

Identification of Powdery Mildew Resistance Genes in Wheat

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INTRODUCTION

One of the main conditions for successful breeding for resistance to parasites is the selection of parents different in genes which control these characters. In Yugoslavia only Pm 4a gene expresses resistance in interaction with most isolates different in virulence at the seedling stage. There is a question how to explain complete resistance to *Erysiphe graminis tritici* of many lines at the seedling stage and field conditions. It might be supposed that these lines possess some another single Pm gene or that few genes act complementary. One of the possible ways to answer on this question is to analyse inheritance of the resistance in progenies from crosses of tested variety or line and all lines which carry single Pm genes. If some of the known genes are included in inheritance there are expected differences in segregation ratio in comparison with other combinations (Jerkovic, 1992; Stojanovic, 1984).

MATERIALS AND METHODS

The tested line 64209-77 is resistant to 10 isolates in the seedling stage and to population of parasite in field. Crosses with 6 lines with single Pm genes in Chancellor background and varieties Transec (Pm 7), Kavkaz (Pm 8) and Amigo (Pm 9 or Pm 17) (Heun et al. 1990) were made. F<sub>1</sub>, F<sub>2</sub> together with parents were tested with most virulent isolate 32/1 (virulence formula V/A Pm 1, 2, 2+, 3a, 3b, 3c, 4a, 4b, 5, 6, 7, 8, 9, (Pm 1 2, 9 Normandie), (Pm 2+6, CI 12633), Mld - Halle Stamm 13471 / Pm 5+6 Coker 983 of *Erysiphe graminis tritici* in the seedling stage in greenhouse. Plants with reaction types 0 - 2+ were estimated as resistant.

RESULTS AND DISCUSSION

Inheritance of the resistance in F<sub>1</sub> is recessive. In F<sub>2</sub> prevalent segregation ratio was 21R : 43S which indicate A<sub>1</sub>bbcc as the resistant genotype. In the combinations with near isogenic lines which carries Pm 4a, Pm 6 and Pm 9 frequencies of resistant plants in F<sub>2</sub> were higher than others (Table 1). The segregation in the F<sub>2</sub> progenie from the crossing with very susceptible variety Barbee is the same as in progenies, where most of Pm genes are included.

Table 1: Segregation to powdery mildew resistance in the progenies of the crosses between line 64209-77 and Pm lines

Hybrid	Number of plants			Exp. ratio	2	
	Total	Resis.	Susc.		X	P
64209-77xPm1	180	61	119	21:43	0,08	0,75
xPm2	170	56	114	21:43	....	0,99
xPm3a	152	57	95	21:43	1,46	0,25
xPm4a	147	76	71			
xpm5	123	34	89	21:43	1,49	0,25
xPm6	118	79	39	48:16	3,62	0,05
xPm7	173	63	110	21:43	0,94	0,25
xPm8	144	59	85	21:43	4,54	0,05
xPm9	168	112	56	48:16	6,00	0,01
xBarbee189	66	66	123	21:43	0,22	0,75

It is possible that Pm 4a acts complementary with dominant gene from resistant parent. For Pm 6 and Pm 9, it is possible that they are included in effective combinations with genes from 64209-77 or genes are identical with some of recessive genes from these parent. The second hypothesis is in agreement with segregation ratio 48:16. The question is why in that case the inheritance in F<sub>1</sub> generations from the crosses 64209-77 x Pm 6 line and 64209-77 x Amigo is not dominant because the resistant genotype must be also A<sub>1</sub>bbCc. In the crosses with Chancellor the Pm 6 is mentioned as the dominant gene (McIntosh, 1988). It may be concluded that line 64209-77 does not possess any of identified nine genes for the resistance to powdery mildew. Pm 6 and gene from Amigo (Pm 9) are included in effective combination with at least one dominant gene from examined resistant line.

#### REFERENCES

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