Towards the Development of Integrated Management Recommendations for Sclerotinia on Soybeans: Lessons from the 2013 Field Season

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Management of Sclerotinia in soybeans has been hampered by a lack of research on how to integrate the use of foliar fungicides, row spacing, and partially-resistant varieties. Recommendations for using fungicides to manage Sclerotinia were developed from research conducted on solid-seeded soybeans, and fungicide efficacy and optimal fungicide timing are likely to be different when soybeans are planted in wider rows: Canopy closure and Sclerotinia disease development are delayed as row spacing increases, and fungicide coverage is expected to increase as row spacing increases. No recommendations exist relative to the use of partially-resistant varieties to manage Sclerotinia in northern growing regions; the disease control and yield response associated with managing the disease with a partially-resistant variety is poorly documented for soybeans within the 0 maturity group. It is also unknown whether the performance of partially-resistant varieties differs as row spacing is changed. Resistance to Sclerotinia in soybeans is conferred primarily by plant architecture traits that promote disease escape, not by resistance genes that confer immunity, and the ability of the plant architecture traits to facilitate disease escape may be influenced by the spatial distribution of plants in the field. This project seeks to evaluate the usefulness of varieties partially resistant to Sclerotinia for managing white mold, how the performance of partial resistance to Sclerotinia is influenced by row spacing, and how fungicide efficacy is influenced by row spacing. The 2013 field season was the first year of this multi-year project.

Under the high Sclerotinia disease pressure observed in the trials in 2013, several partially-resistant soybean varieties conferred excellent control of Sclerotinia stem rot, but the strength of partial resistance was variable. Seven pairs of soybean varieties were evaluated; each pair consisted of varieties from the same company that differed in the Sclerotinia ratings assigned by the breeder but sharing similar maturity. Under high Sclerotinia disease pressure, three of the seven partially-resistant varieties were associated with sharp reductions in Sclerotinia and strong yields averaging 48 to 52 bu/ac (approximately 25 to 33% higher than the corresponding susceptible varieties), and two of the seven partially-resistant varieties conferred moderate reductions in Sclerotinia and yields averaging 43 to 48 bu/ac (approximately 20% higher than the corresponding susceptible varieties). Of the remaining two partially-resistant varieties, one maintained high yields (averaging 48 bu/ac) and moderate Sclerotinia levels under heavy Sclerotinia pressure while the corresponding susceptible variety performed similarly, and one showed unsatisfactory performance under heavy Sclerotinia pressure, with Sclerotinia incidence averaging 60 percent and yields averaging only 39 bu/ac. For most varieties, the performance of partially -resistant varieties was consistent across row spacings, although in two of the seven partially-resistant varieties there was a trend towards improved performance under wider row spacing. The results suggest that partially-resistant varieties may be a useful tool for helping manage Sclerotinia; however, because the strength of partial resistance is variable, the use of a partially-resistant variety is unlikely to eliminate the need for foliar fungicides.

Under heavy Sclerotinia disease pressure, fungicide efficacy was maximized in soybeans planted to wide rows 21 and 28 inches apart relative to soybeans planted to narrow rows 7 and 14 inches apart. In the trial conducted in 2013, the canopy was not closed at bloom initiation, and fungicide applications were made at or shortly before canopy closure. Future trials will test this strategy relative to the recommended fungicide application timing of bloom initiation.