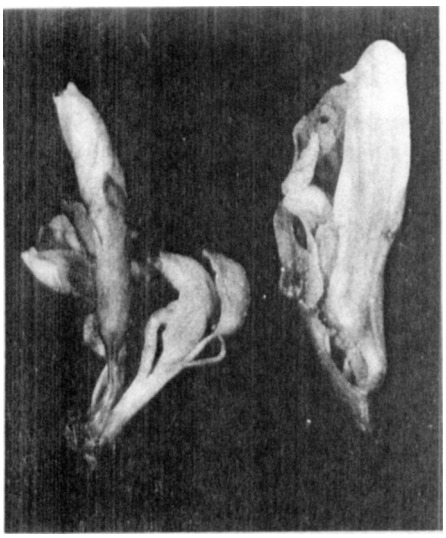

**Fig. 1. Flowers of mutant 175**

**Left: Inflorescence with two flowers derived from a single growing point. The calyx of the lower flower was removed; the second flower, sitting on a short stalk, comes from the central region of that calyx.**

**Right: Inflorescence with three flowers derived from a single growing point. Most of the lower flower was removed. The middle flower consists only of a single petal opposite to the leaf-like carpel of the lowest flower. Between these two organs, the stalk is discernible carrying theapical flower inside the petal of the middle flower.**

## INFLUENCE OF TEMPERATURE ON THE FLOWERING BEHAVIOR OF FASCIATED AND BIFURCATED PISUM GENOTYPES

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The flowering behavior of four mutants with dichotomous stem bifurcation, four bifurcated recombinants, three fasciated mutants, and a fasciated recombinant was studied in the phytotron under the following temperature conditions:

12.5C constant (experiment 1)
I2.5C night, 25.5C day (experiment 3)
23.5C constant (experiment 2)

The plants were grown under 18 hr light and 6 hr darkness in all three experiments. Number of days from sowing to the beginning of flowering was determined in ten plants per genotype. The mean values and the variability observed are given in Fig. 1 together with the values of the mother variety 'Dippes Gelbe Viktoria' (DGV).

The bifurcated mutants 239CH and L201A are homozygous for gene bif-1; mutant 157A is homozygous for bif-2 which is polymeric to bif-1. Both these genes show reduced penetrance. The mutant gene of 37B is allelic to bif-1 but it shows full penetrance. The bifurcated recombinants, considered in the lefthand part of the figure, contain bif-1 together with genes for waxlessness, different internode lengths and/or different seed sizes. As expected, all these genotypes flowered conconsiderably later under constant low temperature than under high temperature. The differences between experiment 2 and 3, however, were very small. In experiment 3, the high temperature was only given over a period of 6 hr per day, i.e. between 10:00 a.m. and 4:00 p.m. From 6:00 to 10:00 a.m. the temperature gradually rose from 12.5 to 25.5C and from 4:00 to 9:00 p.m. it fell from 25.5 to 12.5C. This relatively short duration of the high temperature had a very positive effect on the flowering behavior of the bifurcated genotypes tested. Thus, the period of low temperature had relatively little effect on the rate of development , provided that the plants were exposed to high temperature during daytime. DGV plants behaved similarly. Plants of mutant 1201, however, showed a certain degree of earliness in experiment 2 which was not observed in experiment 3.

The fasciated mutants 123, 251A, and 489C are homozygous for more than 20 mutant genes, most of them being identical in the three genotypes. Recombinant R 176X contains in addition gene dim-1 for small leaves, flowers, pods, and seeds derived from mutant 176A. These four genotypes behaved differently from the bifurcated genotypes just discussed (righthand part of Fig. 1). In experiment 1, three of them were considerably later than most of the bifurcated genotypes tested. Of particular interest, however, is the fact that they flowered later in experiment 2 than in experiment 3. Therefore the constant high temperature of 25.5C caused a delay in flowering as compared to the daily change of low and high temperature. This delay is especially pronounced in mutant 489C. Under the "normal" temperature conditions of experiment 3, the plants of this genotype began flowering about 70 days after seed sowing. Under constant low temperature, the plants had only minute flower buds 100 days after seed sowing when the experiment was stopped. Surprisingly, the same behavior was observed under the constant high temperature of experiment 2. In both these experiments, the plants of mutant 489C would have needed at least two weeks more for producing fully opened flowers.

Thus, the constant temperature of 25.5C influences the flowering behavior of the three fasciated genotypes negatively, whereas it has a positive effect on the mother variety, the bifurcated genotypes tested, and many other genotypes not considered in the present paper.

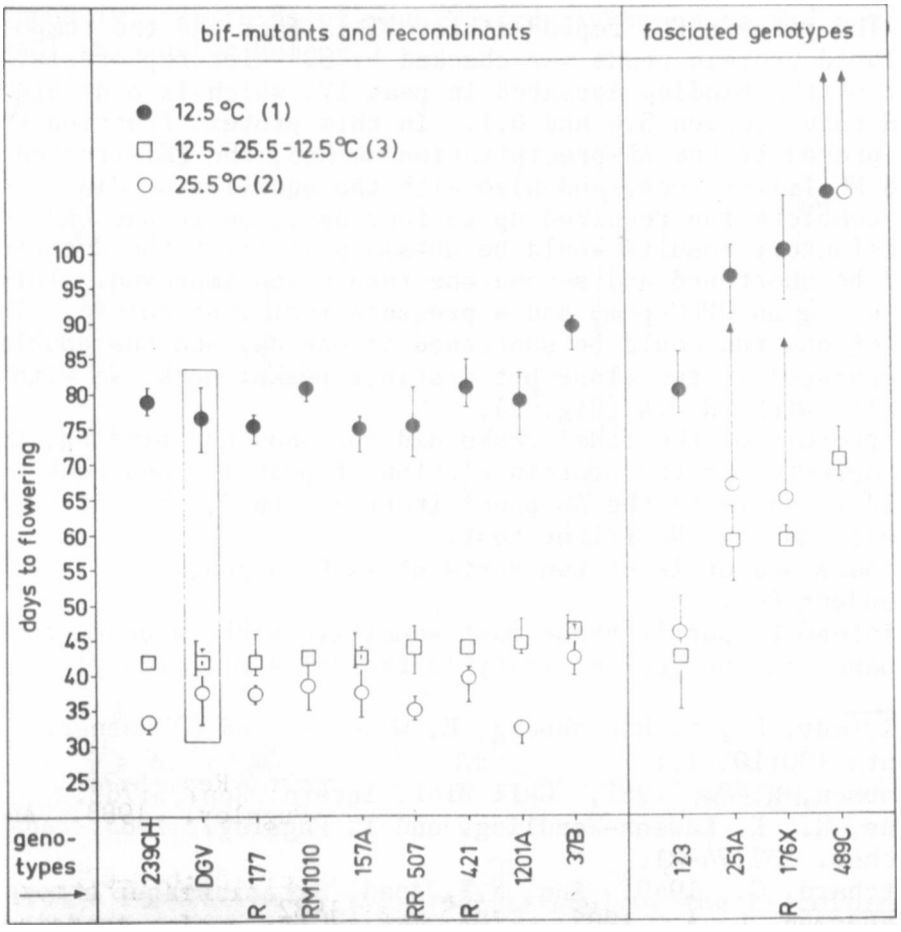


Fig. 1. The flowering behavior of 8 genotypes with dichotomous stem bifurcation and 4 genotypes with apical stem fasciation grown in the phytotron together with the mother variety DGV.