

DEVELOPMENT OF SELF-INCOMPATIBLE LINES OF WINTER RAPE BY MEANS OF DOUBLED HAPLOID SYSTEM

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ABSTRACT

Some genetic resources of self-incompatibility (SI) have been obtained from three cultivars of winter oilseed rape. The SI degree has not been entirely stabilised within self-pollinated lines during six generations of inbreeding and rigorous selection. Using microspore culture method we achieved doubled haploid (DH) lines possessing high and stable degree of SI. Self-compatible and SI plants segregated in F₂ generation after crossing SI and self-pollinating lines in the ratio of approximately 3:1. This indicates a recessive monogenic disposition of SI in the experimental lines.

INTRODUCTION

Oilseed rape is in contrast to the other Brassica species predominantly self-pollinating. Some attempts have been made to introduce S alleles conditioning SI into genome of Brassica napus from the original species B.oleracea and B.rapa (Thompson,1983). Transformation experiments for S-locus-specific glycoprotein (SLG) gene introduction to self-compatible B.napus were performed recently (Hinata *et al.*, 1993). In our experiments we intend to search for strong S alleles in some winter oilseed rape cultivars and to develop lines possessing high and stable SI degree.

EXPERIMENTAL

The occurrence of self-incompatibility in winter oilseed rape cultivars, self-pollinated and DH lines

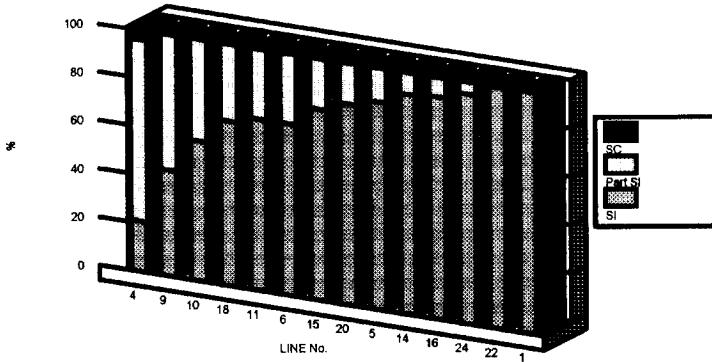
Two year's testing about 4 500 plants of 21 winter oilseed rape cultivars showed the occurrence of at least partially self-incompatibility round 0.1 percentage. After repeated testing vegetatively propagated SI individuals, some SI plants of three origins have been achieved. During six generations of inbreeding we have not succeeded in complete stabilising SI degree within self-pollinated lines. We have achieved several DH lines possessing high and stable degree of SI by means of microspore culture methods (Vyvadilová, Zelenková, 1992).

Table 1 shows an example of the variation of SI degree in individual inbred generations and DH R₁ generation. The relative number of seeds (Rs) was chosen as a measure of SI degree. $Rs = SF/SB \times 100$, SF = mean number of seeds after self-pollination in opened flowers, SB = mean number of seeds after self-pollination in buds.

TABLE 1. Variation of SI degree in I₄-I₆ and DH R₁ generation of the line No. E 6/5

Line No.	I (R) generation			
	I ₄	I ₅	I ₆	R ₁
E 6/5				
Total no. of plants	13	9	17	19
SI	4	2	11	14
Partially SI	3	7	6	4
SC	6	0	0	1
Range of Rs	7.68 - 133.68	11.81 - 63.98	7.45 - 35.60	0.36 - 87.90

Figure 1 shows the percentage of SI, partially SI and self compatible (SC) plants within individual DH lines of R₂ generation. Majority of R₂ lines derived from highly SI R₁ plants showed high degree of SI as well. However some rest of variability in lines were observed.

FIGURE 1. Percentage of SI plants in individual DH lines R₂ generation

Segregation in F₂ generation after crossing SI and SC lines

To improve seed quality of six self-pollinated SI lines they were crossed with doubled zero self-compatible lines. SC and SI plants segregated in F₂ generation in the ratio of approximately 3:1. This indicates a recessive monogenic disposition of SI in the experimental lines.

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