

# MESSENGER-INQUIRER



July 1, 2023

## Grain Fill Stages in Corn

Only two weeks ago my article pertained to the effect of dry soil conditions on the corn crop. Since then, more than two inches of rain have been received across the county, rehydrating soils, and returning the crop to a rapid growth pace. While some yield loss is to be expected from the extended lack of moisture, mild temperatures during much of the period helped mitigate irrevocable crop loss.

With the improved yield potential of this crop, I expect fungicide application to be a popular activity over the next few weeks. The Crop Protection Network, a group of Midwest land grant universities, releases the best resource for selecting fungicide products. Located on my website at <https://daviess.ca.uky.edu/anr>, the fungicide efficacy guides for both corn and soybeans are a composite of research trial data from across the Midwest. They evaluate how effective fungicide products are at controlling the most common foliar crop diseases. If you have not selected your fungicide yet, use this resource to make your best decision.

Mid-April planted corn is now at tassel and ear silk initiation stages, one of the most critical periods of the year for corn yield. Grain fill for corn begins with successful pollination at the start of kernel development and ends after about 60 days when the kernels reach maturity. During grain fill, the corn plant concentrates its resources on the developing kernels. A stress-

# MESSENGER-INQUIRER

free grain fill period can maximize the yield potential of a crop. Lack of moisture or severe heat stress during grain fill can cause kernels to abort, be lightweight, and encourage the development of stalk rot. Kernel development occurs through several distinct stages that most corn producers are familiar with – blister, milk, dough, dent, and black layer.

Although not a stage in kernel development, silk emergence is the first stage in kernel production. Silks are receptive to pollen for beginning grain development up to 10 days after they emerge. About 10 to 14 days after silking, the developing kernels are white-colored "blisters" on the cob. At this time, the ear silks are mostly brown and drying rapidly. Some starch is beginning to build up, and the seed components, radicle and first seed leaf, are already developing by the blister stage. Kernel moisture content is around 85 percent.

The milk stage occurs about 18 to 22 days after silking. The kernels are mostly yellow and contain "milky" white fluid. Severe stress can still abort kernels, although not as easily as at the blister stage. Kernel moisture content is approximately 80 percent.

The dough stage occurs about 24 to 28 days after silking. The kernel's milky inner fluid is changing to a "doughy" consistency as starch continues to accumulate in the kernel. Kernels can be shelled off by hand at this stage and the cob will be light red. By dough stage, about half of the mature kernel dry weight is in place. Kernel abortion is much less likely once kernels have reached the early dough stage, but severe stress can continue to affect eventual yield by reducing weight. Kernel moisture content is approximately 70 percent.

About 35 to 42 days after silking, most of the kernels are denting. A horizontal line appears near the dent end of the kernel and slowly advances to the tip end of the kernel over a period of 3 weeks. This line is called the "milk line" and marks the boundary between the liquid

# MESSENGER-INQUIRER

and solid areas of the maturing kernels. Severe stress can still limit kernel dry weight accumulation. Kernel moisture content at the beginning of the dent stage is approximately 55 percent.

About 55 to 65 days after silking, kernel dry weight usually reaches its maximum, and kernels are said to be mature and safe from frost. Physiological maturity occurs shortly after the kernel milk line disappears and just before the kernel black layer forms at the tip of the kernels. Severe stress after physiological maturity has little effect on grain yield, unless the stalk or ear falls, and harvest is prevented. Kernel moisture content at physiological maturity averages 30 percent.

While not a stage of grain development, harvest maturity is when grain moisture content falls to where harvest can occur with minimal kernel damage. Harvest maturity is usually considered to be near 25 percent grain moisture.

Educational programs of Kentucky Cooperative Extension serve all people regardless of economic or social status and will not discriminate based on race, color, ethnic origin, national origin, creed, religion, political belief, sex, sexual orientation, gender identity, gender expression, pregnancy, marital status, genetic information, age, veteran status, or physical or mental disability. UNIVERSITY OF KENTUCKY, KENTUCKY STATE UNIVERSITY, U.S. DEPARTMENT OF AGRICULTURE, AND KENTUCKY COUNTIES, COOPERATING