Effects of applying Sulfur to Sulfur-deficient linseed and rapeseed

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Sulfur is deficient in soils of the Australian Tablelands suitable for growing oilseeds Deficiency in crops has been masked in the past by the use of superphosphate, but recently there has been an increase in the use of high-analysts fertilizers low in S. There is little information about either the S requirement of linseed or the yield recovery achieved by remedying S deficiency once it is recognized.

Methods

Linseed (cv Glenelg) and rapeseed (cv Wesway) were grown in sand culture in a glasshouse, and supplied with nutrient solutions containing 210 mg N 1 , and S at concentrations and for periods shown in Figs 1 and 2.

Results and discussion

Maximum yields of both crops occurred at a 20 mg S_1-1 in the nutrient solution (Fig. 1); however for a given percentage of maximum yield the seed S concentration of rapeseed was much higher than the seed S concentration of linseed.

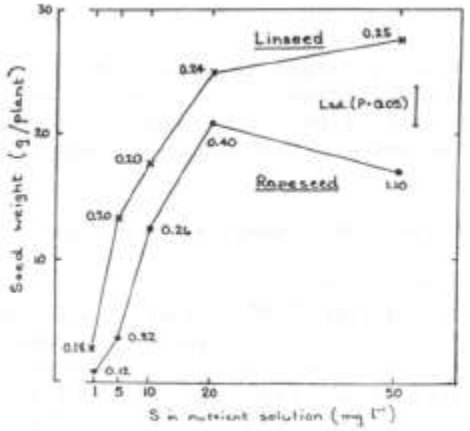

Fig. 1. Effect of constant S concentration in nutrient solution on seed yield. Figures on graph show seed S concentrations(%).

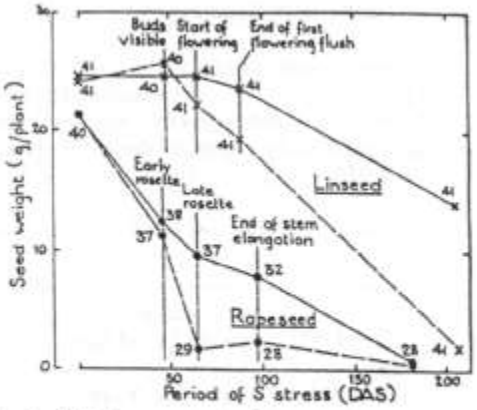

Fig. 2. Effect on seed yield of applying S to S deficient crops. Nutrient S concentrations were raised from S (——) or I (– – –) to 20 mg l⁻¹ at times shown. Figures on graph show seed oil concentrations(%).

There was a large reduction in yield of rapeseed even when the S supply was increased to deficient plants at an early stage (Fig. 2). If relief of deficiency was delayed until stem elongation, there was very little yield from plants which had been severely deficient. The yield did not recover even if S was applied at above optimum rates, and the S concentrations of seed equalled those of seed of plants grown with a constant optimum S supply. In contrast, there was very little yield penalty when the S supply to severely deficient linseed was increased as late as the end of the first flowering flush (88 days after sowing).

Neither S deficiency nor the S concentration of the seed had any effect on seed oil concentration of linseed. For rapeseed, however, there was a double penalty for S deficiency lowered seed oil concentration as well as seed weight. Seed oil concentration remained low even when increased S supply raised seed S concentration above that of seed of plants grown at constant optimum S supply.

The practical implications are that it is essential to maintain an adequate S supply to rapeseed from early in the crop's development, preferably from sowing. There appears to be much more latitude with linseed, and relief of S deficiency as late as flowering can restore yields. However, prolonged flowerin[9] in the field may be curtailed by lack of moisture as the season