Wisconsin Crop Manager

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Assessing Flood Damage to Soybean

Shawn Conley, State Soybean and Wheat Specialist University of Wisconsin, Madison; Grover Shannon, Emeritus Professor, University of Missouri, Division of Plant Sciences

To view this post on the original website, click here.

Severe flooding over the weekend has many low-lying soybean fields underwater. As the water dissipates yield potential and replant questions will arise. Flooding can be divided into either water-logging, where only the roots are flooded, or complete submergence where the entire plants are under water (VanToai et al., 2001). Water-logging is more common than complete submergence and is also less damaging.

Soybeans can generally survive for 48 to 96 hours when completely submersed. The actual time frame depends on air temperature, humidity, cloud cover, soil moisture conditions prior to flooding, and rate of soil drainage. Soybeans will survive longer when flooded under cool and cloudy conditions. Higher temperatures and sunshine will speed up plant respiration which depletes oxygen and increases carbon dioxide levels. If the soil was already saturated prior to flooding, soybean death will occur more quickly as slow soil drainage after flooding will prevent gas exchange between the rhizosphere and the air above the soil surface. Soybeans often do not fully recover from flooding injury.

Crop injury from water logging is difficult to assess. Water-logging can reduce soybean yield 17 to 43% at the vegetative growth stage and 50 to 56% at the reproductive stage (Oosterhuis et al., 1990). Yield losses are the result of reduced root growth, shoot growth, nodulation, nitrogen fixation, photosynthesis, biomass accumulation, stomatal conductance, and plant death due to diseases and physiological stress (Oosterhuis et al., 1990; VanToai et al., 1994 and 2003). A significant amount of genetic variability for flooding tolerance among soybean varieties occurs in maturity groups II and III (VanToai et al., 1994) and likely exists for maturity group I soybeans as well.

Increased disease incidence in the surviving plants may also occur and limit yield potential. The main culprit will likely be phythophthora given the warm wet weather; however phythium, rhizoctonia, or fusarium may also occur. Differential response among varieties will be tied to the sources of genetic resistance to these diseases.

Once we can get back into the fields the decision to replant will be based on the yield potential of the current stand relative to the cost and yield potential of the replanted soybean field (Table 1, next page).

Before any decision to tear up a field is made make sure you contact your crop insurance agent to discuss coverage and you have the replant seed on your farm or at least en route. Also remember to check herbicide labels for plant back restrictions if you are planning to plant soybean into a flooded corn field.

Early plant population	Replanting date									
	May 1-20		June1		June 10		June 20		July 1	
Ppa x 1000	----------% of maximum yield----------									
200	**100**[1]	86	**89**	90	**75**	75	**68**	67	**61**	60
180	**98**	85	**88**	87	**75**	72	**66**	64	**63**	60
160	**97**	84	**87**	84	**70**	70	**64**	61	**63**	58
140	**95**	83	**85**	81	**67**	67	**62**	57	**62**	56
120	**93**	81	**82**	78	**65**	65	**59**	53	**60**	52
100	**91**	80	**80**	76	**63**	63	**57**	49	**56**	47
80	**88**	79	**77**	73	**61**	61	**54**	44	**51**	40
60	**86**	78	**73**	70	**60**	60	**51**	39	**44**	33
40	**83**	77	**69**	67	**59**	59	**47**	34	**35**	25

[1]Yield potential of full season varieties are in bold while yield potential of earlier maturity group soybeans are given in normal text.

Table 1. Expected relative soybean yield at four replanting dates compared to predicted yields for a range of plant populations resulting from an optimum planting date of May 1-20 for full season maturity or short season maturity varieties.

Since full season maturity group soybeans are unrealistic for planting this late plant soybean cultivars 0.5 MG earlier than "normal". The average yield potential for soybean planted in late June in southern WI is in the 30 to 35 bu yield range (Figure 1). For yield potential and harvestability, (a combine may not be able to pick up the lower pods) a grower should not go to an extreme early MG for their geographic area.

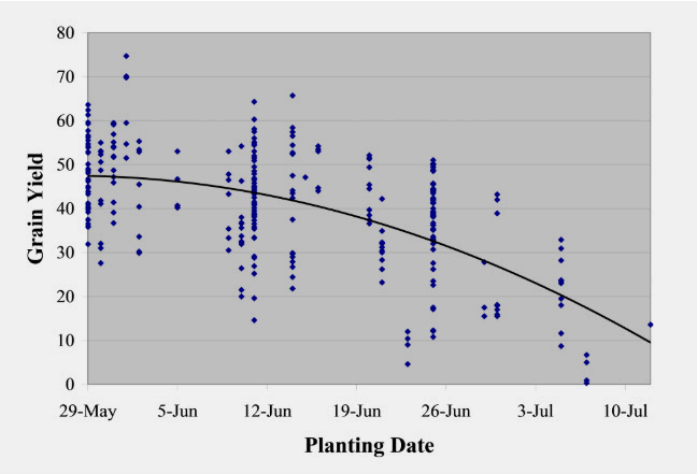

Figure 1. Planting date effect on grain yield of early to mid maturity group soybeans (0.4 to 1.8 RM) in southern WI (Data from early 1990s planting date study).

To maximize yield potential in late planted soybean, a minimum of 180,000 plants per acre is required in narrow row system (<20 inches) as yield potential in rowed beans would be significantly reduced due to decreased canopy development. To achieve 180,000 plants per acre a grower may have to seed as many as 225,000 seeds per acre.

2018 Pest Management Update Meeting Series Announced

Damon L. Smith, Extension Field Crops Pathologist,
University of Wisconsin-Madison

The schedule for the Wisconsin Pest Management Update meeting series has been set. Presentations will include agronomic pest management information for Wisconsin field and forage crops. Speakers include Mark Renz and Rodrigo Werle, weed scientists, Damon Smith, plant pathologist, and Bryan Jensen, entomologist.

The format will be the same as in 2017. Meetings will either be in the morning or afternoon On November 12-16, 2018. Simply choose a day/location to attend with each meeting running 3 hours. Note that several locations and contacts have changed since 2017 (marked with * in the meeting flier). Please read the informational flier carefully and make sure you contact the appropriate person at your desired location.

2018 Pest Management Update Highlights:

- Integrated Pest Management Updates in corn, soybeans, alfalfa, and small grains: Update on new products and/or use of existing products as well as brief highlights of the 2018 pest situations in each crop.
- Waterhemp management

- Dicamba off-target research
- Pollinator Training
- Soybean cyst nematode training and management

Please make your reservation with the host contact at least one week prior to the scheduled meeting date.

Three hours of Certified Crop Advisor CEU credits in pest management are requested for each session.

To download a PDF of the flier, CLICK HERE.

Wisconsin Late-Season Soybean Disease Update

Damon L. Smith, Extension Field Crops Pathologist, University of Wisconsin-Madison

To read this post from its original site, click here.

The calls have been coming in this past week on a couple of soybean diseases. In the southern third of the state most of the calls have centered on sudden death syndrome or SDS. To the north, most questions pertain to Sclerotinia stem rot or white mold. I'll discuss SDS in some detail, plus provide a detailed description of brown stem rot (BSR) which also typically shows up this time of year. Finally I'll provide a brief update on the white mold situation.

Sudden death syndrome (SDS)

The first noticeable symptoms of SDS are chlorotic (i.e., yellow) blotches that form between the veins of soybean leaflets. These blotches expand into large, irregular, chlorotic patches (also between the veins), and this chlorotic tissue later dies and turns brown. Soon thereafter entire leaflets will die and shrivel. In severe cases, leaflets will drop off leaving the petioles attached. Taproots and below-ground portions of the stems of plants suffering from SDS, when split open, will exhibit a slightly tan to light brown discoloration of the vascular (i.e., water- conducting) tissue. The pith will remain white or cream-colored. In plants with advanced foliar symptoms of SDS, small, light blue patches will form on taproots and stems below the soil line. These patches are spore masses of the fungus that causes the disease.

Foliar symptoms of SDS can be confused with those of brown stem rot. However, in the case of brown stem rot (BSR), the pith of affected soybean plants will be brown. In addition, roots and lower stems of plants suffering from BSR will not have light blue spore masses.

Once symptoms of SDS are evident, yield losses are inevitable. Yield losses can range from slight to 100%, depending on the soybean variety being grown, the plant growth stage at the time of infection and whether or not SCN is present in a field. If SDS occurs after reproductive stages R5 or R6, impact on yield is usually less compared to the development of SDS at flowering that can lead to substantial yield losses. When SCN is present, the combined damage from both diseases can be substantially more than the sum of the damage expected from the individual diseases.

SDS is caused by the soilborne fungus, Fusarium virguliforme (synonym: F. solani f. sp. glycines). F. virguliforme can overwinter freely in the soil, in crop residue, and in the cysts of SCN. The fungus infects soybean roots (by some reports as early as one week after crop emergence), and is generally restricted to roots as well as stems near the soil line. F. virguliforme does not invade leaves, flowers, pods or seeds, but does produce toxins in the roots that move to the leaves, causing SDS's characteristic foliar symptoms.

SDS cannot be controlled once plants have been infected**. Foliar fungicides have NO effect on the disease.** Recently a new seed treatment has been identified that has efficacy against SDS. The active ingredient fluopyram can be found in the seed treatment iLeVo and is rated "very good" in multi-state trials. Other methods of control include using SDS-resistant varieties whenever possible in fields with a history of the disease; however, keep in mind that SDS-resistant varieties with maturity groups suitable for Wisconsin and other northern regions (groups I and II) can be limited. If SDS and SCN are both problems in the same field, planting an SCN-resistant soybean variety may also be beneficial in managing SDS. Do not delay planting soybeans to avoid symptoms of SDS. In Wisconsin, it has been demonstrated that the benefits to yield when planting early outweigh the benefits of reduced SDS symptoms if planting is delayed. Improve soil drainage by using tillage practices that reduce compaction problems. Rotation, while useful in managing other soybean diseases, does not appear to significantly reduce the severity of SDS. Even after several years of continuous production of corn, F. virguliforme popula-

tions typically are not reduced substantially. Research from Iowa State University has shown that corn (especially corn kernels) can harbor the SDS pathogen.

For more information CLICK HERE to download a full color fact sheet on SDS. A short video on SDS can also be viewed by CLICKING HERE.

Brown stem rot (BSR)

Symptoms of BSR are usually not evident until late in the growing season and may be confused with signs of crop maturity or the effect of dry soils. The most characteristic symptom of BSR is the brown discoloration of the pith especially at and between nodes near the soil line. This symptom is best scouted for at full pod stage. Foliar symptoms, although not always present, typically occur after air temperatures have been at to below normal during growth stages R3-R4, and often first appear at stage R5, peaking at stage R7. Foliar symptoms include interveinal chlorosis and necrosis (i.e., yellowing and browning of tissue between leaf veins), followed by leaf wilting and curling. Yield loss as a result of BSR is generally greatest when foliar symptoms develop. The severity of BSR symptoms increases when soil moisture is near field capacity (i.e., when conditions are optimal for crop development).

Symptoms of BSR in soybean stems compared with a healthy soybean stem in the center.

Foliar symptoms of BSR can be confused with those of sudden death syndrome (see description below). However, in the case of sudden death syndrome (SDS), the pith of affected soybean plants will remain white or cream-colored. In addition, roots and lower stems of plants suffering from SDS (but not those suffering from BSR) often have light blue patches indicative of spore masses of the fungus that causes SDS.

BSR is caused by the soilborne fungus Cadophora gregata. There are two distinct types (or genotypes) of the fungus, denoted Type A and Type B. Type A is the more aggressive strain and causes more internal damage and plant defoliation than Type B. P. gregata Type A also is associated with higher yield loss. P. gregata survives in soybean residue, with survival time directly related to the length of time that it takes for soybean residue to decay. Thus, P. gregata survives longer when soybean residue is left on the soil surface (e.g., in no till settings) where the rate of residue decay is slow. P. gregata infects soybean roots early in the growing season. It then moves up into the stems, invading the vascular system (i.e., the water-conducting tissue) and interfering with the movement of water and nutrients.

Several factors can influence BSR severity. Research from the University of Wisconsin has shown that the incidence and severity of BSR is greatest in soils with low levels of phosphorus and potassium, and a soil pH below 6.3. In addition, C. gregata and soybean cyst nematode (Heterodera glycines) frequently occur in fields together, and there is evidence that BSR is more severe in the presence of this nematode.

BSR cannot be controlled once plants have been infected. **Foliar fungicides and fungicide seed treatments have NO effect on the disease.** Use crop rotations of two to three years away from soybean with a non-host crop (e.g., small grains, corn, or vegetable crops), as well as tillage methods that incorporate plant residue into the soil. Both of these techniques will help reduce pathogen populations by promoting decomposition of soybean residue. Also, make sure that soil fertility and pH are optimized for soybean production to avoid overly low phosphorus and potassium levels, as well as overly low soil pH. Finally, grow soybean varieties with resistance to BSR. Complete resistance to BSR is not available in commercial varieties. However several sources of partial resistance that provide moderate to excellent BSR control are available. Also, some, but not all, varieties of soybean cyst nematode (SCN) resistant soybeans also are resistant to BSR. Most soybean varieties with SCN resistance derived from PI 88788 express resistance to BSR. However, the same is not true of varieties with SCN resistance derived from Peking. Therefore growers should consult seed company representatives about BSR resistance when selecting a variety with SCN resistance derived from this source. You can download a full color fact sheet on BSR by clicking here.

White Mold

Symptoms of white mold are becoming pretty apparent in Wisconsin. White fluffy growth (mycelium) is readily evident. Incidence in the northern half of the state is higher. We have visited fields as far north as Wausau and Pulaski, Wisconsin and have observed incidence ranging from 0% to 30% of plants infected. Reports from areas in the northwest indicate white mold present, but not as high of incidence levels. As we move to the southern

White, fluffy growth of the white mold fungus on a soybean stem

portion of Wisconsin, white mold can be found, but at reasonably low levels. Most of the soybean crop is at the R5 growth stage, with some earlier maturing fields approaching R6.

Questions have arisen about spraying fungicide now to reduce the damage caused by white mold and preserve yield. **The short answer is NO.** The reason is that the primary means of infection by the white mold fungus is through soybean flowers. These infections happened weeks ago. Therefore, the optimal time to spray would be when flowers were out. A low level of plant-to-plant transmission can occur late in the season in soybeans. However, this rate is low enough, that spraying to prevent it does not produce favorable results.

How much soybean yield might I lose from white mold?

Research has demonstrated that for every 10% increase in the number of plants that are infected with white mold at the R7 growth stage, you can expect between 2 to 5 bushels of yield loss. Thus, the fields I mentioned earlier will likely range from little detectable yield loss (3% incidence) to as high as 10 bushels lost (20% incidence).

What should I do if I see white mold in my soybean field now?

Get out and survey your fields for white mold. It is a good idea to determine how much white mold you have in your fields, so you can make some educated harvest decisions. One way to move white mold from one field to the next is via combines. You could clean your combine between each field, but this can be time consuming.

So by determining which fields have no white mold and which fields have the most white mold, you can develop a logical harvest order by beginning your harvest on fields with no white mold and working your way to the heavily infested fields. This will help reduce spread of the white mold fungus to fields that aren't infested. You can also make some decisions on your rotation plan and future soybean variety choices based on these late season observations.

If you would like to learn more about white mold and management of this disease, CLICK HERE to download a fact sheet from the crop protection network.

Drought Stricken Soybeans.. Should I Leave Them or Take Them for Forage?

Shawn Conley, State Soybean and Wheat Specialist
University of Wisconsin, Madison

To read this article from its original blog, click here.

Late soybean plantings followed by dry conditions have some northern WI growers considering chopping their soybean as a forage. Before you even consider this option make sure you check the label of the pesticides applied to the crop before you grease the chopper.

- Let's start with the herbicides first. In short, outside of glyphosate (25 day) and a handful of pre's and posts (please refer to Table 3-3 in A3646, Pest Management is WI Field Crops) most soybean herbicides are listed as "not permitted" for forage use.
- Next, many common insecticides used for soybean aphid management implicitly state "Do NOT graze or feed treated forage or straw to livestock" (please refer to A3646, Pest Management is WI Field Crops
- Lastly, fungicide labels are as equally exclusive with pre-harvest intervals ranging from 14 days to "Do NOT graze or feed soybean forage or hay" (please refer to A3646, Pest Management is WI Field Crops)

If you somehow pass the gauntlet of "Do not" or "Not Permitted" and the forage value is greater than the grain value then the highest protein and yields are obtained from soybean harvested at the R6 to R7 growth stage. Harvesting soybeans for forage between the R1 and R5 stage will result in a very high quality silage, but dry matter yields will be reduced significantly. Forage quality will be reduced from R5 soybean forward if a conditioning process is used during harvest as conditioning will cause significant seed shattering.

Here are some options for you to consider to help think through the forage versus grain decision.

Option # 1: Soybean haylage considerations

What is my realistic tonnage expectations?

- Late planted drought stricken soybean will yield ~1 to 2 tons of dry matter per acre.

What is it going to cost me to harvest and put this crop up?

- The average cost on a per acre basis to harvest and ensile a soybean forage according to 2017 WI Farm

Custom rate survey are as follows:

- Mowing ($14.20 per acre)
- Swathing ($7.75 per acre)
- Haylage (Chopping, hauling, & packing bunker; $49.20 per acre)

How should I price this crop?

- "Soybean silage pricing will fall between good quality hay and poor quality hay (Refer to: https://fyi.uwex.edu/forage/hay-market-report-8-13-2018/)"
- If you were to price the soybean forage based on expected grain yield and CBOT then realistic yield levels would range from 15 – 25 bu per acre at $7.95 per bu (local cash price: 8/22/18). Expected forage value range would be $119.25 to $198.75 per acre.

Option #2: Green manure considerations

I am tired of throwing money at this crop…….

- Though you will save on harvest costs the average cost of a plow down disk operation is $19.70 per acre.

How much will I save on next years fertilizer bill?

- By not harvesting the crop you will not remove the 30# P and 85# K (estimated removal rates of P2O5 and K2O for 15-25 bu per acre soybean grain and straw (A2809)).
- You may contribute 20-40 pounds of N to next years corn or wheat crop.

Neither of these prove to be particularly attractive options. However I would encourage growers, crop consultants, and nutritionists to weigh the true economical value of each option carefully before proceeding.

Wisconsin DATCP Pest Bulletin, August 23

Krista Hamilton, Entomologist, Bureau of Plant Industry
Division of Agricultural Resource Management, Wisconsin Department of Agriculture, Trade and Consumer Protection

Volume 63 Issue No. 16 of the Wisconsin Pest Bulletin is now available at: Print/View this issue

LOOKING AHEAD: Large corn earworm flights registered in southern WI

FORAGES & GRAINS: Late-season grasshopper activity increasing in alfalfa

CORN: Preliminary corn rootworm beetle survey results show mostly low populations

SOYBEAN: Japanese beetles still common in Wisconsin soybeans

FRUITS: Brown marmorated stink bug confirmed in a Marquette Co. orchard

VEGETABLES: Cucurbit downy mildew reported in Columbia County

NURSERY & FOREST: Powdery mildew especially prevalent in nurseries this year

DEGREE DAYS: Growing degree day accumulations as of August 22, 2018

UW/UWEX Plant Disease Diagnostic Clinic (PDDC) Update August 17

Brian Hudelson, Sue Lueloff, John Lake and Ann Joy

The PDDC receives samples of many plant and soil samples from around the state. The following diseases/disorders have been identified at the PDDC from August11, 2018 through August 17, 2018.

The 8/17/18 PDDC Wisconsin Disease Almanac (i.e., weekly disease summary) is now available at:

https://pddc.wisc.edu/wp-content/uploads/sites/39/2018/08/FullTable081718.pdf

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