

Can warm nights reduce grain yield in corn?

- Peter Thomison

High night temperatures (in the 70s or 80s) can result in wasteful respiration and a lower net amount of dry matter accumulation in plants. The rate of respiration of plants increases rapidly as the temperature increases, approximately doubling for each 13 degree F increase. With high night temperatures more of the sugars produced by photosynthesis during the day are lost; less is available to fill developing kernels, thereby lowering potential grain yield. High night time temperatures result in faster heat unit (GDD) accumulation that can lead to earlier corn maturation, whereas cool night temperatures result in slower GDD accumulation that can lengthen grain filling and promote greater dry matter accumulation and grain yields.

Past research at the University of Illinois indicates that corn grown at night temperatures in the mid-60s outyields corn grown at temperatures in the mid-80s. Corn yields are often higher with irrigation in western states, which have low humidity and limited rainfall. While these areas are characterized by hot sunny days, night temperatures are often cooler than in the Eastern Corn Belt. Low night temperatures during grain fill have been associated with some of Ohio's highest corn yields in past years. Last year, when the highest corn average yield to date were achieved, 174 bu/A, Ohio experienced one of its coolest Julys on record. The cool night temperatures may have reduced respiration losses during early grain fill and lengthened the grain fill period.