## Evaluating the concept of thermal time

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Comparable measurements of the duration between phenological events in the development of different cultivars over environments are required for the formulation of predictive models. This study reports on an evaluation of the concept of thermal time in providing such a measure for barley and concludes that the concept requires modification if it is to have universal application.

### Methods

The duration from seeding to awn appearance expressed as accumulated temperature above zero was calculated from daily mean temperatures for 2 related cultivars (Mona and Bonus) for each of twelve successive monthly plantings over 1986/87 and, for the period from seeding to anthesis for three plantings (October, April and June) in 1987/88. As neither cultivar responds to vernalization, or in our studies exhibited any decrease in main stem leaf number at field photoperiods above 10.2 h, it would be hypothesized that the duration from seeding to awn appearance or anthesis would be constant for each genotype.

### Results and discussion

The data presented in Figs. 1 and 2 show that Mona, a mutant out of Bonus, is inherently earlier. The differential between them varies with seeding date but without change in main stem leaf number of 7-8 for Mona and 11-12 for Bonus. Both the earliness of Mona and the associated difference in leaf number are governed by the action of a single recessive gene.

The hypothesis of a constant duration to awn appearance (1987/88) and to anthesis (1988/89), cannot be sustained. The data would indicate that factors other than temperature influence the rate of either leaf initiation and appearance or, the timing and rate of stem elongation, or both. These details will need to be identified and used in modifying the concept of thermal time.

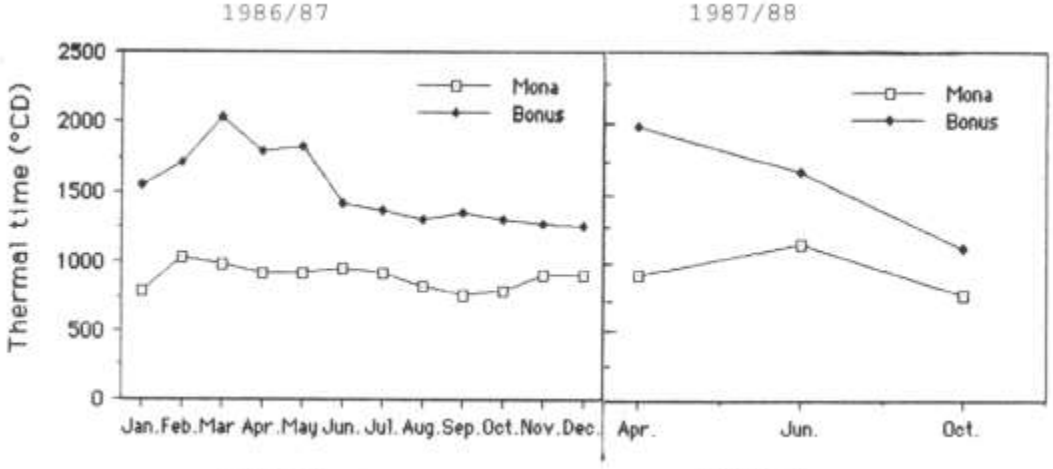


Figure 1 Figure 2