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Checking the Back Forty

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Weekly Growing Degree Days and Rainfall thru July 17, 2011

	Temperature *(°F)*				**Growing Degree Days (GDD)** *(Base 50°F)*					**Precipitation** *(Inches since 4/1/2011)*			
Station	High	Low	Avg	Departure from normal	Week of July 11-June 17	Since May 8	Departure from normal	Since May 22	Departure from normal	Week	Departure from normal	Season	Departure from normal
Cobleskill	85	52	70	3	145	1023	169	930	156	0	-0.77	17.63	4.52
Morrisville	86	54	71	4	149	1005	197	897	166	0.05	-0.75	15.74	2.85
Norwich	88	51	69	2	136	1056	206	929	161	0	-0.77	22.26	9.10
Oneonta	88	51	69	3	138	1038	249	926	209	0	-0.91	21.04	6.84

From the USDA National Agricultural Statistics Service New York Field Office and the New York Department of Agriculture and Markets
Weekly accumulations are through 7:00 AM Sunday Morning

We are tracking Growing Degree Days (GDD) during the season using 50°F as a base temperature. There will be two dates of reference for these GDDs, May 8 and May 23, 2011. Rainfall accumulation will be from April 1 on.

Early planted corn tassels are now visible. Tasseling/silking should be completed by about 1200-1300 GDDs so given the above GDDs we are lining up pretty well with that. By this coming weekend we should expect to be at the tasseling/silk stage for that early planted corn. Tasseling and silking have always been assumed to be in sequence, first tasseling and then silking occurring a few days later; there is actually more overlap than that. Also note that silking can be delayed in hotter, dryer weather. It should take 1250 GDDs for 96-100 RM hybrids and 1300 GDDs for 101-105 RM hybrids to reach tasseling/silking. Expect to harvest 96-100 RM hybrids for silage at about 750 GDDs after tasseling/silking and for 101-105 RM hybrids at about 800 GDDs.

References:

How a Corn Plant Develops, Special Report No. 48, Iowa State University, 1998

Tassel Emergence & Pollen Shed
http://www.agry.purdue.edu/ext/corn/news/timeless/Tassels.html
Silk Development and Emergence in Corn
http://www.agry.purdue.edu/ext/corn/news/timeless/Silks.html
R.L. (Bob) Nielsen, Agronomy Dept., Purdue University, West Lafayette, IN 47907-2054

Using the Number of Growing Degree Days from the Tassel/Silking Date to Predict Corn Silage Harvest Date
Bill Cox, Crop and Soil Sciences, Cornell University
http://css.cals.cornell.edu/cals/css/extension/cropping-up-archive/Vol16No4A1.pdf

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A need for oxygen… and maybe a little nitrogen.

Seems that I have now been at this job long enough there is a need to relearn things and one lesson for me this summer was seeing how much crops suffer from saturated soils. Saturated soils by definition are ones where the open pore space is filled with water. Now you expect to see crops such as corn and soybeans be poor or die in wet low areas of a field or grass only to exist in those areas and the alfalfa to be long gone. However I saw the effect of the large rainfall events on crops this spring and I offer my thoughts on what I have seen and then the following article from Peter Thomison at Ohio State. Bottom line: plant roots need oxygen to breathe.

I was in an alfalfa field in early May beginning our first cutting project and it was raining so hard that it was one of the few times I have been in a very well drained field and heard and felt the squish of water under my boots. I had measured the field a week earlier and in the week in between a several heavy rainfalls which would have saturated the soil occurred. The field in a week's time had not grown an inch in height. A second field, a newer alfalfa-grass field I was monitoring in May began to quickly show the difference drainage makes as the alfalfa over the tile lines quickly became 6 inches taller than the rest of the field. Their were no particular wet spots in the field the tile lines were just moving that much water away. And a third instance with alfalfa, some new seedings where one field was and continues to be slightly ahead of two others because the soil is a little coarser and slightly better drained. Let's not forget with legumes it is not only taking oxygen in for respiration it is needing nitrogen for nitrogen fixation. With saturated soils nitrogen fixation becomes equally hard to accomplish.

And although I can think of several specific fields I have seen in my travels this year in general in most corn fields you can see where the tile lines are. The corn over the tile lines is feet taller and darker green than the corn in between. Certainly some of this is denitrification, the N_2 gas loss in waterlogged soils where anaerobic conditions exist. But part of it is not having roots that can get the oxygen they need to grow and be healthy. Quite often it is said in wet years corn plant roots don't have to go deep to chase water so they become shallow rooted. Corn plant roots don't go deep in wet years because they can't, they can't grow in the lack of oxygen. Compacted soils are affected more; the "compaction" is a loss of pore space so there is even less chance of air/oxygen to be present.

Extreme years as this one, dry years bring out similar but different and possibly opposite responses, exaggerate but point out quickly how much effect soils types have on crop growth. It seems to only take slight differences in drainage to see a crop response in these difficult conditions, a slight ridge in a corn field can make one row taller greener than the row right next to it because there is a little more soil depth and better drainage. I point this out because people often search for some other answer to crop problems when at the end of the day it is simply changes in soil physical properties.

So the message is not to go tile drain everything but taking a moment to recognize that small changes in soil physical properties make a big difference in crop growth. There are reasons why soils are classified to have certain production limitations and why as we look to expand acres of corn and soybeans as their current high prices I caution we need to come back to really knowing our soils and their capabilities. Although there are certain inherent properties to soils we can't change that doesn't mean we still shouldn't do what we can with crop rotations, cover crops and reducing compaction to improve soils.

Flooding and ponding effects on corn and soybean

Peter Thomison, Extension Specialist, Corn, Ohio State University
C.O.R.N. Newsletter 2011-18, June 14 - June 20, 2011

Editors Note: Although we seem to be out of the heavy rains that caused issues earlier in the season we still suffer from the effects. Peter Thomison's well written article explains what happens to corn and soybeans under flooded or saturated soil conditions.

"Pop up" thunderstorms during the past week resulted in localized ponding and flooding of corn and soybean fields (most of these recently planted). If the ponding and flooding was of a limited duration, i.e. the water drained off quickly within a few hours, the injury resulting from the saturated soil conditions should be minimal.

CORN

The extent to which ponding injures corn is determined by several factors including: (1) plant stage of development when ponding occurs, (2) duration of ponding and (3) air/soil temperatures. Prior to the 6-leaf collar stage (as measured by visible leaf collars) or when the growing point is at or below the soil surface, corn can usually survive only 2 to 4 days of flooded conditions. Since much of the corn that's been planted so far is not beyond the V3 to V4 stage, it's especially vulnerable to damage from ponding and saturated soil conditions. The oxygen supply in the soil is depleted after about 48 hours in a flooded soil. Without oxygen, the plant cannot perform critical life sustaining functions; e.g. nutrient and water uptake is impaired, root growth is inhibited, etc. If temperatures are warm during ponding (greater than 77 degrees F) plants may not survive 24-hours. Cooler temperatures prolong survival so the relatively cool temperature forecast for the next couple of days should be beneficial. Once the growing point is above the water level the likelihood for survival improves greatly.

Even if ponding doesn't kill plants outright, it may have a long term negative impact on crop performance. Excess moisture during the early vegetative stages retards corn root development. As a result, plants may be subject to greater injury during a dry summer because root systems are not sufficiently developed to access available subsoil water. Ponding can also result in losses of nitrogen through denitrification and leaching. Even if water drains quickly, there is the possibility of surface crusts forming as the soil dries that can impact the emergence of recently planted crops. Growers should be prepared to rotary hoe to break up the crust to promote emergence.

For corn that's emerged, check the color of the growing point to assess plant survival after ponding. It should be white to cream colored, while a darkening and/or softening usually precedes plant death. For corn not yet emerged, evaluate the appearance and integrity of seeds or seedlings that have yet to emerge (likely rotting if discolored and softening). Look for new leaf growth 3 to 5 days after water drains from the field.

Disease problems that become greater risks due to ponding and cool temperatures include pythium, corn smut, and crazy top. Fungicide seed treatments will help reduce stand loss, but the duration of protection is limited to about 10-14 days. The fungus that causes crazy top depends on saturated soil conditions to infect corn seedlings. There is limited hybrid resistance to these diseases and predicting damage from corn smut and crazy top is difficult until later in the growing season.

SOYBEAN
(the following is adapted from Palle Pedersen, former soybean extension specialist, Iowa State University) Water logging and poor aeration associated with localized floods and ponding can result in significant soybean yield reduction. The extent of ponding and flood damage to soybean is related to the temperature of the water, the amount of water motion and the duration of the flooding and ponding conditions.

Soybean prefers adequate soil oxygen for maximum productivity. Oxygen content of water is much lower than air therefore saturated soils and flooding reduces the amount of oxygen available to the plant. Research has shown that oxygen concentration can be close to zero after 24 hours in flooded soil, depending on water movement. Without oxygen, the plant cannot perform important functions like respiration, an important function of plant growth. Soybeans can generally survive for 48 to 96 hours when completely submersed. The actual time frame is dependent upon air temperature, cloud cover, soil moisture conditions prior to flooding, and rate of soil drainage.

Temperatures influence the speed of respiration so high temperatures will be more detrimental to soybean recovery since the faster the respiration is "running" the faster the oxygen is depleted and the plants then start rotting. Cool, cloudy days and cool, clear nights increase the survival of a flooded soybean crop.

Research from Minnesota shows that flooding for 6 days or more may result in a significant yield loss or loss of the entire crop. With temperatures in the 80s, soybean plants may only survive a few days. Ohio researchers found that plants in flooded fields are injured from a buildup of toxins and carbon dioxide, which is up to 50 times higher in flooded soils than in non-flooded soils. They concluded that plants are more injured from the buildup of carbon dioxide than from lack of oxygen. During emergence, soybean fields subjected to flooding and saturated soil conditions are at major risk from Phytophthora and Pythium damping-off.

Reference:
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