be slow with cool temperatures. Full, healthy canopies are expected to provide good photosynthetic capacity. What is potentially a good soybean crop still has a number of weeks before harvest yield potential is realized. Cloudy, cool weather limits photosynthesis and growth rates. This can lead to below normal pod numbers and a lack of filling for late-initiated pods. It is also possible for cool temperatures to trigger maturity before seeds are filled.

Frost. The effect of late-season frost on a soybean crop depends upon the growth stage of soybean plants. Temperatures that range from 30°F to 32°F can easily damage the top leaves on a soybean plant. When air temperatures drop lower than 30°F, the entire soybean plant can be killed. Fields with narrow-spaced rows (6 to 15 inches) seem to survive frost damage better than wide-spaced rows (30 to 36 inches) because of the limited air movement within the canopy. An early frost may cause slow field drydown. Some or all of the grain may be green and there may be lower quality seeds, lower yield potential, and variable moisture content.

Harvest Timing. Typically soybeans can dry in the field, but there may be instances when it is preferred to harvest high moisture soybeans. Generally, soybeans can be harvested after foliage has dried and seeds are mature. Field losses, harvest losses, and market weight losses may be reduced with higher moisture soybeans. Some challenges with wet soybean (greater than 18% moisture) harvest is possible if threshing becomes difficult and soybeans are crushed and bruised. Moisture content changes more quickly in soybeans compared to corn, and it is important to check moisture levels for each field, day, and time of day.

Drying. High-moisture soybeans have the potential to spoil and can have reduced germination after a few days. They therefore need to be dried soon after harvest. Soybeans can be dried down to 13 percent and 12 percent moisture for winter and one-year storage, respectively. High and low temperature dryers may be used to dry soybeans; however, temperatures should be limited to 130°F to 140°F for soybeans.

Summary

Corn and soybean yield potential could be good this fall. Crops receiving a light frost may not be substantially hurt if temperatures rebound after the cold weather event. Proper harvest and storage conditions will be needed to maintain grain quality.

Sources:
10. 2008. Soybean drying and storage. Iowa State University. PM-1636

For additional agronomic information, please contact your Asgrow®, DEKALB® and Deltapine® Brands Seed Representative

Individual results may vary, and performance may vary from location to location and from year to year. This result may not be an indicator of results you may obtain as local growing, soil and weather conditions may vary. Growers should evaluate data from multiple locations and years whenever possible.

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