Donovan Farmers Co-op Elevator, Inc.

Agronomic Update—Wednesday, March 10th, 2017

Yet again, Mother Nature is proving to us that we can only control so much in the world of farming. Coming into the planting season, we have spent countless hours planning and making decisions in hopes of getting the most out of every acre. Sitting here now in the 2nd week of May, one of the many questions consuming our thoughts, is whether or not we are going to have to replant. Based on our current saturated state, and the cold weather we have been experiencing, this is a legitimate concern. So where do we go from here? Below are some general facts on corn growth and development that can help drive some of those decisions.

Cool Temperatures and Early Season Corn Growth and Development

Growing Degree Unit Accumulation: When can we expect our corn to emerge?

Growing degree units (GDUs) are a tool that farmers and agronomists use to track and predict crop growth stages. Daily accumulation of GDUs for corn is calculated according to the following equation:

$$\text{Corn growing degree units} = \frac{\text{Daily Max Temp.} + \text{Daily Min Temp.}}{2} - 50$$

Growth is not expected to occur when temperatures are below 50°F and your accumulated GDU's max out above 86°F. As a result of past research and observation, corn typically begins to emerge when approximately 120 GDUs have accumulated. Factors such as genetics, residue cover, soil moisture, soil texture, and planting depth can modify the relationship between GDU accumulation and emergence.

If daily minimum and maximum temperatures are known, farmers and agronomists can predict when emergence will occur using 120 GDUs as a general rule-of-thumb. For example:

1. Corn planted around Iroqouis County on April 20th, before the onset of rain and cool temperatures, has experienced 132 GDU's as of May 10th, 2017 according to weather data collected at Stelle, IL (Ford County) by the Illinois Climate Network (http://www.isws.illinois.edu/warm/cropdata/cropddcalc.asp). As a result, we expect that this crop has begun to emerge or will within the next couple of days.
2. Corn planted during the following week, for example on April 25th, has only accumulated 88 GDU's as of May 10th, 2017. We expect this corn to still be in the ground. That being said, with this warm weather on the way, we should be seeing emergence within the next week.

Consequences of Slow Emergence

Corn seedlings that are exposed to cool temperatures and wet soils are more vulnerable to damping-off diseases such as *Pythium*. A key indicator of infection by *Pythium* includes a region of rotten or discolored tissue on the mesocotyl of the seedling (Figure 1).

Figure 1. Discolored mesocotyl on corn seedling. This type of damage is an indication of a fungal pathogen; cool, wet conditions favor *Pythium* infection. Source: Iowa State University

Unfortunately, no genetic resistance exists against *Pythium*, and although most common corn seed treatments include active ingredients which provide some level of protection against this pathogen, stand loss or reduced vigor will still occur if environmental conditions are favorable.

Following emergence, it is important to evaluate stands to understand the potential for yield loss, and to determine whether replanting should be considered as a result of the adverse weather that has been experienced (Table 2). Please feel free to reach out to our Regional Agronomist or myself to help evaluate your stand.

Table 2. Relationship between planting date, plant population, and yield expectation. Source: University of Illinois.

Planting Date	Plant Population per Acre						
	10,000	15,000	20,000	25,000	30,000	35,000	40,000
	% of maximum yield expected						
April 01	54	68	78	88	95	99	99
April 10	57	70	81	91	97	100	100
April 20	58	71	81	91	97	100	99
April 30	58	70	80	89	95	97	96
May 09	55	68	77	86	91	93	91
May 19	50	63	72	80	85	86	84
May 29	44	56	65	73	77	78	75
June 08	35	47	56	63	67	67	64

Final Considerstaions

As I have been walking fields the last week and evalutaing the current state of our planted corn, with confidence I can say that a majority (80+%) of what we have in the ground, will not need to be replanted. We still have good seed integrety and color. Some things to look for and questions to ask yourself when looking at germinated seed: 1. Is the seed still solid? If not, is it "mushy"? Mushy indiactes rotted seed = not good = possibility of replant. 2. What is the color of the inside of the germinated seedling? Healthy seed should have a yellow/off white clean hue to it. Anything else may indicate disease or rot. 3. What is the condition of my shoot (mesocotyl), radicle, and if far enough along, seminal (secondary) roots? Again, a clean off white/yellow hue is what we are looking for.

What about corn that is up and yellow? If this is your case, good news, as long as the root system is intact and healthy, we should not see a negative effect on yield. That corn plant basically is the equivalent to a crying baby at the moment. It is unhappy and needing nutrients. Once this weather warms up, and we get effective nutrient uptake, we should see a world of difference.

We have covered some of the basics. If you would like to evaluate your corn stand, or have more in depth questions, please feel free to reach out!

Andrea Davidson
Retail Agronomy Advisor
815-601-6625