

## **Do *Brassica* oilseed crops differ in S fertilizer requirements for optimum yield, seed quality and S uptake?**

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### **Summary**

Canola-quality *Brassica juncea* (i.e., *juncea* canola) has equal or superior seed and meal quality to conventional canola species. This non-GMO crop may provide growers in western Canada with options for diversifying canola production. Field experiments were conducted in 2003 and 2004 on a S-deficient Gray Luvisol (Boralfs) soil in northeastern Saskatchewan, Canada, to determine the effects of sulphur (S) fertilizer rates (0, 10, 20, 30 and 40 kg S ha<sup>-1</sup>) on growth/development, seed yield, quality and S uptake of *juncea* canola (*B. juncea* L. cv. Amulet and Arid) in comparison with conventional mustard (*B. juncea* L. cv. Cutlass) and hybrid canola (*B. napus* L. cv. Invigor 2663 or 45H21). All oilseed species responded positively (for seed yield and most other parameters) to S fertilizer application in both years, but responses varied with oilseed species and year. In 2003, drought in the late growing season during flowering and seed formation caused a drastic reduction in seed yield. Without S fertilizer, seed yield of Cutlass mustard was also low but was much greater than the other three oilseed species. With S fertilization, Cutlass mustard produced the highest seed yield, followed closely by Arid *juncea* canola, then Amulet *juncea* canola, and the least seed yield with Hybrid canola. Seed yields increased with increasing S rate up to 30 in most cases and up to 40 kg S ha<sup>-1</sup> in some cases. In 2004, in the absence of S fertilization, Cutlass mustard again had higher seed yield than the other three oilseed species/cultivars. There was a considerable increase in seed yield with increasing S rate up to 20 kg S ha<sup>-1</sup> and some seed yield increase beyond this rate for Cutlass mustard and Hybrid canola. In the S fertilizer treatments, Hybrid canola had the highest seed yield, followed by Cutlass mustard and then the two *juncea* canola cultivars. The effect of S deficiency on oilseed crops was more dramatic on seed yield than straw yield. Application of S fertilizer increased oil concentration in seed, but it had little or no effect on protein concentration in seed. In both years, considerably high concentrations of glucosinolate accumulated with increasing S rate in *juncea* mustard seed. In other oilseed species, concentrations of glucosinolate in seed were low though increased with S fertilization. In conclusion, the response curves were fairly similar for all oilseed species, suggesting that S fertilizer management strategies should be similar for these oilseed species. That is, higher yielding types would require similar fertilizer S, but rather use S more efficiently to achieve higher yield with the same amount of S.