YIELD & QUALITY

On-Farm Evaluation of Soybean Row Spacing

Soybean yield responded to row spacing at five site-years in 2019 and 2020, or 31% of the time overall (2019–2021). Yield was increased by 1.9 bu/ac with narrower row spacings, on average.

on-farm network
PARTICIPATORY • PRECISE • PROACTIVE

ACCORDING TO PREVIOUS Manitoba small-plot research on soybean row spacing, narrow rows (9–10 inches) outyielded wide rows (27–30 inches) 86% of the time. When comparing narrow (8–12 inches) vs. intermediate rows (16–24 inches) in this same study, narrow rows increased yield only 15% of the time. To test this at the field scale, MPSG's On-Farm Network (OFN) began investigating row spacing with interested farmers in 2019, conducting trials using each farmer's existing equipment.

Sixteen soybean row spacing trials have been conducted through the OFN from 2019–2021, comparing narrow vs. intermediate row widths (7.5 vs. 15 or 10 vs. 20 inches) and intermediate vs. wide rows (15 vs. 30 inches). In addition to yield, canopy closure ratings were taken in 2020 and 2021 to assess how efficiently soybeans captured sunlight and shaded out late-emerging weeds at different row widths.

In the on-farm trials, soybean yield responded to row spacing at five of 16 site-years (31%)—at two of seven sites in 2019 and three of five sites in 2020 (Figure 1). Yield was increased by an average of 1.9 bu/ac among significant site-years. Broken down by row spacing comparisons, narrow rows (7.5–10 inches) outyielded intermediate rows (15–20 inches) 43% of the time (3/7 site-years) and intermediate (15-inch) outyielded wide rows (30-inch) 20% of the time (2/9 site-years). At significant sites, narrow rows increased yield by 1.8 bu/ac over intermediate and intermediate rows raised yield by 2.1 bu/ac over wide rows.

In 2021, plants were smaller overall due to drought conditions, resulting in poor canopy closure. Rows remained open at R5 (<85% canopy closure) for all row spacings except for 7.5-inch rows. In 2020, canopy closure at R1 decreased as row width increased, where 30-inch rows had 11% less ground coverage than 15-inch rows. As the season progressed, the canopy continued to close until full closure was reached at R5 for all row spacings.

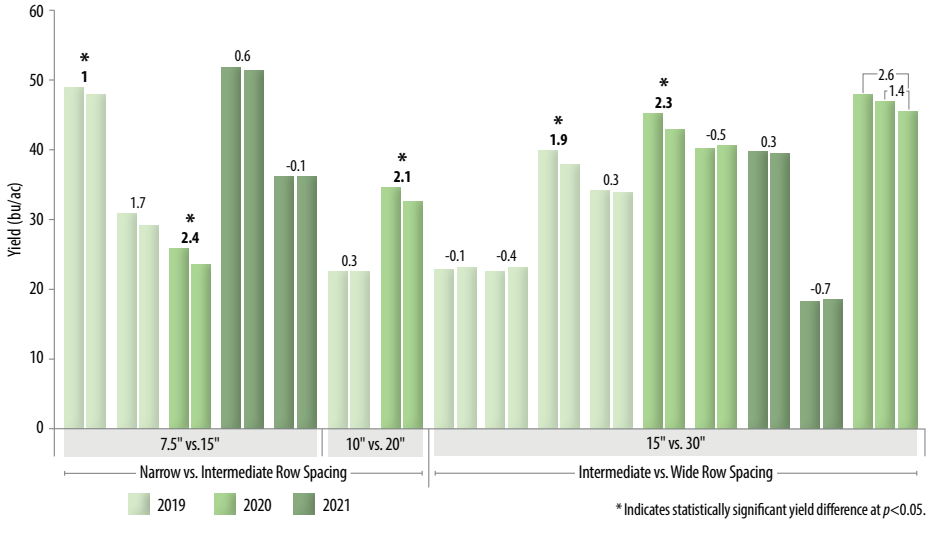
Narrow row spacing is one tool that helps create a more competitive plant stand against weeds. At one on-farm trial in 2020, late-season weed pressure was significant enough to quantify the impact of row spacing on weeds. At that site, weed pressure was greater in 15 than 7.5-inch rows (average of 9 vs. 5 weeds/0.5m², respectively). This narrow spacing had a 2.4 bu/ac yield advantage.

In years with adequate moisture and greater yield potential (2019–2020), soybean yield has benefitted from narrower row spacings roughly 42% of the time. When combined with 2021 data, including drought-stricken sites, yield responded to row spacing roughly one-third of the time. Narrow row spacing has been said to provide moisture conservation benefits in dry years due to increased shading of the soil surface and a more even distribution of plants throughout the field. On-farm trial sites in 2021 did not see an advantage to narrower rows. This may be due to the strong influence of moisture limitations ahead of and during the growing season, which may have minimized the impact of other agronomic factors.

Compared to the previous small-plot work, on-farm results have shown a greater likelihood of response (43%) for soybeans grown on narrow vs. intermediate rows. This research has validated that narrow rows can deliver soybean yield benefits at the field scale and more often than expected.

The OFN will continue to investigate row spacing with interested farmers to further build this dataset and gain a better understanding of soybean row spacing dynamics across a range of environments.

Figure 1. Soybean yield response (bu/ac) to row spacing at sites across Manitoba from 2019 to 2021.



PRINCIPAL INVESTIGATOR Manitoba Pulse & Soybean Growers – On-Farm Network

MPSG INVESTMENT $42,630

CO-FUNDER Canadian Agricultural Partnership

DURATION 3 years