

7 Abstrakt

Angiosperm plants must flower at an appropriate time during the year and under favourable conditions to assure successful reproduction. Flowering is therefore controlled by many external and internal stimuli. Various authors demonstrated that the induction of flowering can be affected by abiotic stresses in some species. In the model plant *Arabidopsis thaliana*, mineral nutrient deficiency was found to influence flowering. However, there are very little data from laboratory experiments. The aim of this work was therefore to investigate the effects of mineral nutrient deficiency on *A. thaliana* flowering in precisely controlled conditions.

The research reported here had three goals: 1) To develop a system for hydroponic cultivation of *A. thaliana* which could be used to study the effects of nutrient stress. 2) To describe the changes in the timing of *A. thaliana* flowering after a sudden reduction of mineral nutrient supply during plant cultivation. 3) To design a model system for future investigations concerning the effects of nutrient stress on flowering.

We modified a hydroponic system described by Gibeaut et al. (1997). Our improved system was very suitable for plant growth and enabled us to accurately control nutrient levels. All experiments were performed in short days to eliminate photoperiodic induction.

We stressed the plants by diluting the nutrient medium 100-fold or 1000-fold. The flowering response, especially the number of days from sowing to bud appearance, was studied in three ecotypes (Ler, Col, Sf-2). Preliminary experiments with Ler and Col showed that 1000-fold media dilution accelerated flowering, most strongly when performed at the age of 3 weeks, as compared to the age of 4 or 5 weeks. Therefore

the nutrient stress was always applied at the age of 3 weeks in later experiments. 1000-fold dilution shortened the time to bud appearance in all three ecotypes (by 13 - 16 days in Ler, 6 - 7 days in Col, and 4 - 5 days in Sf- 2). 100-fold dilution caused an acceleration of bud appearance in Ler and Sf-2 (by 7 - 8 and 4 - 5 days, respectively) but a delay in Col (by 9 days).

We demonstrated that an abrupt decrease of mineral nutrient availability during cultivation markedly reduced the time to flowering in some *A. thaliana* ecotypes. In contrast, previous studies reported that continuous or gradually progressing nutrient deficiency rather leads to delays in flowering.

We found the most pronounced flowering response to stress in ecotype Ler after a 1000-fold dilution of the nutrient medium at the age of 3 weeks. These conditions can be employed as a model system for future research concerning the role of nutrient stress in flowering.