Crop Stress and Drought Questions
July 25, 2012 Webinar

Question: How much rain is needed to bring soil moisture to ideal?
http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/region_monit/rdpcp.gif

The graphic should be considered for values up to 7 inches, higher amounts on the graphic have reference to replacing very deep moisture and the values greater than seven should just be called seven for crop production purposes. The graphic cited is intended for the amount of precipitation needed to bring hydrology levels to normal... sub-soil is basically the same but the value may never exceed 10 inches.

Question: How to make graphics of precipitation and heat stress days for your local area?

In any Corn Belt state, go to http://www.mesonet.agron.iastate.edu/ then select “Ag Weather.” Then under “Growing Season” click “Single Site Graphs,” then choose your state (Iowa is default) and a location from the menu or from the map. Select a starting date (year, month, day) such as Jan. 1 or planting date, or other as you choose. The ending date can be any later date (if you choose a date beyond yesterday that is OK it will just compute up until yesterday anyway). Then punch “Make Plot.” On the three resulting graphs the red line will indicate the normal condition and the blue line the results for the year of interest.

It is good also to make charts for some past years when you had a great harvest and a poor year as well so you have a frame of reference for judging this current year.

Question: What is the impact of drought on seed corn crop?
Not known. We know that the parent lines are more impacted by drought than are hybrids. However, the seed industry was well aware of this drought pending as early as July 2011, so the impact on the seed industry depends on the extent of their increased planting, irrigation and field placements. One major company contacted me about risk of loss of entire fields of seed according to distance between production areas.
Question: Will El Niño bring more snow this winter?
It will bring more than last year. The El Niño should be well established by October. Such years tend to have near normal over-winter precipitation in the western Corn Belt and scant winter moisture in the valley of the Ohio River.

Question: If it rains, will we return to normal soil moisture?
Normal rain in fall and winter will result in 7-8 inches of moisture in most Iowa soils by May and a full profile (running tiles) by mid-June.

Question: What is the impact of dry conditions on fall NH3 application?
[Partial answer by Elwynn:] Fall application always has a risk of loss of the material. However, dry conditions minimize the potential loss. This assumes that there was sufficient moisture for the material to inject.

Question: What are the effects of heat during pollination and soon thereafter?
Modern hybrids show little high temperature disadvantages, unless the temperature reaches more than 108 F. Note this is simply the temperature effect on the plants. At elevated temperature water loss tends to be greater than at lower temperatures. Some lines have pollen or silks that are more sensitive to drying out than others. It is drying that is usually associated with poor pollination and also with abortion of young kernels.

Question: How much rain is needed in NW Iowa to limit corn loss to less than 20 percent below the normal?
[I have not had time to compute this; the question does require some extensive analysis to answer meaningfully.] The farmer can estimate the loss to date from hours of rolling of corn leaves. It will take 15 inches total of water to yield 80 percent of normal. Some fields have been observed to have roots to 9 feet depth (by digging) this gave them about 11 inches in the soil at planting time. If you have a well rooted field, in a deep Loess soil, consider that you started with the 11 inches or a little more.

Question: 1988 had drought stress, what was the soil moisture at the start?
The soil moisture was on the high side of average. We ran the moisture stress model for 1988 using 1956 soil moisture and it computed a worse year for yield, worse than 1936. The soil moisture in 2012 was almost like 1956 to start with, but the spring rain was better than in 1956, overall.

Question: Does good fertility reduce water stress?
This is a mixed answer. 1988 was an early season severe drought and the fields with starter died; those without were not as bad. In the late season drought of 1983 the higher fertility fields held up the best (at least to the extent of our small sample of about 14 fields). The corners of some fields are fertilizer deficient, those smaller plants are green and little stressed in the day, the larger plants along the rows are dead or nearly so (observed in the Ames area on July, 25 2012).