Multi-pronged strategies to provide efficient, sustainable, and durable control to Sclerotinia stem rot

Funding: $90,000

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Overview of project objectives

Sclerotinia stem rot of soybean (SSR) is a significant yield-limiting disease in the North Central region. Successful control of this disease requires farmer to use multiple tools in an integrated disease management plan including crop rotation using non-host crops, resistant cultivars, reduced tillage, modifying the soybean canopy through seeding rate and row spacing, and applying chemical control.
This project's objectives include:

- evaluating current soybean management practices for effectiveness
- identifying new germplasm lines resistant to *Sclerotinia sclerotiorum* that can be incorporated into soybean breeding programs
- refining the existing advisory tool to incorporate model output for different forms of SSR resistance, and
- developing outreach publications and tools including an electronic book to inform growers of SSR management.

Key results

The research team consolidated data from the last several years and examined how row spacing, plant populations and foliar fungicide applications affect the disease severity index (DIX) and soybean yield. The interaction of row spacing and planting population had a significant effect on both disease and yield. The DIX was lowest in 30-inch rows with less than 140,000 seeds/acre. The DIX was highest with populations of 200,000 seeds/acre in 15-inch rows. Fungicide application was most effective and yields highest when fungicide was applied at both R1 and R3 growth stages. But other factors need to be considered for field specific SSR management including field history and environmental conditions. In development of new germplasm for SSR resistance, the research team identified five lines with resistance to the white mold pathogen and they hope to identify another three to five lines from the 2020 field trials. The Sporecaster app was introduced in 2018 and since then it has been downloaded more than 3,500 times. Daily use ranged from 600-800 users per day during July and August. Major adjustments have been made to the app, especially to improve its performance in northwest Iowa. Other adjustments included improved weather accuracy and the ability of the user to adjust a spray action threshold. The updated version (1.35) is now available. Outreach publications have been updated and are available for downloading. Content for the electronic book is in development and the goal is to have it completed by the end of 2021.

Benefit to farmers

Farmers will gain more understanding of modern management strategies for Sclerotinia stem rot (SSR) including improved fungicide application timing through the use of an advisory tool, reducing unnecessary fungicide inputs, saving money and time and improving yield and profitability.

Links

Multi-pronged strategies to provide efficient, sustainable, and durable control to Sclerotinia stem rot *USB National Soybean Checkoff Research Database*