The Soybean Seeding Rate Conundrum

Shawn P. Conley, Department of Agronomy, and Damon Smith, Department of Plant Pathology, University of Wisconsin-Madison

- Use a soybean seed treatment
- Plant less than 140,000 seeds in white mold areas
- Target a final stand of 100,000+ plants in productive fields
- Target a final stand of 135,000+ plants in low productivity fields or areas within fields

Soybean seeding rate is one of the most heavily debated and frankly, in my humble opinion, the most overthought agronomic decision we make in soybean. As a general rule of thumb I recommend farmers purchase a bag of seed per acre (140,000 seed count) and plant that entire bag per acre (140,000 seeds). Remember your target is to get a minimum stand of 100,000 plants per acre as this population will achieve 100% yield potential in most field environments. This above recommendation holds true in many high yielding field situations.

We also recommend that growers use a seed treatment on early planted through late May plantings. In WI we have compiled a plethora (that means “a lot” for ISU and UNL graduates) of data showing the economic value and ROI for farmers in our state. We also know that the cost and active ingredient choices across the available seed treatment platforms is vast. Therefore, it is important to know two important things when making this important decision.

- What is my pest and disease history in an individual field so I can choose the appropriate active ingredients in my seed treatment.
- What active ingredients choices do I have and what is actually on my seed?

For more detailed information on our seed treatment work here are a few additional resources to check out!
• Economic Risk and Profitability of Soybean Seed Treatments at Reduced Seeding Rates

• Response of Broad Spectrum and Target Specific Seed Treatments and Seeding Rate on Soybean Seed Yield, Profitability and Economic Risk

What seeding rate should I use on less productive fields or areas within fields?

This question is an active area of research in many labs including ours, so specific recommendations may change over the next year. Our current data suggests that we need ~135,000+ plants/acre at harvest to achieve 99% of our maximum yield potential in low yield environments. This would suggest that farmers need to be dropping 160 to 170,000 seeds/acre in these situations.

![Figure 2. Soybean Yield Response to Harvest Plant Population in Low Yielding Environments.](image)

How does white mold change the equation?

White mold continues to be one of the major yield-limiting soybean diseases in northern soybean growing states. Management of most soybean diseases starts with selecting a variety with a good level of resistance to the targeted disease. However, the development of white mold resistant varieties has proven difficult. The result is that resistant varieties can only address part of the disease management puzzle for white mold.

An integrated approach using several tactics is needed. Specific agronomic practices can help to manage white mold. Strategies for managing white mold such as variety resistance, changes to row spacing and plant population, and the timely application of foliar fungicides, have often been studied individually. However, it has become increasingly clear that a holistic approach to managing this yield-limiting disease, which combines several of these management strategies, is necessary.

Trials in 2017 and 2018 examined row spacing (15-inch vs 30-inch rows) and planting population (110,000 to 200,000 seeds/acre) simultaneously at two locations one in Wisconsin (2017) and one in Michigan (2018). In addition, fungicide applied in a conventional two-spray program where applications occur at the R1 and R3 soybean growth stages were compared with fungicide application based on a new white mold prediction model.

In this preliminary research, increased row spacing had a strong effect on reducing white mold incidence and severity with disease levels being significantly lower in the 30-inch row spacing compared to the 15-inch row spacing. While soybeans planted in a 15-inch row spacing can generally out-yield soybeans planted in a 30-inch row spacing, disease levels in a 15-inch row spacing can often be high enough that little yield advantage over the 30-inch row spacing might be observed in a high white mold environment. The effect of plant population was also significant. Planting populations of 140,000 seeds/acre or lower resulted in disease index values (DIX) a bit lower than those of 170,000 or 200,000 seeds/acre. If the row spacing and planting population are adjusted correctly, fungicide applications might not be useful, even in a high white mold environment. Based on these studies it appears that wider row spacing and planting at 140,000 seeds/acre or below in Wisconsin can potentially reduce white mold severity and preserve yield potential without the need for a fungicide application in a highly disease-conducive environment. These studies are being repeated in multiple locations in 2019 to determine if these results are consistent in different environments and locations.

![Figure 3. Disease severity index of soybean plots planted in 30-inch or 15-inch row spacing, at planting populations ranging from 110,000 seeds/acre to 200,000 seeds/acre and treated with Approch fungicide applied in a conventional program or according to the disease risk model, or not treated. Trials were located in WI in 2017 and MI in 2018.](image)
Should I Take the Time to Develop Seeding Rate Prescriptions?

The answer to that question is “it depends”. I would certainly not purchase a variable rate planter for the sole purpose of planting soybean. In our previous work entitled “What data layers are important for variable rate soybean seeding prescriptions” we found soybean seeding rate was a poor predictor of soybean yield within a field. We would therefore not recommend that farmers spend a lot of time building seeding rate prescriptions to capture all the variability across a field. We would recommend that farmers develop simple prescriptions where they plant fewer seeds (140,000 seeds/acre or less) in highly productive and/or white mold prone areas. In the less productive fields and areas of fields, seeding rates should be targeted at the 160-170,000 seeds/acre range.

Read the original article at: https://coolbean.info/2019/04/19/the-soybean-seeding-rate-conundrum/

Considerations Prior to Cereal Rye Cover Crop Termination

Rodrigo Werle (UW-Madison Extension Cropping Systems Weed Scientist), Dan Smith (UW NPM Southwest Wisconsin Regional Specialist) and Shawn Conley (UW-Madison Extension Soybean and Small Grain Specialist)

Fall-planted cereal rye is increasingly used as a cover crop to protect the soil during winter and spring in corn and soybean cropping systems across the Midwest. Our 2018 survey indicated that 77% of Wisconsin farmers and Ag professionals are interested in cover crops.

Fall-planted cereal rye is awakening and will start growing rapidly in southern Wisconsin; thus, it’s important to have a termination plan in mind prior to crop establishment.

The following pictures demonstrate the rapid cereal rye growth during a 10-day interval in the spring of 2018:

Follow the link below to read the rest of the story and learn about Cereal Rye Cover Crop Termination Strategies or watch a video: https://vimeo.com/332363304

Agronomy/Soils Field Day at the Arlington Ag Research Station, Held on 8/28/19

Carrie Laboski, Professor and Extension Soil Fertility/Nutrient Management Specialist, UW-Madison

Hold the date! The UW-Madison Agronomy/Soils Field Day at the Arlington Ag Research Station will be held on 8/28/19.

A special afternoon only tour will feature research on hemp grain and fiber production. Look for more information in late May. If your company is interested in sponsoring this event, contact Joe Lauer, jglauer@wisc.edu
Are You Pre-Pared For The Soybean (And Waterhemp) Growing Season?

Rodrigo Werle (UW-Madison Extension Cropping Systems Weed Scientist), and Shawn Conley (UW-Madison Extension Soybean and Small Grain Specialist)

Spring has arrived rather quickly in Wisconsin and the planting season is right around the corner (or perhaps it has already started for some growers). Before getting their soybeans in the ground, farmers should make sure they have solid weed management plans for the growing season, particularly if waterhemp is present in their operations.

According to our 2018 Survey, several Wisconsin soybean fields get only treated with a one-pass POST-emergence herbicide program (keep in mind that pre-plant tillage is a common practice adopted in Wisconsin cropping systems and that helps farmers “start clean”). Because of the widespread occurrence of waterhemp populations resistant to glyphosate and/or other POST-emergence herbicides (e.g., ALS- and PPO-inhibitors; see article: “Herbicide Resistance in Wisconsin: An Overview”) combined with its extended emergence window (mid-May through July), a one-pass POST-emergence program in soybeans is likely not a viable strategy in fields infested with waterhemp.

Moreover, research conducted across the Midwest has demonstrated the importance of keeping the soybean crop weed-free from establishment through the V3 growth stage (3rd trifoliate). Weeds emerging after the V3 growth stage will likely not impact soybean yield; however, they should still be proactively managed to prevent them from reproducing and replenishing the seedbank (remember “no seed, no weed”). Thus, effective PRE-emergence herbicides can help farmers maintain their fields weed-free during initial establishment of the crop (= achieve full yield potential) and also reduce the selection pressure on POST-emergence herbicides (due to fewer weeds to be controlled POST-emergence), helping on the fight against herbicide resistance. (Continue Reading the rest of the story by following the link below)

Read Full Article: http://www.wiscweeds.info/post/are-you-prepared-for-the-soybean-growing-season/

The Wisconsin “Healthy Grown” Program - 2019 Update

Deana Knuteson, UW-Madison Horticulture, NPM Program

The Wisconsin “Healthy Grown” program works to advance growers’ use of bio-intensive IPM, efficiently manage inputs, and enhance ecosystem conservation efforts by certifying under the “Healthy Grown” potato, onion and carrot standards. “Healthy Grown” high-bar standards promote agricultural sustainability and enhance environmental farming systems and puts Wisconsin growers in a position to capture the expanding consumer demand for sustainable options in the marketplace.

The scope of the program fits markets looking for food grown under systems with key criteria for sustainability – including new terms such as resilient agriculture, food security, healthy and sound ecosystems, green production systems, stewardship and regenerative production systems. In 2018, 10 operations with over 11,000 acres of crops were certified as “Healthy Grown” produce. That number will increase in 2019, as we have enrolled 12 growers and are expanding acres during this current growing season.

For more information or if you are interested in the program, please contact Deana Knuteson, NPM Program, UW-Horticulture at (dknuteson@wisc.edu) or 608-347-8236.

Wisconsin Fruit News- Volume 4, Issue 1

Christelle Guedot, Fruit Crop Entomology And Extension Specialist, Wisconsin-Madison Fruit Program

This week in the WI Fruit News you can read about:

NEWA weather stations
Insect Diagnostic Lab update
Berry Spring insects
Cranberry degree day insecticide trials
Grape Flea Beetle
Promoting branching apple trees
Pre-bloom fertility apple trees

Read Full Article: http://www.wiscweeds.info/post/are-you-prepared-for-the-soybean-growing-season/
Dog wood borer mating disruption

Find Article Here:  [https://go.wisc.edu/gi37bp](https://go.wisc.edu/gi37bp)

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**Soybean Management Strategies To Facilitate Timely Winter Wheat Establishment In 2019**

Adapted From Original Article Written By Dr. Adam Gaspar And Dr. Shawn P. Conley

Winter wheat acres across WI have declined over the past few years due to late grain harvests, disease concerns (FHB or scab) and poor wheat prices, however anyone that lives and works in WI knows that a base number of cereal acres are needed to support the dairy industry (straw and land to summer haul manure). As farmers get ready to kick off the 2019 growing season here are a few suggestions to help get your 2019/20 winter wheat crop established on time.

**Plant early.** If weather and soil conditions allow for it plant the acreage you intend to go to winter wheat first. This is regardless of which crop you plan to follow (soybean, corn silage or field corn). Remember the optimal planting date window for most of our WI winter wheat acres is the last week of September through the first week in October. In the table below you will notice that for every 3 days soybean planting is delayed we see ~1 day delay in beginning maturity (R7), so delaying planting by one week equates to about 2 days later maturing. However when planting is delaying past June 1st it turns in to more of a 1:1 relationship. Also remember in WI it normally takes another 5-8 days for the soybean crop to move from R7 to R8 (full maturity).

Table 1. Calendar date for reaching R1 (beginning seed fill) and R7 (beginning maturity) growth stage by planting date and maturity group for the 2014, 2015, and 2016 growing seasons at Arlington and Hancock, WI.

<table>
<thead>
<tr>
<th>Planting Date</th>
<th>Maturity Group</th>
<th>R5 Date</th>
<th>R7 Date</th>
<th>R5 Date</th>
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<td>3 Aug</td>
<td>8 Aug</td>
<td>14 Sept</td>
<td>25 Sept</td>
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<td>30 July</td>
<td>1 Aug</td>
<td>9 Sept</td>
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<td>1.5</td>
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As we all know mother nature holds the ultimate trump card on whether we will get our winter wheat crop established in that optimal window. These aforementioned strategies are relatively low risk to the farmer and regardless of what weather patterns we run into are agronomically sound.

Crop rotation matters. Our long-term rotation data suggests winter wheat yields are greatest following soybean then followed by corn silage and lastly corn for grain. Therefore plan your rotation accordingly to maximize yield and system efficiency.

Manage for the system not necessarily the crop. If you are serious about maximizing wheat grain and straw yield on your farm one of the biggest contributing factors for both of these in WI is timely wheat planting. Make management decisions to facilitate that. *We all know what inputs can extend soybean maturity that don’t necessarily guarantee greater yields. So instead of listing them and fielding angry emails I am being strategically vague here*. In a recent study I would note that across years and environments we did quantify a %RYC (percent relative yield change) swing of -4.1% to 11.2% among various soybean inputs so balance that against a loss of 10-20 bushels of wheat grain yield and 0.5 tons of straw?


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UW IPM video channel [https://www.youtube.com/user/uwipm/](https://www.youtube.com/user/uwipm/)