

CMS Polima in Polish Double Low Winter Oilseed Rape

I. BARTKOWIAK-BRODA and J. KRZYMANSKI

Instytut Hodowli i Aklimatyzacji Roslin,
Ul. Sieroca 1a, 61-771 Poznan, POLAND

INTRODUCTION

CMS Polima is probably the most promising system for hybrid seeds production of oilseed rape.

The objective of this study was to find good restorers and maintainers giving full male fertility or full male sterility of F1 hybrids independently from the temperature in which the F1 plants are growing.

MATERIAL AND METHODS

Lines with different levels of male sterility were selected from a spring oilseed rape Polima received from China. Double low /"00"/ and winter hardy MS lines were obtained as a result of backcrossing to Polish double low winter oilseed rape lines followed by intensive selection. Search for restorers and maintainers was conducted in our differentiated double low breeding material. The F1 plants from test crosses were observed in field conditions. From 130 "00" lines one restorer and 13 maintainers were selected. The rest of "00" lines produced only intermediate progeny.

Canadian and Chinese breeders noted that the expression of maintaining ability in CMS Polima system can be influenced by growing temperature /1,2/. The same was also observed in our study. Test crosses with 13 best maintainers were done and the F1 progenies were tested in growth chambers to check the thermostability of MS effect. The following conditions were used:

- day/night temperatures 15°C/10°C, 20°C/15°C, 25°C/20°C, 30°C/25°C;
- daylength of 16h and humidity of about 90 per cent in all temperature combinations.

Pollen production was checked at week intervals from the beginning to the end of flowering. The degree of selfpollination was controlled by bagging.

RESULTS AND DISCUSSION

The average frequency of plants with thermostable MS was 25 per cent, however it was varying in the investigated maintainers and ranged from 0 to 60 per cent. The maintainers with similar frequencies were set up in groups and segregation ratio was investigated /Table 1/.

Summing up the following conclusions can be drawn:

- Plants with thermostable MS effect occurred in F1 progeny of test crosses.
- Segregation of F1 plants according to thermostability of the MS effect indicates that the investigated maintainers are not homozygous with respect to this character.

Table 1. Frequency of thermostable MS plants in F1 of test crosses and the probability of segregation ratio for maintainers.

Main-tainer	Number of plants		Ratio	Probability of χ^2 for ratio			
	observed	with thermostable MS		1:1	1:3	1:7	1:15
633	20	12	1:0.67				
634	9	5	1:0.80				
group 1	29	17	1:0.71	0.353	0.000	0.000	0.000
625	15	4	1:2.75				
626	17	4	1:3.25				
630	18	6	1:2.00				
631	17	4	1:3.25				
639	16	5	1:2.20				
group 2	83	23	1:2.61	0.000	0.569	0.000	0.000
638	14	2	1:6.00				
640	19	3	1:5.33				
641	18	3	1:5.00				
group 3	51	8	1:5.38	0.000	0.125	0.491	0.005
629	19	1	1:18.00				
632	18	1	1:17.00				
group 4	37	2	1:17.50	0.000	0.006	0.258	0.832
628	17	0	-	-	-	-	-
total	217	50	1:3.34	0.000	0.840	0.000	0.000

- Segregation ratio for all investigated maintainers is 1:3 but they can be set up in groups with the following segregation ratios 1:1, 1:3, 1:7 and 1:15.
- Stable and homozygous maintainers with respect to thermostability of the MS effect can be obtained by selection based on observations of F1 hybrids grown in controlled environment.

REFERENCES

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