Drought Stress Impact on Corn

Drought stress caused by higher temperatures and lower or limited moisture can have an impact on corn any time during the growing season, but will have the greatest effect on yield from the late vegetative through the mid grain fill (dough and early dent) stages. Moisture is important for the uptake of nutrients, the movement of sugars or carbohydrates to the developing kernels, and for stalk and root maintenance. Drought stress occurs when the corn plant is unable to take in or replenish moisture lost through normal evapotranspiration.

When the mean daily temperature exceeds 77° F and the high or maximum daily temperature is above 95° F, regardless of soil moisture conditions, stress will occur as a result of the corn plant's inability to take up enough moisture. Stress can occur at slightly lower temperatures if soil moisture is more limited. If there are only a few days of stress, the effect is minimal. However, if stress occurs or persists 4 to 5 days or longer and there are symptoms of leaf rolling and visible wilting, the net effect will be a reduction in yield.

The amount of yield loss depends on the stage of growth and the duration and intensity of drought stress. Corn is most sensitive from the late vegetative through the mid grain fill stages as indicated in the table. Stress around pollination can delay silking, inhibit fertilization and kernel development. If stress is severe enough kernels may not develop and ears will be barren. During early grain fill (blister and milk stages), kernels can abort or be reduced in size. In later stages (dough and early dent), kernel size and weight can be reduced. Once corn reaches the mid to late dent stage, stress will have less effect on grain yield, but can have more impact on stalks and roots. There is usually enough moisture to move sugars from the stalks and roots to finish grain fill. Stalks and roots will be weakened and more easily invaded by stalk rot organisms.

Estimated corn evapotranspiration and yield loss per day of stress

Growth Stage	Evapotranspiration in inches per day	Percent yield loss per day of stress
V12 to V16	.21	2 - 4
V16 to Tasseling	.33	3 - 4
Pollination	.33	3 - 8
Grain fill	.26	3 - 5

Source: Univ. of Wisconsin

If drought stress is severe and persists long enough, firing or death of the older leaves below the ear is an early symptom. All leaves will eventually wilt, turning a frosty color and plants will die prematurely, disrupting grain fill. Kernels can vary in size, weight and moisture. Early stalk rot and lodging are potential problems.

It is important to scout or monitor fields often during periods of drought stress. Check stalks during the grain fill period for signs or indications of stalk rot. Look for discoloration around the nodes and internodes. Pinch the lower portion of the stalk at the third or fourth internode from the soil surface. If it easily gives or collapses, stalk rot is evident. Schedule harvest accordingly to minimize losses due to early lodging and if plants die prematurely, kernel size, weight and moisture can vary. More attention to combine adjustments will be necessary to minimize harvest losses.

© Copyright 2011 Syngenta

June 2012 - TAG

This information is accumulated from publicly available sources outside of Syngenta or its affiliates. Syngenta makes no representation as to the accuracy of such information. The Syngenta logo is a registered trademark of a Syngenta Group Company. Classification: PUBLIC