



THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL,
AND ENVIRONMENTAL SCIENCES

Hardin County Extension News Release

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Corn Development Stress

Hardin County – One of the corn production scenarios agronomists least like is a wet spring followed by a hotter and drier than normal July and August. The spring of 2019 was one the wettest on records throughout much of the state and now, as the dry weather that started in July persists, such a scenario seems to be a possibility. A combination of warm temperatures and inadequate rainfall is beginning to stress corn fields across Ohio. What's exacerbating this problem are the marginal roots evident in some fields. Several factors, including poor planting conditions and/or excessively wet soil conditions in June have inhibited good root development in many fields.

With the onset of drier, warmer conditions in July, these small, shallow root systems have been unable to extract water deeper in the soil profile. Recent cooler weather and the possibility of summer storms may ease the stress. Cooler weather and possible rains are important since most corn fields are near or entering the pollination period, the stage of development most susceptible to drought. Even fields that have already pollinated are at risk, since hot and dry weather may cause young kernels to abort.

With the wide range of planting dates this year, corn is at many different stages of development. To estimate the impact of hot and dry weather on corn yield potential, one needs to review the effects of moisture deficits on corn growth and development. Yield losses to moisture stress can be directly related to the number of days that the crop shows stress symptoms during different growth periods. The following summarizes Iowa State University research, which shows the potential impact of water stress on yield at different growth stages.

Vegetative Stages: According to the most recent National Agricultural Statistics Service report for the week ending August 11, 71% of Ohio's corn had silked (compared to 94% for the five-year average). Some of the corn planted in mid to late June or later is still vegetative. During the later vegetative stages, when kernel numbers per ear are determined, plants become more sensitive to stress. According to the Iowa research, four days of severe stress (corn wilted for four consecutive days) at the 12th to 14th leaf stage has the potential to reduce yields by 5 to

10 percent. Kernel row numbers on the ear are determined by the 12th collared leaf stage and the potential number of kernels per row is complete about one week before silking.

Tassel Emergence: As the tip of the tassel begins to emerge from the whorl, the upper stalk internodes rapidly elongate and the ears begin to expand. Silks from the base of the ears are also rapidly elongating. Four days of moisture stress at this stage has the potential to reduce yields 10 to 25%.

Silk Emergence to Pollen Shed: At this stage, leaves and tassels are fully emerged and the cobs and silks are growing rapidly. This is the most critical period in terms of moisture use by the plant. Four days of severe moisture stress at this stage has the potential to reduce yields 40 to 50%.

Blister through Dent Stage: About 12 to 36 days after silking, the cobs, husks and shanks are fully developed, and the kernels are increasing in dry weight. Moisture stress will reduce grain fill from the ear tip down. Four days of drought at the blister stage has the potential to reduce yields 30 to 40%, and at dough stage, 20 to 30%.

Uneven emergence was also a common problem in our area because of wet spots in fields. Plants in these spots will be shorter and more vulnerable to dry weather. Additional yield losses in these areas will depend on the length of the emergence delays and the percentage and distribution of later emerging plants.

Many parts of the Corn Belt have shown signs of entering a drought period, especially eastern Iowa and west central Illinois. Fortunately, only a small area of southwestern Ohio has been categorized as droughty. Northwestern Ohio is dry but has not reached a droughty definition at this time, which is good since much of the corn is beginning to pollinate. The area would greatly benefit from good rain showers. Fortunately, temperatures are ideal for growth: afternoon temperatures in the mid-80s and night-time lows in the upper 50s and low 60s.

In summary, corn yields have already been significantly reduced because of the late planting. Timely rains in August and early September will be needed to prevent further yield reductions. Farmers will also need a later than normal killing frost to ensure that the late planted corn will mature.

Article written by Ed Lentz, OSU Extension-Hancock County and edited by Mark Badertscher, OSU Extension-Hardin County.