How to Use the *Variety Evaluation Guide* to Choose High-Performing Varieties Suited to Your Farm

The Bean Report

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To some (like me), getting the newest *Variety Evaluation Guide* in the mail is like Christmas coming early! Why? Because it can mean increased profitability on the farm in the new year. Aside from fall field operations, variety selection marks the beginning of the next growing season. With more than 70 soybean varieties to choose from, that differ in yield by nearly 20 bushels, it's important to ensure you are choosing a variety in the upper percentile. To help you do this, MPSG supports the development of the *Variety Evaluation Guide* (included with this magazine). This guide provides an independent, robust assessment of variety yield performance, maturity and agronomic traits. Variety selections should be based on agronomic and yield performance, not just seed cost, programming or proximity to seed dealers. Here are five steps to follow when choosing soybean varieties.

STEP 1. IDENTIFY YOUR VARIETY ZONE

This is by far the most important attribute because yield potential will only be realized if the crop reaches maturity before frost. In the *Variety Evaluation Guide*, soybeans are classified according to "Maturity Grouping" and "Relative Days to Maturity." The rating that we suggest to use is "Relative Days to Maturity." This rating takes into account all factors that influence soybean maturity including heat, moisture and photoperiod specific to each region across Manitoba.

As a starting point, use Figure 1 to determine what variety zone you are in. In the *Variety Evaluation Guide*, soybean varieties are listed according to "Manitoba Variety Zone" (short, mid and long). You should stay within your variety zone when choosing varieties. It is safe to venture into earlier zones, but not as safe to venture into longer zones. For example, many farmers in mid-season zones are growing short-season varieties due to comparable yield potential and the benefit of earlier maturity. The same can be said about farmers in long season zones growing mid-season varieties to spread out harvest. Growing multiple varieties across your farm that differ slightly in maturity and yield potential can be a good risk mitigation strategy; when doing this, always plant the longer variety first.

STEP 2. USE YIELD TABLES TO COMPARE VARIETIES OF SIMILAR MATURITY

In the *Variety Evaluation Guide*, there are three tables that list soybean yield:

i. **Variety Description table** – this table will be your reference for maturity and variety characteristics. All varieties tested are listed in ascending order of "Relative Days to Maturity" and are categorized into short, mid and long season zones. Use this table to compare yields within your variety zone, by referring to "Yield % Check" column. This column indicates relative yield as a percent of the check averaged across the core test sites (Morris, St. Adolphe, Carman and Portage). This yield data is averaged over multiple years (see "Site Years Tested" column), so you can be confident with the performance data. Narrow down varieties within your zone that offer good yield potential, and then look at individual site years in one of the next two tables to see how the varieties performed at the site closest to you this past growing season.

ii. **Yield by Location table** – this table indicates how each variety performed at trial locations in eastern Manitoba. The yield value is again listed relative to the check. In this table, you have a new tool – the "LSD%" number that is listed at the bottom and stands for "Least Significant Difference." This number is used to compare the yield performance of any two varieties. What we suggest is to choose a check variety – this may be the check indicated in the table, or a different variety that you are familiar with. When comparing varieties to one another, or the check, they must be higher or lower by at least the "LSD%" number in order for it to be said with confidence that the difference is truly due to genetics and not environment or experimental error. See Table 2 as an example.

iii. **Western Manitoba Soybean Adaptation table** – this table acts the same as the Yield by Location table, but is specific to western Manitoba and also includes "Relative Days to Maturity." This is important because varieties can mature differently in

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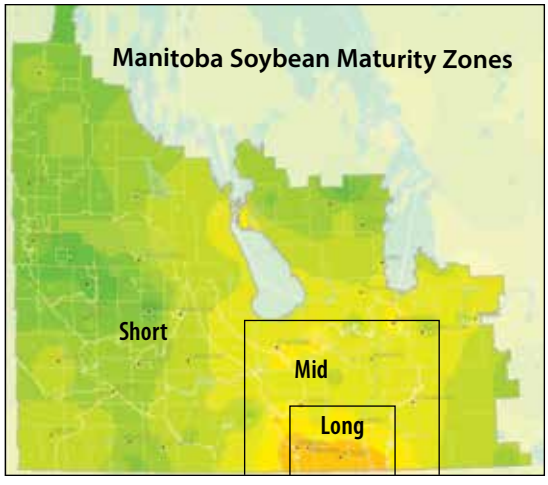

Figure 1. Manitoba Soybean Variety Zones

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western Manitoba compared to eastern Manitoba. Use the "LSD%" to compare yields between any two varieties for any of the four sites listed. For example, in Table 2 the LSD% is 5. Therefore, varieties with yields that are +/- 5% of the check are statistically the same as the check. If yields are ≥5% compared to the check, it is statistically higher yielding than the check.

Table 2. An example of how to use the "LSD%" to identify varieties that have similar, higher or lower yields compared to a "check" variety.

Variety	Yield % Check	Yield compared to a chosen "check" using LSD%
Variety A	99	Same as the check
Variety B	**103**	**"Check" chosen by user**
Variety C	105	Same as the check
Variety D	95	Lower than the check
Variety E	108	Higher than the check
LSD%	5	

STEP 3. IDENTIFY RISK OF IRON CHLOROSIS

Iron Deficiency Chlorosis (IDC) is a classic production challenge that farmers may face each year; the impact of which can be reduced with proper variety selection. IDC is the general yellowing of a soybean field that is noticeable from the road in late June, early July. This condition occurs when the soybean plant can't access iron from the soil. It doesn't mean the soil is deficient in iron, but that it is in a form unavailable to the soybean plant due to soil conditions such as waterlogging, salinity and/or high levels of carbonates. More often than not, the soybeans grow out of it within a week or two and it does not reduce soybean yield. However, if you have fields that are prone to IDC, it is a good strategy to choose varieties that are more tolerant to this condition (Figure 2). To determine if a particular field is at risk for IDC, use Table 3 and values that can be found in your soil test. If you don't have a recent soil test, think back to previous years; fields

Figure 2. Soybean field expressing IDC symptoms on June 28, 2015. The variety on the left has an IDC rating of 1.7 compared to the variety on the right with an IDC rating of 2.1.

affected by IDC in the past will have the same problem in the future.

In fields that are susceptible to IDC, a lower yielding variety with a good IDC rating (closer to 1) may out yield a high yielding variety with a poor IDC rating (closer to 5). Soybean varieties are evaluated for their reaction to IDC each year at a site in Winnipeg, and assigned a rating from 1–5 (1 = tolerant, 5 = susceptible) that is listed in the Variety Description table. Among the varieties you have narrowed down, choose those with low IDC ratings for high risk fields.

Table 3. Soybean IDC risk based on soil parameters (adapted from: AgVise)

	Carbonate level (%)		
Soluble Salts (mmhos/cm)	0 to 2.5	2.6 to 5	>5.0
0 to 0.25	Low	Low	Moderate
0.26 to 0.50	Low	Moderate	High
0.50 to 1.0	Moderate	High	Very high
>1.0	High	Very high	Extreme

4. CONSIDER GENETIC RESISTANCE TO *PHYTOPHTHORA* AND SOYBEAN CYST NEMATODE

Genetic resistance is an important management tool for all crops. When it comes to soybeans, this tool is essential for *Phytophthora*, a soil-borne pathogen that causes root rot early in the season, reducing plant stand and can also kill plants later on, reducing yield. *Phytophthora* risk increases in fields with a frequent history of soybean and those that are prone to water-logging. About half of soybean varieties available contain *Phytophthora* resistance genes. Keep in mind, even though you plant a variety with *Phytophthora* resistance, you may still have root rot in your field for two reasons. First, the genetic resistance may not hold up against the specific race present in your field; and second, root rot is often a complex of several pathogens including *Fusarium*, *Rhizoctonia* and *Pythium*.

Genetic resistance is also a good line of defence for Soybean Cyst Nematode (SCN), a parasitic nematode that infects soybean roots, robbing yield. This pest is present in all major soybean-growing regions of the world but has NOT been detected in Manitoba, yet. However, if you are located near the US border or the Red River, and have a high frequency of soybean or edible bean in your rotation, you should consider growing a variety with SCN resistance (there are four available). The nematode can go undetected for a number of years without causing visual symptoms. By using a variety with genetic resistance, you can slow the build-up of SCN in your soil.

Both *Phytophthora* and SCN resistance information is available in the last column of the Variety Description table under "Notes."

STEP 5. PLANT ARCHITECTURE

Soybeans can have upright, semi-upright or bushy architecture. Plant height, pod height, and leaf architecture also vary. These characteristics can affect row closure, weed competitiveness, white mold susceptibility, harvestability, and overall performance in narrow vs. wide row planting systems. For example, upright varieties tend to perform better in narrow rows. If you use wide rows (15–30 inch), bushy varieties that branch out will tend to better facilitate row closure thereby increasing competitiveness and light capture.

Notes on these characteristics are not available in the *Variety Evaluation Guide* but are available from seed companies. ■