What is Needed to Maximize the 2008 Corn Crop

Roger W. Elmore
Iowa State University, relmore@iastate.edu

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Abstract
Iowa's corn has experienced an unforgiving growing season. With the last breaths of summer in the air many wonder what it will take to maximize yields from this date forward. According to the recent USDA report, Iowa's corn is about two weeks behind the five year average. Eleven percent is ready for a frost, 71 percent is in the dent stage. At beginning dent the crop normally needs about 3 weeks to mature. The bottom line - regardless of location in Iowa, the corn crop needs a normal or later than normal frost date to maximize yields.

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Disciplines
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What is Needed to Maximize the 2008 Corn Crop

By Roger Elmore - Department of Agronomy

Iowa’s corn has experienced an unforgiving growing season. With the last breaths of summer in the air many wonder what it will take to maximize yields from this date forward. According to the recent USDA report, Iowa’s corn is about two weeks behind the five year average. Eleven percent is ready for a frost, 71 percent is in the dent stage. At beginning dent the crop normally needs about 3 weeks to mature. The bottom line - regardless of location in Iowa, the corn crop needs a normal or later than normal frost date to maximize yields.

Recall that planting dates were later than we would like to maximize corn yields, and that early-season growth was hampered by cold and wet soils. Plant emergence was difficult and slow. Rainfall prevented timely post-emergence operations such as side-dress fertilizer applications and post-emergence herbicide applications. Several articles in the ICM news document the season well.

Based on what I understand, cool temperatures after silking are necessary for maximum yields. This happened in 2008. Indeed, slow heat unit accumulation rates characterize 2008 in Iowa. The disadvantage of this is that slower crop development coupled with later than desired planting dates necessitates a long growing season, and a late frost.

An example from Central Iowa

A late August ICM News article, "Factors Needed to Maximize Corn Yield Potential in 2008", suggested that to maximize yields in central Iowa, based on the Ames weather data through Aug. 22, large amounts of sunlight and rainfall after silking were necessary to maximize yields from that point forward; plus a late frost or after Oct. 22. To some extent this has happened. The crop nervously awaits a freeze – or at least those close to corn production feel that way! Figure 1 shows dates of 28 degree fall frosts for Ames. The average date is Oct. 17.

To test this thinking, earlier this week I used Hybrid Maize, a computer model, with 2008 weather data through Sep. 15 for Ames. Table 1 shows a summary of the results.
<table>
<thead>
<tr>
<th>Yield ranking of years</th>
<th>Maturity date</th>
<th>Yield potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best yielding</td>
<td>10/28</td>
<td>99</td>
</tr>
<tr>
<td>Median</td>
<td>10/17</td>
<td>91</td>
</tr>
<tr>
<td>Worst yielding</td>
<td>10/4</td>
<td>70</td>
</tr>
</tbody>
</table>


If the weather after Sept. 16 is like of the median year for Ames, a crop could yield 91 percent of its normal potential, if there are no other limiting factors. Based on Table 1 a maturity date of Oct. 28 is necessary for the highest yield potential with a frost date later than that. This has happened in four of the last 30 years; 13 percent of the time (Figure 1). In addition to a late frost, plenty of sunlight is necessary to maximize yields. This week’s weather forecast is promising.

Iowa’s 2008 corn crop needs a later than normal frost date to maximize yield. Conditions that hasten crop maturity from this point forward or an earlier frost will reduce yield potentials.

Roger Elmore is a professor of agronomy with research and extension responsibilities in corn production.