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August 2009 Field Crops 28.491-69

Will Corn Mature in 2009?

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Record cool temperatures have occurred this July and farmers are getting concerned about whether the corn crop will mature. Figure 1 shows the typical relative maturity zones for full-season corn grown in Wisconsin when planted prior to May 15. Growing degree unit accumulation ranges from 2900 GDUs in the south to 1700 GDUs in the north with relative maturities ranging from 115 to < 80 days RM.

The normal (1978 to 2008) GDU accumulation at Arlington from May 1 to August 6 is 1596 GDUs (Table 1). This year it is only 1264 GDUs. Daily GDU accumulation ranges from 0 to 36 GDUs per day with an average in early August of 23 GDUs per day. Thus, we are 2-weeks behind normal. Fewer GDUs have accumulated at Arlington than at Marshfield located 100 miles north (Table 2).

Once corn silks it takes about 55 to 60 days to achieve maturity - R6 black layer (Ritchie et al., 1993). Development during grain filling is influenced by temperature, but not as much as during the vegetative leaf emergence stages. Instead the number of days between pollination and a killing frost influence the time to maturity. So if an average killing frost occurs October 1, then subtracting 55 to 60 days means that the crop must be silking by August 2-7. Silage harvest usually begins around 50% kernel milk which is 42 to 47 days after silking, so silking must occur by August 15-20; but remember that the timing of silage harvest is dependent upon achieving the proper moisture for the storage structure.

A common question being asked right now is, "If we have a normal (or cooler or warmer) season from this point forward, will we have enough time to get the corn crop mature?" Tables 1 and 2 show projected GDU accumulation for Arlington and Marshfield from August 6 to the normal killing frost date for these locations. In general, both locations are behind, but Arlington more so than Marshfield. **At Arlington, only with a late killing frost date AND a warmer than normal fall can we begin to approach enough GDU accumulation to mature a full-season 105 d RM (2500 GDU) hybrid. All other scenarios project to a killing frost before the crop matures. But remember that the number of days has more influence on whether the crop matures, so noting the silking date and the order with which your fields silk will help you determine whether a field will mature and the field harvest order that may occur in the fall.** At Marshfield, a cooler than normal grain filling period and/or an earlier than normal killing frost will be the scenarios that will not accumulate enough GDUs to mature a full-season 90 d RM (2200 GDU) hybrid.

Management options

1) Note silking dates to project calendar days to when a field will mature. Note order that field silk to plan the harvest queue. It will take approximately 42 to 47 days to get to 50% kernel milk, and 55 to 60 days to get to black layer.
2) Consider selling a greater proportion of your corn acres as silage or high moisture corn.
3) Consider locking in a price for drying fuel.
4) Taking the dock for shrink at the elevator.
5) Fine-tune your dryer so that over- or under-drying does not occur. Over-heating the grain in the dryer or filling the bin too fast for drying to occur will increase costs and decrease grain quality reducing profitability.
6) Hire and train the skilled labor that will be required to monitor dryers, fans, augers, and other equipment during the drying process.
7) Consider some field drying if moisture levels are high, but do not let corn stand in the field too long or snow may increase harvest losses due to ear droppage and stalk breakage from snow and ice.

Literature Cited

Ritchie, S.W., J.J. Hanway, and G.O. Benson, (eds.) 1993. How a corn plant develops, pp. 1-21 pp. ed. Iowa State Univ. Coop. Ext. Serv., Ames.

Figure 1. Relative maturity zones (days; GDUs) for full-season corn hybrids planted before May 15.

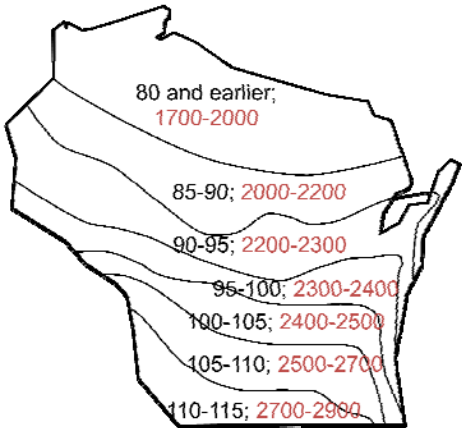


Table 1. Projected Growing Degree Unit (GDU)† accumulation after August 6, 2009 at Arlington, WI. Current GDU accumulation from May 1 to August 6 = 1264 GDUs (Normal‡ = 1596 GDUs). Weather data obtained from Bill Bland (AWON, UW-Soils) and the Midwest Region Climatological Center.

Frost date	Normal GDU	Projected GDU accumulation if temperatures after August 6 are:		
Tmin < 30 F	accumulation from May 1	Normal	One std§ Cooler	One std Warmer
One std earlier than normal = September 28	2458	2127	1946	2308
Normal = October 11	2563	2232	2051	2413
One std later than normal = October 24	2631	2299	2118	2480

†GDUs = [(Tmax + Tmin)/2] - Tbase, where corn grows between 50 and 86 F. Tmax = maximum daily temperature (upper limit = 86 F), Tmin = minimum daily temperature (lower limit = 50 F). Tbase = base/threshold temperature for corn growth (50 F). Daily range = 0 to 36 GDUs

‡Normal = average and standard deviation of previous 30 years (1979-2008).

§Std = standard deviation

Table 2. Projected Growing Degree Unit (GDU)† accumulation after August 6, 2009 at Marshfield, WI. Current GDU accumulation from May 1 to August 6 = 1302 GDUs (Normal‡ = 1522 GDUs). Weather data obtained from Mike Bertram (Marshfield ARS), Bill Bland (AWON, UW-Soils) and the Midwest Region Climatological Center.

Frost date	Normal GDU	Projected GDU accumulation if temperatures after August 6 are:		
Tmin < 30 F	accumulation from May 1	Normal	One std§ Cooler	One std Warmer
One std earlier than normal = September 26	2288	2068	1864	2272
Normal = October 7	2373	2153	1949	2357
One std later than normal = October 17	2427	2207	2003	2411

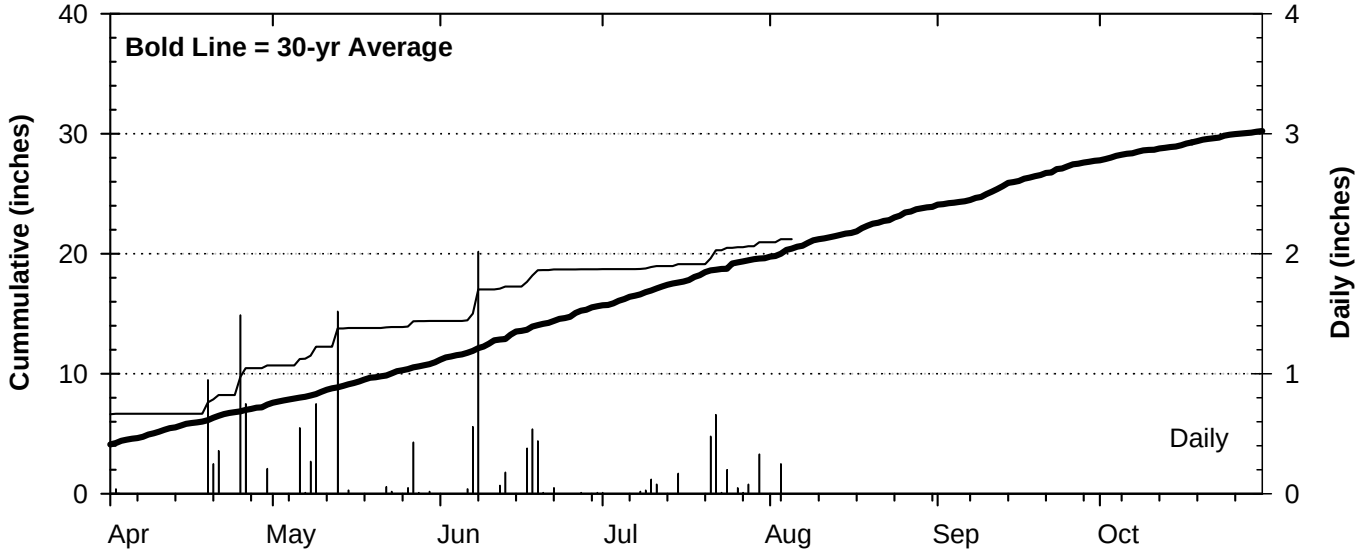
†GDUs = [(Tmax + Tmin)/2] - Tbase, where corn grows between 50 and 86 F. Tmax = maximum daily temperature (upper limit = 86 F), Tmin = minimum daily temperature (lower limit = 50 F). Tbase = base/threshold temperature for corn growth (50 F). Daily range = 0 to 36 GDUs

‡Normal = average and standard deviation of previous 30 years (1979-2008).

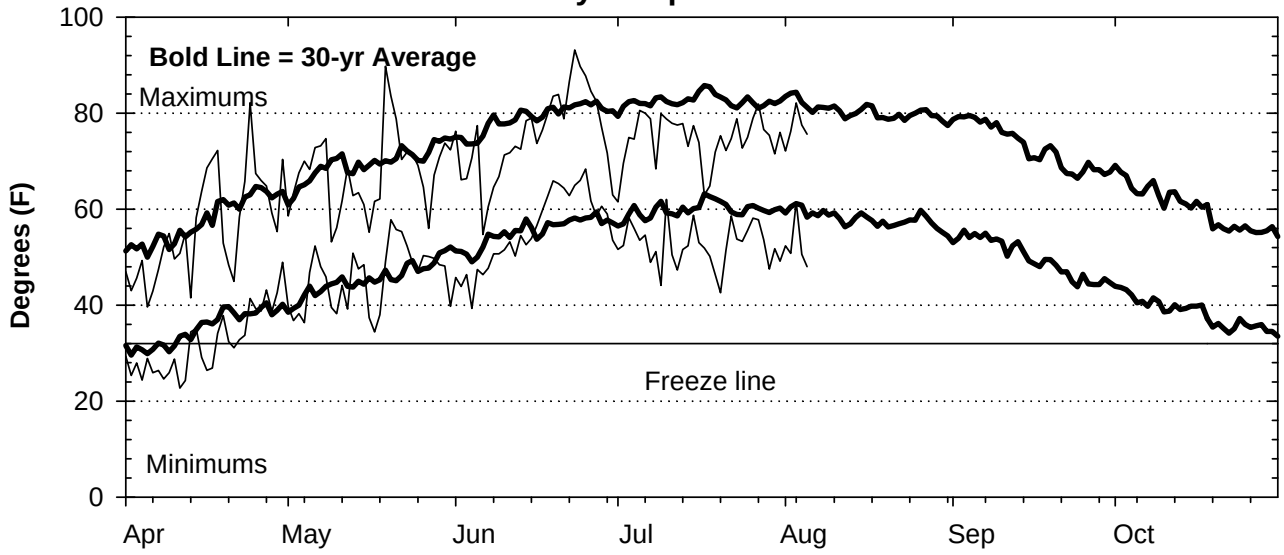
§Std = standard deviation

2009 Weather Summary for UW ARS - Arlington, WI

Precipitation

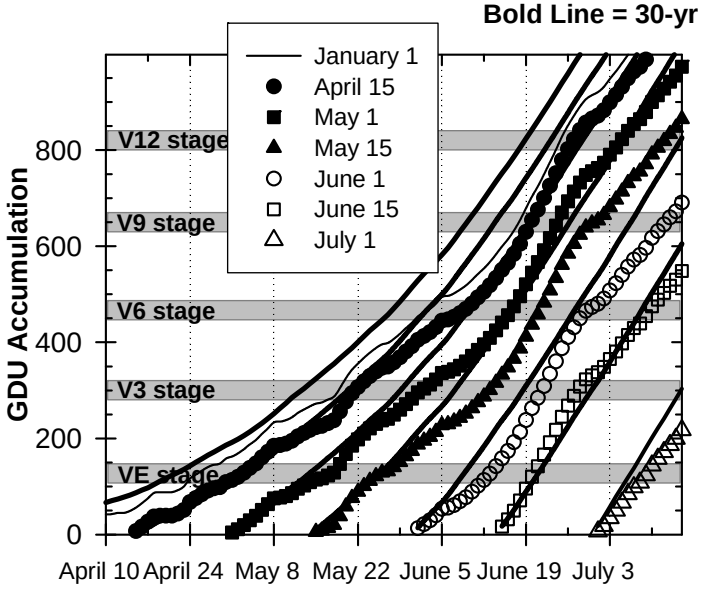


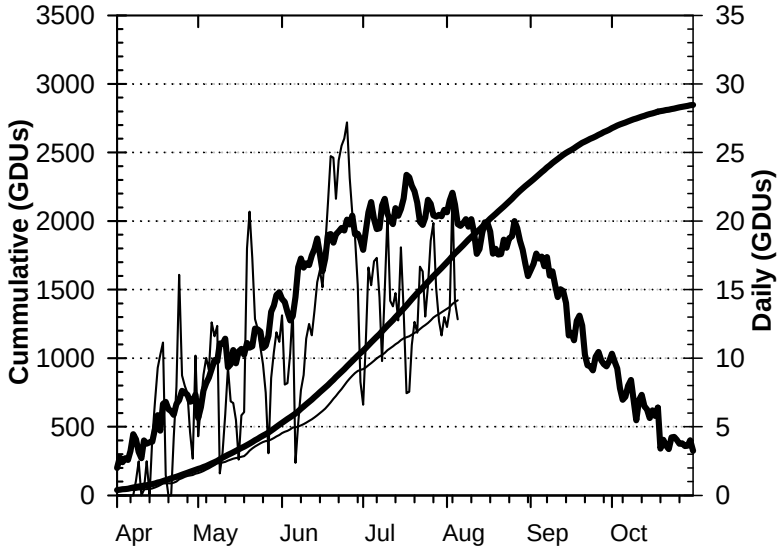
Daily Temperatures



Growing Degree Units (modified - base= 50, max = 86)

Bold Line = 30-yr Average for each planting date

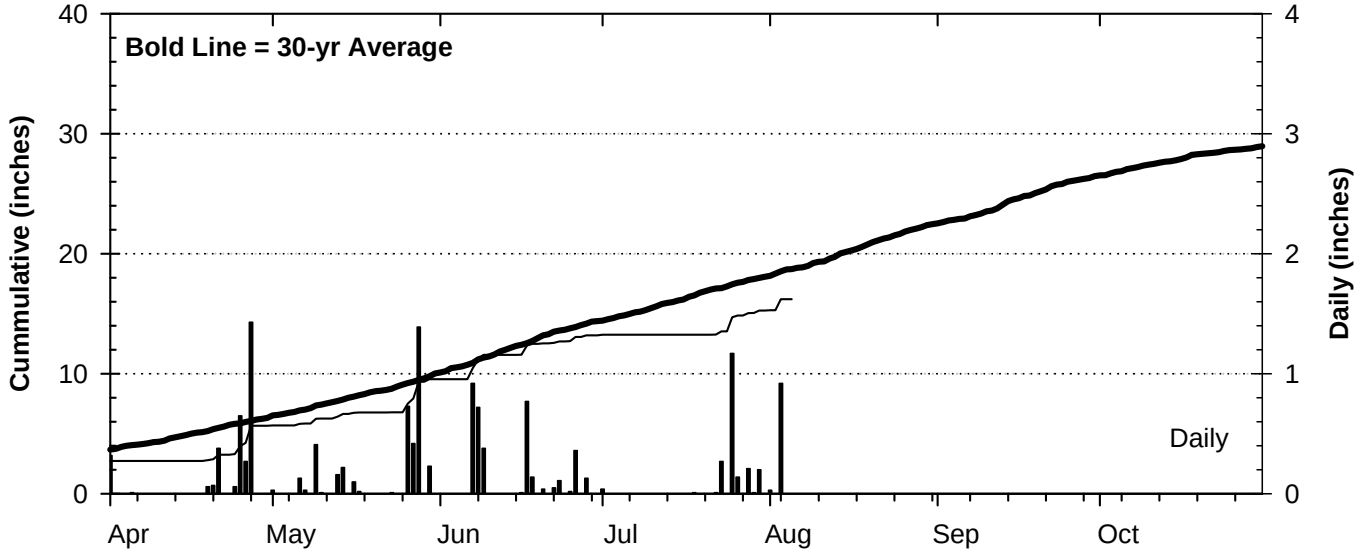




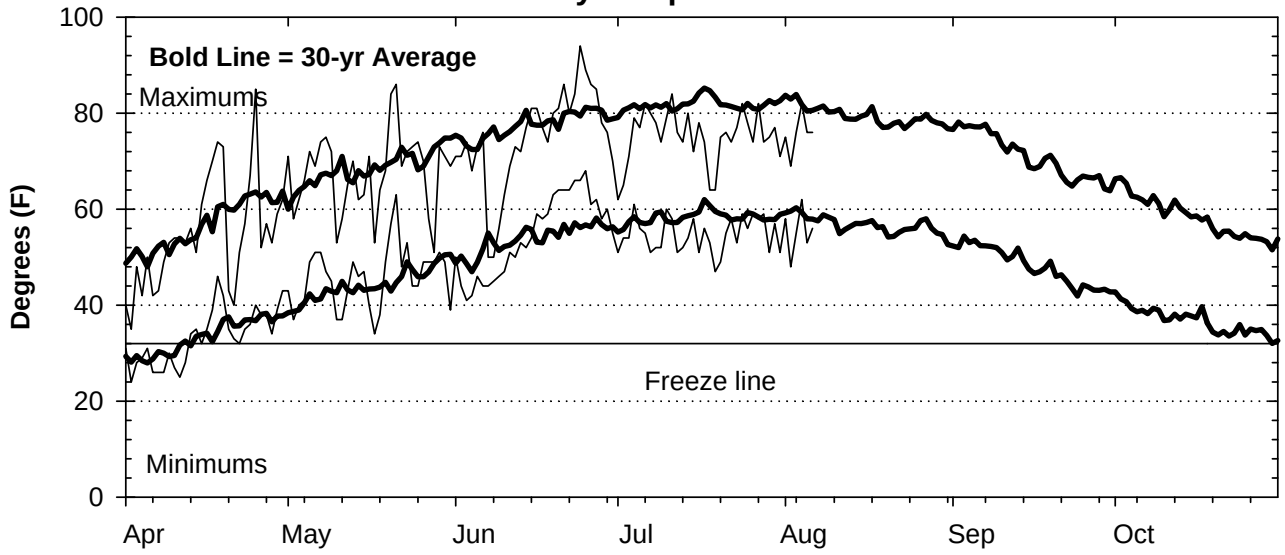
Source: Weather data obtained from Bill Bland (AWON, UW-Soils) and the Midwest Region Climatological Center.

2009 Weather Summary for UW ARS - Marshfield, WI

Precipitation



Daily Temperatures



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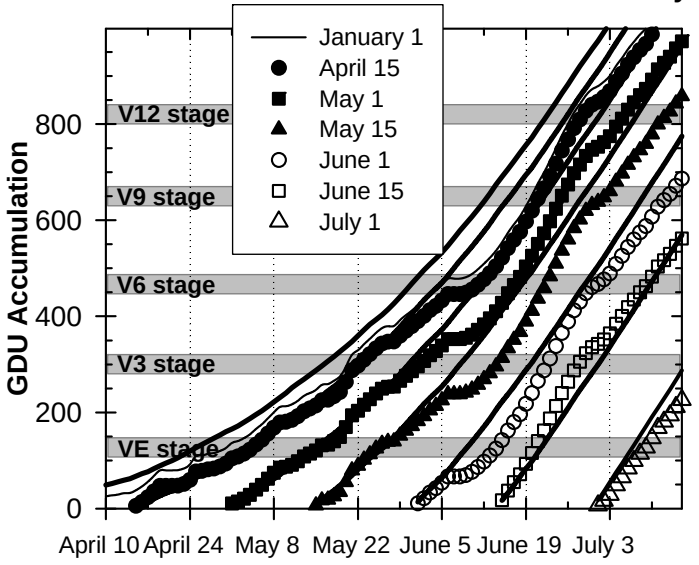

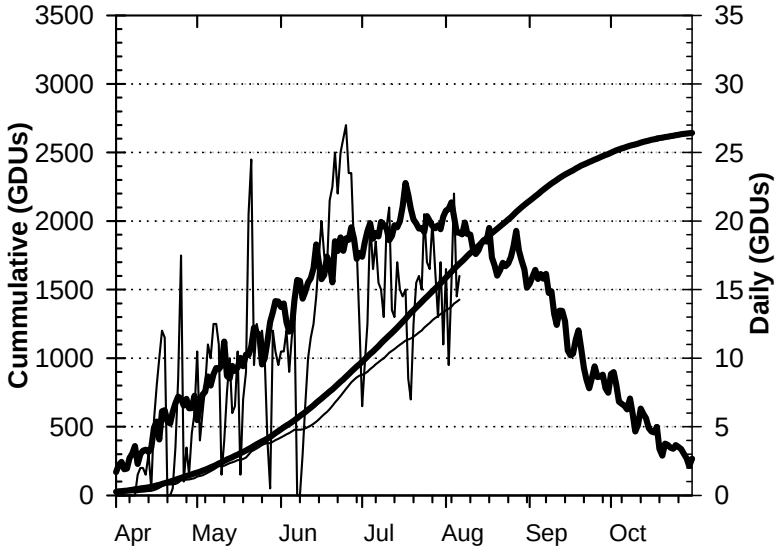

Source: Mike Bertram (Marshfield ARS), Bill Bland (AWON, UW-Soils) and the Midwest Region Climatological Center.