Effectiveness of Foliar Applications of Various Sulphate-S Fertilizers to Correct Sulphur Deficiency on Canola in the Growing Season

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BACKGROUND

- Canola is the major cash crop in Saskatchewan and most of it is grown in the Parkland region.
- Canola has high requirements for S and many soils in this area are deficient is S.
- S is immobile in plants.
- Deficiency of S at any stage can cause considerable reductions in seed yield.
- In order to prevent any seed yield loss due to S deficiency, a constant supply of available S to canola plants is needed throughout the growing season.
- On soils marginally deficient in S, the deficiency of S on canola can occur during the peak growing periods, depending on the levels of N and other fertilizers applied and high yielding canola cultivars.
- Higher rates of N fertilizer used to meet N requirements of high yielding canola cultivars can result in faster depletion of S from soil, and consequently increase the instances and severity of S deficiencies on canola, particularly during peak growing periods.
- Initial research at the Melfort Research Farm has indicated that S deficiency on canola during the growing season can be corrected and seed yields restored by foliar application of potassium sulphate (see seed yield results on average of six sites).
- Foliar application of potassium sulphate at 15 and 30 kg S/ha did not cause any leaf injury on canola.
- However there are other sulphate-based-S fertilizers which may cost less per unit of S and also contain ammonium-N (e.g., ammonium sulphate, ammonium thiosulphate).
- Field research information is lacking on the effects of foliar-applied ammonium-based sulphate-S fertilizers on leaf damage, effectiveness to correct S deficiency and S-use efficiency for canola.

OBJECTIVE

- To compare the effects of various sulphate-S fertilizers in correcting S deficiency and on leaf damage of canola by foliar applications at late bolting.

MATERIALS AND METHODS

- Location: Archewill
- Soil: Gray Luvisol
- Mean Precipitation: 450 mm

- Growing Season: May to August
- Canola Cultivar: 45A71 (*B. napus*)
- Rates of S: 7.5 and 15 kg S/ha
- Spray Volumes: 100 and 200 L/ha
- Source of S:
  - K_2SO_4 (potassium sulphate)
  - ATS (ammonium thiosulphate)
  - $(NH_4)_2SO_4$ (ammonium sulphate)
  - $K_2S_2O_3$ (potassium thiosulphate)
- Other Fertilizers: Blanket Application of N, P and K Fertilizers
- Data Recorded: Seed Yield, Protein Content, Oil Content and Total S in Seed and Straw.

SUMMARY AND CONCLUSION

- Foliar application of S through K_2SO_4, ATS, $(NH_4)_2SO_4$ and $K_2S_2O_3$ at two S rates (7.5 and 15 kg S/ha), sprayed at late bolting using two spray volumes (100 and 200 L/ha), improved seed yield of canola.
- There was no leaf injury observed from any of the four sulphate-S fertilizers.
- The $(NH_4)_2SO_4$ was most effective to increase the seed yield.
- Increase of spray volume from 100 to 200 L/ha and S rate 7.5 to 15 kg/ha tended to enhance seed yield although the effect was not siginificant in most cases.
- The findings (based on one year and one site results) suggest that foliar application of these fertilizers can therefore be used to correct S deficiency occurring during the canola growing season without any leaf damage from any of the sulphate-S fertilizers used in this study.

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Relative effectiveness of sulphate-S fertilizer, along with 120 kg N/ha at seeding, applied at different growth stages on increase in seed yield of canola (average of six sites)

Fertilizer	Seed yield (kg/ha) from sulphate-S rates at (kg	
N +preseed incorporated	93	108
N +sidebanded S at	92	106
N +seedrow	94	
N +topdress S at	68	
N +foliar S at	77	
N +topdress at	50	
N +foliar at	64	

Effectiveness of foliar S applications of various sulphate S fertilizers on seed yield increase of canola at Archerwill in 2000.

Treatment	Seed yield increase (kg/ha) from			
	$(NH_4)_2SO_4$	AT	AS	K_2SO_4
7.5 kg S/ha (100	148	137	202	122
7.5 kg S/ha (200	106	137	294	198
15 kg S/ha (100	61	268	338	360
15 kg S/ha (200	104	284	397	321