Indirect evidence from early efforts to breed for PSbMV-immunity, as well as direct experimental evidence, suggest the existence of a "threshold effect" in the identification of PSbMV-immune breeding progenies. That is, progenies from certain PSbMV-immune parents may appear to be immune when inoculated with PSbMV once or twice, but in fact become infected after three or four inoculations. Such pseudo-immune plants, then, are able to transmit PSbMV through their seeds and would therefore have the potential of trans- mitting virus from inoculated progenies (screened for immunity) into succeeding generations. It is hoped, on the basis of this evidence, that immunity would be the only acceptable breeding objective, an objective warranting precise virus-detection methodology.

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THE SEED PRODUCTION OF RECOMBINANTS IN COMPARISON WITH THEIR PARENTS

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The recombinant R 46C of our collection, homozygous for two mutated genes (efr/efr, bif-l/bif-1), shows early flowering and ripening and reduced penetrance of gene bif-1 for dichotomous stem bifurcation. This recombinant was crossed with several mutants in order to study the influence of the mutant genes on seed production.

The main traits of the mutants used are: mutant 122, narrow leaflets; mutant 423, waxless stipules and pods; mutant 250, stem fasciation, late ripening, small seeds; mutant 107D, stein fasciation, late ripening, small seeds.

The resulting recombinants were compared with their parental genotypes and in relation to our initial line 'Dippes gelbe Viktoria' = 100% (Fig. 1).

All recombinants are early flowering and ripening; thus gene efr for earliness is not influenced by the mutant genes tested.

Recombinant R 833, homozygous for earliness, stem bifurcation (from R 46C) and narrow leaflets (from 122) did not differ much from R 46C nor from 122 with respect to the number of seeds per plant. Since the influence of mutant 122 is to reduce the thousand seed weight, the seed weight per plant of R 833 lies between that of R 46C and 122.

Recombinant R 837, homozygous for earliness, stem bifurcation, and waxlessness (from mutant 423), showed a slight increase in the number of seeds per plant as compared with the parental genotypes, almost reaching the value of our initial line. But because of its reduced seed size the seed weight per plant was not much higher than in recombinant R 833 but not as reduced as in mutant 423.

    The high yielding fasciated mutants 250 and 107D have a complex geno-
typic constitution, differing from our initial line in at least 15 mutant
genes. Recombinant R 46C was crossed with these mutants and several recom-
binants were obtained, one of which, R 863, is early (from R 46C) and very
tall (from mutant 250) but nonfasciated. A relatively high seed yield was
obtained in R 863 but the seed size was similar to mutant 250. The seed weight
per plant was good but the plants are so tall (70% higher than their parental
genotypes) that their cultivation in the field would be very difficult.

    Recombinant R 870 is also early flowering and ripening and non-fasciated,
but only about 50% as tall as the parental genotypes. The number of seeds
per plant in R 870 was less than that of mutant 107D and about the same as
R 46C. The seed weight per plant was almost equal to that of R 46C. Since
the plants are considerably shorter than R 46C, R 870 can be considered an
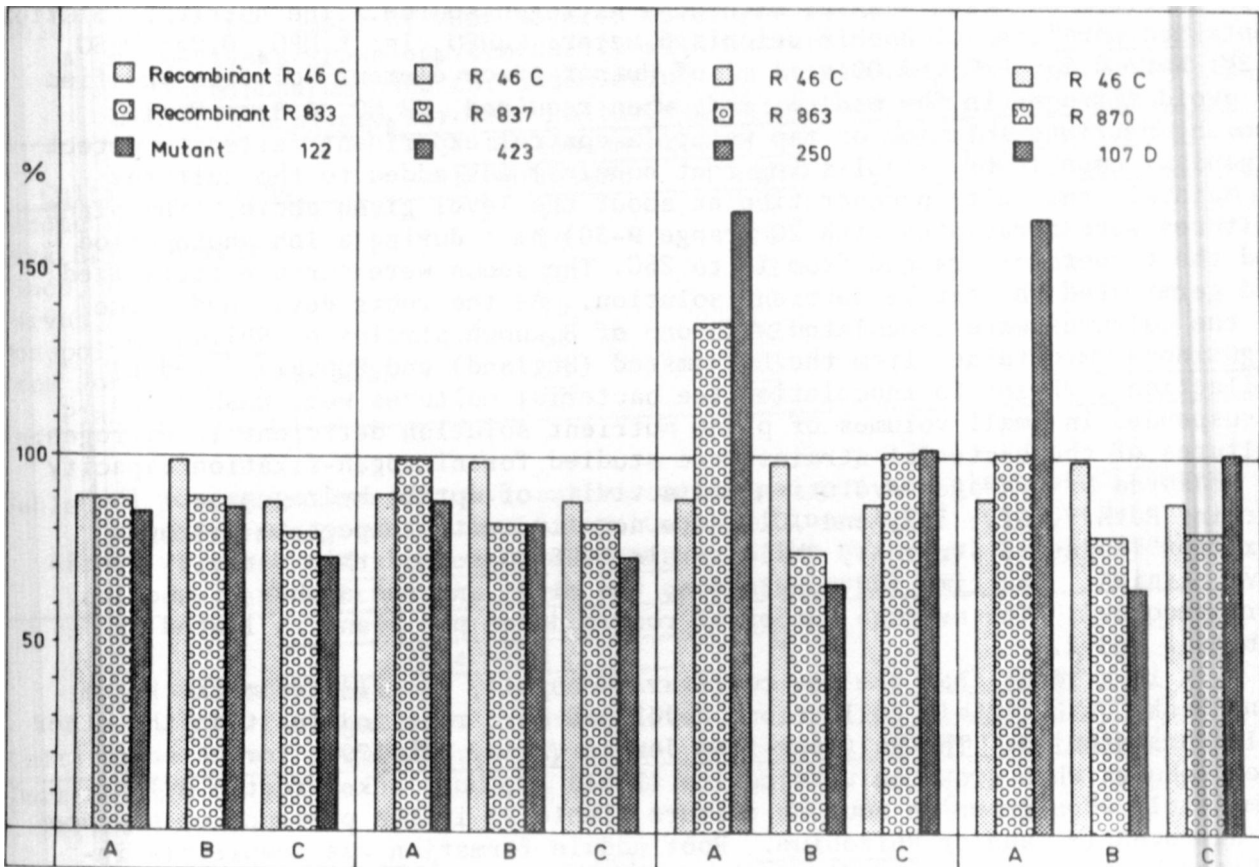improvement over R 46C.

Fig. 1. Some yielding characters of recombinants R 833, R 837, R 863,
         and R 870 compared with those of their parental genotypes,
         recombinant R 46C, and mutants 122, 423, 250, and 107D.
         A - number of seeds per plant; B - thousand seed weight;
         C - seed weight per plant.   Each mean value is related to the
         corresponding value of the initial line = 100%.