The Bean Report

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MANITOBA Pulse & Soybean GROWERS

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Soybeans at the V2 (2nd trifoliate) stage on June 13, 2017.

Soybeans

Recent rains have offered some relief from hot, dry conditions in Manitoba. As of June 11th, most areas of the province had received less than normal rainfall—a dramatically different scenario compared to 2016 (Table 1). However, most areas had met or exceeded normal growing degree-day (GDD) accumulation (Table 1), which is good news for heat-loving soybean crops. Soybean plants are quite efficient at extracting soil moisture, even in dry conditions. But hopefully we receive time rainfall events for the remainder of the season to achieve good soybean yields. Soybean growth stages across the province currently range from VE (cotyledon) to V2 (2nd trifoliate). The window for assessing soybean plant stands is from the V1 (1st trifoliate) to R1 (first flower) stages throughout the month of June. Refer to page 2 for more information on plant stand assessment.

Dry Beans

Pinto bean plant nearing the V2 (2nd trifoliate) stage on June 12, 2017.

Dry bean growth stages currently range from the unifoliate to early V-stages. Slow emergence and reduced plant stands were reported in some dry bean fields prior to this week's rains. Growers are advised to assess live plant stands (see page 2) at this time to determine the level and causes of seed/seedling mortality. Seed quality, equipment or growing conditions could be responsible for slow or reduced emergence.

It is also advised to choose weed control products carefully, as some products are not registered for all types of dry beans.

Table 1. Manitoba weather from May 1 to June 11, 2017, including rainfall and growing degree-days (GDD).

Location	Total Rainfall (mm)	% Normal Rainfall	Total GDD	% Normal GDD
Russell	34	48	332	111
Virden	43	61	346	103
Melita	22	28	371	105
Boissevain	37	52	372	103
Brandon	48	67	323	102
Dauphin	35	44	325	106
Gladstone	51	69	325	97
Portage la Prairie	37	48	369	103
Treherne	38	49	369	106
Winkler	36	42	399	106
Morris	31	39	384	107
Emerson	39	43	388	101
Arborg	32	47	313	111
Beausejour	24	30	357	107
Steinbach	35	40	376	111

Source: Manitoba Crop Weather Report.

Pulse & Soybean Plant Stand Assessment

Now is the time to assess pulse and soybean plant stands, which can provide insight on economic return, disease pressure and canopy closure for competition against weeds. You can determine the percent mortality of your crop by comparing the live plant population to the intended target population or seeding rate. Seed or seedling mortality may be caused by equipment/seed handling, seed quality, seeding practices or growing conditions. Mortality may be out of your control in some cases, but there could also be opportunities to improve production practices for more accurate plant stands and greater economic return.

Table 2. Optimum plant stands for soybeans, dry beans and field peas.

Crop	plants/acre	plants/ft²	plants/m²	plants/hula hoop (28.4″ diameter)*
Soybeans	140-160,000	3.2-3.7	35-40	14-16
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/black beans (row)	90-100,000	2.1-2.3	22-25	9-10
Navy/black beans (solid)	130-140,000	3.0-3.2	32-35	13-14
Kidney/Great Northern	70-80,000	1.6-1.8	17-20	7-8
Field peas	350-400,000	8.0-9.2	80-90	35-40

* A diameter of 28.4″ for a hula hoop is equal to 1/1000th of an acre.

Tips for assessing plant stands

The MPSG Bean App *Plant Stand Assessor* simplifies the following steps for more efficient recording, unit conversion and calculation of plant populations.

- Use a fixed area for **solid-seeded crops** (7-14″ rows), such as a hula hoop or quadrat (ft² or m²) to count plants. Measure the hula hoop diameter, which feeds into the plant stand calculation below.

  Hula hoop equation:
  plants/acre = # of plants inside hoop * {43,560 / [3.14 * (inside hoop diameter in inches 2)² / 144}
  Based on Area = πr^2, where π is approximately 3.14 and r is the radius (half the hoop diameter), 43,560 ft² equal to 1 acre, and 144 in² equal to 1 ft².
- For **row crops** (15-36″ rows), use the row length method to assess plant populations (row spacing * row length = area²).
- Choose **5-10 random, but representative areas** of the field to conduct plant counts. Adjust the number of counts (sample size) based on the field size. To cover more ground, enter the field from different edges.
- Take note of areas such as headlands, depressions or knolls that may cause higher or lower plant stands.
- Count and record the number of plants within each selected area.
- Calculate the average number of plants for the field and compare to the optimum plant stands listed in Table 2.

HIGH PLANT STAND

Plant populations greater than the optimum generally provide the opportunity for increased yield. This may be due to more rapid and effective canopy closure of the crop, which is important for soybeans and other pulse crops which are poor competitors against weeds. However, high plant populations also increase the risk of disease development—so be on the lookout for diseases while scouting.

OPTIMUM PLANT STAND

Plant populations within the optimum range should offer the best of both worlds in terms of yield, economic return and pest pressure. Take note of seeding rates and practices that help you achieve the optimum stand. Keep in mind potential adjustments needed in the future for different planting conditions (e.g., wet vs. dry).

LOW PLANT STAND

Populations lower than the optimum have an increased risk of yield loss, despite the ability of some crops to compensate for reduced stands. Low plant stands have slower canopy closure and poor competitive ability against weeds. Replanting decisions should be based on the time of year and yield benefit vs. the cost of seed.

Scouting for Early Season Disease & Insect Pests

Figure 1. Soybean plant infected with Phytophthora root rot (*Phytophthora sojae*).

Figure 2. Field peas infected with *Aphanoymyces euteiches* (left) compared to uninfected plants (right).

Crop pests such as diseases and insects become more prevalent over time with frequent production of a particular crop. With the continuing rise of soybean production in Manitoba, a gradual increase in soybean pest pressure will follow suit, similar to other crops in the past.

Soybean and pulse crops are now entering the early V-stages and advanced node stages (as with field peas), but it is important to continue scouting for seedling diseases and root rots—some of which can appear throughout the growing season. These diseases can be difficult to diagnose in the field, so lab testing is needed for confirmation. Suspected disease or insect samples can be sent to the Manitoba Agriculture Crop Diagnostic Centre.

Scouting & Diagnosis of Seedling Diseases & Root Rots

1. Check several areas of the field in a "W-pattern" visually inspecting plants for abnormalities and symptoms.
2. If root rot is suspected and you want to submit a sample to the lab, dig around the plant to obtain the full root system. Leave a small amount of soil around the root.
3. Wrap roots in foil to the soil line and crimp the foil to keep soil from moving onto the cotyledons or leaves. Place the foil-wrapped plant in a plastic bag.
4. Ship or drop off samples the day they are collected. Shipped samples should be in a container or cardboard box to avoid crushing. Avoid sending samples immediately before the weekend.
5. Do not collect or ship dead plants. Do not wash seedlings prior to submitting.

Adapted from the Crop Protection Network.

Seedling Disease & Root Rot Symptoms

General symptoms include poor emergence and root development, yellowing, root discolouration and lesions on the root or stem tissue near the soil line. Crop rotation is the best way to manage seedling diseases and root rots. See images of the following diseases here.

Pythium spp. is considered a "water mould". It can affect soybeans, pulses, cereals, canola and alfalfa. Symptoms include water-soaked lesions on the hypocotyl or cotyledons. Diseased plants pull easily from the soil.

Rhizoctonia solani can also affect soybeans, pulses, cereals, canola and alfalfa. Characteristic symptoms include reddish-brown lesions that remain firm and dry on the hypocotyl at the soil line, or on the roots.

Fusarium spp. hosts include soybeans, pulses, cereals, canola and alfalfa. Symptoms include discoloured (brown or pink) root tissue. Severe infection will result in wilting and leaf death.

Phytophthora sojae also known as Phytophthora root rot (PRR), only affects soybeans. All soybean growth stages are susceptible. Infected seedlings will exhibit water-soaked stems or dark brown lesions low on the stem. This disease is characteristic of wilted leaves remaining on the plant (Figure 1). Selecting PRR-resistant varieties is one method of control.

Aphanoymyces euteiches is also considered a "water mould." Hosts include field peas, dry beans and lentils (soybeans are resistant, faba beans and chickpeas have partial resistance). Caramel coloured roots are characteristic of this disease (Figure 2).

Scouting for Early Season Insects

Insects to scout for at this time include cutworms, wireworms and seedcorn maggot. Inspect fields in a "W-pattern" for signs of poor emergence or feeding damage on above and below-ground portions of the plant. Seed treatments only provide early-season protection against wireworms and seedcorn maggot.

Cutworms should be identified at a species level to determine feeding behaviours and economic thresholds. The most common species in Manitoba are the dingy, redbacked and darksided cutworm. Symptoms include clipped plants, holes in leaves or gouged edges of cotyledons or leaves. Cutworms have a medium economic impact in Manitoba and insecticide control is available if necessary. Click here for more information on cutworms.

Wireworms can affect a wide range of crops in Manitoba, including soybeans and pulses. Due to a four to seven year life cycle, they may persist in a field for several years. Beans should be scouted from planting to V3. Wireworms bore holes into plants or feed on roots. Insecticides do not provide rescue control.

Seedcorn maggot is an infrequent pest of soybeans, dry beans and corn in Manitoba. Seedcorn maggot may be found in manured or heavy residue fields. Scouting should take place from planting to VE. Symptoms include hollowed out seeds or cotyledons. This insect has a low economic impact in Manitoba. No rescue insecticides are available.