

Maximizing Yield and Quality of Canola Seed with Optimum Sulphur Fertilizer Management Practices in the Parkland Region of Western Canada

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What is Sulphur?

Sulphur (S) is:

- A primary nutrient.
- An essential component of several amino acids in the plant.
- Plants take up sulphur from the soil as sulphate.
- Sulphate moves readily in moist soils = potential for leaching.

Adequate S is required for:

- Maximize oil concentration in canola seed.
- Balance growth and development responses to high nitrogen (N) rates in order to optimize seed yield, especially in high-yielding canola cultivars.

Sulphur Deficiency Characteristics and Symptoms

- S deficiency occurs most commonly on well-drained, coarse textured and sandy soils with low organic matter, particularly in Dark Gray and Gray soils.
- Inadequate available S (i.e., sulphate) in soil can seriously affect crop yield and quality (e.g., oil content), especially in canola.

Deficiency Sources:

- High N fertilizer application on S-deficient soils.
- High crop yield.
- Growing high S-demand crops such as hybrid canola.
- Continuous cropping.
- Leaching of sulphate.
- Decreasing levels of organic matter.

Deficiency Symptoms:

- Curled, cup-like top/young leaves.
- Purple-reddish leaves.
- Short spindly stems.
- Poor pod development.
- Poor seed set.

Sulphur Fertility Management

- Increase S fertilizer rate to optimize canola seed yield when applying high N fertilizer rates on S-deficient soils, especially if no response is observed to N fertilizer in high-yielding canola cultivars.
- Timing and form of S fertilizer applied is more important than rate in terms of efficient uptake and plant use.

Timing:

- Seeding – ideal time for S fertilization.
- In-season – but only to correct S deficiencies as a RESCUE treatment.
- Best response if sulphate is applied before bolting stage.
- Moderate response if sulphate is applied between bolting and early flowering stage.

Form:

- Sulphate forms of S fertilizer more effective at correcting S deficiency than elemental sulphur (ES) forms.
- Fall applied ES better than spring applied ES, but still not as effective as sulphate even after several annual ES applications.

Factors affecting effectiveness of ES:

- Limited dispersion of S particles in the soil reduces potential microbial oxidation of granular ES to plant-available sulphate forms.
- Broadcast, surface-applied powdered ES in suspension can produce similar results as sulphate fertilization, thus overcoming the dispersion problem.

Ongoing Research:

- Three-year study (2011 to 2013 growing seasons) is underway to compare the effectiveness of using a new rapid release elemental sulphur granular fertilizer (called Vitasul) with sulphate granular fertilizer to prevent/correct S deficiency in hybrid canola on a S-deficient soil.

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