The Bean Report

No. 4 • June 6, 2018 @MbPulseGrowers • www.manitobapulse.ca

MANITOBA Pulse Soybean GROWERS

This Issue:

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Cutworms In Field Crops

Soybean Insect and Disease Scouting Calendar

Soybean at first trifoliate (V1). Wait until this stage to begin safely conducting post-emergent land rolling and glyphosate application.

Soybeans

Soybeans are mostly at the cotyledon to unifoliate stage (VE-VC) but range from germination to second trifoliate (V2). Where soybeans were seeded into warm soils and received adequate precipitation, emergence has been quick and even. Post-emergent land rolling can be safely conducted at V1 during the hottest part of the day, when soybeans are actively transpiring and cell turgor is low, making them less susceptible to snapping. This crop stage is also ideal for the first in-crop herbicide (see Table 4). The beginning of the critical period of weed control for soybean is VE to V1 and the end of the critical weed free period is from V3 to flowering (R1), depending on crop competitiveness which is influenced by plant density, row spacing and plant architecture.

Risk of iron deficiency chlorosis (IDC) is relatively low this year, as recent rainfall moved soluble salts, a key determinate of IDC, deeper in the soil profile. Calcium carbonate (i.e., lime) is also prevalent in Manitoba soils, but exacerbates IDC under waterlogged conditions by increasing the soil pH, decreasing iron availability and plant uptake.

Dry Beans

Dry bean planting is now complete. A monitoring program for Western bean cutworm, an unknown threat in Manitoba, initiates this week. See page 2 for more details.

Field Peas

Peas are at the four to six above ground node stage (V4-V6). In-crop herbicide applications will be wrapping up this week and should be avoided past the V6 stage (for group 2 products). Dingy cutworm damage has been found in western Manitoba, but below nominal thresholds.

On-going scouting activities should include nodule and plant stand assessments and looking for root rot and pea leaf weevil.

Faba Beans

Faba beans have two to four leaves unfolded. Scouting activities include those listed for peas. Ensure in-crop herbicides are applied as early as possible as late stages are undefined for most chemistries.

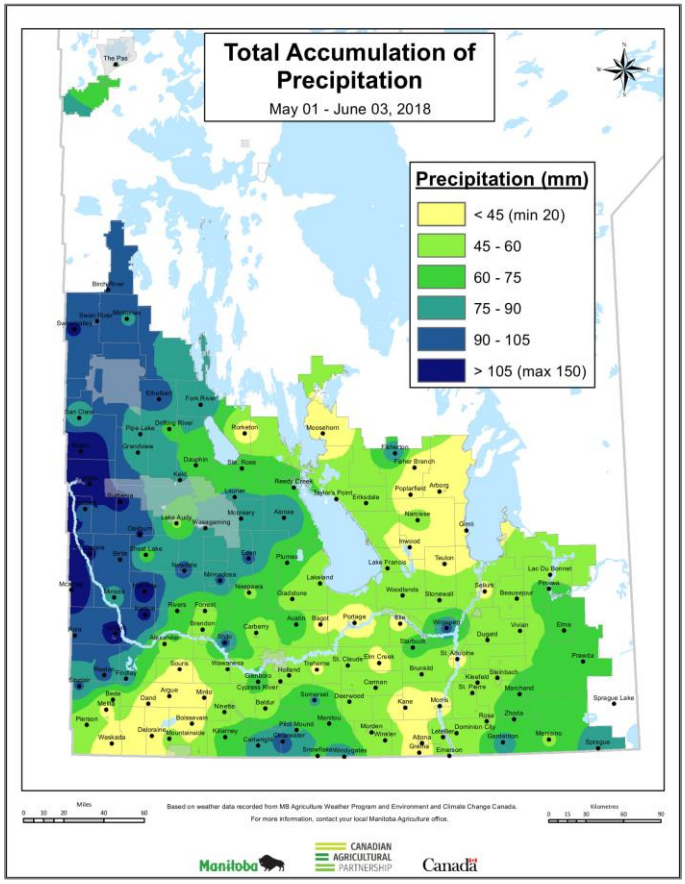

Table 1. Approximate daily (mm/day) and total seasonal (mm) water use for soybeans, field peas and dry beans.

	Soybeans	Peas	Dry Beans
Daily Water Use Germination & Seedling Stages	1.3-2.5	0.5-2.0	0.5-1.5
Total Seasonal Water Use	400-500	300-370	300-375

Late Soybean Seeding in Manitoba

The planting period for soybeans is wider than originally thought in Manitoba, according to research conducted by Dr. Yvonne Lawley at the University of Manitoba. This research found that soybean yield declined by 0.23 b/ac with each day delay in planting (Figure 2) from April 27 to June 22. High soybean yields may be achieved by early May planting, if seedlings can escape a killing frost and the risk of delayed emergence from cooler soils. However, we can be more certain of the late end of the planting period, in which a decline in yield potential can be expected if soybean planting is delayed until June. If delayed planting is inevitable—as it sometimes is in Manitoba—the first week in June may result in similar yields as late May, or only slight yield reduction. The second week of June or later will result in greater yield loss. When considering late planting, also refer to MASC crop insurance deadlines.

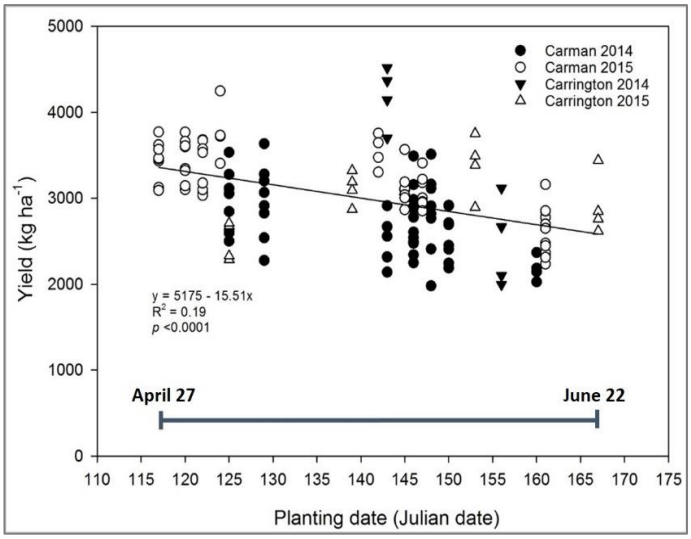

Figure 2. Soybean yield response to planting date based on four site-years at Carman, MB and Carrington, ND in 2014 and 2015 (Tkachuk 2017).

All soybean varieties grown in Manitoba are indeterminate, meaning vegetative growth continues throughout the reproductive phase. Despite this ability to continue vegetative growth, photoperiod signals the start of flowering around the time of the summer solstice and reproduction becomes the main focus. A shorter initial vegetative period from late planting may result in lower yield.

Kristen MacMillan at the U of M designed a field experiment in conjunction with MASC to support a review of seedling deadlines in Manitoba. The project investigated very early, early and mid-season varieties seeded at three planting windows (late May, early and late June) at Morden, Portage la Prairie and Arborg, representing three distinct crop insurance areas. Based on soybean maturity and yield data, Portage and Morden demonstrate good yield potential and little risk for seeding soybeans as late as June 12, however at Arborg, seeding soybeans beyond June 6 typically resulted in yield decline and increased risk of not reaching maturity (see report here).

Scouting for Cutworms

It is recommended to scout for cutworms early in the growing season on a weekly basis. It may now be late in the season for cutworm control, as the damage may already be done, or larvae may be too large to control (>2 cm long). However, continue to scout for this insect pest until late June.

Symptoms of cutworm feeding include clipped plants, holes in leaves or gouged edges of cotyledons or leaves (Figure 3). Cutworm larvae often hide below ground, so gently dig around damaged plants within the top 10 cm of soil. One useful scouting method is to scoop soil into a pan or container and shake any potential larvae loose from the soil. Research is needed to validate cutworm thresholds in soybean and pulse crops in Manitoba. As a guideline, refer to Table 2 for current nominal thresholds. There is no known threshold for cutworms in faba beans. Pea plants that are damaged early by cutworms at the soil surface can regrow or branch out from below-ground growing points (Figure 3). For other species, plant survival is likely if feeding damage occurs above the growing point. For more information on cutworm identification, scouting and management, refer to AAFC's Cutworm Pests of Crops on the Canadian Prairies field guide.

Table 2. Economic thresholds of cutworms in pulse and soybean crops.

Crop	Cutworm Threshold
Peas	2-3 larvae/m^2
Dry Beans and Soybeans	1 cutworm or more per metre of row and larvae are <2 cm long *or* 20% of plants cut

Sources: John Gavloski, Manitoba Agriculture and Field Crop and Forage Pests and their Natural Enemies in Western Canada

Figure 3. Minor cutworm damage to a soybean seedling (L) on May 24, 2018. Re-growth on clipped pea seedling (R) on May 23, 2018.

A new scouting initiative led by Manitoba Agriculture is commencing this week. Western bean cutworm has never been detected in Manitoba, but is a pest of corn and dry beans in Ontario. Baited traps will be placed in dry bean fields across Manitoba to determine if this pest is present in our province. To participate in the monitoring program or for more information, contact John Gavloski.

Assessing Pulse and Soybean Plant Stands

Plant stand (or population) assessments should be conducted each year in each field. These assessments are important for record-keeping, as seed quality, equipment and field conditions can all influence seed survival. This activity can be somewhat time-consuming but can help put more money in your pocket via higher yield or lower seed cost, due to the right target population and seeding rate. The general goal of plant stand assessments is to determine the number of live plants established per unit of area compared to the seeding rate, for an estimate of seed survival. This goal is the same for all crops. However, each crop behaves differently and there are varying levels of "optimum" target plant stands to aim for. That is why plant population research must be conducted specifically for each crop.

Why do we need optimum plant populations?

Optimum plant populations are typically low enough to be affordable and reduce disease pressure, but high enough to be competitive against weeds and achieve greater yields. Refer to Table 3 for the most current optimum plant populations of soybeans, field peas, dry beans and faba beans. This information is a compilation of research conducted in Manitoba, North Dakota and Saskatchewan. If your population assessments tell you that your crops are not within these recommended ranges, you may need to adjust the seeding rate next year. Or you may want to investigate other factors that can influence plant stand, such as seed handling (e.g., mechanical damage to seed), seeding practices and equipment settings (e.g., seed depth) or soil management (e.g. soil moisture).

How to assess plant stand

- Assess plant stand approximately one month after emergence, when all plants are expected to be out of the ground. Wait longer if emergence is delayed or variable across the field.
- Visit five or more areas of the field and conduct random, representative plant counts using a hula hoop (with any diameter) or quadrat for 7-14" rows and the row length method for 15-30" rows.
- Enter plant counts into the MPSG Bean App Soybean Plant Stand Assessor, which is available on Apple or Android devices.

The app calculates the average plant stand and converts it to plants/ac for you. Use this tool for any crop type. Note: Recommendations provided in the app are for soybeans only.

Implications of plant population results:

High (> Optimum) – Increased yield potential, but a greater risk of disease pressure.

Optimum – Optimized yield potential and economic return. Balance between reduced weed and disease pressure.

Low (< Optimum) – Lower yield potential. Crop competitive ability against weeds is reduced and weed control should be top of mind. Pods may be lower to the ground, influencing harvestability.

Table 3. Optimum target plant populations for soybeans, field peas, dry beans and faba beans in Manitoba.

Market Class	Plants/acre	Plants/ft^2	Plants/m^2	Plants/hula hoop (28.25" diameter)*
Soybeans	140-160,000	3.2-3.7	35-40	14-16
Field Peas	350-400,000	8.0-9.2	80-90	35-40
Pinto Beans (row)	60-70,000	1.4-1.6	15-17	6-7
Pinto Beans (solid)	90-100,000	2.1-2.3	22-25	9-10
Navy Beans (row)	90-100,000	2.1-2.3	22-25	9-10
Navy Beans (solid)	130-140,000	3.0-3.2	32-35	13-14
Kidney Beans	70-80,000	1.6-1.8	17-20	7-8
Great Northern Beans	70-80,000	1.6-1.8	17-20	7-8
Pink & Black Beans	90,000	2.1	22	9
Small Red Beans	95,000	2.2	23	10
Faba Beans	160-180,000	3.7-4.1	40-44	16-18

*The multiplication factor for a hula hoop with 28.25" diameter is 10,000 for plants/ac.

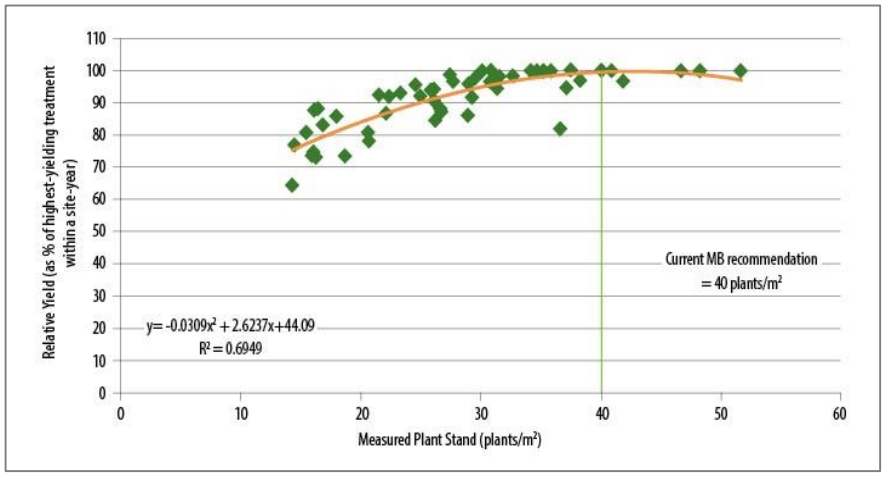

Figure 4. Soybean yield response (relative yield as percent of the highest-yielding treatment within each site-year) to actual plant stand, based on 13 site-years of data across Manitoba from 2011-2013. Data was averaged across narrow- and wide-row spacing treatments in this study (Mohr et al., 2014).

Plant population research

Soybean plant population research in Manitoba has been conducted by Agriculture and Agri-Food Canada and the University of Manitoba. Results from Dr. Ramona Mohr (AAFC) have shown that soybean yield is maximized at 160,000 plants/ac (Figure 4). Depending on economic assumptions (see Bean App Soybean Seeding Rate Calculator), the optimum range is 140,000 to 160,000 plants/ac. Click here for details on dry bean seeding rate research from North Dakota State University. Field pea plant density has been widely studied in Saskatchewan and recent research was conducted in Manitoba to validate optimum plant populations in conjunction with foliar fungicide applications (see report here).

Soybean Herbicide Options

Table 4. Pre- and post-emergent weed control options in soybeans for grassy, broadleaf and perennial weeds in Manitoba (Source: Manitoba Agriculture)

HERBICIDE	Page in *Guide to Field Crop Protection*	Herbicide Group	Barnyard Grass	Foxtail, Green	Foxtail, Yellow	Volunteer Barley	Volunteer Wheat	Wild Oat	Biennial Wormwood	Buckwheat, Wild	Chickweed	Cleavers	Cocklebur	Hemp-nettle	Kochia	Lamb's-quarters	Mustard, Wild	Nightshades	Pigweed, Redroot	Ragweed, common	Russian Thistle	Shepherd's Purse	Smartweed, Annual Species	Stinkweed	Waterhemp	Canola, Volunteer	Canada Thistle	Dandelion	Perennial Sow-thistle	Quackgrass
Glyphosate[2,3]	215	9	•	•	•	•	•	•	•	•	•	•	•	•	•[13]	•	•	•	•		•	•	•	•	•[13]	•[9]	•	•	•	•
Roundup Xtend[10]	332	4/9	•	•	•	•	•	•	•	•	•	•	•	•	•[12]	•	•	•	•		•	•	•	•	•	•[9]	S	•	S	•
Pre-plant/Pre-emergent																														
Authority/Authority Charge[7]	98	14								•		S			•	•		•	•						•					
Authority Supreme	101	14/15	•	•	•			S		•		•			•	•	S		•					•	•					
Dicamba[10,11]	150	4								•		•			✓	•	•		•	•			•		✓[S]		TG		TG	
Dual II Magnum	163	15	•[6]	•[6]	•[6]													•	S[6]											
Edge Granular	170	3	•	•	•	S	S	S		•	•	S		S	•	•		S	•		S		S		✓					
Fierce	184	14/15		•						•	•				•	•	•	•	•				•		•	S		•		
Focus	209	14/15	•[6]	•[6]	•[6]			S[6]		S[6]		•[6]			S[6]	S[6]	S[6]		•[6]					•[6]	•[6]	•[6]				
Linuron	264	7	S	S	S					•	•				•	•			•	•		•	•	•	✓[S]			S[15]	S[15]	
Metribuzin + trifluralin EC (PPI)	276	3/5	•[6]	•[6]	•[6]			•[6]		•[6]	•			•		•	•		•[6]		•[6]		•	•	✓[S]	•				
Trifluralin	369	3	•[6]	•[6]	•[6]			S[6]		S[6]	•[6]					•[6]			•[6]						✓[S]					
Valtera[5]	384	14		S					✓		•				•	•		•	•	•					•	S		•		
Zidua SC	Add	15	•[6]	•[6]	•[6]														•[6]						•[6]					
Post-emergent																														
Bentazon	112	6							✓		•	•	•			•	•	•	S	•	S	•	•	•		•	•			
Clethodim	136	1	•	•	•	•	•	•																						
Dicamba[10,11]	150	4							✓	•		•			✓	•	•		•	•			•		✓[S]		TG		TG	
Flexstar GT[1,2]	187	9/14	•	•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	✓	•	•	•	•	•
Imazamox (Solo ADV, Dawai 80SL)	242	2	•	•	•	•	•	•		S		S			S	•	•		•			•	•	•		•[4]				
Imazamox/Imazethapyr	244	2	•	•		•	•[4]	•		•	•	•		•		S	•		•		•	•	•	•		•[4]				
Imazethapyr	247	2		•				S		S	•	•		•			•		•			•	•	•		•[4]				
Liberty 200SN[8]	262	10	•	•	•			•	✓	•	•		•			•	•	•	•	•		•	•	•	✓	•[14]	S		•	S
Odyssey Ultra	288	1/2	•	•	•	•	•	•		•	•	•		•		S	•		•		•	•	•	•		•[4]				S
Pinnacle	301	2														•	•		•				•							
Poast Ultra	305	1	•	•	•	•	•	•																						•
Quizalofop	319	1	•	•	•	•	•	•																						•
Reflex + Basagran[1]	325	6/14							✓				•			•	•	•	S	•		•	•	•	✓	•				
Ultra Blazer	382	14											•			•	•	•	•	•			•				TG			
Viper ADV	393	2/6	•	•	•	•	•[4]	•				S			S	•	•		•		•	•	•	•		•				

• - Control S - Suppression TG - Top growth control ✓ - Control/suppression based on field trials.
[1]For use in the Red River Valley of Manitoba only [2]For use on glyphosate tolerant varieties only [3]Not all glyphosate products are registered for use on glyphosate tolerant soybeans [4]Will not control CLEARFIELD varieties [5]Apply in fall or spring prior to seeding of or up to 3 days after seeding [6]Control of weeds emerging from seed (not controlled if emerged at application) [7]For in season activity only [8]For use in Liberty tolerant soybeans only [9]Will not control glyphosate tolerant varieties [10]For use on RR Xtend soybean varieties only [11]Not all dicamba products are registered for use on RR Xtend soybeans [12]Including glyphosate resistant biotypes [13]Not including glyphosate resistant biotypes [14]Will not control LL varieties [15]Seedlings only

Scouting for Root Rots

While in the field assessing plant stand and nodulation this spring, take note of seedling vigor, including overall health of roots, cotyledons, leaves and stems. Stunted growth or yellow or necrotic plant tissue can be symptoms of environmental or management causes (herbicide injury, sunburn, deep seeding, etc.) or the seedling disease complex. For a guide to soybean root rot symptoms and look-alikes, see the Crop Protection Network's Seedling Diseases fact sheet.

While Rhizoctonia, Pythium, Fusarium species have a wide host range, Aphanomyces and Phytophthora are specific pathogens of peas and soybeans, respectively. And although you might be thinking that the relatively dry conditions this spring will limit the prevalence of root rot this year, these pathogens thrive under various soil moisture and temperature conditions. See MPSG's Root Rot Complex Affecting Soybeans and Pulse Crops fact sheet for host, environment and management considerations for these five pathogens. According to recent pulse and soybean disease surveys, Pythium and Rhizoctonia are uncommonly found compared to Fusarium, Phytophthora and Aphanomyces.

Visually identifying the culprit(s) of root rot by assessing the symptomatic tissue can be difficult. Need help? Send a plant sample to Manitoba Agriculture's Crop Diagnostic Services. Access the sample submission procedure and form here.