BETWEEN THE ROWS®

August 11, 2014 | GRAIN FILL STAGES IN CORN | wyffels.com

The corn crop is progressing through the grain fill stages of development. During this time, the corn plant switches nearly all of its resources to filling kernels. Plant health is critical during grain fill. Healthy leaf tissue, especially from the ear leaf up, is required for production of sugars via photosynthesis. Healthy roots intake water that is essential for sugar transport and cell expansion. Healthy stalk tissue is needed to transport sugar, water and nutrients and to structurally support the developing ear. Any stress that reduces the health of the roots, stalks, and leaves will negatively impact corn yield. These stresses include disease, moisture deficits, wind, hail, freezing temperatures and insects. The good news is that the farther the plant is along in the grain fill process, and the closer to harvest, the less impact stress will have on yield loss. The following table lists details of the various grain fill stages, potential yield loss, and how stress impacts kernel development.

Grain Fill Stage	% kernel moisture	Approximate days to black layer	Approximate GDUs to black layer	% estimated Yield Loss: whole plant death	% estimated Yield Loss: loss of leaves only	Effects of stress on kernel development
R1 Silk		55-65	1230-1500	100	97	Poor or incomplete pollination
R2 Blister	85	45-50	900-1000	100	73	kernel abortion
R3 Milk	80	35-40	850-900	>75	59	kernel abortion
R4 Dough	70	30-35	650-700	50	41	reduced kernel size and weight
R5 Dent	55	20-25	325-375	40	23	reduced kernel size and weight
R5.5 Half milk line	45	14-18	260-300	12	7	reduced kernel size and weight
R6 Black Layer	30-35			0	0	physiological maturity, no kernel size or weight loss

Much of the 2014 corn crop has experienced very favorable weather through pollination and early grain fill. If conditions remain favorable, we could see record yields across the Corn Belt. However, not all fields will be record breakers. In areas that have been short on rain in July and early August (Figure 1), one could expect ear tip dieback - the loss of kernels on the ear tip from kernel abortion or lack of kernel filling (Figure 2). Ear tip dieback can also occur in fields that have lost a large portion of leaf tissue above the ear from disease such as Goss' wilt, Northern Leaf Blight, Rust, or Gray Leaf Spot. Greensnap and root lodging earlier in the year will limit top end yields in some fields. Late season nitrogen deficiency can be seen in some fields, which will limit yield potential. Record yields will also be tempered in fields that had poor stand establishment. A big component in the yield equation is ears per acre. The more ears that you have in a cooler than normal year with adequate rainfall, the higher the yield potential.

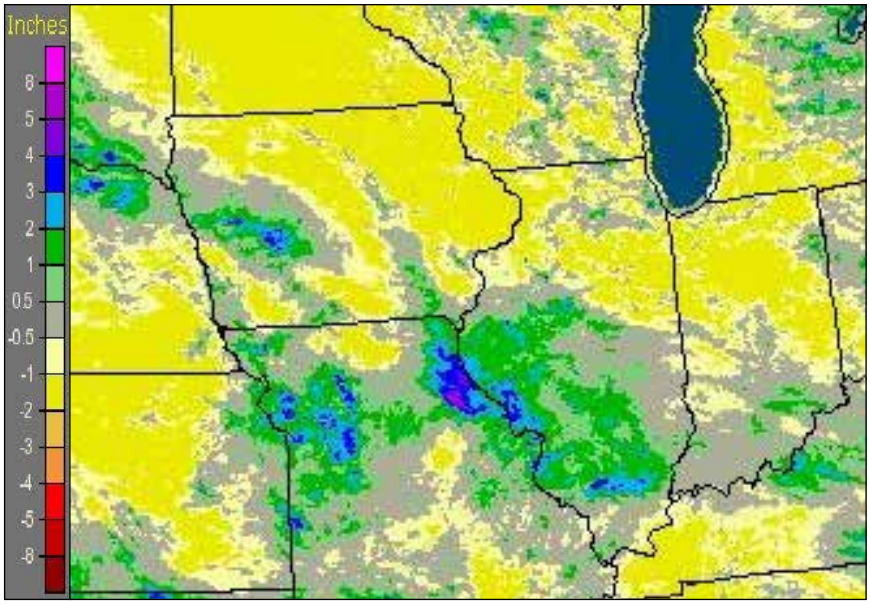

Figure 1: 14-day rainfall departure from normal, July 26 - Aug 8

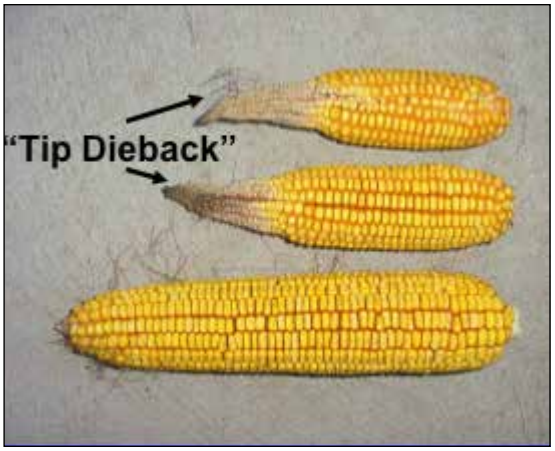

Figure 2: Example of ear tip dieback
Photo courtesy of The Ohio State University Extension

GDU Progress

The following table illustrates GDU progress from May 1 – August 7 for various geographies. We have fallen behind long term averages but are still ahead of 2009.

State/Region	Apr 1- Aug 7 2014 GDU	50 yr avg GDU	2014 - 50 yr avg difference	2009 GDU	2014 - 2009 difference
IOWA					
NW	1647	1786	-139	1545	102
NC	1564	1745	-181	1464	100
NE	1606	1734	-128	1470	136
WC	1703	1881	-178	1644	59
C	1663	1843	-180	1610	53
E	1720	1867	-147	1636	84
SW	1839	1956	-117	1754	85
SW	1792	1920	-128	1670	122
SE	1843	1976	-133	1771	72
ILLINOIS					
NW	1719	1844	-125	1628	91
NE	1737	1789	-52	1572	165
W	1892	1975	-83	1780	112
C	1866	1963	-97	1799	67
E	1828	1939	-111	1795	33
WSW	1999	2071	-72	1942	57
ESE	1995	2073	-78	1971	24
SW	2136	2176	-40	2103	33
SE	2082	2196	-114	2126	-44
MINNESOTA					
SW	1539	1671	-132	1440	99
SC	1555	1690	-135	1453	102
SE	1560	1629	-69	1354	206
WISCONSIN					
SW	1620	1690	-70	1428	192
SC	1564	1643	-79	1416	148
SE	1507	1618	-111	1364	143
KENTUCKY					
W	2174	2203	-29	2126	48
C	2044	2109	-65	2016	28
Blue Grass	1970	2030	-60	1912	58
E	1923	2004	-81	1872	51

This data can be accessed at: *http://mesonet.agron.iastate.edu/GIS/apps/coop/gsplot.phtml*

From the desk of

Dr. Brent Tharp
Agronomic and Product Training Manager

309.737.6434 cell
btharp@wyffels.com