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Short Communication

EFFECT OF LOW TEMPERATURE TREATMENT IN *BRASSICA JUNCEA* L.

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In northern India, sudden fall of temperature below freezing point often causes damage to crop yields especially to rapeseed and mustard where the yield losses are reported to be as high as 70 to 90 per cent (Kumar and Kumar, 1989). The damage is attributed to ice formation in the plant tissue (Levitt, 1980). Keeping this in view, the present study was undertaken in *Brassica juncea* L. grown under field condition to investigate effect of low temperature on seed number per siliqua, an important seed yield contributing trait, by using a movable freezing chamber. The information would be utilized for breeding frost tolerant lines.

The material comprised thirty diverse varieties (strains) of *Brassica juncea* L. (Table 1). These were planted under field conditions in 1 m^2 plots. Row to row and plant to plant distances were 30 x 10 cm. Untreated plots of the same size were left within each type of plant stand. The freezing treatments were carried out by moving the freezing chamber into the plant stand, putting the detachable side panels into position and connecting the tubes from the refrigeration unit (Ohlsson, 1987). The freezing treatment was given at 50 per cent pod formation stage. The plant stands were exposed initially to 2°C for 30 minutes followed by -2°C for 1.30 hours. Then a more severe freezing shock of -3.5°C was administered for another 30 minutes since the most distinctive change in yield reduction was expected in the interval of 0 to -3°C (Eif and Ohlsson, 1987). The plant stand was then allowed to thaw for 15 minutes before the side panels and tubes were disconnected. Thereafter, panels were partly opened for 15 minutes and the freezing apparatus was moved out of the treated plots.

The number of healthy seeds per siliqua was counted from lower, middle and upper positions. The observations were based on five siliquae from each position on each of five plants and then averaged.

Table 1. List of varieties/strains tested for frost tolerance

Durgamani	RW 175	RN 156	RN 162	RN 169
Kranti	RN 150	RN 157	RN 163	RN 170
RH 781	RN 151	RN 158	RN 164	RN 171
RH 848	RN 152	RN 159	RN 165	RN 191
RH 7361	RN 154	RN 160	RN 166	RHS 8520
RH 8520	RN 155	RN 161	RN 167	Varuna

Number of healthy seeds were counted. Simultaneously, the data on number of healthy seeds per siliqua on control plants at comparable positions were also recorded. The per cent reduction of healthy seeds in treated plants was calculated over the untreated control plants. The per cent reduction of healthy seeds in treated plants ranged from 11.97 to 55.90 (Table 2). The low per cent reduction of healthy seeds per

Table 2. Varieties/strains of *B. juncea* showing tolerance for low temperature on the basis of per cent losses in seeds per siliqua

Varieties/ strain	Pedigree	Losses in seeds/ siliqua (%)
RN 150	RS 751 X RW 175-1	15.00
RN 154	RS 64 X RW 175	18.82
RN 160	YRT-3 X RW 175-1	12.15
RN 161	Varuna X RW 175-2	16.66
RN 162	T 6342 X RW 175-1	19.03
RN 165	TM 7 X RW 175-8	17.48
RN 167	(UVR-12 X RW 175) X Varuna	20.00
RN 170	(UVR-12 X RW 175) X Varuna-7	11.97
Kranti	Selection from Varuna	19.39

siliqua depicts freezing tolerance while high per cent reduction exhibits freezing susceptibility. Keeping this as basis of screening, the varieties per strains were classified into 3 categories, viz., tolerant (0 to 20% seeds killed), susceptible (20 to 70% seeds killed), and highly susceptible (71 to 100% seeds killed). Table 2 shows 9 varieties/strains displaying tolerance which might be due to the presence of frost tolerant parent RW 175 in all except *Kranti*. The above elite strains therefore could be gainfully utilized for breeding frost tolerant varieties.

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