



***In silico* identification and analysis of phytoene synthase genes in plants**

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ABSTRACT. In this study, we examined phytoene synthetase (PSY), the first key limiting enzyme in the synthesis of carotenoids and catalyzing the formation of geranylgeranyl pyrophosphate in terpenoid biosynthesis. We used known amino acid sequences of the PSY gene in tomato plants to conduct a genome-wide search and identify putative candidates in 34 sequenced plants. A total of 101 homologous genes were identified. Phylogenetic analysis revealed that PSY evolved independently in algae as well as monocotyledonous and dicotyledonous plants. Our results showed that the amino acid structures exhibited 5 motifs (motifs 1 to 5) in algae and those in higher plants were highly conserved. The PSY gene structures showed that the number of intron in algae varied widely, while the number of introns in higher plants was 4 to 5. Identification of PSY genes in plants and the analysis of the gene structure may provide a theoretical basis for studying evolutionary relationships in future analyses.

Key words: Carotenoids; Evolution; Phytoene synthase