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Weather Impact on Midwest Corn 2011

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A break in the Midwest heat storm is a good thing, but is it good enough for the corn crop? A few days of temperatures exceeding 93 F – like we experienced in July – are “bad” for corn production, but consecutive days of the high temperatures are especially bad. When the heat comes as silking gets underway – as it did this year – the negative aspect is increased. Our mail indicates that ears did not pollinate well in at least major parts of fields across the Midwest and the locally grown sweet corn we have been consuming verifies that there are pollination problems this year. Many reported [silking problems in late July](#). Shallow kernels, missing kernels, and tip back are common in field corn this year. All of this unfortunately sounds similar to what we [experienced last year](#).



Pollination and kernel set problems in northeast Iowa. Photo by Brian Lang, ISU Extension.

Corn development and temperature

As of Sunday, Aug. 7, 73 percent of Iowa's corn was good to excellent condition, a significant change from 82 percent the week ending [July 10 \(USDA-NASS\)](#). The percent of Iowa's corn silking and corn in or past the dough stage were slightly behind last year but slightly ahead of the 5-year normal. Some fields have reached the dent stage seemingly one to two weeks ahead of schedule. Remember though that kernels contain about 45 percent of their drymatter at dent and normally another month is necessary to complete the crop's development. Fortunately the weather outlook for the next 10 days indicates that temperatures are likely to be on the low side of normal in the Corn Belt east of Des Moines, Iowa (Figure 1). The precipitation outlook shows a tendency toward normal for Iowa and neighboring states but less than normal rainfall for the areas further East, South, and West.

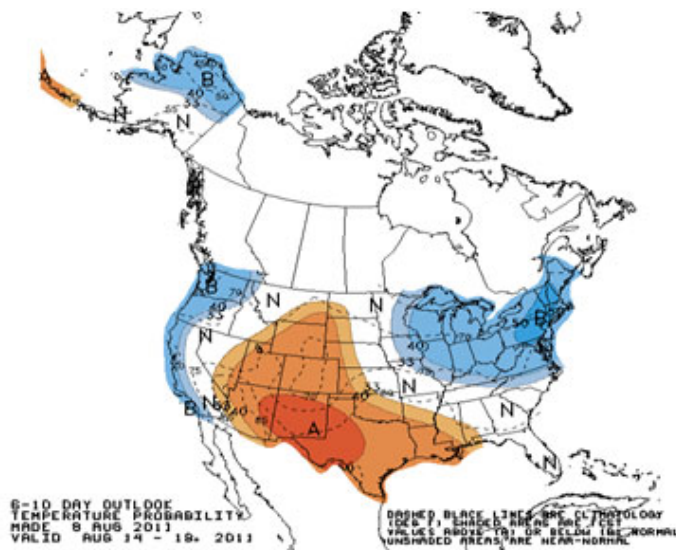


Figure 1. The [outlook shows cooler than usual temperatures](#) for Aug. 14-19 for northeast U.S. (also near the Pacific coast) and above normal temperatures are likely to the north and east of New Mexico.

Most areas in Iowa will have a reprieve from the heat during the next 10 days. However, the reprieve will not restore the loss of potential crop yield that was incurred by faulty pollination or by the accelerated pace of grain maturity. Areas south of I-80 will likely return to above normal temperature (Figure 2) during the week of Aug 16-22. Precipitation will be normal to dry from west to east across the Corn Belt.

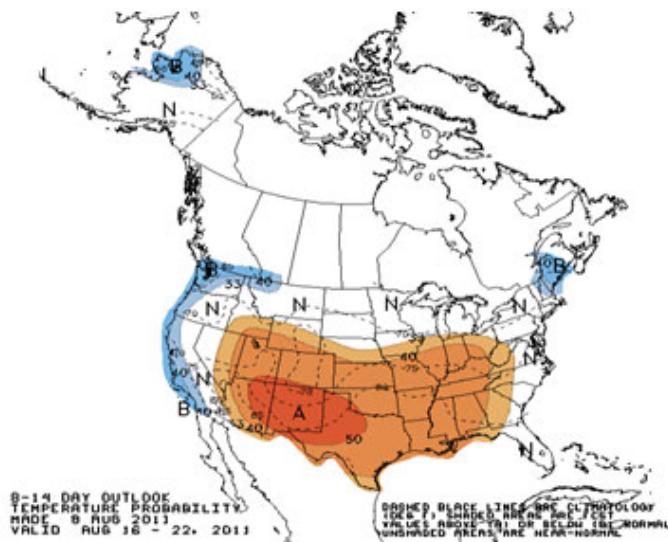


Figure 2. The 8 to 14 day outlook (August 18-22) indicates a likelihood of warmer than usual temperature across the Corn Belt to the south of I-80.

One year ago the [higher than usual night-time temperatures](#) after silking likely resulted in a yield reduction of about 10 percent (below that expected from the general condition of the crop). The high temperatures of 2011 have added more complexity to the development of the crop. Heat and water stress at pollination resulted in:

1. Poorer pollination than was noted in 2010
2. More hours of leaf-rolling of corn resulting is about a 1 percent yield loss for every four hours of rolling during the week of pollination and a 1 percent yield loss per 12 hours of rolling during other developmental stages of the crop
3. The accelerated maturity following pollination appears to be more significant in 2011 to date than it was during 2010

Producers can estimate the accelerated maturity influence from computed growing degree days. On the [Mesonet IEM Ag Weather/Climate Information](#) site simply select a weather station near your area of interest (they are shown on a state map or listed by nearby city) and begin the computation on July 1. Construct graphs for 2009, 2010 and 2011 if you wish to estimate the effect on your crop for comparison with the previous two years.

Figure 3 shows the normal growing degree day accumulation from July 1 to Aug. 8 for Ames, Iowa as a red line. The figure shows a blue line of accumulation for 2009 that is below the normal and resulted in yields that generally exceeded the expected. During 2010 the accumulation was greater than normal and the yield was reduced by about 10 percent (in excess of other stress effects that the crops may have experienced). The 2011 accumulation to date is about twice that of 2010 and the impact on yield may also be about double for the location shown. Remember, the accelerated accumulation of growing degree days shortens the time from silking to maturity and this generally reduces the yield because of a reduced number of days that the crop is gaining kernel dry weight between silking and maturity.

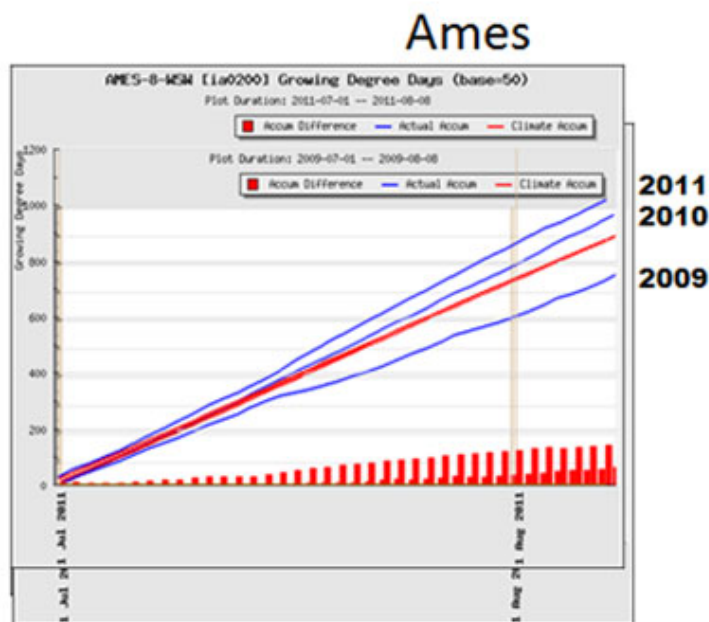


Figure 3. Accumulation of Growing Degree Days at Ames, Iowa from July 1 to Aug. 8. During 2009 the accumulation (lowest curve) was below the normal "red" line and the grain filling period was somewhat longer than usual. During 2010 the accumulation exceeded normal and the shortened filling period resulted in a somewhat reduced yield. The 2011 accumulation (top curve) appears to be about twice the 2010 amount to date. The graphic is a composite of three graphs generated at the [Iowa Mesonet website](#). Choose "single site graphs" and enter the year, starting date (July 1 for example), and the ending date (any date between July 1 and the day of computation).

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