FLOWERING BEHAVIOR OF 18 PISUM GENOTYPES UNDER THREE PIFFERENT PHOTOPERIODS

Gottschalk, W. Institute of Genetics, University of Bonn
Federal Republic of Germany

Nine mutants, 8 recombinants and the initial variety 'Dippes Gelbe Viktoria' (DGV) were grown in the phytotron under the following conditions:

- Short-day (12 hr light, 12 hr darkness)
- Long-day (18 hr light, 6 hr darkness)
- Permanent light

In all 3 light regimes the temperature was a constant 15 C from 9 PM to 6 AM rising to 25 C from 6 AM to 10 AM and decreasing to 15 C from 4 PM to 9 PM. Humidity was *60%*. Eight plants of each genotype were grown in Mitscherlich pots and evaluated for number of days to first open flower (DF), flower bud abortion and other characteristics.

The data in Fig. 1 illustrate variation in DF for the mother variety DGV and the early flowering recombinant R 46C. The following mean values for DF were obtained:

	Short day	Long day	Permanent light
Mother variety	52.3	44.3	41.3
Recombinant R 46C	40.2	33.9	30.6

Interestingly, not all the genotypes studied showed the same behavior. Instead, the material can be subdivided into 5 groups as far as the reaction to photoperiod is concerned (Fig. 2). Six of the 18 genotypes tested agreed principally with DGV and R 46C (group 1; only the mean values for the genotypes are given). In the two genotypes of the second group, there is no difference, or almost no difference, between the permanent light and long-day plants but a very strong difference between these two categories and the plants grown in short-day. The two mutants of group 3 (two closely related fasciated genotypes with different internode lengths) do not show any clear differences among the three phctoperiods, i.e. the photoperiod has no influence on their flowering behavior. The genotypes of groups 4 and 5 need long-day conditions in order to produce functional flowers. There is a characteristic difference between the two groups. In the recombinants of group 4, flower formation was initiated under short-day conditions but only tiny buds were produced which did not undergo further development. The mutants of group 5, however, remained vegetative in short-days due to the presence of gene fis. They required long-days for the initiation of flower formation. With regard to the differences between long-day and permanent light, the genotypes of groups 4 and 5 showed the same reaction of those of group 1.

It is surprising that such large differences in flowering behavior are found in such a small group of genotypes which derive from the same mother variety, i.e. the genetic differences involved are likely to be few in number. These genotypes are an interesting material for inves-

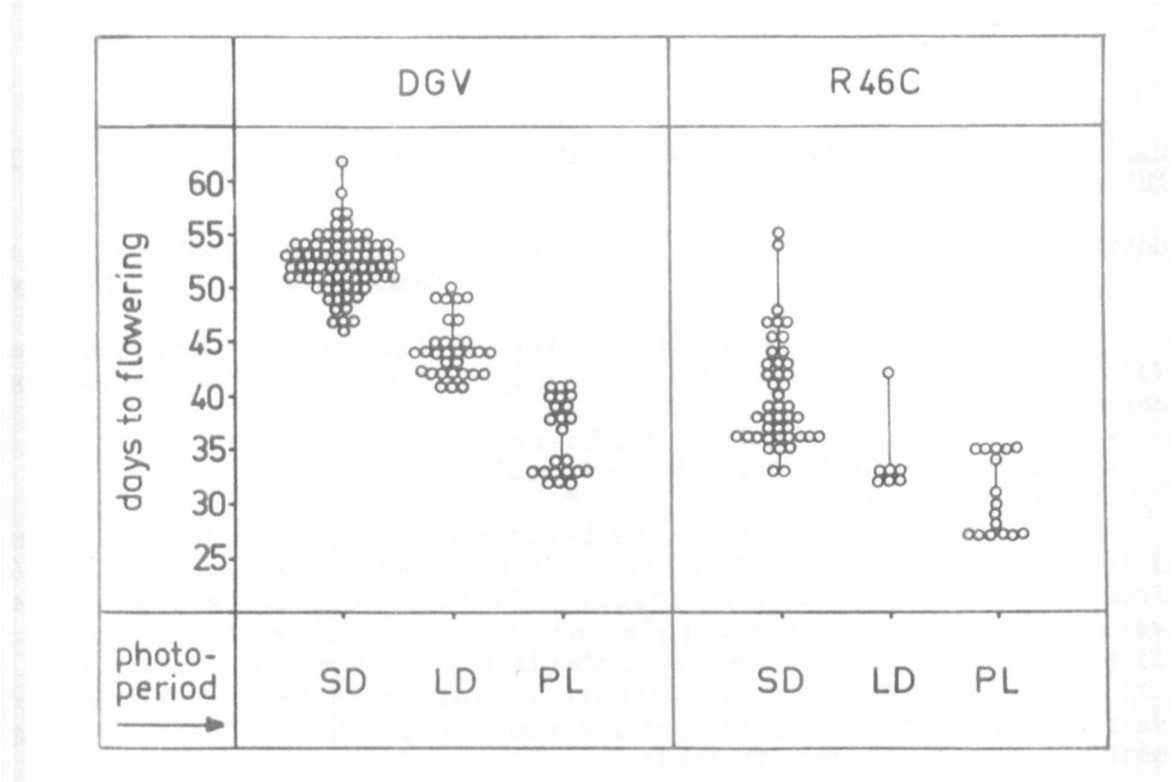

Fig. 1. Flowering behavior of the early flowering recombinant R 46C and its mother variety 'Dippes Gelbe Viktoria' (DVG) in three different photoperiods. Each dot is the value for a single plant. (SD r short-day; LD = long-day; PL = permanent light).

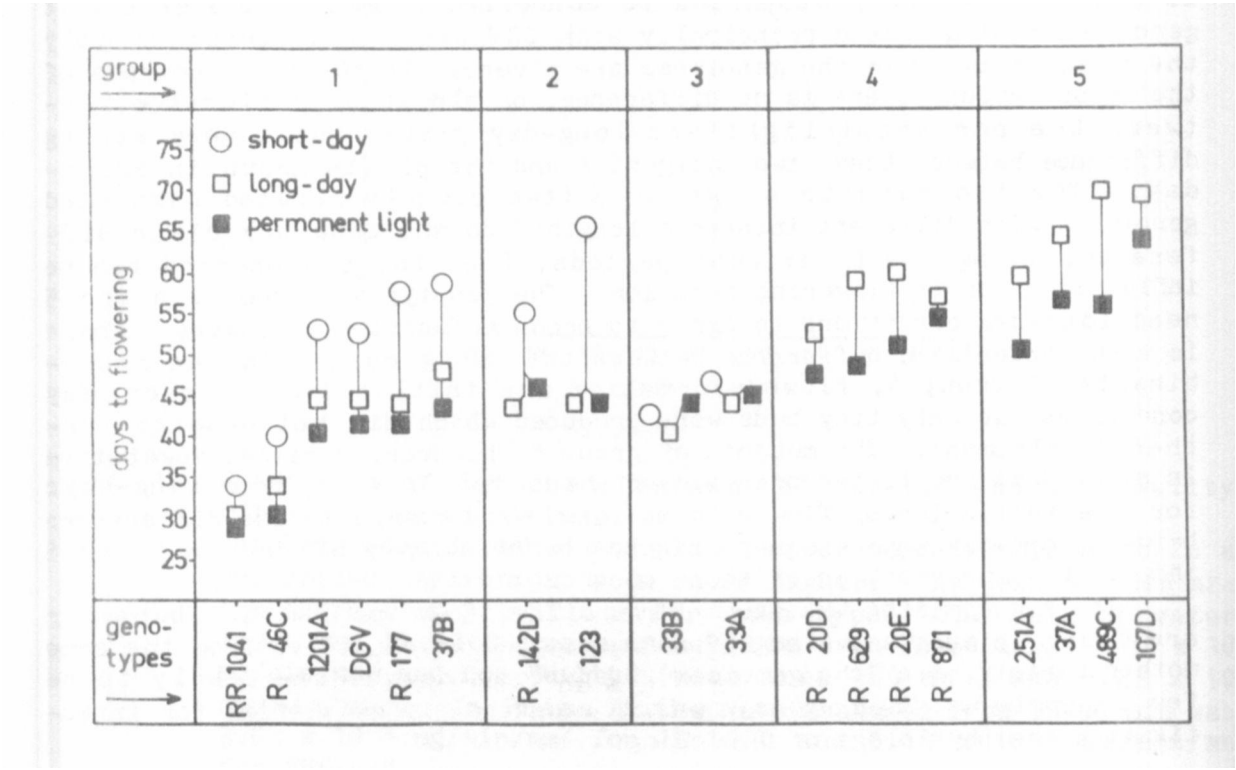

Fig. 2. Flowering behavior of **9** mutants, **8** recombinants and the mother variety (DGV) under three different photoperiods in the phytotron. Each point represents the mean value for the respective genotype.