

Effect of pre-sowing seed treatments on *toria* (*Brassica napus*) and Indian mustard (*Brassica juncea*) under rainfed conditions

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ABSTRACT

A field experiment was conducted during *rabi* seasons of 1993-95 at Diphu to find out the effect of pre-sowing seed treatment on the production of *toria* (*Brassica napus* L. var. *napus* L. senso stricto; syn. *B. campestris* L. var. *toria* Duth. & Full.) and Indian mustard [*Brassica juncea* (L.) Czernj & Coss.]. Pre-sowing seed treatment either with 1.0% KCl or 1.0% KH_2PO_4 or 0.25% Na_2HPO_4 or a slurry of Dithane M-45 (2 g/250 ml of water) for 10 hours followed by drying to original weight resulted in an increase of seed yield by 30.11 to 55.20%. The crop raised from treated seeds had higher number of siliquae/plant and 1000-seed weight. Even, water soaking was found better over dry seed. TM-2 (123 days) yielded more than M-27 (92 days).

Key words: Pre-sowing seed treatment, *Toria*, Indian mustard, KCl, KH_2PO_4 , Na_2HPO_4 , Dithane M-45

Toria (*Brassica napus* L. var. *napus* L. senso stricto; syn. *B. campestris* L. var. *toria* Duth & Full.) and Indian mustard [*Brassica juncea* (Linn.) Czernj. & Coss.], the two popular *rabi* oilseed crops of hills zone of Assam are grown on residual soil moisture. The occasional winter showers are not enough to replenish the moisture need and as such the crops suffer from drought. Under limited soil moisture encouraging results in term of germination, vigour and drought tolerance were obtained by treating the seeds of Indian mustard (Ghosh *et al.*, 1986), *toria* (Paul *et al.*, 1995) and sesamum (Chatterjee

et al., 1985) before sowing. However, such informations are very meagre for *toria* and Indian mustard. Hence, the present experiment was conducted with the objective to find out suitable pre-sowing seed treatments for increasing the production of *toria* and Indian mustard under rainfed conditions in the hills zone of Assam.

MATERIALS AND METHODS

The field experiment was conducted at the Regional Agricultural Research Station, Diphu (25° 52' N; 93° 30' E), Assam during *rabi* 1993-94 and 1994-95 in randomised

block design with 3 replications under rainfed conditions. The soil of the experimental site was having pH of 5.23 and the available N, P and K were 207, 26.4 and 437 kg/ha, respectively. Treatments comprised two *Brassica* spp. viz. *toria* (M-27) and Indian mustard (TM-2) and 7 pre-sowing seed treatments viz. dry seeds, water soaked, 1.0% KCl, 1.0% KH_2PO_4 , 0.25% Na_2HPO_4 , 5×10^{-4} Na_2HPO_4 and Dithane M-45 (2 g/250 ml water). Required quantity of seeds was soaked in appropriate solutions for 10 hours followed by drying in shade to its original weight. The crops were fertilized uniformly with 65 kg N and 35 kg P_2O_5 /ha. Seeds of both the crops were sown on 19th and 31st October in 1993 and 1994, respectively. At harvest, observations were recorded on plant height, branches/plant, siliquae/plant, 1000-seed weight and seed yield. During 1993-94. Germination percentage of the treatments was studied in the laboratory separately. Rainfall received during growth period of M-27 was 31.4 and 51.8 mm and that of TM-2 was 74.2 and 109.2 mm in 1993-94 and 1994-95 respectively.

RESULTS AND DISCUSSION

Effect of crop varieties

Indian mustard 'TM-2' recorded significantly taller plants, higher 1000-seed weight and seed yield/ha than *toria* 'M-27'. This increase in plant height, number of siliquae/plant, 1000-seed weight and seed yield of TM-2 was 97.7, 4.5, 54.5 and 60.1% respectively. Indian mustard recorded 2% higher germination than *toria* but both the species were statistically similar. TM-2 matured on an average 31 days later than M-27 and hence TM-2 had 31 days more at its disposal for growth and development than M-27, which might have contributed towards

higher yield and yield attributes. Even, TM-2 (7.08 kg) yielded better than M-27 (5.91 kg) in respect of per day per hectare yield.

Effect of pre-sowing treatments

Though plant height, number of branches/plant and number of siliquae/plant did not differ significantly, there was an increase of 4.9 to 14.6%, 4.4 to 20.0% and 21.7 to 61.6% in plant height, number of branches/plant and number of siliquae/plant, respectively of treated seeds over control (dry seeds). Treated seeds also recorded significantly higher germination percentage over dry seeds.

Pre-sowing seed treatment resulted in significant increase in seed yield (Table 1) over control. This significant yield difference might be due to increase in number of branches/plant, number of siliquae/plant and 4.5 to 18% increase in 1000-seed weight. However, seed yields were low in 1993-94 because the crop faced more water stress situation in 1993-94 than 1994-95 as evidenced from less rainfall with high evaporation in 1993-94 season.

The highest seed yield of 8.35 q/ha was obtained with Dithane M-45 treated seeds showing 55.2% increase in yield over control (dry seeds). Seed treatment with 1.0% KH_2PO_4 recorded second position (7.93 q/ha) in respect of seed yield. Seed treatments with 0.25% Na_2HPO_4 and 1.0% KCl also showed significantly better yield over dry and water soaked seed treatment. Treatment with water soaked seed recorded 21.19% yield increase over control. Ghosh *et al.* (1986) in mustard and Chatterjee *et al.* (1985) in sesamum also got higher yield in pre-sowing seed treatment over dry seeds. The interaction between variety and seed treatments was not significant.

The results indicated that where *toria* and

Table 1. Effect of pre-sowing seed treatment on yield and yield attributes of *toria* and Indian mustard

Treatment	Germination (%)	Plant height (m)		Number of branches/plant		Number of siliquae/plant		1000-seed weight (g)		Seed yield (q/ha)			
		1993-94	1994-95	1993-94	1994-95	1993-94	1994-95	1993-94	1994-95	1993-94	1994-95	Pooled	Percent increase in seed yield
<i>Crop varieties</i>													
Toria (M-27)	76.4	0.72	1.05	5.7	5.7	83.7	181.5	2.82	2.67	3.16	7.72	5.44	—
Mustard (TM-2)	78.4	1.55	1.95	4.2	3.9	89.8	187.4	4.23	4.25	5.34	12.07	8.71	60.11
CD (P = 0.05)	NS	0.06	0.09	0.7	0.6	NS	NS	0.12	0.24	0.47	1.28	0.75	—
<i>Pre-sowing seed treatments</i>													
<i>Dry seeds</i>													
(Control)	63.0	1.05	1.40	4.5	4.5	62.6	139.0	3.29	3.12	2.98	7.78	5.38	—
Water soaked	76.0	1.13	1.45	4.6	4.7	87.6	157.7	3.51	3.32	3.84	9.20	6.52	21.19
1.0% KCl	79.7	1.17	1.50	4.9	4.7	86.8	175.3	3.44	3.49	4.55	9.44	7.00	30.11
1.0% KH ₂ PO ₄	81.3	1.15	1.54	5.2	4.9	98.9	199.2	3.64	3.64	4.82	11.03	7.93	47.40
0.25% Na ₂ HPO ₄	81.7	1.11	1.51	5.0	4.8	77.0	195.3	3.57	3.33	4.09	11.03	7.56	40.52
5 × 10 ⁻⁴ Na ₂ HPO ₄	78.0	1.15	1.53	4.7	4.8	87.0	206.0	3.52	3.63	4.55	9.03	6.79	26.21
Dithane M-45	82.3	1.22	1.60	5.6	5.2	107.0	218.7	3.73	3.69	4.92	11.78	8.35	55.20
CD (P = 0.05)	3.7	NS	NS	NS	NS	NS	NS	0.20	NS	0.84	2.41	1.39	

NS = Non-significant

Indian mustard are grown under moisture stress condition as rainfed crops, the soaking of seeds in slurry of Dithane M-45, 1.0% KH_2PO_4 , 0.25% Na_2HPO_4 and 1.0% KCl may be recommended for getting higher yield.

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