

# Is all well that ends well? Iowa Corn – 2008

Roger Elmore and Lori Abendroth, Department of Agronomy

Shakespeare penned a play over 400 years ago entitled, *All's well that ends well*. According to scholars, the play itself is interesting because it cannot easily be classified either as a tragedy or as a comedy. Can the same be said of the 2008 growing season?

The most recent USDA-NASS report (Dec. 1, 2008) reports that 6 percent of Iowa's corn is yet to be harvested. The 2008 crop overall has finished well with the third best yield expected in Iowa's history, 172 bushels per acre based on USDA's November estimate. This yield is only a bushel under that of 2005, and nine bushels under the all-time 2004 high.

And yet, 2008 started out with low expectations. We'll be talking about this season for years - along with 1993, 1988, and 1983 - but not because yields were low in 2008. Indeed, the year finished well! Let's think about how that happened.

## The Growing Season

Planting got off to a slow start because of rain and cool weather. Figure 1 documents Iowa planting progress in five-year increments since 1975. Iowa producers have consistently planted corn earlier over the last three decades. Half of Iowa's corn acreage is planted approximately two weeks earlier compared to the late 1970's. Advancements in technology and management practices have made this possible including: hybrid cold-stress tolerance, seed treatments, seed quality, reduced tillage, and larger equipment (planters and tillage).

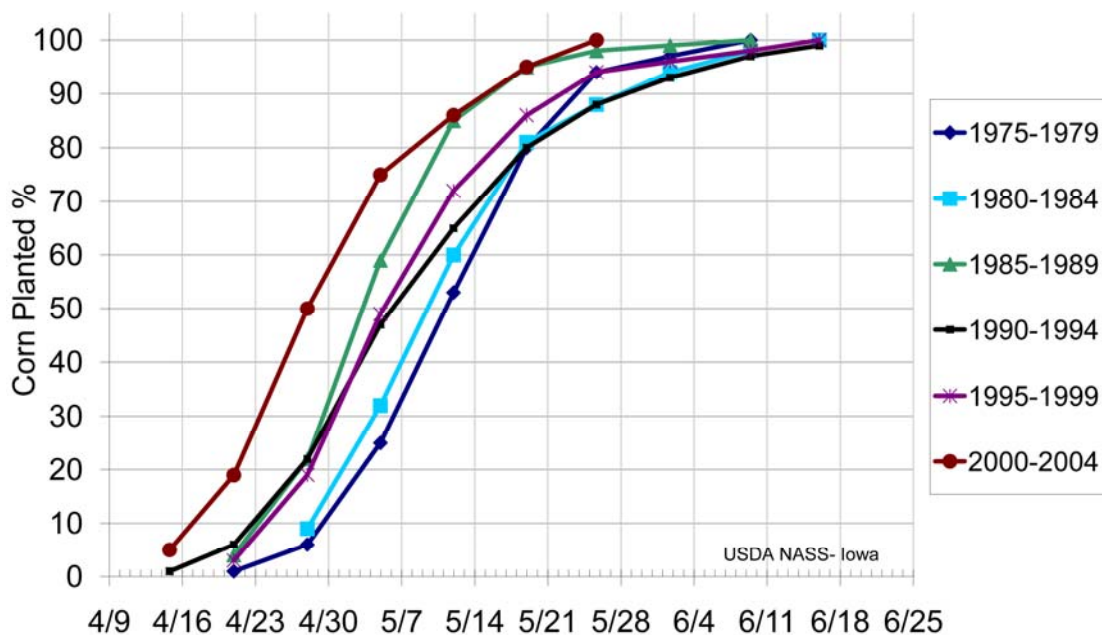
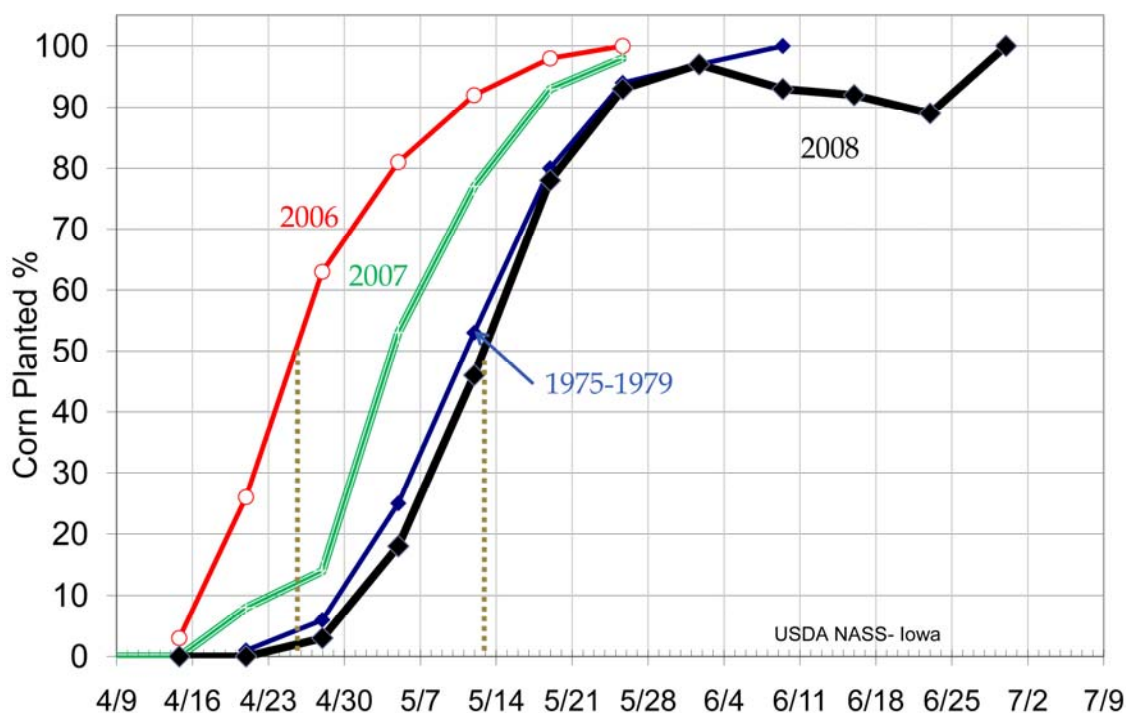


Figure 1. Iowa Corn Planting Progress.

Planting has never occurred earlier than in 2006, Figure 2, when half of Iowa's corn was planted by 25 April. In contrast, Iowa producers in 2008 did not have half of Iowa's corn acreage planted until 13 May; 18 days later than 2006. The rate of planting progress in 2008 was similar to 1975-1979 until rains and flooding resulted in the need to replant over a million acres. Replanted or 'to be replanted' area reached a maximum of 11% on 23 June - please realize that Figure 2 displays these percentages as not planted even though some were already replanted before that date. Iowa's corn was not completely planted until the end of June 2008.

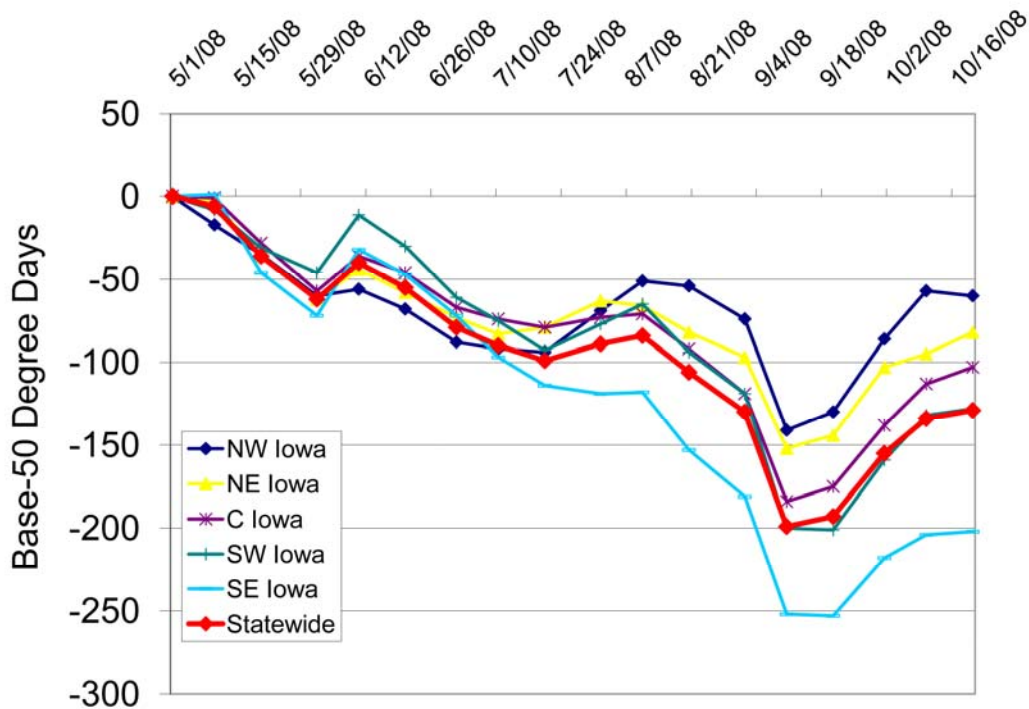
We also know that in general, early is better than later planting dates when it comes to yields (see: [Corn Planting Dates](#) and the [Corn Planting Guide \(PM 1885\)](#)). We generally recommend to plant corn in Iowa by May 10th. Yet this year, only half of the acres were planted in the western third of the state by then. It took until the 15<sup>th</sup> of May for the rest of the state to reach 50% planted. And then, over a million acres were replanted after flooding or drowning out (Figure 2).



**Figure 2. Iowa Corn Planting Progress, 1975-79, '06, '07, and '08.**

Although projected corn acreage was high in late March, 13.3 million acres, only 12.5 million acres of corn were harvested in Iowa; this is a reduction of 6% from the initial estimate. These reductions were most likely the result of producers switching some acres to other crops, or flooding or ponding, and the inability to replant corn. The difference in estimated and actual corn acreage in 2008 is second only to 1993 when there was an acreage reduction of 8.3%.

After the crop was in the ground, the growing season – and corn growth – crept along, not unlike a Shakespearean play – sorry Shakespeare lovers! Refer to Figure 3 and note that cumulative heat units were significantly lower than normal all season. Read a more complete [2008 weather summary](#) by Rich Pope.



**Figure 3. Degree day departure from normal. Iowa, 2008.** (Adapted from Rich Pope)

Silking is the most critical growth stage for corn with late silking dates typically causing greater yield reductions. Again, 2008 went against this trend. A clear trend in silking dates does not exist over the past 30 years (data not shown). Yet, silking dates in 2008 are clearly different when compared to the last few years, Figure 4. Fifty-percent silking occurred 15 days later in 2008 than in the two previous years. In fact, 2008 was the slowest year on record. Incidentally, we should question the rule-of-thumb that a late-silking date correlates to lower yields as it is dependent on weather conditions after silking. Note that corn in 2004 was also “behind” in silking yet resulted in the highest Iowa corn yields ever.

Delayed planting and silking dates obviously resulted in a delayed harvest. Although harvest timing hasn’t changed much on average over the last 30 years (data not shown), 2008 is much slower than recent years and is two weeks behind last year, Figure 5.

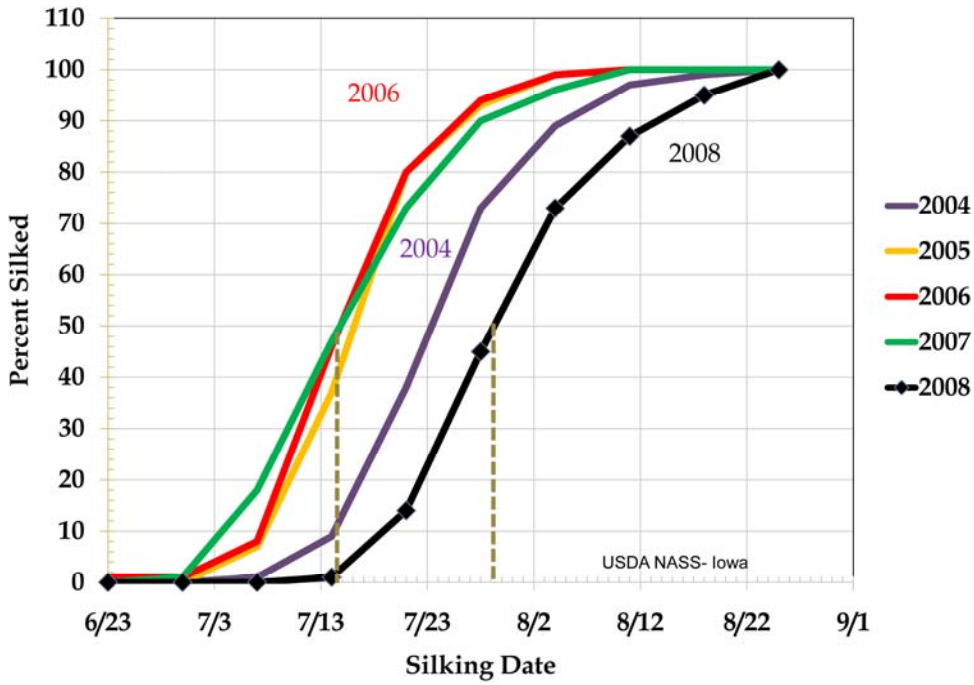


Figure 4. Iowa Corn Silking Dates 2004-2008.

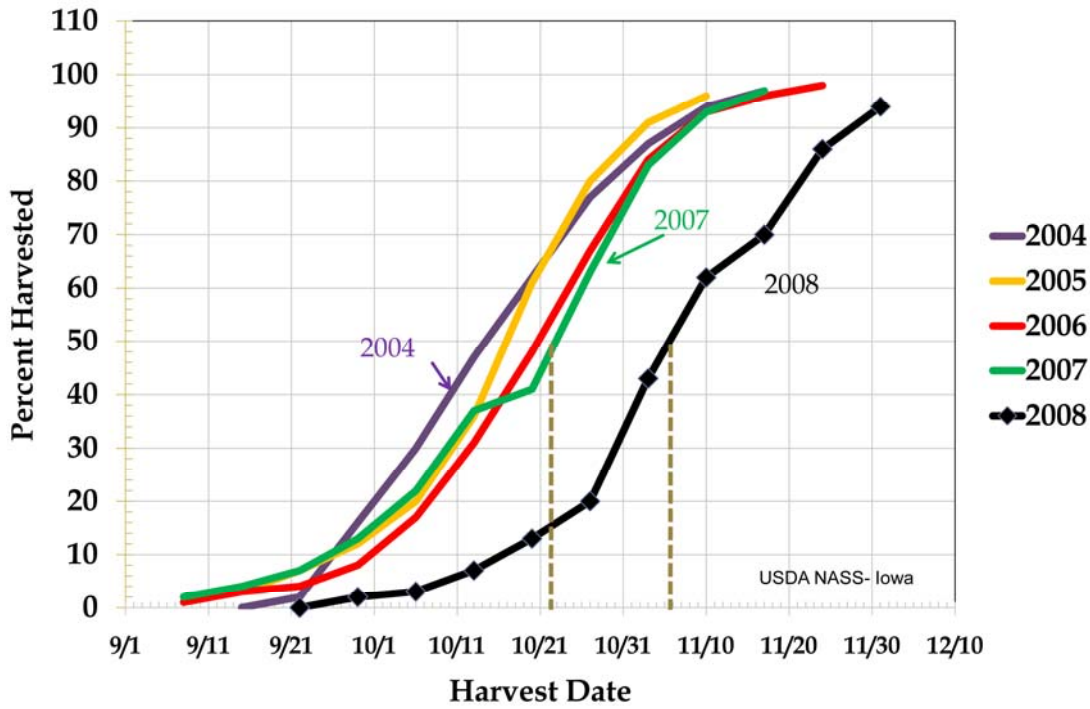
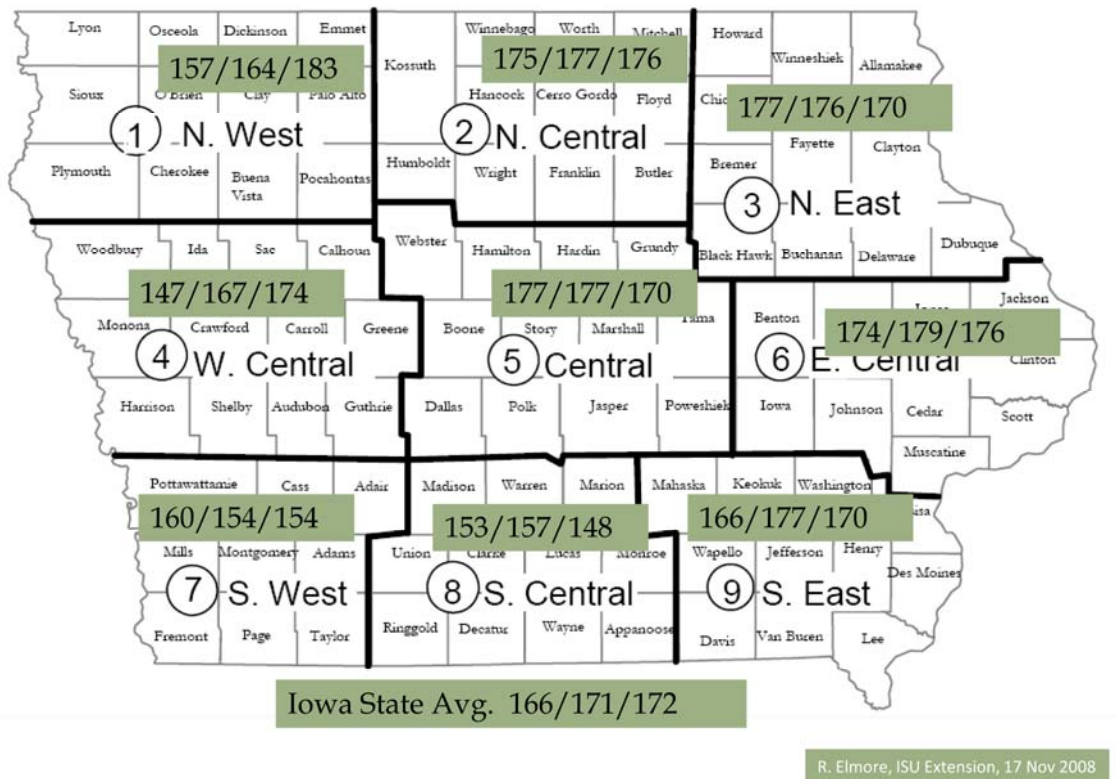


Figure 5. Iowa Corn Harvest Dates 2004-2008.

**Yields and Estimated Yields**

In spite of the seemingly poor year and all of the doomsday talk, USDA-NASS estimated Iowa yields third best in history. Average corn yield in Iowa continues to increase 2.25 bushels per acre per year. The 2008 estimate, 172 bushels, is four bushels above the trend line. Gross production will be high, 2.15 billion bushels, because of the acres grown and high yields. Yields for each of the USDA-NASS reporting districts for the past three years are shown in Figure 6. Some districts are fairly consistent year to year. The northwest cropping district posted exceptional yields this year due to near normal heat unit accumulation (refer to Figure 3), ordinary planting dates and less saturated soils in the spring. Yields in southwest Iowa were reduced from drought and storm damage. High reported yields surprised most of us. Yield-reducing factors, such as insect pressure and fungal diseases, had minimal impact this year.



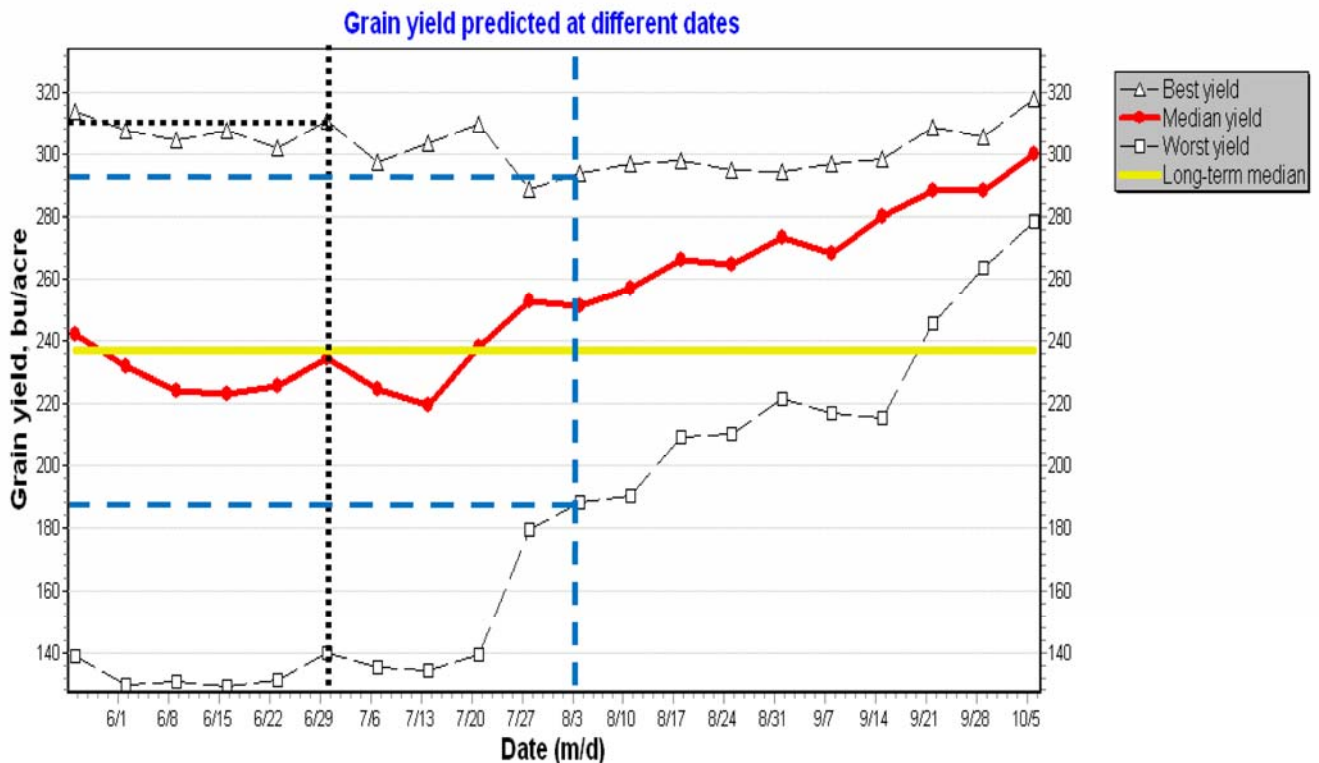
**Figure 6. Iowa District Estimates Corn Yield final 2006/Final 2007/ Nov. 2008. (USDA NASS)**

### Why did 2008 turn out well?

During the 2008 growing season we used a crop model, Hybrid-Maize, to help us understand weather interactions with the crop. Using the model, we developed a synopsis for the Ames 2008 growing season. The input parameters were: 15 May planting date – average for central IA in 2008, 155 day hybrid, 32,000 plants per acre, without irrigation. Weather data from 1986 through 5 October 2008 were used.

Weather conditions this year, provided an excellent opportunity to maximize corn yield. In fact, according to the model, 2008 had the second highest potential yield since 1986; that's right behind the yield potential of 1999. Only weather and the input parameters affect yield potential in the model; it does not consider yield reductions due to diseases, insects, weeds, soil compaction, hail, lodging, etc.

The model calculates potential yield weekly during the growing season. As harvest approaches, the range in predicted yield narrows (Figure 7). The red line sloping upward from the left-middle of the chart shows the 2008 median simulated yield potential based on weather that actually occurred before that point in time and a median weather year from that point forward. The worst year is represented by the lower, upward sloping dashed black line. For example, on 29 June if the worst possible weather year occurred from that point forward, potential yield was 45% of that of the best possible weather year, about 140 bushels per acre. Because late season weather was conducive to higher yields, the projected yields continued to move upward from what was predicted earlier in the season. After silking on 3 August, yield potential in the worst possible year was up to 64%— about 188 bushels per acre. At maturity it was 87% of potential or about 277 bushels per acre. As the season played out, yield potential for 2008 was 94% of maximum, 299 bushels per acre.



**Figure 7. Simulated Potential Yield across 2008; Hybrid maize Simulation. Ames, Iowa**

How did this happen? The answer lies in the late-season weather. Table 1 provides data on solar radiation, temperatures, rainfall, and silking and maturity dates for 2008 in addition to

three other possible years. Although 2008 silk dates were late, sunlight (solar radiation) after silking, and rainfall were similar to those of the best year. Temperatures after silking were cooler than in the worst years. This, coupled with slow heat unit accumulation, resulted in slow crop development (Fig. 4 and 5) and subsequently longer grain-fill period. Without a late frost this all would have been for naught (see crop maturity dates in Table 1). Simulations during the growing season led us to state that to maximize corn yields after silking; the crop needed high sunlight, adequate rain, cool temperatures, and a late frost. That is exactly what we received! The crop season finished well, better than we could have ever hoped.

The late harvest and cool fall contributed to high grain moisture, an increase in grain molds, and in some cases low test weights. Much attention should be given to handling grain this winter.

**Table 1. Growing-season conditions for years with different yield potentials based on Hybrid-Maize at Ames IA, 2008.**

| Year<br>rank by<br>potential yield | Silking<br>date | After silk                           |             |        |                       | Maturity<br>date |
|------------------------------------|-----------------|--------------------------------------|-------------|--------|-----------------------|------------------|
|                                    |                 | Solar<br>radiation<br><i>Langley</i> | Temperature |        | Rain<br><i>inches</i> |                  |
|                                    |                 |                                      | Max °F      | Min °F |                       |                  |
| Best Year in<br>Simulation         | 17-Jul          | 34344                                | 72.7        | 54     | 9.7                   | 5-Oct            |
| Median Year in<br>Simulation       | 20-Jul          | 24906                                | 75          | 49.8   | 15.4                  | 19-Oct           |
| Worst Year in<br>Simulation        | 4-Jul           | 21902                                | 81.8        | 63.3   | 2.3                   | 28-Aug           |
| 2008                               | 25-Jul          | 32572                                | 75.9        | 55     | 8.1                   | 13-Oct.          |

**2008: Tragedy or Comedy?**

The curtain is nearly down; the last act is coming to a close. Was all well in 2008 since it ended well? The first acts made us think it was a tragedy. The 2008 drama certainly wasn't a comedy! Yet as the final scenes play out, and with the last protracted scene on stage, some conclusion is

possible. Those who know about dramas would say 2008 was a tragicomedy; it provided a happy ending to a potentially tragic story. During a critical point in a tragicomedy, the viewer is uncertain whether to laugh...or cry. And in the end, the tragicomedy, *Iowa Corn-2008*, turned out well. Yields were better than we could have expected. We will remember this one!

*Roger Elmore is a professor of agronomy with research and extension responsibilities in corn production. Lori Abendroth is an agronomy specialist with research and extension responsibilities in corn production.*