

Effect of Spring Frost on Emerging Crops

10 year recap: previous late spring frosts – May 30, 2015 and June 6, 2009

Don't assume because there is frost (or snow) on the ground, that your emerging crop is dead.

With the drop in temperatures in the past couple of days, there are a few things to keep in mind if the mercury dips below 0°C. The temperature is the instigator for causing frost, but whether it is -0.1°C or -4°C the damage inflicted is highly influenced by these other factors:

1. Duration

- Short frost = <2 hours, may not cause much damage if frost is light (above -1 to -2°C), crop type and staging is tolerant, conditions wet and crop has become acclimatized.
- Short frost = <2 hours, but hard frost (lower than -2°C), crops like canola are more sensitive to longer frost vs cereals, damage can be variable in field and across area.
- Long frost = >2 hours, whether frost is light or hard the longer the negative temperatures the more time for damage to happen. Tolerance by crop type varies.

2. Other Environmental Conditions

- Cloudy and wet – prior to a frost, cool temperatures slow plant growth and “hardens” plants off, which will help them tolerate a frost. Wet soil also helps buffer the cold air effects on the plants, as wet soils change temperature slower than dry soils.
- Sunny and dry – the combination of a dramatic drop in air temperatures when plants are actively growing then a brilliant sunny day after the frost event is where we have seen the most damage. Scouting after the frost (24 to 48 hours) is very important to assess extent and percentage of field injury.
- Field residue cover – increased residue in fields was seen to increase frost damage on very susceptible crops in the 2009 June frost event.

3. Crop Type

- Spring Cereals – more tolerant than other crop types, and are tolerant to temperatures as low as -6°C because the growing point is below ground until the 5-leaf stage.
- Winter Wheat – can withstand very low temperatures for a short period of time (-11°C for less than 2 hours) up until the tillering stage.
- Corn – smaller than V5, will recover from light frost as growing point is below ground. Leaves may be killed, but plants will recover if the growing point is not damaged.
- Oilseeds – environmental conditions impact frost severity on susceptible canola and flax cotyledons. Resiliency increases at the 3- to 4-leaf stage (canola) or 2nd whorl (flax). Sunflowers are fairly tolerant up to the V4 stage.
- Pulses – peas are the most tolerant, then soybeans. Edible beans are very susceptible to frost even before emergence. Field pea crops are rarely lost to frost. Soybeans are more sensitive but the smaller the soybean plant the more tolerant they are. They can withstand short light frosts from emergence to cotyledon.

Scouting After a Frost

Scouting should start 24 to 48 hours after the frost and continue for the 5 days following the frost event. Look for leaves wilting, looking “water-soaked” or see “frost banding”. Watch for new growth in the plant. You do not want to see plants wilted and not perking back up or pinching off on the stem near the growing point (canola, flax, soybeans). Also assess the area affected by frost, small areas or a few plants damaged are okay, as other plants emerged (or just emerging) will fill those spaces. Large dead areas may need to be reseeded.

Assessing surviving plant stand density is also important. This will give an indicator of yield potential and can help delineate areas within a field, should only certain patches need to be reseeded.

For more crop specific details on what occurs to plants exposed to frost and when to do assessment please refer to Manitoba Agriculture and Resource Development’s [Spring Frost Damage Bulletin](#).

For further questions please contact an [ARD/MASC Service Centre](#).



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

Figure 1: Water-soaked canola leaves, 6 hours after frost event

Figure 2: Frost injury to soybeans (Credit: Manitoba Pulse & Soybean Growers)