## A PISUM GENE CONTROLLING RESPONSE TO PHOTOPERIOD

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Four X-ray induced fasciated mutants of our collection, 107D, 123, 250A, 489C, and the neutron induced fasciated mutant 2797A were grown together with the mother variety 'Dippes Gelbe Viktoria' in the phytotron under short-day and long-day conditions. In short-day (12 hours darkness, 11 hours full light, 2 x 1/2 hour "dawn"), they did not flower. Instead, they remained vegetative for 75 days whereas the control plants had begun flowering 46 days after sowing. The plants were healthy and physiologically fully active. When the phytotron conditions were changed to long-day (6 hours darkness, 17 hours full light, 2 x 1/2 hour dawn), the plants of all these genotypes had small flower buds 8-10 days later. Thus, the retardation of flowering was a reaction to the short-day conditions.

In a second trial, the genotypes were exposed to the long-day conditions mentioned above during their whole ontogenetic development. The 5 genotypes flowered, but they could be subdivided into two groups according to their flowering behavior. The plants of mutants 107D and 123 flowered richly; they began flowering 4 days later than the initial line. Mutants 250A, 489C, and 2797A began flowering 30-40 days later then the control plants. Stem fasciation was strongly expressed, but the accumulation of flowers in the top region of the plants, which is a characteristic peculiarity of these mutants when grown in the field, did not occur. On the contrary, only a small number of flowers developed fully, the majority of the flower buds remaining small and undeveloped.

The fasciated mutants studied have a complicated genotypic constitution, being homozygous for about 15 mutant genes. Most of them were found to be identical in the independently arisen mutants. This certainly holds true also for the gene controlling the reaction to the photoperiodic conditions. This gene suppresses the initiation of flower formation under short-day conditions whereas it allows flowering in long-day. Under the natural long-day conditions of West Germany, mutants 250A, 489C, and 2797A flower about 10 days later then their mother variety. The different behavior of these plants under long-day field and long-day phytotron conditions is presumed to be due to the relatively high temperature maintained in the phytotron (changing from night to day between 15 and 25°C).

Two other strongly fasciated genotypes, not belonging to our own collection likewise failed to flower under short-day phytotron conditions. This applies to the Bulgarian mutant VI-10 of Mrs. Vassileva's collection and the commercial fodder pea variety 'Ornamenta' developed by Scheibe using a spontaneously arisen fasciated mutant.

Our phytotron results likely explain the failure of these lines to flower when grown at 7 different locations in India, as well as in Egypt, Uganda, and Brazil. Most of the plants tested did not flower at all. Only in some years did a small portion of them form a few flowers, but no seeds.

The gene responsible for this behavior is provisionally designated as *fis* (= flower initiation suppressor).

Editor's Note: To date there are four well established loci controlling flowering in *Pisum*. It is urged, therefore, that the gene discussed here be tested against known genotypes before the symbol is formally adopted.