Effect of photoperiod on aerial morphogenesis of eight Medicago truncatula lines

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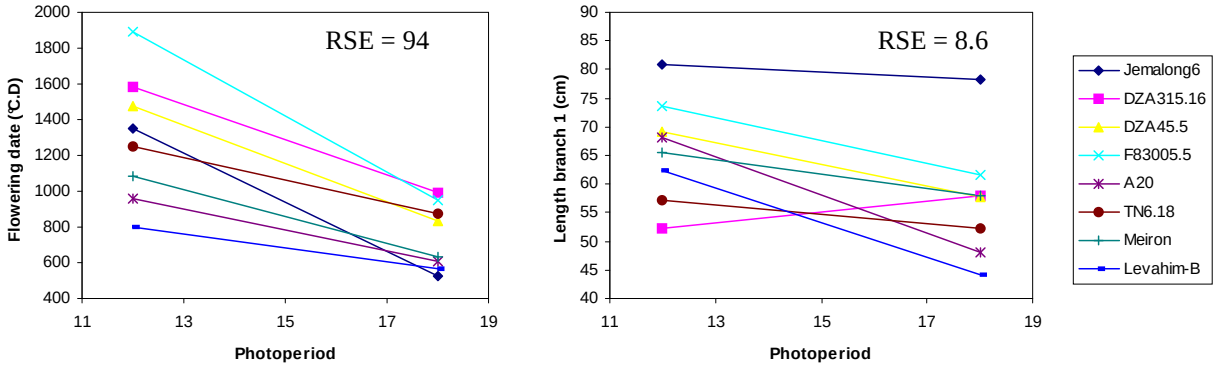
The influence of environmental factors on aerial morphogenesis is only partly described on the model legume *Medicago truncatula*. Such factors can affect phenotypic evaluation of genetic material such as recombinant inbred lines (RILs), mutants or natural accessions. The objective of this study was to describe the effects of photoperiod, genotype and the genotype x photoperiod interaction on morphogenesis. In growth chambers, six parental lines of RILs populations and two Israeli accessions were grown under two photoperiods, 12 and 18h applied without significant change in total energy supply. Primary branch elongation was measured twice a week, flowering time was scored, and when stem elongation had ceased, the number of primary branches was counted and the length of the main stem was measured.
For all traits, photoperiod and genotype effects were highly significant in analysis of variance but the effect of photoperiod was the highest. On average, plants flowered earlier and had longer main stem, shorter branch length and higher branch elongation rate at a long than at a short photoperiod. Duration of branch elongation and number of branches were lower at a long than at a short photoperiod. The interaction between genotype and photoperiod was always significant. Flowering of Jemalong6 and F83005.5 was more hastened by long photoperiod than that of the other genotypes. Branch length was shorter at a long than at a short photoperiod for five genotypes, longer for one genotype and little affected for two genotypes.



These results show that plant morphology is greatly affected by environmental conditions. A large genetic variation is available. Moreover, the interaction between conditions and genotypes is large, modifying the ranking of the genotypes. It indicates that the protocols for evaluation of RILs, mutants or natural accessions must be carefully chosen.

Acknowledgements

We thank Dr A. Samach from University of Jerusalem (Israel), Dr T. Huguet from INRA-CNRS at Toulouse (France) and J.M. Prosperi from INRA at Montpellier (France) for providing the seeds.