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Interactive Effects of Nitrogen, Sulphur and Row Spacing on the Grain and Oil Yields of Toria

V Nepalia and M S Saroha
Department of Agronomy, Rajasthan College of Agriculture, Udaipur-313001

Toria, (*Brassica campestris* (L) var. toria) is yet not regarded as a prominent oilseed crop despite being an important member of rapeseed and mustard group. One possible reason for its relatively discontented spatial spread seems to be the least attention by scientists. No study seems to have been made on the effect of N,S and row spacing on toria in south eastern Rajasthan. Hence, this study was conducted to record the interactive effect of these factors.

A fled experiment was conducted on toria (Cv. T-9) at Agronomy Farm, Rajasthan College of Agriculture, Udaipur. The soil of the experimental site was silty clay loam having pH 8.4, organic C 0.75%, total N 0.084%, available P 16.8 Kg ha^{-1}, available K 179 Kg ha^{-1} and 18.6 ppm available S. Treatments comprised of four levels of N (0,20, 40 & 60 Kg ha^{-1}), two levels of S (0 & 250 kg ha^{-1}) and two row spacings (30 & 45 cm). A dose of 250 kg S ha-1 was chosen as per normal recommendation (Singh 1988). In all 16 treatment combinations were tried with four replications. In the sulphur treated plots, elemental S was spread and mixed into the soil 21 days before sowing.

The maximum seed yield was obtained with a at 60 kg N and, 250 kg S ha^{-1} and row spacing of 30 cm (Table 1). At 0 Kg N under both spacings, S application failed to produce significant increase in seed yield. At N levels of 20,40 and 60 kg ha-1 with 45 cm spacing S application did not increase seed yield, possibly due to the dominance of spacing, i.e., phenomenon of reduction of yield associated with increasing row spacing above 30 cm (Saini & Gupta 1982). However, at closer spacing of 30 cm, sulphur application proved beneficial in order to yield more, with increasing N levels indicating superiority of closer spacing which ultimately allowed N and S to show their performance. The variation in stover yield followed similar pattern. Increasing N dose from o to 60 Kg tended to increase stover yield. Similarly application of 250 kg S also increased the the stover yield. Increasing row spacing from 30 to 45 cm was found negatively associated with stover yield.

Increments in N dose above 20 kg tended to reduce the oil content whereas at every level of N and row spacing, application of S was associated with rise in oil content and at every level of N and S no effect of row spacing was observed (Table 2). Maximum oil yield was recorded at 60 kg N and 250 Kg S with a row spacing of 30 cm. In case of 45 cm spacing, S application could influence oil yield only at higher N levels. The pattern of oil yield almost followed the grain yield pattern.

Nitrogen uptake studies showed variation on account of interaction between all the three factors. N uptake by seeds was significantly influenced by interaction whereas, N uptake by stover was found unaffected. Maximum N uptake at 60 kg N, o kg S ha^{-1} with 30 cm row spacing.

Sulphur uptake studies suggest S uptake by seeds was significantly altered by three dimensional interaction, while S uptake by sotver, despite showing clear trends, remained unaffected by interactive action of N, S and row spacing. Maximum S uptake by seeds (10.69 kg ha^{-1}) was recorded with 60 kg N and 250 kg S ha^{-1} and 30 cm row spacing.

Table 1 *Combined effects of N, S and row spacing on grain and stover yields (q ha^{-1})*

Nitrogen levels (Kg ha^{-1})	Row spacing (cm)			
	30		45	
	Sulphur (Kg ha^{-1})		Sulphur (Kg ha^{-1})	
	0	250	0	250
0	8.69 (37.49)	8.90 (41.66)	8.33 (34.37)	8.39 (37.84
20	9.42 (43.40)	10.56 (47.91)	9.41 (42.50)	8.90 (44.44)
40	10.97 (51.93)	11.59 (57.29)	9.42 (47.22)	10.60 (51.38)
60	11.92 (55.55)	12.73 (60.06)	10.95 (53.47)	10.70 (55.90)

CD 5% on grain yield (NxrxS) 0.521

CD 5% for stover yield (NxrxS) NS

In parenetesis are stover yield

Table 2 *Combined effects of N, S and row spacing on oil content of seeds (%) and oil yields (kg ha^{-1})*

Nitrogen levels (Kg ha^{-1})	Row spacings (cm)			
	30		45	
	Sulphur (Kg ha^{-1}		Sulphur (Kg ha^{-1})	
	0	250	0	250
0	38.64 (335.79)	39.77 (354.22)	38.38 (320.08)	39.88 (334.78)
20	39.05 (368.02)	39.95 (422.26)	38.38 (366.21)	39.99 (356.58)
40	37.66 (413.17)	39.05 (451.52)	37.89 (357.22)	38.55 (408.92)
60	37.04 (441.71)	38.48 (489.91)	36.66 (401.69)	38.31 (410..17)

CD 5% oil content (NxrxS) NS

CD 5% oil yield (NxrxS) 21.261

In parenthesis are oil yiled

References

Saini JS & Gupta TR 1982 Response of toria varieties to varying plant spacings. *Indian Journal of Agronomy* **27** 383-386.

Singh H G 1988 Sulphur Management in fine textured calcareous soil. In : *Proc. TSI FAI Symposium on Sulphur in Indian Agriculture*, March 9-11 1988 New Delhi.

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