Optimizing Row Spacing and Seeding Rate for Maximum Soybean Agronomic Performance under White Mold Pressure

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In fields where Sclerotinia (white mold) is a concern, soybeans are often seeded to wide rows (generally 30 inches) to minimize disease development. However, previous research suggests that even under significant white mold disease pressure, soybean yields may often be maximized by seeding soybeans to narrower rows. The goal of this study is to identify how row spacing impacts soybean yield and market grade under different levels of white mold disease pressure.

Field studies were established at the NDSU Carrington, Langdon, and Williston Research Extension Centers and at the NDSU Robert Titus Research Farm in Oakes. Soybean varieties representing a mix of upright and bushy types were evaluated in four row spacings (7, 14, 21, and 28 inches or 7.5, 15, 22.5, and 30 inches) at each of three seeding rates (132,000; 165,000; and 198,000 pure live seeds/ac). To create conditions favorable for white mold, supplemental overhead irrigation was applied. Presented are results from 2016 and 2015, combined with preliminary studies conducted in Carrington in 2013 and 2014. Seed yield and quality data from the 2017 field season are still being collected.

Wide row spacing minimized Sclerotinia incidence (Figure 1) but often did not optimize soybean yield. When Sclerotinia incidence was less than 50% in soybeans seeded to intermediate (21 or 22.5-inch) row spacing, yields were maximized with the intermediate row spacing (Figure 2). When Sclerotinia incidence in soybeans seeded to 21- or 22.5-inch row spacing was below 40%, the increased contamination of the grain with sclerotia (resting structures of the Sclerotinia fungus) associated with the narrower row spacing was never sufficient to result in a reduction in soybean market grade (Figure 3). Parallel results were observed for soybeans seeded to 14- and 15-inch rows. Increasing the seeding rate from 132,000 to 198,000 pure live seeds/ac contributed to a modest increase in Sclerotinia disease pressure but also a modest increase in soybean yield.

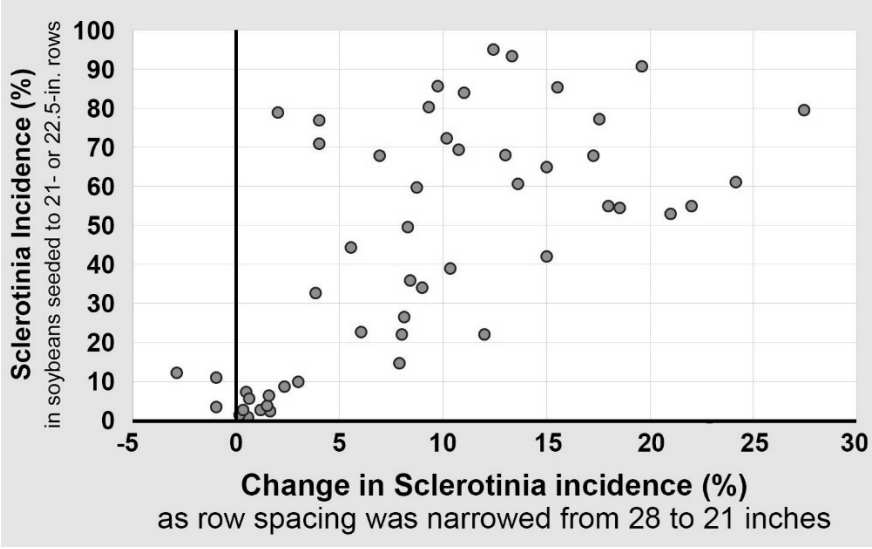

Figure 1. Impact of row spacing on white mold (Sclerotinia) incidence in soybeans grown under Sclerotinia disease pressure. *Each dot represents a soybean variety tested at one location in one year.*

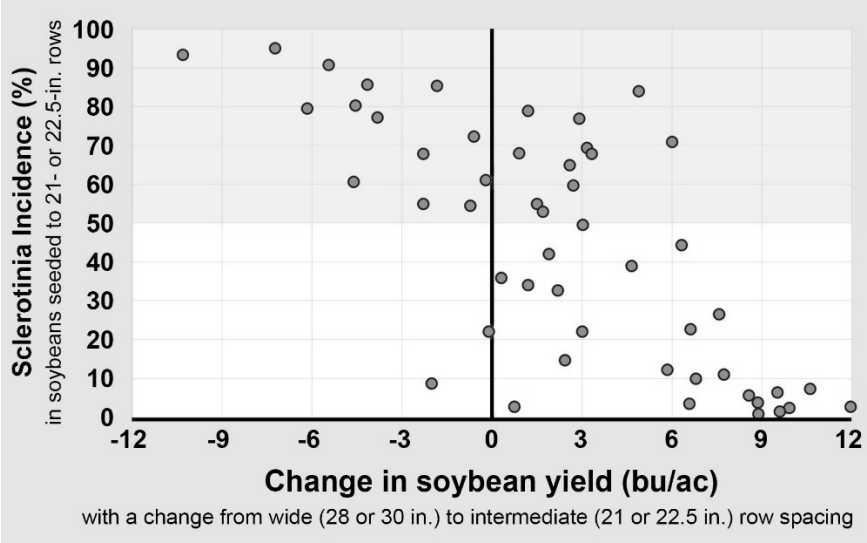

Figure 2. Impact of row spacing on soybean yield in soybeans grown under Sclerotinia disease pressure. *Each dot represents a soybean variety tested at one location in one year.*

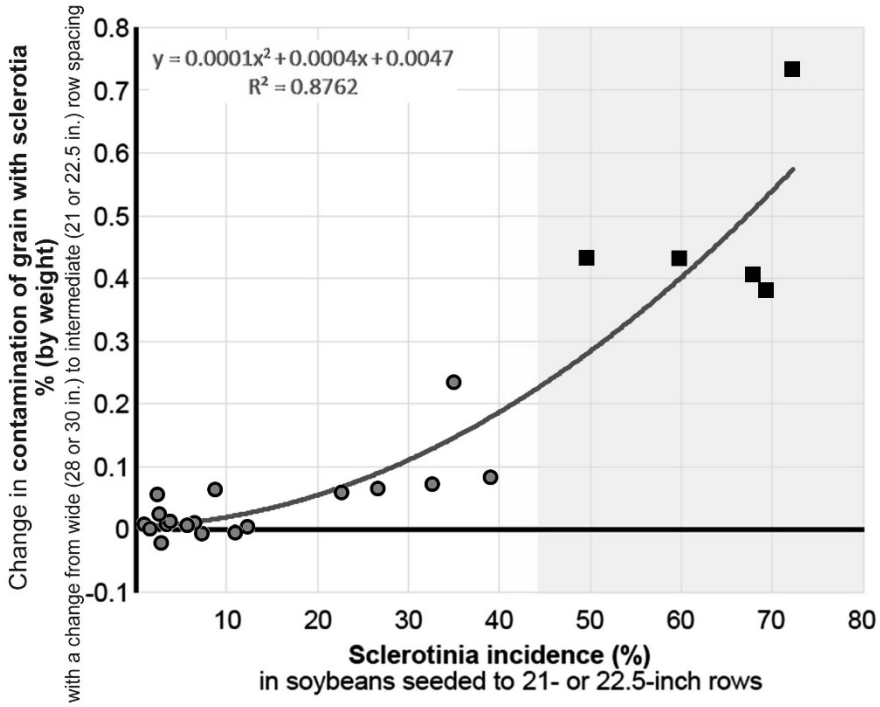

Figure 3. Impact of row spacing on contamination of soybean grain with sclerotia (resting structures of the Sclerotinia fungus) in soybeans grown under Sclerotinia disease pressure. *Each dot represents a soybean variety tested at one location in one year. Square dots denote a reduction in U.S. market grade due to increased contamination of grain with sclerotia.*

The results suggest that if Sclerotinia incidence is not expected to exceed 40 to 50 percent, seeding soybeans to an intermediate row spacing (14 to 22.5 inches) is likely to maximize soybean yield under white mold pressure without reductions in soybean market grade.

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