From the Ground Up

Soil Solutions, LLC · 2120 Pearl Street · Onawa, IA 51040 · 712-433-0000

September 2013

Will my Corn Crop Mature in Time?

This is the question that some producers are asking themselves. Planting was delayed by wet weather and now the temperatures in recent weeks have been cooler than normal. This is raising the question of how will this affect the maturity of the corn?

As you know corn growth is primarily temperature related. This is measured using Growing Degree Days (GDD) or Heat Units. These are computed from the day of emergence. For corn the calculation is (Maximum Daily Temperature + Minimum Daily Temperature)/2 – 50. If the maximum temperature exceeds 86 then the factor used for that day is 86. If the minimum temperature is cooler than 50 then the factor used is 50.

When you run the numbers using this equation you can understand that GDDs do not accumulate as rapidly during the early corn growth so a few days delay in planting may not alter silking date, pollination and filling of grain that much. A rule of thumb is that a two week delay in planting will delay silking by one week.

Most hybrids (dependent upon relative maturity to a degree) require about 65 days between the date of silking and physiological maturity or about 1200 GDD. However, later planted corn will require usually 80-120 fewer GDD than early planted corn. Some think that this is because there is also a day length factor that will also affect corn maturity. As the days shorten, the corn plant triggers a signal that tells itself that it needs to speed up maturity. Sunlight or the number of cloudy days could alter this as well. A rule of thumb that used to hold true was that a 1 week delay in maturity on August 1 would delay harvest by one month. This may not be as true today with current hybrids.

Average accumulation for GDDs for July for Onawa, Iowa is 24.5 per day (765 total for month). Average accumulation of GDDs for Onawa, Iowa for August is 22 GDD per day (688 total for month). Average accumulation for September is 16 GDD per day (488 total for month). If this occurs then reaching maturity should not be a concern. However, during the first 14 days of August at Onawa, IA we have a deficit of 44 GDD. During July we had a deficit of 48 GDD with the greatest deficits coming after pollination.

As of August 1, most corn in Western Iowa and Eastern Nebraska had pollinated during the cooler temperatures and it appears that pollination was not a problem. Yield potential appears quite high at this time with many reporting 18 rows around.

Checking my notes from the past I find that 1992 was similar in that we had a cool period during pollination and also during the grain filling period. That year we had lower than normal protein levels in the corn. It was theorized that the cooler conditions later in the season reduced N mineralization from organic reserves causing plants to run low on nitrogen later in the season. This also caused some stalk quality issues in some cases due to cannibalization. Later N or foliar nitrogen applications may want to be considered to offset this potential problem.

"Tipped back" ears. Why?

Every year there are fields in areas that have a large amount of ears that are "tipped back". This always raises the question as to why. The "smart ass" answer is the cob was too long for the ear. Or some people will tell you that you know that this is better than having the ears filled to the tip. This way you know you got all of the corn that you could get. From a producer's standpoint these explanations are not sufficient.

It is true that, in general, tipping back is worse as we increase plant populations. There are several factors we do know about tipping back. First, we know that it is triggered during the first 10 days after pollination. Anything that will add stress on the plant during that stage will signal for the plant to decrease ear size so that it will be certain to produce what it can. Factors that reduce photosynthesis such as less solar radiation or cloudy days can cause this. Higher plant populations may mean less sunlight penetration as well.

It has also been suggested that the longer corn takes to pollinate an ear the more likely the ear will tip back. If an ear can pollinate over a 3-5 day period you usually don't see much tipping back. When pollination occurs over a period greater than seven days tipping back is almost certain. The thought here is that the pollen that falls later is not as strong as the pollen that falls earlier making for a weaker kernel and more likely to abort.

Some other factors that may affect pollination is that the shedding of pollen is in the morning between 9:00 and 11:00 a.m. Pollen shed is not a continuous process. It stops when the tassel is too wet or too dry and begins again when temperature conditions are favorable. Rarely are kernels fertilized by the tassel of the plant the ear is on.

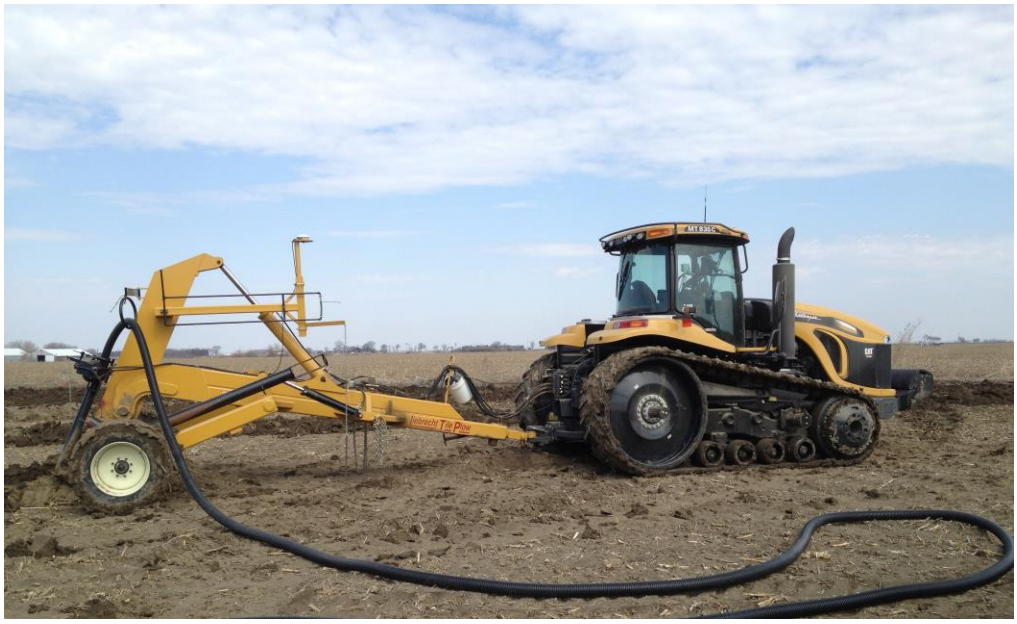
Varieties also differ in their tendency to tip back. This may be due to the difference in synchronization of tassel emergence and silk emergence. Some varieties will shoot silks almost at the same time as the tassels emerge. Other varieties (especially with drought stress) may delay silk emergence by several days. The more delay in silking the more likely that tipping back may occur.

Some feel that applying plant nutrition, especially calcium, just at early tassel emergence, that you can reduce the amount of kernel abortion.

Reducing kernels on the ear tip definitely means a reduction in yield potential, however, some of this yield loss can be made up in some hybrids by producing a deeper or larger kernel. Since there are not as many kernels on the ear, with adequate water and plant nutrition during the grain fill period more food will be packed into each kernel.

Fall is the Season for Installing Drainage Tile

Especially since it appears harvest may be later this year, the window for installing drainage tile may be much narrower than past years. This means it is all the more critical that you begin planning now. Soil Solutions now offers the service of installing drainage tile. If you are interested, now is the time to get together with us. We will do a site assessment, discuss with you what the best layout would be and provide you with an estimate of what it would cost.



Another opportunity with today's tiling systems is to be able to irrigate the crop using the drainage tiles. This is done using gates to close the system and shut off the drainage. The gates are also used to raise or lower the water table to the desired level thereby

giving you more control. If you think you would be interested in such a system give us a call. It can also be done on fields that are not flat by following the contour of the hill.

Another option to consider is planting the field you want to tile to wheat, oats or a grass forage crop this fall or next spring. Then after harvesting that crop next summer install your drainage tiles. This allows you to still realize a cash crop from this ground and install drainage tiles when the soil may be more manageable in the summer. It will also allow more time to get the best plan in place for you and arrange for financing if needed.

Drainage, both subsurface and surface, is an area that can boost yield more quickly than almost any other farming practice. If you have interest and would like to see fields that have been tiled give Brad a call at 712-433-0000 and we will show you how the system works.

Manganese and Zinc in soybeans

Many soybean plant analyses in recent years have indicated low levels of manganese and zinc. This is most likely due to the continued use of glyphosate. Another factor is that the practice of liming soil has increased. As we increase the pH closer to neutral, manganese availability will decrease. With lower uptake of manganese and zinc these nutrients should be considered in our fertilizer programs. Since soil applied manganese becomes fixed quickly, either row placed manganese at planting or foliar applications are the preferred application methods. Row placed or foliar applications are also very effective in supplying the crop's need for zinc. Foliar applications can be economical until beans begin enlarging.

Benefits of Foliar Nutrition

Response to foliar applications of nutrients is first based on yield increases, however, there are other benefits that are less noticeable or may even go unnoticed. Typically with foliar applications you will find that root growth is stimulated. Since the roots are considered "the brains" of the plant this stimulation can signal the plant to keep from senescing as quickly. This can result in a longer fill period.

This root stimulation will also increase the amount of root exudates. As root exudates increase so will microbial activity and also more nutrients will be mineralized. Expect soil tests to increase where foliar programs are used. Enhanced microbial activity also increases natural plant antibiotics which will increase plant health.

Fun Facts about Crops

Soybeans produce two nodes per week on the main stem. If your soybeans emerge around May 10th you should have nearly 18 nodes on your soybeans by July 20th. The length of the internodes will alter the plant height, not so much the number of nodes. Node number will cease once the plant reaches R5 stage (begin seed growth in top four main stem nodes).

The tap root of the soybean plant grows at the rate of 1 inch per day.

A good rule of thumb for soybeans is to have canopy closure by July 4th. "Green to the eye, by the 4th of July." This means that you are capturing maximum sunlight for photosynthesis.

Farmers may want to assess their corn and soybean management skills. The rule of thumb for corn and soybeans is that the ratio of corn to soybean yields should be 3.25 to 1. This means that if you are producing 200 bushel corn you should be able to produce about 60 bushel soybeans. At 250 bushel corn you should be at 75+ bushel soybeans. Under dry land conditions moisture timing may favor one crop over another however.

The first node of roots on a corn plant always forms at 1 ¼ to 1 ½ inch below the soil surface so long as you are planting deeper than that. This is triggered by sunlight as the coleoptile leaf nears the soil surface.

The roots of the corn plant are the "brains" of the corn plant. Roots are intimately associated with their environment. Many plant hormones are produced by signals from what the roots sense. Managing soils so that the "brain" can stimulate the plant is critical to high performance. This includes drainage and air/water exchange.

Depending upon the relative maturity, a corn plant can have between ½ mile and 1 mile of roots under it. This means within an acre of corn you can have between 12,500 and 35,000 miles of roots. Maximum root production occurs between 80 and 95 days after emergence or at about the blister stage. Roots do continue to grow after that, but total root mass declines.

The rate of root growth will double at a soil temperature of 75 degrees compared to a soil temperature of 55 degrees.

The rate of oxygen use for corn in soil containing actively growing plants is 3 to 6 pounds per acre per hour. Researchers have found that oxygen levels of less than 10 percent in the soil atmosphere may inhibit plant growth. This emphasizes the importance of good soil structure and having good air/water exchange.

Get your soil sampling scheduled!!

Another service that Soil Solutions has added this year is soil sampling. We have found many growers do not have recent soil samples, have only taken composite samples or do not understand how to use their soil analyses to their greatest benefit. We will provide a soil sampling

service using zone sampling. Zones will be no larger than 10 acres and will be developed using soil types, yield information and any other pertinent information that the producer wants to provide.

If you are interested in this service give us a call at our Onawa, Iowa office at 712-433-0000 and we will arrange to meet with you and get it scheduled as soon after harvest as possible.