Vol. XVII (1-2), 1980

INDUCED GENETIC VARIATION IN *BRASSICA JUNCEA* II BREEDING FOR RESISTANCE AGAINST SHATTERING

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M_2 population was kept standing for 3 weeks after maturity to evaluate it for shattering resistance. Comparative studies were made and the single plants/plant progenies where silique did not dehisce were selected as putative shattering resistant mutants. The shattering resistant mutant R 210 is 15.85 per cent shorter than control and bore more number of fruit bearing branches and pods on the main shoot. There was slight decrease in pod length and number of seeds per pod but the 1000-seed weight was 13.20% higher than the mother variety. The shattering resistance in this mutant line apparently may be attributed to thickened pod walls.

INTRODUCTION

There is a serious shortage of edible oils in Pakistan. Oleiferous brassicae are an important group of oil producing crops which occupy about 4% of the total cropped area. However, *Brassica juncea* is the most important member of this group. Although considerable efforts have been made in the past to improve the yield of this crop but due to post maturity heavy losses in the field, even the inherent potential of the existing varieties can not be fully realised.

In the existing germ plasm there is little variability for shattering resistance available to the breeders for use in their breeding program. However, induced mutation procedures have been successfully used to isolate nonshattering mutants in *B. juncea* (Rai, 1959, Rai and Nayar 1959, Tomaszewski and Tomaszewska 1970) and some of the nonshattering mutants developed in India are commercially grown by the farmers.

The shattering resistance in the induced mutant may be due to thickened pods as compared to the control (Rai, 1959). However the nonshattering mutants developed by Rai and Nayar (1959) either had appressed pods or thickened pods. Tomaszewski and Tomaszewska (1970) isolated some shattering

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resistant mutant lines in M_4 generation after irradiation treatment with X-ray in *Brassica napus* where the seed was pre treated with 0.1 per cent cholchicine.

MATERIALS AND METHODS

The seed treatment procedure and method of raising M_1 and M_2 generations have been described in previous publication (Shaheen *et al*, 1979). The part of the M_2 experimental material raised for studies pertaining to non-shattering resistance was left in the field after maturity for a period of three weeks when most of the fruit bearing pods in the control shattered. The single plants and the plant progenies showing complete resistance against shattering were selected as putative nonshattering mutants. Data on various morphological characteristics of these mutants were recorded separately.

RESULTS AND DISCUSSION

The comparative observations on shattering resistance in the M_2 generation revealed that although some of the single plants showed varied degree of resistance to shattering, but most of these single plants lacked complete resistance against shattering. The behaviour of these plants needs to be confirmed in the M_3 generation for making final selection. However, progeny R 210 derived from 100 KR treatment showed complete resistance to shattering. The morphological characters of this mutant line are given in Table 1.

Table 1. *Morphological characters of a promising progeny R 210 showing resistance to shattering.*

Progeny No.	Dose	Height (cm)	No. of fruit bearing branches	No. of pods on main shoot	Pod length (cm)	No. of seeds per pods	Yield per plant (gm)	1000 seed weight (gms)
R 210	100 KR	106	68	40	4.38	5.6	22.80	4.2
Poorbi Raya		227.92	40	42	4.63	10.85	22.74	3.71

The average plant height of this mutant line was 106 cm and was 115.86 per cent shorter than the control (227.92 cm). The plant gave a bushy appearance and the plant canopy was compact as compared to the parent variety Poorbi Raya. The mutant bore more fruit bearing branches as well as number of pods on the main shoot (Table 1). However there was a slight decrease, i.e. 5.70%, 93.75% in pod length and number of seeds per pod respectively. The pods appeared to be hard flattened and cylindrical. The 1000 seed weight was 13.20% high than the control. The yield per plant of the nonshattering mutant line was at par with the control showing that there was no depressing pleiotropic effect of the mutant gene on total yield.

The resistance against shattering in this mutant line seemed mainly due to its thickened pod walls rather than appressed position of pods (Rai and Nayar 1959). The shattering resistant mutant line reported by Rai and Nayar (1959) had thickened pods. Although the mutant line showed slight effect on fertility as well as reduction in pod length and number of seeds per pod, the higher grain weight of the mutant line perhaps largely compensated for the expected yield difference of the mutant line.

The branching pattern and plant height of the mutant line was quite desirable, therefore, the nonshattering mutant R 210 may be evaluated for its yield and possible release as a new variety. Its use in hybridization programme may also be more rewarding for transferring the nonshattering and short stature characters in some other background for recovering high yielding recombinants.

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