



## Photoperception and Photoperiod Genes in Soybean

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Light is one of the most important environmental factor controlling plant growth and development. It provides energy for growth and biomass production via photosynthesis and temporal and spatial information for developmental control by photoreceptor-mediated signaling networks. Light is the main input to the endogenous time-keeping mechanism, allowing the generation of adaptive responses to daily and seasonal changes in environmental conditions. Photoreceptor genes and signaling partners have been successfully identified in plant species by traditional genetic and molecular approaches, however, the vast majority of the available information is from model plant species. The incorporation of genomic and bioinformatic tools to previously available genetic knowledge has helped us to gain insight into physiological and developmental processes in economically important crops. In soybean, genome-wide analyses of ortholog groups and *in silico* gene expression profiling have helped to identify photoreceptor, light signaling and circadian clock-component genes. Further insight on the molecular function of the identified genes has been gained by phylogenetic and protein-motif investigations. Furthermore, coupling functional information and genome mapping has permitted the attribution of candidate genes to known light and photoperiod-responsive loci in the soybean genome. Comprehensive studies of the natural variation for flowering-time in soybean germplasm have suggested that circadian regulation of photoreceptor gene expression, but not photoreceptor gene sequence, may be associated to photoperiodic flowering. Thus, genomic tools have accelerated soybean research by helping to establish the genetic framework for light- and circadian-controlled processes, associated to economically important traits such as photoperiodic flowering, in soybean. Moreover, knowledge on gene sequences, transcriptional profiles and genome location have helped to clarified the evolutionary relationships between soybean and other crop species. Further genomic investigations may help to elucidate the role of temperature in light and photoperiod controlled-processes in soybean.