Grain yield development is a season-long process

As the calendar changes to August, this season's corn plantings have long been completed. At this point in the season, it's a good time to review some of the key growth stages the crop has progressed through and determine final grain yield. By knowing these key growth stages and understanding any stresses that the crop has encountered, you can use the information to develop appropriate management plans and set proper expectations for the harvest season.

Experienced farmers know that potential grain yield is an interaction of various factors, including genetic potential, climatic factors, soil productivity, available moisture, pest infestations and nutrient considerations.

While the interactions between these factors change from season to season, there are several key growth stages that are important each season for their impact on final grain yield.

Final grain yield in corn is comprised of known components, including: harvestable ears per acre (determined by seeds per acre planted, seeds germinated, and seeds emerged), numbers of kernels per ear (determined by the number of kernel rows and the number of kernels per row) and, lastly, kernel weight. Each of these components is determined at critical growth stages throughout the life of the plant.

Key timings for final yield potential – emergence, kernel row and kernel numbers, pollination and grain fill.

The first key growth stage that impacts final grain yield is **emergence**. The establishment of a strong, uniform stand at the optimum population is critical to the start of a successful growing season. The optimum population is a function of soil productivity, yield goals and individual hybrid selection. From various studies on plant population and final yield, modern hybrids, like those you provide to your customers, have been developed and can withstand higher plant populations than previous generations of hybrids.

The next critical growth stage in final yield potential is when the individual corn plant determines the **number of kernel rows and the potential number of kernels per row**. This stage of development occurs during the rapid phase of growth within the vegetative phase. Genetics influences the number of kernel rows, which is determined around the V12 growth stage. Around this same time, the number of kernels per row will also be determined and is complete by 7-10 days ahead of silking (growth stage V17). Managing the corn crop at these vegetative growth stages to reduce pest, moisture and nutrient stresses helps maintain high yield potential for the crop.

The third critical growth stage is **pollination**. Pollination of the individual ovules or kernels is required to convert

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potential kernel numbers into fully developed kernels. Successful pollination occurs when pollen sheds from the tassel, lands on an emerged silk, progresses down the length of silk (which is actually a tube) and fertilizes the ovule. Pollen shed generally occurs over 1-2 weeks, and it generally takes between 2-3 days for all of the kernels on each individual ear to be successfully pollinated. Weather conditions, especially drought conditions, can be disruptive to pollination and can result in poorly filled and stunted ears. Hail damage is critical at this time as well. To assess pollination of the crop, carefully remove the husk of an individual ear and shake the exposed ear. Silks from successfully pollinated kernels will fall away, while those that are unpollinated will remain attached.

The final critical growth stage for developing final grain yield is **grain fill**, when the kernels develop. This stage begins with pollination and ends at black layer formation or stage R6, when no more nutrients and materials move into the kernel and dry weight accumulation is complete. Environmental conditions and nutrient management are some of the key considerations at this time to help maximize the yield potential that has developed.

Knowing these key growth stages and their impact on final yield potential, along with key management considerations, can help you evaluate crop performance throughout the season and establish expectations for harvest yields.

Pollination converts potential kernel numbers into fully developed kernels. The process is vulnerable to weather conditions, particularly drought.

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