SEED STORAGE PROTEINS OP CHROMOSOME MUTANTS IN PISUM

Rao, R. and S. Grillo
Plant Breeding Institute
University of Naples, Portici, Italy

In Pisum the electrophoretic analysis of seed proteins has been very useful to investigate genetic variations both in different ecotypes and in induced mutants (1).

The seed storage proteins (globulins) of 8 reciprocal translocation lines (Table 1) obtained from Dr. Lamm (Sweden) and of the F1's between these and two test lines were extracted from one cotyledon. The second cotyledon, along with the embryo, was used to propagate the Individual into the next generation.

The cotyledon was finely ground and the powder extracted twice at 4°C in borate buffer pH 8.5 with 0.5M NaCl. Globulins were prepared and submitted to SUS-electrophoresIs as described elsewhere (2).

Large differences in seed protein content were observed (Table 1). Electrophoretic patterns of the globulins revealed both quantitative and qualitative differences among the mutants and between the mutants and the test lines. The patterns of three mutant lines are shown in Fig. I. The relative amount of convicilin (71 - 74 Kd zone) was considerably different among the samples (Fig. 1c) while differences of subunit structure were particularly evident in the zone ranging 40 Kd (Fig. lb) and 1 kd (Fig. 1 a). The F1 cotyledons (Fig. 1), obtained from parents having different electrophoretic patterns, showed intermediate profiles with respect to the number of subunits and their relative amounts, indicating a codominant relationship between the alleles coding for these subunits.

Because of differences in background genotype, the relationship, if any, between the observed electrophoretic variations and the chromosome aberrations of the mutants could not be established. This will be attempted by analyzing the F2 generation.

Table 1. Genotypes, chromosomes involved in the translocation, and seed protein content.

Code	Line	Translocation between chromosomes	Protein (% d.m.)
1	L-111	3-7	25.0
2	L-88	4-7	18.7
3	L-112	5-7	17.6
4	L-21	5-7	23.4
5	L-SH	1-5	20.7
6	L-108	2-6	25.8
7	L-83	3-5	21.8
8	L-114	4-6	25.9
9	L-110	---	24.0
P	Proteo	---	23.1

I. Gottschalk, W. and A. P. Muller. 1982. Qua1. Plant. Plant Foods Hum. Nutr. 31(3):297-306.
2. Rao, R. and J. C. Pernollet. 1981. Agronomic. 1:909-916.

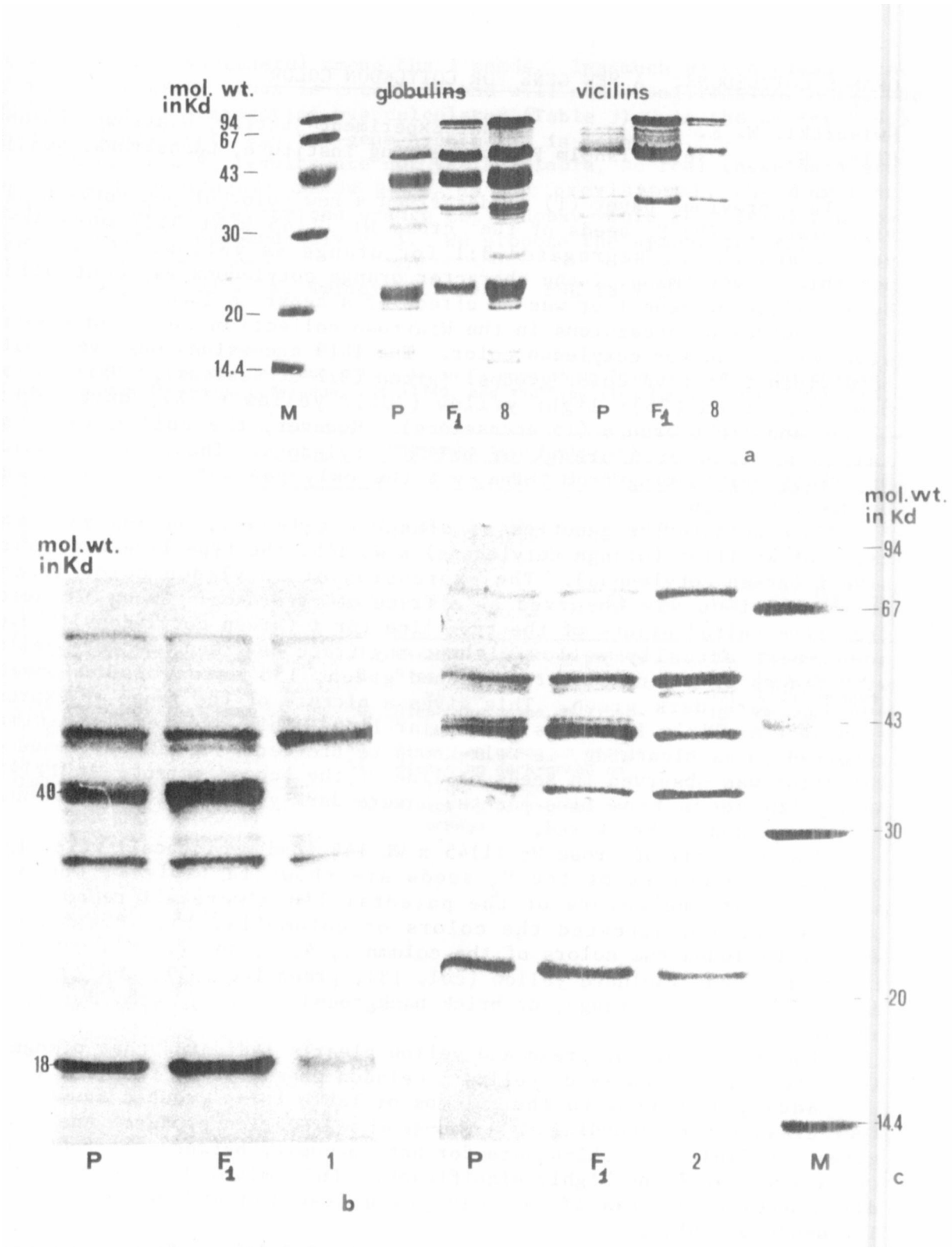

Fig. 1. SDS-electrophoregrams of reduced seed globulins in four parent and F1 plants (b and c). Vicilin patterns are shown in (a). (See text.) M: Mol. wt. markers.