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## Factors Affecting Canola Survival from Seeding to 21 Days after Emergence

As a general rule, about 50%-60% of both open-pollinated and hybrid seeds will survive to produce viable seedlings. Other than weather conditions, most factors that affect survival can be managed to some degree.

Determining the appropriate seeding rate to achieve proper plant populations (7-14 plants/ft<sup>2</sup>) requires a good estimate of seed and seedling survival for each field situation. Survival in the spring can vary greatly, easily ranging from 75% to 25% depending on many factors. The following is a discussion of how some key factors can affect seed and seedling survival:

**1) Seed Size:** In most cases, the larger the seed size, the better the vigour. The more vigour, the better the seed/seedling is able to cope with early stresses and survive. The following rating system, developed by Dr. Bob Elliott of AAFC-Saskatoon estimates potential seed vigour:

Seed Vigour Index Rating = (7 Day germination %/100) X Thousand Seed Weight (grams)  
Typical Seed Vigour Index Ratings: Open pollinated = 3-3.5, Hybrids = 3.5-4.5

If a seed lot has a rating below these ranges, the seed may be less vigorous and more sensitive to stresses. Managing seeding to reduce stress on the seed will be more critical. Growers should seed these lots into warm soils, keep seeding depth shallow and consider seeding at a little higher seeding rate.

**2) Seed Chlorophyll:** Higher seed chlorophyll content can reduce vigour and increase mortality. Testing should be done to determine that the levels are below 35mg/kg.

**3) Hybrids vs. open pollinated (OP) varieties:** Typically hybrids will have higher seedling vigour (growth) than OP varieties by 10-20%. Remember to adjust seed rate to accommodate seed size, making sure the right amount of seeds are planted to ensure a proper plant stand.

**4) Seedbed Temperature:** Cold soils (< 5° C) at seeding, and for 2 weeks following, can increase mortality by 10-20%. The ideal soil temperatures for germination at least 10° C, but around 5° C is a reasonable starting point.



**5) Frost:** Early season frost can thin a stand, but in most cases a sufficient number of canola seedlings will survive. Having the weed control options available to keep a field clean until the canola canopy closes the ground will be an asset in this situation. Most often reseeding a frosted field will fail to improve returns. If canola is being seeded early in order to improve yield potential, the increased risk of early spring frost may warrant an increase in seeding rates to ensure a stand within the range of 7-14 plants/ft<sup>2</sup> is achieved. Research has shown that stands with a plant population as low as 2 plants/ft<sup>2</sup> can still produce a viable canola crop. However yields are often lower than a canola stand that has at least 7 plants/ft<sup>2</sup>.

**6) Seed Depth:** Optimum seeding depth is 1/2"-1" below the press wheel furrow. There are still too many cases of deep seeding. Increased seeding depth increases time to emergence, reduces plant populations, decreases seedling, plant and root growth, delays maturity, and increases the risk of seedling diseases. All of this can increase seedling mortality and ultimately reduce yields.

**7) Seeding speed:** Slow down! This will ensure uniform seed distribution and emergence, along with proper fertilizer separation in single pass seeding systems. If higher seeding speeds are needed to cover the required acres, recognize that seed survival will likely be reduced and increase seeding rates accordingly.

**8) Fertilizer in the seed row:** High rates of fertilizer (especially nitrogen) placed in the seed row can greatly increase mortality if the seeding equipment has low seed bed utilization (SBU), especially in poor moisture conditions.

## **9) Seeding Equipment and Seedbed**

**Quality:** Seedbed quality depends on soil texture, moisture, tillage, openers used, and trash residue. Improper on-row packing can result in poor seed to soil contact and increased mortality, especially in dry springs. Crusting on low organic matter soils can also increase mortality. Large amounts and/or uneven distribution of crop residue can cause seed placement problems, leaving some seed stranded within the straw.

**10) Tight Rotations and Disease:** Short breaks between canola crops (less than 2 years) increase the probability of mortality due to seedling disease. Other host crops for diseases or use of residual herbicides in the rotation may also cause stand establishment problems.

**11) Weeds:** Heavy weed pressures in the field can increase mortality through competition with the canola seedlings for moisture, nutrients and sunlight. Denser canola stands will be more competitive, and early weed removal will also improve crop performance.

**12) Insects:** Heavy flea beetle pressures can thin the stand even with high seed treatment insecticide rates. The clue is the previous fall. If flea beetles numbers were high, the likelihood of flea beetle pressure the following spring is also high. Keeping seed rates up to obtain a dense plant stand will spread the damage over more plants. Cutworms and wireworms the previous year can also indicate a potential threat.