AGRONOMY

Agronomic Management of Soybeans in Manitoba: Cultivar Growth Rate and Maturity

In short-season regions, variety selection is a key component to successful soybean production. Among the criteria for selection, maturity groupings are an accurate indicator of variety suitability.

SOYBEAN GROWTH, DEVELOPMENT and maturation are driven by the accumulation of heat units and the progressive reduction in day length over the growing season.

Previously, cumulative crop heat unit (∑CHU) estimates have been used to rate the suitability of early-maturing varieties for different locations. More recently, the maturity group rating system has been adopted based on differences in photoperiod sensitivity among early varieties. Those varieties designated as being in the 0, 00, and 000 maturity groups are adapted to northern latitudes. Plant breeders have found that in western Canada many early varieties will reach physiological maturity and provide respectable yields at much lower ∑CHU than originally suggested.

Field experiments evaluating the development and agronomic performance of three early-maturing varieties (Table 1) were conducted at eight locations in southern Manitoba (Table 2) from 2011–2013. Trials were planted between May 15 and June 13, once soil temperature reached 10°C. According to the published heat units for each cultivar, five of the eight sites usually receive enough ∑CHU for Cultivar 1 to mature, three of the eight sites receive enough ∑CHU for Cultivar 2, and only one site, Morden, would have the thermal requirements for all three varieties (Table 2).

Table 1. Characteristics of the three soybean varieties grown in 2011–2013.

Soybean Cultivar	Company Heat Units	Maturity Group	Manitoba Variety Zone
Cultivar 1	2325	00.1	Short-season
Cultivar 2	2475	00.7	Long-season
Cultivar 3	2525	0.0	Long-season

Table 2. Characteristics and mean soybean yields at eight different sites from 2011–2013. Sites harvested prior to frost (H) and site harvested after frost (F) are indicated.

Site	Latitude (°N)	∑CHU	Yield bu/ac		
			2011	2012	2013
Arborg	50.90	2384	–	28.2 (F)	32.5 (F)
Beausejour	50.08	2496	–	45.1 (F)	44.5 (H)
Brandon	50.02	2316	29.9 (F)	30.9 (F)	58.5 (F)
Carberry	49.90	2316	18.5 (F)	45.0 (H)	55.1 (F)
Melita	49.27	2428	–	27.6 (H)	49.4 (F)
Morden	49.18	2635	50.0 (CT) (H); 33.9 (ZT) (H)	59.0 (H)	54.7 (H)
Portage	49.96	2513	49.7 (F)	24.6 (F)	62.2 (F)
Roblin	51.18	2162	49.5 (F)	54.6 (F)	47.0 (H)

CT = conventional tillage; ZT = zero-tillage

Fourteen out of 22 site-years were harvested after the first killing frost. Morden was the only location harvested prior to frost in all three years. Despite harvesting post-frost, all three varieties advanced to physiological maturity (R7), except at Arborg in 2012. At R7, frost has little effect on seed yield. Seed moisture may be slightly higher and seed size and quality slightly reduced compared to pods that dry down and reach harvest maturity (R8) prior to frost.

Soybean yield and quality were not significantly different between trials harvested post-frost vs. pre-frost. In addition, harvesting after frost had no significant effect on seed weight or protein content. However, the oil content of soybean harvested prior to first fall frost was 1 to 1.5% higher for all three varieties.

The results from this study confirmed that it is possible to achieve reasonable yields with adequate quality under sub-optimal ∑CHU in Manitoba. This strengthens and validates recent moves towards using maturity groupings to assess variety suitability to a region.

Independent evaluations of soybean variety performance are conducted at multiple locations throughout Manitoba every year to help farmers and agronomists select the best varieties for each farm and growing region. Yield, maturity and other important agronomic information are summarized in MPSG's *Pulse and Soybean Variety Guide*.

PRINCIPAL INVESTIGATOR Dr. Aaron Glenn, Agriculture and Agri-Food Canada – Brandon

MPSG INVESTMENT $163,900 – *three objectives*

DURATION 4 years