

INFLUENCE OF TEMPERATURE ON THE FLOWERING BEHAVIOR OF EARLY FLOWERING GENOTYPES

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Eight pea genotypes, homozygous for genes efr for earliness, bif-1 for dichotomous stem bifurcation and for some other mutant genes, were grown together with the late flowering mother variety 'Dippes Gelbe Viktoria' (DGV) under three different temperatures in the phytotron as follows:

- 12.5°C constant
- 12.5°C night, 25.5°C day
- 25.5°C constant

Other environmental factors were identical in the three trials. The plants were grown under long-day conditions with 18 hr light and 6 hr darkness; humidity was about 60%. The dots given in Fig. 1 represent the mean values of the trait "number of days from sowing to beginning of flowering", based on 8 normally developed plants of each genotype. Genes efr and bif-1 derive from recombinant R 46C. R 46C was crossed with other genotypes of our collection and the following recombinants were used for the experiments:

- R 20D: efr, bif-1 with full penetrance, "long III", reduced chlorophyll content
- R 20E: efr, bif-1 with full penetrance, "short II"
- R 427: efr, bif-1 with low penetrance, dim for reduced size of all plant organs, "short I"
- R 831: possibly identical with R 427
- R 836: efr, bif-1 with extremely low penetrance, "wax 445" for waxlessness, "short I"
- R 837: efr, bif-1 with reduced penetrance, "wax 423" for waxlessness, "short I"
- R 879: efr, bif-1 with reduced penetrance, "short I"

As expected, most of the genotypes tested flowered earlier under high temperature than low. This is exemplified by the first 6 recombinants shown in Fig. 1. At 12°C they flowered a month later than at 25°C. In DGV the delay was somewhat more. The difference in time to flower between the plants grown under constant 25°C and those grown under 12°C night/25°C day was small, demonstrating that the low night temperature had a minimal effect on flowering time.

Plants of recombinants R 20D and R 20E showed a specific behavior in that they formed tiny flower buds at very low nodes as does R 46C, the donor of gene efr. Fully developed flowers, however, were produced considerably later on higher nodes. In R 20D, grown under constant 25°C, they appeared more than 7 weeks after sowing, and in R 20C more than 10 weeks after sowing. In both cases, only some of the plants flowered at all, whereas the others did not produce fully developed flowers until the trial was stopped. Therefore, the values for these two genotypes, given in Fig. 1, are not true mean values. Under constant low temperature of 12°C, plants of R 20D required more than 13 weeks to reach flowering, and those of R 20E more than 16 weeks. Some plants of R 20E did not flower at all. Under alternating high and low

temperatures (i e. under approximately normal conditions), however these two recombinants flowered earlier than at constant 25°C.

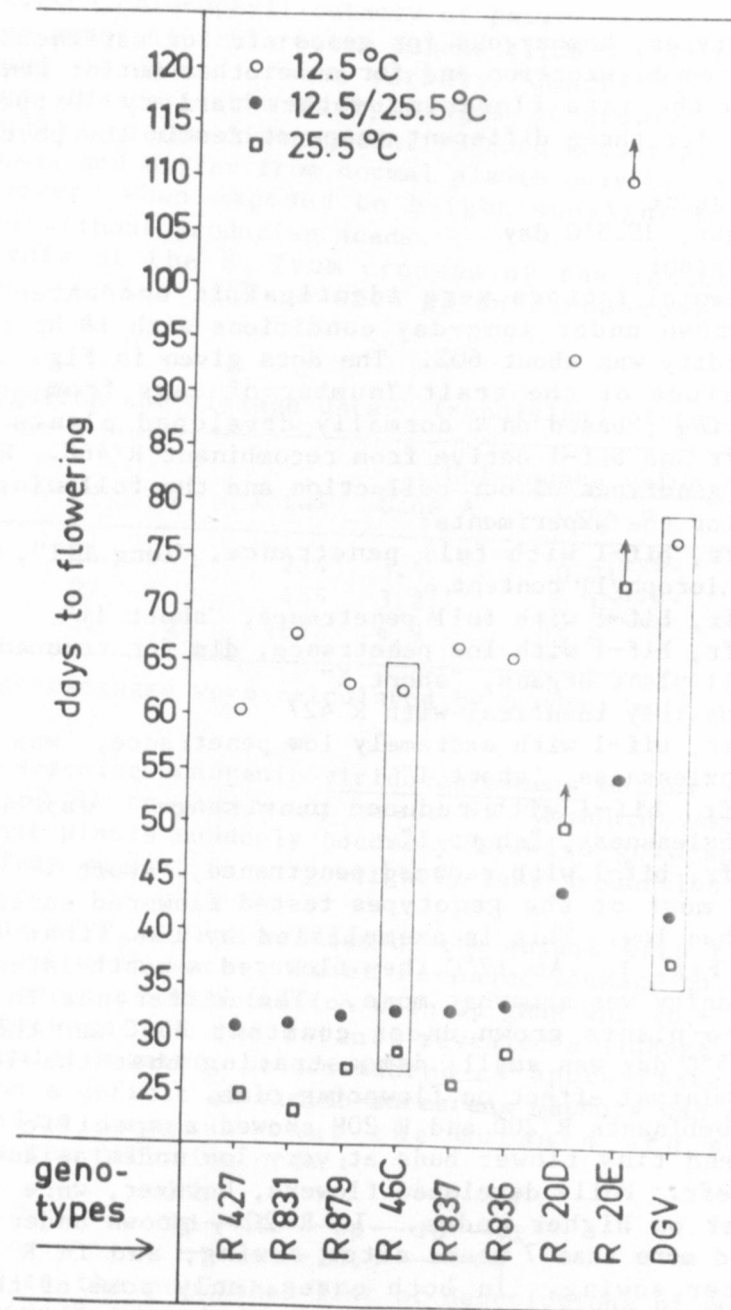


Fig. 1. The influence of temperature on the flowering behavior of 8 early flowering *Pisum* recombinants and the mother variety 'Dippes Gelbe Viktoria' (DGV) under three different temperature conditions in the phytotron.