CHROMOSOME ENGINEERING THROUGH THE TRANSFER OF P. FULVUM SATELLITES INTO P. SATIVUM[1]

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The P^. fulvum karyotype differs clearly from that of P. sativum for the arm ratios of some chromosome pairs, for an additional satellite on chromosome 5 and for a very large satellite on chromosome 7 (1).

In this research we have used a P. fulvum accession from John Innes Institute, JI 224, that also had two interchanges (2).

The aim of the present work is the reconstruction of P. sativum chromosomes 5 and 7 through selection for the presence of the two P. fulvum satellites. In crosses between the two species, seeds were obtained only when P. fulvum was used as the male parent. In the F_3 generation 11 plants were selected for the presence of the satellited chromosomes 5 and 1 of P. fulvum. After backcrossing of these plants with P. sativum, 12 plants in the BC1 and 12 plants in the BC2 generation were obtained with either or both the satellites of the chromosomes 5 and 7 of P. fulvum (Table 1). Fig. 1 shows the karyotype of a BC2 plant in comparison with the two parents: one chromosome of pair 7 has the P. fulvum satellite and the P. sativum short arm.

Because genes coding for seed storage proteins have been mapped on chromosome 7, electrophoretic analyses are in progress on these chromosome engineered plants.

1. Ben-Ze'ev, N. and D. Zohary. 1973. Israel J. Bot. 22:73-91.
2. Conicella, C. and A. Errico. 1985. Proceedings of Eucarpia Meeting on Pea Breeding, Sorrento, 10-13 June.

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Table 1. Selection of plants with satellites of chromosomes 5 and 7 coming from P. fulvum in a backcross program with P. sativum.

Cross	Generation	Number of plants analyzed	Number of plants with P. fulvum satellite of		
			chrom. 5	chrom. 7	chrom's 5 and 7
P. sativum x P. fulvum	F_3	18	0	6	3
F3 x P. sativum	BC1	28	2	6	4
BC1 x P. sativum	BC2	20	2	4	6

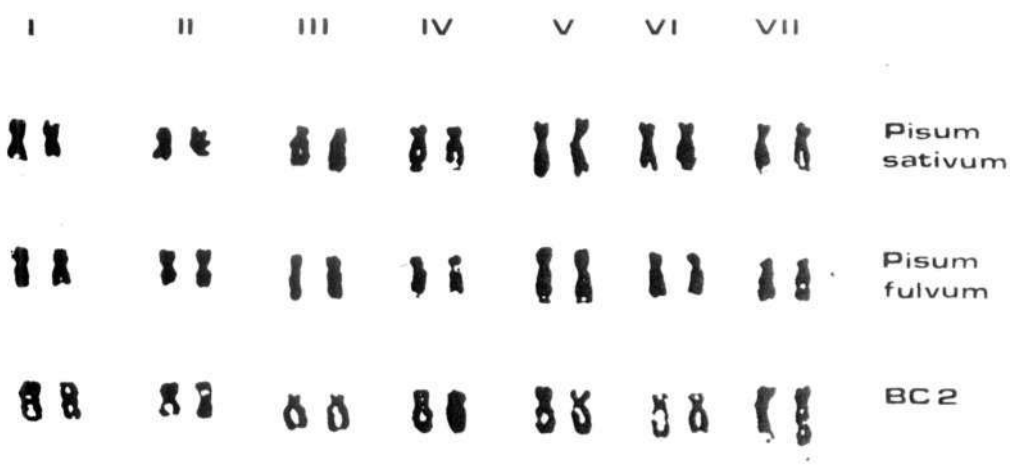

Fig. 1. Karyotype of Pisum sativum, P. fulvum and of a plant coming from the 2nd backcross generation.

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