

Heavy Water Slows Down the Photoperiodic Timing of Flower Induction in *Chenopodium rubrum*

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According to Bünning¹ photoperiodic timing is achieved by a circadian (*i. e.* about 24 hours) oscillation. A number of different experimental approaches have been used to test this hypothesis²⁻⁶. Since D₂O is known to slow down circadian rhythms⁷, we tried to use this feature in a further test of the hypothesis. Under Bünning's hypothesis D₂O should consequently also slow down the photoperiodic timing.

Chenopodium rubrum ecotype 60°47' is a suitable object because of its experimental advantages. Thus, it could be conveniently grown on moist filter paper in petri dishes⁸. As known from the literature and shown in Fig. 1 (control), flower induction under varying lengths of dark periods occurs in a rhythmic

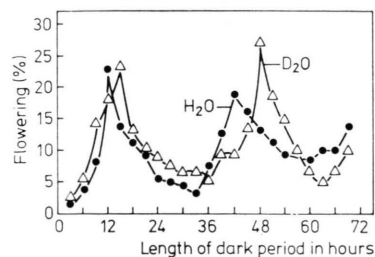


Fig. 1. Rhythmic flower induction of *Chenopodium rubrum* by a single dark period of different lengths under the influence of D₂O (△ - - △) as compared to a control (● - - ●).

fashion with peaks of flower formation at dark periods of 12 and 42 hours⁹. This presumably reflects the participation of an underlying circadian oscillation with a period length of 30 hours as seen in the photoperiodic events¹⁰. Plants treated with a 35% D₂O-Hoagland solution over a certain period including the dark period¹¹ show indeed a different dependency of the photoperiodic induction on the length of the dark period. As shown in Fig. 1, the first peak occurs 3, and the second peak 6 hours later, compared to a H₂O-Hoagland control. The same results are shown if flowering is induced by two dark periods. These results indicate that D₂O increases the period length of the circadian oscillation of *Chenopodium rubrum* by 3 hours and are consistent with the Bünning hypothesis.

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