The Bean Report

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MANITOBA Pulse Soybean GROWERS

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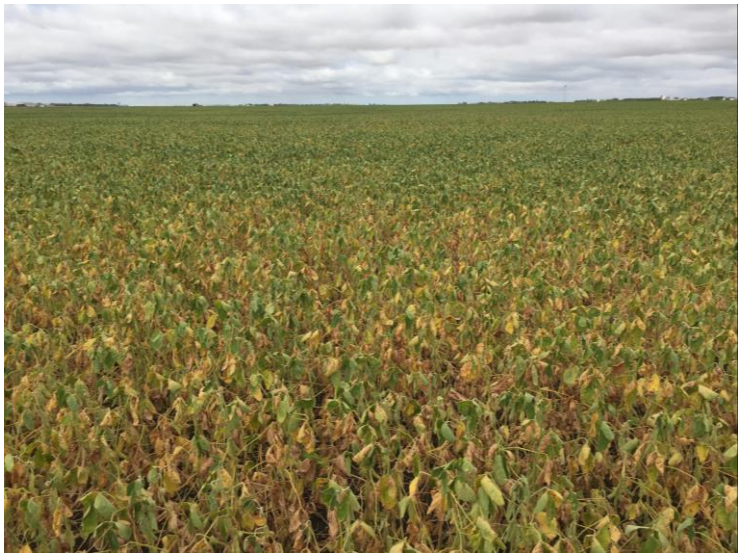


Rapidly-maturing soybeans in central Manitoba on August 14, 2018.

Soybeans

Soybeans across Manitoba currently range from the R6 (full seed) to R7 (beginning maturity) stages. Early-maturing varieties and areas within fields that are prone to drought stress are starting to dry down in central and eastern Manitoba. Advanced maturity is largely due to the extreme heat and lack of rainfall experienced over the past weeks. Unfortunately, these dry conditions during seed-fill pose a serious threat to yield potential. Another hail event occurred on August 3rd in southwestern Manitoba.

The first report of soybean aphids arrived last week, with very low levels in the eastern and central regions of the province. Insecticide applications are not recommended at this time, due to low levels of infestation and advanced crop staging. Soybean aphids no longer pose an economic threat to soybean crops at the R6 stage or later. Spider mites are present in some soybean crops mainly at field edges and hot spots within the field. Read Bean Report #8 for information on thresholds and management. If considering insecticidal control, ensure product application meets the preharvest interval requirement.

Dry Beans

Most dry beans range from R8 (beginning maturity) to R9 (full maturity). Desiccation and undercutting have begun in some fields. See page 3 for more information on desiccation and dry bean harvest. Dry bean crops have also been affected by drought conditions and are shutting down early. Lower yields may result from a lack of moisture during seed-fill and rapid maturation.

Rust has been reported at very low incidence in Manitoba at varying levels of severity. Refer to the NDSU Crop and Pest Report for more information on rust in dry beans. If the disease is well established and the crop is already maturing, fungicide application is not advised. Continue scouting for western bean cutworms throughout maturity. Damage inflicted by this insect pest appears as shot-holes in pods.

Kidney beans showing seed colour change on August 10, 2018.

Field Peas

Field pea harvest is well underway in Manitoba and should wrap up by the end of the week. Yield reports have varied widely from 20 to 80 bu/ac, but average approximately 50 to 60 bu/ac across the board. The wide range in yields is due to variation in soil moisture and severity of root rot encountered over the growing season.

Stay tuned for the new Field Pea Growth Staging Guide coming this fall!

Field peas on August 13, 2018 close to harvest.

Faba Beans

Faba bean crops are now beginning to ripen in Manitoba, with seeds filling the pod cavity and starting to change colour. Desiccation of fabas should take place when 80% of the lower pods turn black, the mid-canopy is still yellow and the top of the canopy is still green. If seeds in the top pods are crushed easily when squeezed, it is still too early for desiccation.

Pea aphids have been found in faba beans at low incidence in Manitoba. Little research is available on economic thresholds in fabas, but pea aphids should pose less of a threat to the crop as it matures.

Impact of Dry Conditions on Pulses & Soybeans

Figure 1. Drought-stressed soybean plants with upside down leaves.

Soybeans

Soybeans respond to drought stress at various points during the growing season with different tactics. At full flower (R2), plants will abort flowers and the period of flowering will shorten with high temperatures and moisture stress. During the early pod (R3) growth stage, stressed soybean plants will abort both flowers and pods. Soybean yield losses will be the greatest when moisture stress occurs during the pod elongation (R4) to seed development (R5) phases. Stress at this time can reduce the number of pods per plant, which is the major source of the lost yield, but can also reduce the number of seeds per pod and the size of the seed. Yield loss from moisture stress at the full seed (R6) growth stage is largely due to a reduction in seed size. Stress occurring after the onset of physiological maturity (R7) does not affect yield.

Why do soybean leaves turn upside down when it is hot?

Soybean plants will expose the undersides of their leaves to the sun as a survival mechanism when environmental conditions are hot and dry (Figure 1). This action ceases photosynthesis and the need for transpiration (i.e., water evaporation from the plant). As drought intensifies, leaves flip upside-down because the underside of the leaf is more silver-white in colour, which reflects more sunlight and reduces temperature stress.

Dry Beans

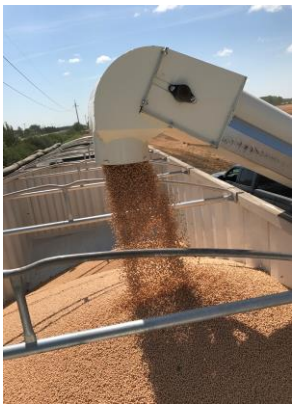
Dry beans vary in their susceptibility to drought stress and yield is a good indicator of this. According to research conducted by NDSU, pinto beans were found to be more tolerant to drought stress than navy and black beans. Pinto, navy and black bean yield losses from drought stress in this study were 32.4, 35.5 and 36.3%, respectively. Previous research found pinto and Great Northern beans to be more drought-tolerant than pinks and reds.

Field Peas

Soil moisture availability and air temperatures are key factors in determining pea yield. A study of Saskatchewan variety trial data found that under dryland conditions, more than 20 days with maximum daily temperatures exceeding 28°C resulted in yields below 45 bu/ac. High temperatures can cause abortion of buds, flowers and young seeds in peas. However, the effect of high temperatures can be offset with adequate moisture. Approximately 200 mm of seasonal precipitation produced yields of 45 bu/ac, whereas yield loss resulted from less than 150 mm of precipitation.

On-Farm Research Trial Harvest Tips

You had a question. You set up a trial to find answers. Now it is time to pull off the seed and determine if that input or practice made a difference. Gathering quality harvest data will provide more meaningful, accurate results to your on-farm research. Here are a few tips for harvesting a successful research trial:



Using a Scale

The scale on a grain cart or weigh wagon can provide accurate yield data across uniform fields. If looking to detect small yield differences (<1-2 bu/ac) between two treatments, weigh wagons are currently the gold standard for measuring grain weight. Their scales have a sensitivity of 10-20 lbs (0.17-0.33 bu) and error can be reduced to <1%. Grain cart scales vary in sensitivity and accuracy. If scale sensitivity is >100lbs (1.67 bu), your ability to detect statistical differences between treatments will be reduced. Calibrate the scale on your grain cart or weigh wagon frequently against a certified or trusted scale. An acceptable level of error is <1%. If your scale is out more than 1%, consult a technician to troubleshoot possible problems.

Using a Yield Monitor

Yield monitors are a great option if you are looking to detect spatial differences within the field; something that cannot be done with a weigh wagon or grain cart. Yield monitor accuracy varies widely depending on seed moisture, crop type and calibration. If using a yield monitor to collect yield data for strip trials, it is important to calibrate the combine on the day and in the field you intend to harvest. For proper calibration methods, consult your operator's manual. Newer combine models may have hoppers with load cells to actively calibrate yield monitors in real time. So far, our experience with these systems have been positive.

Other Tips

Aim to harvest an entire trial on the same day using only one combine to avoid machine calibration and seed moisture differences. Weigh each strip separately. Dumping the grain harvested from all strips of the same treatment into a wagon or cart will not allow you to make statistical comparisons. To statistically analyze your own yield data, use IHARF's On-Farm Analysis Tool. For further guidance on harvesting or analyzing on-farm data, contact MPSG On-Farm Specialist Greg Bartley.

Dry Bean Desiccation and Harvest Considerations

Desiccation

Desiccation is common practice in dry bean production for uniform dry-down and weed control, but it does not bring about or speed up maturity. See below for dry bean desiccation tips:

Timing

Proper desiccation timing is critical to prevent yield and quality loss, and residue accumulation in the seed. Dry bean crops are ready for desiccation at 80% pod colour change and 80 to 90% leaf drop (Figure 2). Plants at that point are physiologically mature and seed moisture is <30%.

Products

Products available for desiccation in dry beans include Heat (saflufenacil), Reglone (diquat) and Valtera (flumioxazin), which can be used alone or in combination with glyphosate. Using tank mixes rather than glyphosate alone can improve weed desiccation and prevent glyphosate residue accumulation in the seed. Consult your buyer and keepingitclean.ca before selecting a desiccation product to avoid market risks.

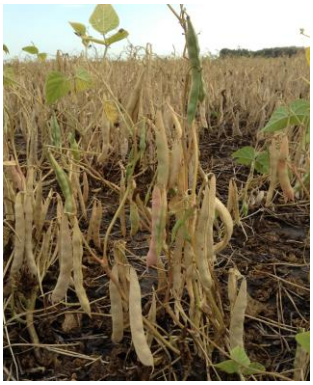


Figure 2. Dry beans ready for desiccation at 80% pod colour change, 80-90% leaf drop and <30% seed moisture.

Harvest Methods

Dry beans can be harvested by either undercutting and windrowing, or direct harvesting (i.e., straight combining). Cutting and windrowing is more common for row-cropped beans and vine-type varieties that pod low to the ground. Direct harvest or swathing with lifters prior to combining has been more common for solid-seeded beans and bush-type varieties that achieve greater pod heights. When direct harvesting, there is a greater risk of loss at the cutter bar due to pod shatter and low pods that are left behind.

Research

MPSG-funded research has evaluated the impact of dry bean plant architecture on harvest losses associated with undercut vs. direct harvest methods. In this study, yield differences between the two harvest methods were compared across varieties. Surprisingly, variety (i.e., plant architecture) had no impact on yield differences between harvest methods in three out of four years. In other words, the characterized plant architecture of dry bean varieties should not be the only factor that dictates which harvest method is chosen. In the year that significant varietal differences were observed (2014), undercutting of pinto beans was superior to direct harvest. Under the moist conditions of 2016, undercutting was superior to direct harvest for all varieties. Overall, it is recommended to assess how the growing season impacts plant architecture and choose the best method of harvest accordingly (e.g., undercut if plants are lower to the ground, direct harvest if plants remain upright). It is also advised to select an upright variety for its yield potential, rather than suitability to direct harvest.

General Harvest Tips

- Dry bean harvest can begin at 18-22% seed moisture. This is when some pods are brown, but most pods are still yellow. If the timing is right and pods are very dry, aim to cut when there is dew to avoid shatter losses.
- For both harvest methods, constant feeding into the header can reduce losses. Areas with less plant material may cause poor feeding into the header and therefore losses.
- High cylinder speeds and augers can inflict the greatest amount of seed damage. Set cylinder speeds as low as possible and to minimize seed damage.
- The maximum safe storage moisture for dry beans is 16%. Moisture content below 16% can increase the amount of split or cracked seed coats and shriveled beans. Beans above 17% moisture are at risk of heating and spoilage.
- Click here for a list of bean grade determinants.

Late-Season Hail Damage to Soybeans

If hail occurs in soybeans at the R6 stage (Figure 3A,B), research in Manitoba has shown that yield loss can range from 12 to 37% depending on the severity of defoliation (33 to 100%). Earlier soybean reproductive stages (R3 to R5) are more sensitive to defoliation.

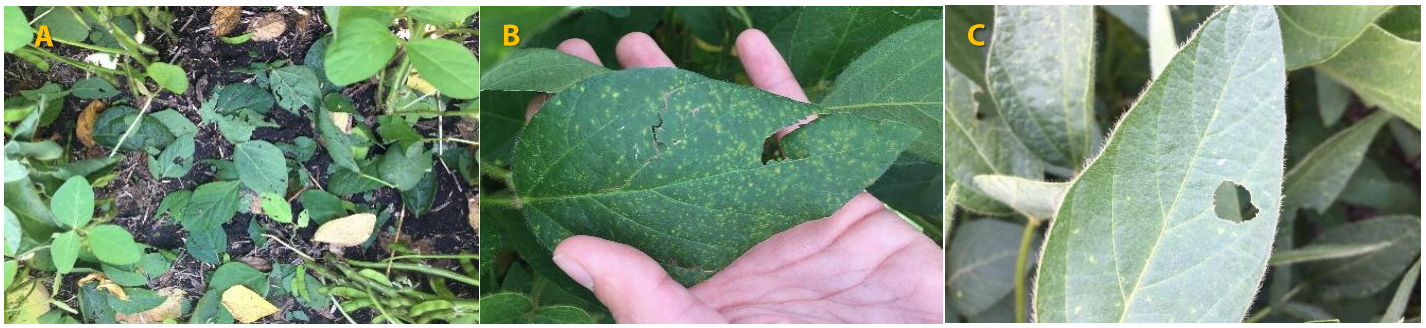


Figure 3. (A) Hail damage to soybeans on August 3, 2018 causing defoliation, **(B)** leaf tearing caused by the same hail event and **(C)** defoliation caused by a grasshopper rather than hail.