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

S. S. Malhi and S. A. Brandt
Northeast Agriculture Research Foundation (NARF), Melfort, Saskatchewan

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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For additional information contact: S. S. Malhi at smalhi@neag.ca or ssmalhica@yahoo.ca and Stewart Brandt at sbrandt@neag.ca