The Bean Report

No. 4 • July 7, 2017 @MbPulseGrowers • www.manitobapulse.ca

MANITOBA Pulse & Soybean GROWERS

This Issue:

Quick Links:

MPSG Soybean Fertility Fact Sheet

CropTalk Westman – IDC in the 2017 Soybean Crop

Manitoba Insect & Disease Update

Dry beans entering the late vegetative stages near Carman, Manitoba on July 5, 2017.

Soybeans

Soybeans showing symptoms of phytophthora root rot on June 30, 2017.

The recent shift to hot temperatures is good news for soybean crops. Cool temperatures recently experienced in the province slowed plant development due to less heat accumulation. Soybean stages currently range from the 3rd to 6th trifoliate stages, with some beginning to flower. The summer solstice on June 21st typically triggers flowering of soybean fields due to the switch to decreasing day length. It is expected that more fields will begin to flower over the coming days. All soybean varieties grown in Manitoba are indeterminate, so vegetative growth will continue into the reproductive growth phase. Determinate varieties on the other hand, which are more commonly grown in southern regions of North America, cease vegetative growth once the reproductive phase begins.

Soybeans with iron deficiency chlorosis (IDC) are showing signs of recovery as crops approach the late V-stages. See page 2 for more information on identification and management of IDC. Symptoms of phytophthora root rot are present in soybeans (left). Characteristic visual symptoms include wilted, necrotic leaves remaining attached to the plant. If PRR is suspected, send samples to the Crop Diagnostic Centre at the University of Manitoba for confirmation.

When considering final in-crop herbicide applications, assess overall weed pressure and canopy closure. If the canopy is still open and there is excessive weed pressure, herbicide application may be effective. However, also consider yield loss that may already have taken place by weed infestation. The Guide to Field Crop Protection indicates that glyphosate application can occur "through flowering." If necessary, applications during flowering are acceptable until pods are visible on the plant. But it is also important to remember the critical weed-free period (CWFP). The CWFP is currently being validated in Manitoba, but previous research has indicated soybeans should remain weed-free until the V3 stage.

Dry Beans

Dry beans are progressing through the late vegetative stages. Flowering has not yet begun, but is expected to take place soon, as buds are now visible. Bacterial blight is showing up in dry bean fields, particularly those that have been stressed or damaged by wind or hail. Certain types of dry beans, such as kidneys, are more susceptible than others. Fungicide timing is soon approaching, but it is important to remember that fungicides do not offer protection against bacterial blight. Weed control in dry beans should now be wrapping up, as plants are beyond the appropriate stage for most in-crop herbicides. Avoid late applications which can cause yield loss and issues with maximum residue levels.

Field Peas

Field pea flowering began toward late June in Manitoba. At this time, growers should scout for aphids (more information on page 2) and assess nodulation (more information on page 3). Pea aphids are now present in Manitoba, and scouting should take place throughout flowering.

Iron Deficiency Chlorosis

Identification

Iron deficiency chlorosis (IDC) has been a widespread issue for soybeans in Manitoba this year. Symptoms of IDC include interveinal yellowing (chlorosis) of new growth, where leaf veins remain green (Figure 1). It can appear as early as the 1st trifoliate stage. Prior to this stage, iron is supplied by the seed. Iron cannot be translocated within the plant; thus, yellowing occurs when the iron source becomes exhausted.

It can occur in large patches, and is most likely to occur at the tops of eroded knolls or in field depression areas. These symptoms should not be confused with potassium or nitrogen deficiency.

Figure 1. Soybean trifoliate showing symptoms of iron deficiency chlorosis (IDC).

Table 1. Field risk of IDC based on carbonate and soluble salt soil test levels (Agvise Laboratories).

SOLUBLE SALTS	CARBONATE LEVEL (%)		
(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

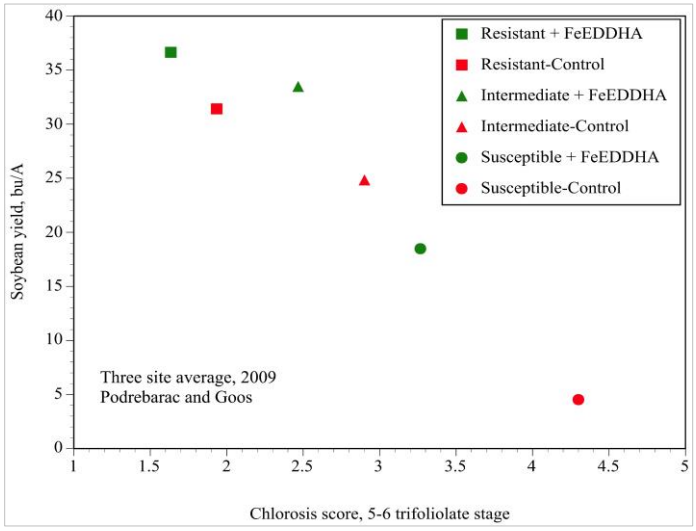

Figure 2. Yield response of resistant, intermediately-resistant and susceptible soybean varieties to iron deficiency chlorosis with/without Soygreen (FeEDDHA) applied in-furrow.

Management

Any amount of yellowing caused by IDC, even if temporary, means that yield is lost. Yield loss will be minimal if soybeans recover from IDC by the 5th-6th trifoliate stage; however, persistence beyond this stage can cause significant yield loss (Goos, NDSU).

Using Table 1 as a guide, soluble salt and carbonate concentrations from soil test results can help you determine which fields are at risk of IDC. For example, a combination of high soluble salt (>1.0 mmhos/cm) and carbonate (>5.0%) concentrations in the soil indicate an extreme risk of IDC (Table 1). It is suspected that the wet conditions in 2016 may have brought soluble salts to the upper soil profile. Without timely rains early in 2017, we may be left with high salt concentrations near the soil surface in many areas.

In-season rescue options for IDC are limited, so the best method for control is prevention. Variety selection is the primary control option. Other options for control include heavier seeding rates, improved drainage, and practices that reduce soil N levels such as cover cropping and N management in other crops. Research from North Dakota State University has shown that in-furrow iron chelate products, such as Soygreen (2-3 lb/ac of FeEDDHA) can offer some protection. However, significant yield loss can still occur when varieties are susceptible to IDC (Figure 2).

Refer to the MPSG Soybean Variety Evaluation Guide or Seed Manitoba for information on variety tolerance to IDC.

Aphid Scouting in Field Peas

Pea aphids feeding on the youngest tissue.

Scouting for pea aphids can now take place, as field peas are flowering in Manitoba. There are two methods to assess aphid populations in a pea crop: 1) examining individual leaf tips and 2) using a sweep net. It is recommended to examine five plant tips (the top 8 inches) in at least four locations of the field. The economic threshold is **2-3 aphids/plant tip** with this method. If using a sweep net, conduct 10 sweeps as you walk through the crop in different areas, swinging the net in a full 180° angle. The economic threshold for the sweep net method is **90-120 aphids/sweep** (or 9-12 aphids per single sweep).

Insecticides can offer control of pea aphids at the time of first pod to protect plants during pod formation and elongation. However, it is important to consider beneficial insects and aphid predators prior to pulling the trigger with insecticide. Aphid predators include lacewing larvae (brown alligators) and lady beetle larvae (black alligators). If given the chance, a single lady beetle larva can eat approximately 100 aphids/day.

Nodulation & Nitrogen Fixation

Leguminous crops have the ability to fix atmospheric nitrogen (N_2), supplying a large proportion of the N requirement. Nitrogen fixation occurs through a symbiotic relationship that is formed between legume plants and rhizobia bacteria. Rhizobia (supplied by inoculant) enters the plant via root hairs and forms nodules. The nodules can then convert N_2 in the air of soil pores to the plant-available form, NH_3. According to a meta-analysis of previous research conducted by Walley et al. (2007), most pulse crops obtain approximately half of their N-requirement from nitrogen fixation. However, total N fixed from the atmosphere is less for lentils and chickpeas compared to other crops. Faba eans are capable of fixing the greatest amount of N, fulfilling 77% of the N-requirement. Not reported in this table are soybeans, which can also fix approximately 50% of their N-requirement.

Table 2. Nitrogen fixation of pulse crops grown under irrigation.

	lb N/ac fixed from the atmosphere	% of Plant-N fixed from the Atmosphere
Dry beans	62	52
Field peas	61	47
Fababeans	77	65
Lentils	42	48
Desi chickpea	36	55

Source: Walley et al., 2007. Nitrogen economy of pulse crop production in the Northern Great Plains. Agron. J.

Root nodules of soybeans (left) and field peas (right).

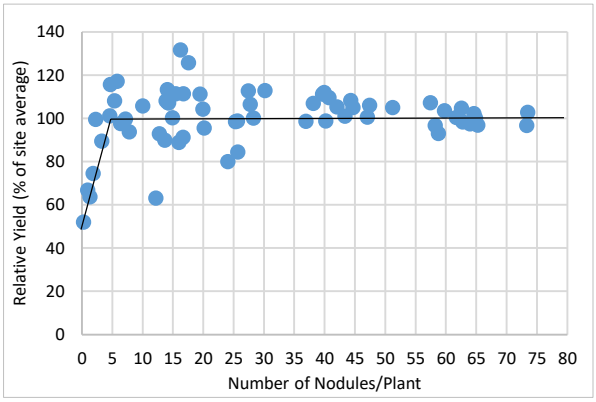

Figure 3. The relationship between soybean nodule number per plant and yield (MPSG).

Assessing Nodulation

Nodulation of pulse crops should be assessed at the R1 (first flower) stage to determine how effectively they are fixing atmospheric N. Use a trowel or shovel to dig up the entire root system of five plants in representative areas of the field (roots and nodules will be lost if plants are pulled by hand). Soak the roots in a pail of water to remove the attached soil and count the number of nodules per plant.

According to MPSG research results, 5-10 nodules per plant are sufficient for 100% of soybean yield potential. To assess nodule activity, cut a few nodules open. If the inner nodule tissue is pinkish-red in colour, the nodules are actively fixing nitrogen. If there are no nodules present and the crop is turning yellow, consider a rescue N application at R2 (full flower) to R3 (early pod). Rescue N applications must be applied below the canopy if using liquid N, or can be broadcast-applied if using a granular product.

The Quest to Maximize Soybean Yield & Profitability in Manitoba!

ULTIMATE SOYBEAN CHALLENGE

What is it? Three teams have been tasked with selecting their own unique combination of soybean management practices and crop inputs in the quest to be crowned the winner of the Ultimate Soybean Challenge (USC)! The winner will be determined in two categories: yield and profit. The goal is for each team to take on a unique strategy for crop management, representing different approaches that farmers take in crop production.

Where and how? The USC is located again at the Agriculture and Agri-Food Canada (AAFC) site in Portage la Prairie, MB. Each selected management strategy will be tested in replicated, randomized field trials. Soil characteristics, tillage prior to seeding, rolling, seeding date and harvest date are the same across all treatments. All other management practices were determined by the team leaders. Updates on crop progress and management will continue to be provided throughout the growing season. Stay tuned to @MBPulseGrowers on Twitter!

	Team A	Team B	Team C
Variety	Akras R2	S007-Y4	OAC Prudence
Inoculant	Liquid + granular	Liquid	Granular
Seed treatment	None	CruiserMaxx Vibrance + Heads Up Plant Protectant (fungicide + insecticide)	Evergol (fungicide only)
Seeding equipment	Air seeder, 9" spacing	Planter, 30" spacing	Planter, 30" spacing
Seeding rate (seeds/ac)	190,000	150,000	150,000
Anticipated weed control	Pre-emergent residual herbicide (if needed) + 1 glyphosate pass	3 glyphosate passes	Rotary hoe + inter-row cultivation, in-crop herbicide if escapes unacceptable
Fungicide	None	Yes	None
Foliar nutrients	None	Depending on tissue test	None

Team A - Cassandra Tkachuk (MPSG) & Kristen Podolsky (University of Manitoba)
Follow best management practices and save money on unnecessary inputs, increasing net return and yield.

Team B - Terry Buss (Manitoba Agriculture) & Dennis Lange (Manitoba Agriculture)
Follow chemical/seed program, spending less on big ticket items (i.e., seed) and more on other inputs, to increase yields and net return.

Team C - Curtis Cavers (Agriculture & Agri-Food Canada) & John Heard (Manitoba Agriculture)
Choose novel soybean management techniques to differentiate from other teams and alleviate any "home-field advantage."