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Identification of diversified functions of soybean *FT* homologs in photoperiod-dependent flowering time control

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Abstract

FT is one of the major floral activator in plant flowering. FT determines the changing point of time from vegetative stage to reproductive stage. To understand the role of *FT* homologs in short-day plant soybean, we identified 10 soybean *FT* homologous genes and named *GmFTs*. We figured out that 10 *GmFT* genes were further categorized into three subclades through phylogenetic analysis. Expression analysis of *GmFT* genes indicated that they might have different functions in photoperiod-dependent soybean flowering. Most of *GmFTs*, for example, *GmFT2a*, *GmFT2b*, *GmFT5a* and *GmFT6* mainly expressed in soybean leaves at short-day condition. However, interestingly *GmFT1a* and *GmFT4* represented opposite expression pattern to other *GmFTs*. Arabidopsis transgenic plants overexpressing *GmFT2a* and *GmFT5a* exhibited extremely early flowering. In contrast, overexpression of *GmFT4* delayed flowering of Arabidopsis transgenic plants. The results suggest that *GmFT4* has antagonistic role to other *GmFTs* in soybean flowering. Interestingly, mRNA level of *GmFT2a* is higher in early flowering soybean accessions than in late flowering ones. Moreover, the highest point of mRNA level of *GmFT2a* showed the positive correlation with the timing of flowering of soybean accessions. But that of *GmFT4* showed opposite pattern. Here, we report that soybean *FT* homologs might acquire different functions in photoperiod-dependent flowering through the functional diversification during evolution.

Keyword: Flowering, FT, Photoperiod pathway, Soybean Flowering, *GmFT*

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