

## Assessing Early Season Frost Damage in Soybeans

After a frost event, fields should be scouted and decisions should be made on a field by field basis. If temperatures were below  $-2^{\circ}\text{C}$  for  $>2$  hrs, there is risk of damage to soybeans. Frost severity can vary widely depending on elevation, residue, crop staging, soil moisture etc. Here are steps to follow for each field assessment which should take place 3-5 days after the frost event to allow for potential recovery time. This waiting period may not be necessary if it was a very hard frost and seedling death is evident early on.

1. For each area of the field that you will assess, identify plants that
  - a) survived, b) are injured but have potential to survive and c) those that had lethal injury. Use the pictures as a guideline.
2. Count the number of plants that survived or have potential to survive and calculate your actual plant stand (live plants/ac). Use the [MPSG Bean App](#). If conditions are cool, re-growth may take up to 7 days.
3. **Identify if you are within a good to adequate range for Manitoba (Table 1) based on yield potential of your existing plant stand.**
4. If plant stand is within the low range, there is reduced yield potential but it is likely economical to keep the plant stand. In the MPSG On-Farm Network, fields with 69-99,000 plants/ac have yielded 22-44 bu/ac.
5. The very low range is the re-seeding decision threshold. Research has shown 76-84% yield potential, but this is for non-injured soybeans. If plants are evenly distributed it may be economical to keep the plant stand, but re-seeding may be justified depending on date, weather, re-seeding options etc.

**Managing frost damaged soybeans** (if the majority of the existing plant stand is comprised of recovering, frost-injured soybeans)

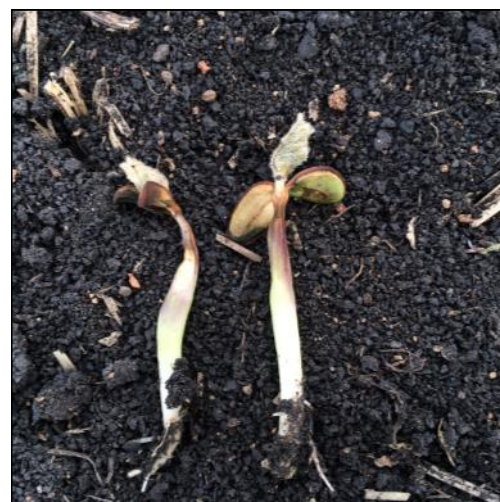
- Timely weed control will be important in reduced stands due to less crop competition, but herbicide applications should be delayed until re-growth has resumed to ensure adequate metabolism by the plant.
- Pod set may be lower to the ground due to excessive branching and reduced plant height. Maturity will likely be delayed.



Injury to the leaves and main growing point, but hypocotyl is healthy. Re-growth is likely within 3-7 days.



Re-growth starting from the axillary buds three days after a frost event killed the main growing point.



Seedling death likely; soft, shrunken hypocotyl (stem below the cotyledons).

**Table 1. Assessing Soybean Plant Stands in Manitoba**

Plant Stand	Plants/ac	# Plants per ft <sup>2</sup>	% Yield*
High	>160,000	>3.6	100%
Good	140-160,000	3.2-3.6	98-100%
Adequate	120-140,000	2.8-3.2	95-98%
Low	80-120,000	1.8-2.8	84-95%
Very low	60-80,000	<1.8	76-84%

\* Based on research across 13 site-years in Manitoba from Mohr et al. 2014