

Evaluating Row Width and Plant Density for Dry Beans

Planting at narrow row widths of 7.5" and at moderate plant densities of 80–120,000 plants/ac resulted in the greatest, most stable yields in wet and dry years for navy and pinto beans.

MANITOBA IS CANADA'S largest producer of pinto beans and the second-largest of navy beans. Planting recommendations have stemmed from neighbouring regions and need validation under our local growing conditions.

Previous research has shown large yield increases (16–69%) by planting dry beans in narrow rows (<15"). The objective of this research was to determine the plant density and row spacing combinations that maximize yield for navy and pinto beans in Manitoba.

Pinto and navy bean experiments were established at Carman and Portage over four years (2015 to 2018). Four row widths (7.5", 15", 22.5", 30") and five plant stand densities (pinto: 40–200,000 plants/ac and navy: 80–240,000 plants/ac) were evaluated for two varieties of each market class (Monterrey and Windbreaker pinto beans and Envoy and T9905 navy beans).

Environmental conditions played a large role year-to-year, so results were

broken down to compare wet (2015 and 2016) and dry years (2017 and 2018). Precipitation was up to 77% lower than normal during dry years. Yields in wet years were 55% greater than dry years. In wet years, white mould was prevalent. Envoy had greater white mould severity ratings than T9905 navy beans, while there was no difference in severity between pinto bean varieties. Increasing plant density consistently increased white mould severity, while row width had less of an effect. Generally, white mould severity was lowest in 7.5" rows, followed by 30" rows and most severe in intermediate row widths. Planting dry beans in 7.5" rows at 120,000 plants/ac appeared to minimize white mould severity in wet years while still achieving high yields.

Yield stability is a measure of how much yield fluctuates year-to-year under different environmental conditions. Yields were greatest and the most stable (i.e., high yield stability index values) at narrow row widths combined with moderate densities for pinto

and navy beans (Figure 1). T9905 yielded 15% more than Envoy and Windbreaker yielded 11% more than Monterrey.

During wet years, navy yield was greatest at 7.5" rows and 80,000 plants/ac, and pinto yield was greatest at 7.5" rows and 40–120,000 plants/ac. Yields decreased with wider row widths and higher plant densities.

During dry years, navy yield was only affected by row width, while both row width and plant density influenced pinto yield. Pinto yields increased with increasing plant density. In both navy and pinto beans, 7.5" row widths resulted in the greatest yields, followed by 15". Wide rows (30") resulted in the lowest yields.

Planting in narrow rows also produced in a more stable yield response. The most stable yield response in both navy and pinto beans was achieved by 7.5" rows at 120,000 plants/ac. The minimum plant density required to achieve high yields was 80,000 plants/ac. ▶

Figure 1. Average yield (lbs/ac) and yield stability index for pinto (left) and navy (right) beans at Carman and Portage in wet (2015–2016) and dry (2017–2018) years.

