Northern Ohio Field Notes

June 9, 2022 John Schoenhals, Pioneer Field Agronomist

This week's topics include:

- Corn of Many Colors
- Soybeans have an "ugly" stage too?
- Corn Herbicide Growth Stage/Size Cutoffs
- Ponding and Flooding Impacts
- Soybean Replant Decisions

Corn of Many Colors

The "ugly" stage of corn is notable in some fields. As the plant transitions from dependance on the seed to dependance on nodal roots, tough growing conditions can result in a variety of symptoms. The weather extremes experienced so far this spring prolonged dependence on seed reserves, which are depleted even as nodal root systems "catch up." The good news is that as these plants reach V5/V6, they will "turn the corner" and take on a much better appearance.

Purple corn- cool nights in the 40s and sunny days in the 70s (as experienced late last week) trigger genes that lead to a buildup of purple anthocyanins (sugar-containing pigment) in the plant. Cool temperatures slow growth, so metabolism slows and these pigments/sugars build up. Purpling varies between hybrids. P0843AM and P0995AM seem to show the most purpling (but not limited to these products). The purple genes do not correlate to yield impacts.

Yellow/striped corn- especially on light textured/low organic matter soils or where no starter fertilizer was applied, plants can exhibit yellow striping of leaves that shows as magnesium and/or sulfur deficiency. Fluctuations in temperatures this spring have slowed mineralization of organic matter, which is a primary source of sulfur in the soil. This appearance is usually short-lived while seed reserves are depleted and nodal roots are still getting established. Epsom salts (magnesium sulfate) can provide a band-aid fix. If no action is taken, symptoms should improve with time (as long as sulfur is being addressed as part of the fertility plan).

Soybeans have an "Ugly" stage too?

Soybean fields (or areas of fields) sometimes become a paler shade of green around the V2/V3 growth stage. While several factors can be the cause of this, it is often the result of a temporary nitrogen deficiency. While soybeans are able to obtain nitrogen through nodulation, this process does not fully kick into gear until V4/V5. Until then, if soil nitrogen is not available, plant growth slows and color becomes lighter green. This is most often noted in fields with high amounts of corn residue. This residue contains lots of carbon. As microbes work to decompose this residue, they tie up nitrogen in the soil, making it unavailable to plants (this is sometimes called the "carbon penalty"). Action is usually not required or recommended- while supplemental nitrogen at this stage can result in greener plants, yield benefits are not usually found. As nodulation increases, normal growth will resume.

Soybean field showing dark and light green striping due to uneven residue distribution

Light green soybean areas have heavy residue

Dark green soybean areas have little residue

Common Corn Herbicide Growth Stage/Size Cutoffs

In a spring where opportunities for field activities are limited due to weather, it is important to pay attention to herbicide growth stage requirements. Failure to follow these guidelines can result in significant yield impacts.

Product	Height or Growth Stage cutoff
Acuron	**up to 12" corn**
Atrazine	**up to 12" corn**
Callisto	**up to 30" or 8 leaf stage**
Capreno	**V1 to V6 or 20" tall**
Cinch Atz, Bicep II Magnum	**up to 12" corn**
Fulltime NXT, Degree Xtra, Volley ATZ, Harness Xtra	**up to 11" Corn**
Glyphosate	**through V8 or 30" corn, use drop nozzles between 30-48"**
Liberty	**up to 24" corn or 7 leaf collars**
Realm Q	**up to 20" corn or through V6 (Prior to V7)**
Resicore	**up to 11" Corn**
Status	**V2 or 4" up to 36" corn or V8**
Surestart II, Tripleflex	**up to 11" Corn**

**Always read and follow label instructions

Ponding and Flooding Impacts

Ponding and flooding damage depends on the following factors:

1. **Duration of Flooding - The longer the soil remains flooded or saturated, the greater the expected damage**
2. **Temperature - Warmer temperatures make it more difficult for crops to survive flooding**
3. **Crop Growth Stage - Younger plants are often more susceptible to flooding, as they have a higher rate of respiration due to the demands of rapidly dividing and enlarging cells**

Corn

- Prior to V6, corn may survive only one to four days of totally saturated soils. The good news is that cloudy/cool conditions allow survival on the longer end of this range.
- Approx. duration of flooding corn can survive, by temperature:
  - Upper 70s or warmer = 1 day or less
  - Upper-60s to mid-70s = ~2 days
  - Mid-60s or cooler = ~4 days
- Soils that have been saturated for 2 to 3 days are susceptible to nitrogen loss through denitrification.
- Lengthy periods of wet soil conditions can lead to an increase in seedling diseases and blights, especially from Pythium. Pioneer seed treatment includes 2 strong modes of action that are effective on Pythium, expected to remain effective for 3 weeks after planting.

Soybeans

- Impact of flooding of soybeans during germination and emergence:
  - When flooding seeds aprx. 1 day after planting, slight decline in germination/emergence from flooding regardless of flooding duration (up to 2 days)
  - When flooding seeds 2 or 3 days after planting, slight decline in germination/emergence from flooding when flooding duration was 1 to 24 hours; however, significant drops in germination/emergence when seeds were flooded for 48 hours or more.
- Impact of flooding on emerged soybean plants:
  - Soybeans generally survive flooding better than corn, but diseases are increased, symbiotic nitrogen fixation is diminished and yield is often reduced.
  - Emerged soybeans easily survive 48 hours underwater, and have even been known to survive submersion for a week under ideal conditions (cool/cloudy) during and after flooding.

Soybean Replant Decisions

"Stand Assessment" sheet with more detail is available here: https://corteva.showpad.com/share/mfP3CWnjtnIQ42iJsquC1

- 42" is the length of 1 row (15" rows) equal to 1/10,000th of an acre (13 plants in 42" of row equals 130,000 stand)
- For drilled beans, it is best to use a hoop for population (use the appropriate multiplication factor)
- Acceptable stands vary based on soil type, planting date, and expectations, but the following are general rules of thumb to guide decision making:
    - Although OSU recommendations are to use 50,000 surviving stand as the threshold for replants, a higher threshold allows improved harvestability, improved weeds control, and improved yield consistency
    - Soybeans have a tremendous ability to compensate at low populations through branching. The ability to compensate becomes a bit less at later planting dates.
    - On productive ground, aprx. 80,000 surviving stand is still good
    - On tougher ground, aprx. 100,000 surviving stand is good
    - The chart below is extensive trial data from University of Illinois. Note that a surviving stand of 80,000 that was planted on May 24 has expected yield of 86% of maximum. If a full stand is replanted on June 12, yield potential is expected to be 78% of maximum. Planting date plays a very important role in soybean yields
    - If stands are consistent, replanting later may reduce yield more than having a low plant population.
- If stands are thin, it is best to add to the stand (plant at an angle) rather than tearing up the stand and starting over

Soybean Stand Counts

Hoop Size	Multiplication Factor
26	11,800
28	10,000
30	8,900
32	7,800
34	6,900
36	6,200

Hula Hoop preferred for drilled beans. Count plants in hoop and multiply by factor for estimated plants per acre. Repeat in several areas for an average.

Row Width	Row length for 1/10,000th of an acre
7.5"	84"
10"	63"
15"	42"
20"	31"
30"	21"

Count plants in length of row
Multiply by 10,000
Repeat in several areas for an average

Planting date range	Plant stand, 000/acre										
	50	60	70	80	90	100	110	120	130	140	150
	Expected yield, % of maximum										
Apr 10-20	89	91	93	95	96	97	98	98	99	99	99
Apr 21-30	88	90	92	93	94	95	96	97	97	98	98
May 1-10	86	88	90	91	92	93	94	95	95	95	96
May 11-18	83	85	87	89	90	91	91	92	92	93	93
May 19-26	81	83	84	86	87	88	88	89	89	90	90
May 27-Jun 3	78	80	81	82	84	84	85	86	86	86	86
June 4-11	74	76	77	79	80	81	81	82	82	82	83
June 12-19	70	72	73	74	75	76	77	77	78	78	78

Table 2. Soybean yields (percent of maximum) for different combinations of planting date and plant population. Derived from the results of 29 planting date and 25 seeding rate trials in Illinois.