

The transition to flowering in winter rapeseed during vernalization

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Abstract

Flowering time is a major determinant of adaptation, fitness and yield in the allopolyploid species rapeseed (*Brassica napus*). Despite being a close relative to *Arabidopsis thaliana*, little is known about the timing of floral transition and which genes govern this process. Winter, semi-winter and spring type rapeseed have important life history characteristics that differ in vernalization requirements for flowering and are important for growing rapeseed in different regions of the world. In this study, we investigated the timing of vernalization-driven floral transition in winter rapeseed and the effect of photoperiod and developmental age on flowering time and vernalization responsiveness. Microscopy and whole transcriptome analysis at the shoot apical meristems of plants grown under controlled conditions showed that floral transition is initiated within few weeks of vernalization. Certain *Bna.SOC1* and *Bna.SPL5* homeologs were among the induced genes, suggesting that they are regulating the timing of cold-induced floral transition. Moreover, the flowering response of plants with shorter pre-vernalization period correlated with a delayed expression of *Bna.SOC1* and *Bna.SPL5* genes. In essence, this study presents a detailed analysis of vernalization-driven floral transition and the aspects of juvenility and dormancy and their effect on flowering time in rapeseed.

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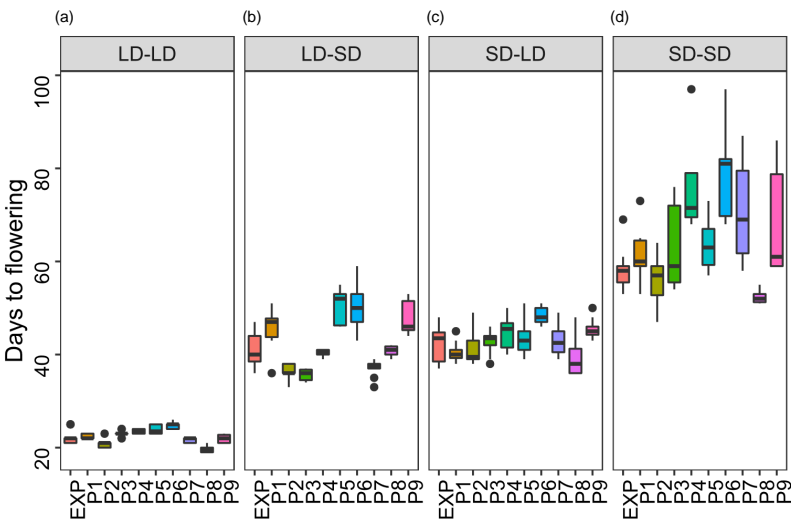
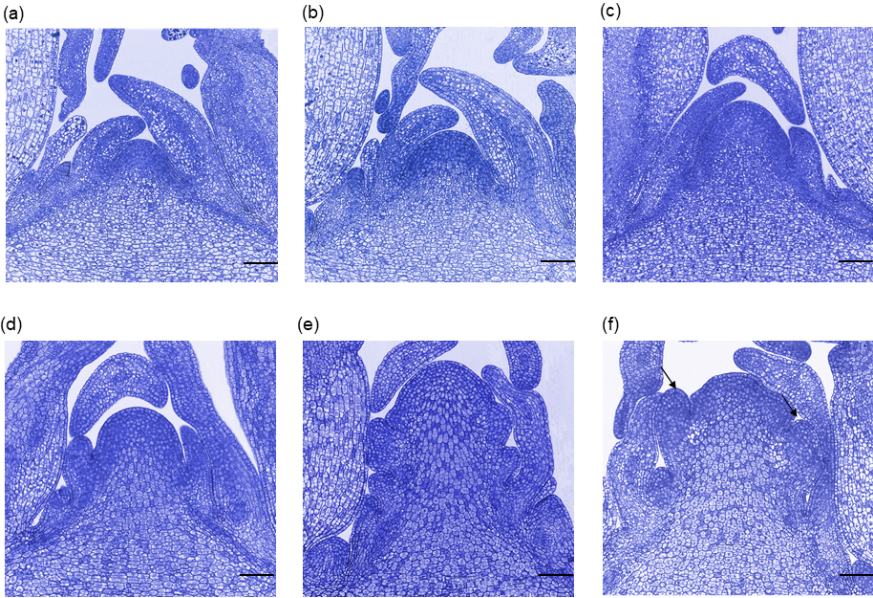


Figure 1

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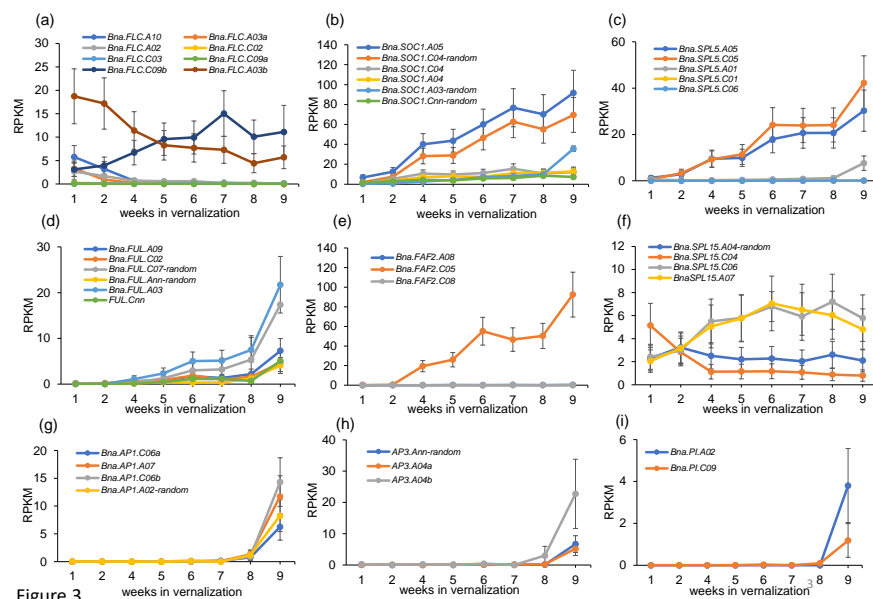


Figure 3

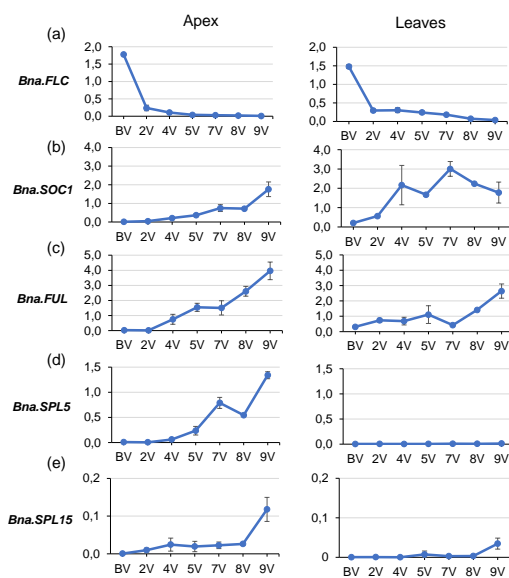


Figure 4

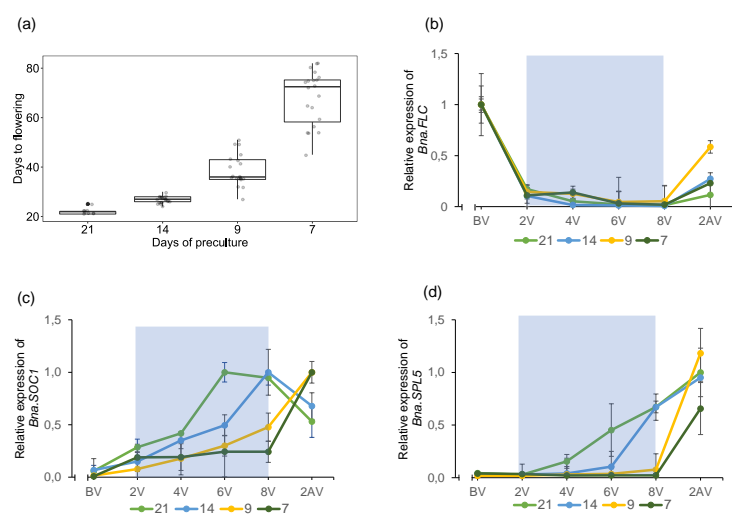


Figure 5

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