

# Predicting Corn Phenology 2010

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**P**henology is a branch of science dealing with the relations between climate and plant and animal life cycles. Corn growth and development is one example. Predicting when corn is going to be at a certain stage can be useful for crop management and even harvest planning.

Corn growth is primarily driven by heat. We measure the heat in modified Growing Degree Units (GDU). Calculate by adding the daily high temperature with the daily low, dividing by 2 and subtracting 50.

The modification refers to the limits imposed on the daily maximum and minimum temperatures allowed in the calculation. Daily maximums greater than 86 degrees F. are set to equal 86 in the calculation of the daily average temperature. Similarly, minimums less than 50 degrees F. are set to equal 50 in the calculation.

We begin with basic information such as a typical adapted corn hybrid that requires 1350 GDU to get to mid-pollination and a total of 2700 GDU to mature to "black layer." We also need average climate data to predict future development. Most hybrids require about 150 GDU to germinate and emerge, depending on depth. That is the point where the GDU phenol-

ogy clock starts ticking. Early in the growth process, each corn leaf requires about 85 GDU. From about the tenth leaf to the final leaf, growth occurs more rapidly at approximately one leaf for every 50 GDU.

Here is a 2010 example for southern Illinois: Corn planted on April 16 emerges around April 26 and has eight true leaves by the end of May. As of June 13, we had accumulated 1090 GDUs, well above the 917 GDU average for that date. Corn is approaching the 11 to 12 leaf stage. We can go on to estimate that given average temperatures, corn hybrids should be mid-pollination sometime around June 24. That late June date would be well before average for southern Illinois.

Carrying this process forward, physiological maturity (black layer) will occur by mid-August. At that point, the corn will be around 30 percent moisture and will begin the dry down process. Corn hybrids can differ significantly, but it takes about 30 GDUs to lower the grain moisture each point from 30 to 25 percent. Corn harvest before Labor Day is quite possible in this scenario. Dry down from 25 to 20 percent moisture requires about 50 GDU for each point of moisture.

Finally, realize that these projections are based on averages, and the summer of 2010 may not turn out to be average.  $\Delta$

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