Final Report: Improving integrated management strategies for white mold of soybean

Principal Investigator:

Damon L. Smith
University of Wisconsin-Madison
Department of Plant Pathology
1630 Linden Drive
Madison, WI 53706
(608) 286-9706
damon.smith@wisc.edu

Co-Principal Investigators

Mehdi Kabbage
University of Wisconsin-Madison
Department of Plant Pathology
1630 Linden Drive
Madison, WI 53706

Shawn Conley
University of Wisconsin-Madison
Department of Agronomy
1575 Linden Drive
Madison, WI 53706

Daren Mueller
Iowa State University
Department of Plant Pathology and Microbiology
351 Bessey Hall
Ames, IA 50011

****At the time this report was written, we were notified that the second year of funding was cut for this project. The reason cited was lack of funds in the checkoff. No further research will occur on this project in Minnesota, due to lack of resources to support this research. This is the final report for this project, that will close.**

Objective #1: Evaluate previously identified commercial varieties for white mold resistance
In Minnesota trials were established in Owatonna, Stewartville, and Lewiston. In Iowa, trials were established in Kanawha and Nashua. In Wisconsin, one trial was established in Arlington. We also had a collaborator in Michigan contribute to this dataset too. In the Winter of 2018 we screened 15 varieties and check lines for resistance against an aggressive isolate of the white mold fungus, in the greenhouse. Out of the 15 varieties just 4 resulted in favorable, resistant reactions. We obtained seed of these 4 varieties plus a susceptible line for planting in the

locations stated above. This results in 5 site-years to test the field performance of these varieties at locations where white mold has been an issue. This number is slightly higher than in the previous report as one site in Iowa had been added that I was previously unaware of. The resistant varieties are as follows: Legend Seed LS23X632N, Legend Seeds LS1172LLN, NuTech 3115L, and Dane. The susceptible check line is Jung 1212R2X.

In Michigan, white mold was high. Our resistant variety, Dane, performed well having only 5% disease while the next best varieties (Legend LS1172LLN and Legend LS23X632N) performed statistically as well as Dane, but had numerically higher disease levels ranging from 16-21%. Yield for these three varieties was around 53 bu/a. Nutech 3115L had disease levels similar to the susceptible Jung 1212R2X variety. Yield also suffered for the Nutech variety.

In all other locations, disease levels were very low. All varieties except for Dane averaged yields of 65-74 bu/a under these low disease levels. Dane average a yield of 47 bu/a in these environments. These varieties will be tested again in 2019, to verify their consistency. At the time of this report, trials have been planted in Wisconsin, Iowa, and Michigan. Identifying resistant commercial varieties will be key to advancing a truly integrated management program for white mold in soybean.

Objective #2: Evaluate current, white mold integrated management practices

In 2018, Integrated management trials were established at two locations in Wisconsin, two locations in Iowa, and two locations in Minnesota. Trial locations were the same as stated above, with the addition of a location in Hancock, Wisconsin. Thus, there are 6 site-years of data for this trial. Trials were developed to evaluate the performance of an industry standard susceptible soybean variety under 15- or 30-inch row spacing planted at population densities of 110,000, 140,000, 170,000, and 200,000 seeds/acre. Additionally, the efficacy of industry standard control applications of Aproach (9 fl oz/acre applied at R1 and R3) and Aproach (9 fl oz/acre applied according to the Sporecaster smartphone app) is being evaluated against a non-treated control for each of the row spacing and seeding rate combinations.

In high white mold environments, moving from 15 to 30 in row spacing can drop white mold levels as much as 50%. Additional incremental decreases in white mold can be achieved in narrow row-spacings, by reducing seed populations down to about 140,000 seeds/a at planting. In 30-inch row-spacings, seeding rate had little effect. Based on these data, 30-inch row spacing at 140,000 seed/a planting population in high white mold environments would be advised to balance yield with reducing white mold. We will be repeating these experiments in 2019. At the time this report was written, trials have been stablished at all locations, including two locations in Minnesota, despite a cut in funding in 2019.

Objective #3: Validate a fungicide application decision tool accessible on a smartphone (Sporecaster).

Sporecaster was made available to the public as a free download on the Google Play Store and iPhone app store in May of 2018. Sporecaster was validated at all research locations. As of this

report, Sporecaster was downloaded over 1,600 times from the Apple and Android stores. Daily use rates during the major “white mold season” (July and August) averaged 250 users per day. As previously mentioned, we also added commercial field validations to this objective. In those validations of 16 commercial fields, Sporecaster was accurate about 80% of the time in predicting yield limiting disease events. Currently, programming adjustments are being made to Sporecaster in preparation for the 2019 field season.