Nitrogen and sulfur affect canola seed yield and oil percentage

A.J. Good [1], A. A. Pinkerton [2], P. Hocking [2], G. Blair [3], and J. Sykes [4]

[1] Incitec, Tamworth; [2] C.S.I.R.O. Division of Plant Industry, Canberra. [3] University of New England. Department of Agronomy, Armidale; [4] N.S.W. Department of Agriculture, Dubbo.

Sulfur (S) deficiency is an increasing problem in canola production in New South Wales (NSW). and was first reported in the Lockhart and Leeton agronomy districts during 1989. Farmers and agronomists now report a widespread incidence of symptoms resembling S deficiency in canola. In 1992. a project was begun to survey the extent of S deficiency, its interactions with nitrogen (N), and to calibrate suitable diagnostic analytical soil and plant tissue tests. We report preliminary results from one of fourteen field experiments.

Methods

An experiment was established on a well-drained red earth near Wellington. following a five year subterranean clover/lucerne dominant pasture. Soil nitrate prior to planting was 70kg/ha (0-120 cm). Plots of canola (cv. Yickadee) 1.5 m x 30 m, were drilled on 26 May 1992 at 3.3 kg/ha with 100 kg/ha triple superphosphate (20% 1^3). Five N rates (0, 20, 40, 80 and 160 kg/ha), as urea (46% N) were banded between the rows. Four S rates (0, 10, 20 and 40 kg/ha) as sulfate of potash (41% K, 16.5% S)/muriate of potash (50% K) blends, were broadcast and incorporated, resulting in a balanced basal potash application of 106 kg/ha. Harvest samples were analysed for clean grain yield (GY) at 9% moisture, and grain oil percentage (GO%).

Results and discussion

GY and GO% were significantly ($P<0.05$) increased at all levels of applied S (Table 1). In the absence of adequate S increasing N rates exacerbated S deficiency as expressed by GY and GO%. In the presence of adequate S, (20 kg/ha), increasing N rates did nit significantly reduce GY or GO%.

Table 1. Seed yield (t/ha) and grain oil percentage (%) with increasing nitrogen and sulfur rates.

Nitrogen (kg/ha)	Sulfur (kg/ha) 0	10	20	40
0	1.33 (34.1)[a]	3.39 (39.7)	3.80 (42.3)	4.12 (41.7)
20	0.95 (36.9)	3.29 (39.9)	3.89 (42.5)	4.15 (42.2)
40	0.96 (35.6)	3.22 (38.5)	3.79 (42.1)	4.09 (41.9)
80	0.81 (34.8)	2.84 (37.0)	3.69 (41.5)	4.02 (42.3)
160	0.77 (33.8)	2.59 (36.2)	3.74 (41.5)	4.20 (42.4)
l.s.d.		0.4 (2.4) (P=0.05)		

[a] Grain oil percentage is shown in parenthesis

Results of this experiment show that low levels of S reduce both canola seed yield and oil content and that on a soil of high N fertility application of N fertilizer exacerbates the effects of S deficiency. The influence of N on S requirement of canola needs to be considered, along with early pre-harvest windrowing and drought, as a cause of variable GY and GO%.