

THE YIELD POTENTIAL OF INDIAN BRASSICA VARIETIES
UNDER MEDITERRANEAN CONDITIONS*

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The species of oleiferous Brassicaceae grown in the Far East are different from those cultivated in Europe. Since those types are little known in the Middle East, it was decided to study their behaviour in a Mediterranean climate. Trials were carried out for two winter seasons at the Bet Dagan Experiment Farm in Israel.

Since heavy orobanche (broom rape) infestation is known in some of the growing areas (2), one of those trials took place on previous, infested plots, looking for differences, in varieties resistance, such as found in other crops (1).

MATERIALS AND METHODS

The Bet Dagan Experiment Farm is located at 32°N 34°E.

A randomized block design was used, with three replications in the first season and with five replications in the second. Each plot contained five 10-m rows spaced at 30 cm. Five varieties of brown mustard (B. juncea) were planted, three varieties of toria Indian rape (B. campestris) and one variety of rape (B. napus). The varieties were provided for the study by the U.P. Institute of Agricultural Science, Kampur, India.

In the first season, planting took place on November 19 on a medium heavy alluvium soil. The field had received 1.2 tons of 15-15-0 fertilizer per hectare: previous crop was alfalfa and the total annual rainfall during the season was 451 mm, which was supplemented by an irrigation of 100 mm during field preparation.

* Supported by Centre for International Agricultural Cooperation Rehovot Israel.

In the second season, planting took place on December 3, on a light sandy soil. The previous crop was vetch, heavily infested by Orobanche aegyptiaca. On February 12 the field had received a top dressing of 46-0-0 (urea) fertilizer at the rate of 200 kg/ha. Total annual rainfall during the season was 813 mm. The toria varieties were harvested in May, ten days after seed ripening. The tall brown mustard and rape varieties were harvested on June 2. The yield was hand-harvested and weighed. A composite sample from each replicate was analysed for oil content, which was calculated as percent of dry seed weight. Significance between varieties was tested by multiple range test (Q test).

RESULTS

Emergence was uniform for all the varieties and occurred within one week of planting. The toria varieties flowered at the end of January between the middle and end of April. Plant height reached 65-85 mm, in the first and 30-40 cm in the second season.

The brown mustard varieties flowered at the end of February, and matured at the end of May. Plant height was 140-170 cm in the first season and 120-130 in the second one.

The rape was retarded by about one week compared with the other types, and ripened after the middle of June.

The total yield of seeds, and the percentage of oil produced by the various varieties, are presented in Table 1.

Orobanche began to appear in late March, with flowering peak in early April. Infection appeared only in three out of the five plots in the trial. No differences were noted between the varieties in the date of orobanche appearance. Orobanche plants number appears in Table 1.

DISCUSSION AND CONCLUSIONS

1) Crop yields. The brown mustard varieties produced the highest seed and oil yields per area among the three crops tested. The yields of its three best varieties were significantly greater than those of any of the other crop varieties in both years. The toria yields were about half and less of the yield produced by the brown mustard varieties, while the rape gave significantly less seed than the three best brown mustard varieties. Yield levels were higher in the first season in comparison with the second one. This fact seems to be the result of different plot fertilities as well as different fertilizer levels. The toria seems to be the most sensitive to those factors, its yields are relatively lower compared with those of the other crops. The brown mustard and rape varieties yielded in the second season about two thirds of the previous yield, while the toria yielded less than half of the previous year yield.

The oil percentage was higher in the less fertile season.

Attention of plant breeders and growers might be paid to the yield potential of brown mustard that can yield more than one

ton oil per hectar under appropriate conditions.

2) Orobanche resistance. The highest infection rate of Orobanche was found in rape, the toria varieties following, with the toria selection suffering from a similar infection rate as the rape. The brown mustard varieties were much less susceptible except for RL 18 which had a similar infection rate to T 9 and Toria A. Significant differences were only found between the rape and T 59, the latter showing a very low infection rate. However, all the varieties tested were affected by orobanche and there was not a single variety with resistance to the parasite.

Since the varieties tested belong to different botanical genera, the chance for finding genetical resistance for orobanche seems to be low. The infection rate was nevertheless low in comparison with severely infected plots, so that varietal differences with regard to infection should be regarded with caution.

REFERENCES

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Table 1 : Results of two years of trial with Brassicae varieties at Bet Dagan, Israel.

Crop	Variety	Seed yield (ton/ha)		Oil content (%)		Avg. no. of Orobanche plants per 10 m ²
		1st season	2nd season	1st season	2nd season	2nd season
Brown mustard	RL 18 Rye	3.170 a	2.010 a	35.5	41.3 ab	5.0 ab
	T 59	3.030 a	1.710 a	36.4	41.1 ab	3.3 a
	RL 16	2.920 a	1.910 a	36.0	40.5 b	4.3 ab
	S 9	2.410 abc	1.930 a	34.0	39.5 b	6.3 ab
	RL 18	2.600 ab	1.660 ab	35.5	39.6 b	11.0 ab
Rape	DGL	1.730 bc	1.140 bc	37.6	42.8 a	25.3 b
Toria	Toria A	1.630 bc	460 d	37.5	38.6 b	11.7 ab
	T 9	1.600 bc	360 d	38.5	39.9 b	10.7 ab
	Toria selection	1.310 c	640 cd	35.3	40.1 b	24.3 ab

* Values followed by different letters differ significantly at the 5 % probability level.