

# Molecular analysis of a transposable controlling element affecting expression of a gene for anthocyanin biosynthesis

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Although transposable controlling elements are believed to exist in virtually every organism, they have been isolated from only a few plants and have been characterized at genetic and molecular level in only two plants, maize (*Zea mays*) and snapdragon (*Antirrhinum majus*). Their ability to transpose, affect gene expression and promote DNA rearrangements causes genetic instability. We have identified and isolated a new transposable controlling element, *Tpn1* (Transposon *Pharbitis nil* one), from a line of Japanese morning glory (*Pharbitis nil*) bearing variegated flowers. The 6.4 kb transposable element was inserted in the gene for dehydroflavonol-4-reductase (DFR), one of the genes involving anthocyanin pigment biosynthesis. Its terminal inverted repeats and the number of target duplications indicate that it belongs to the family of the maize transposable element *Suppressor-mutator / Enhancer (Spm / En)*. Cosegregation data of the variegated flower phenotype and the *DFR* gene carrying *Tpn1* indicate that the mutable phenotype is due to excision of *Tpn1* from the *DFR* gene. Sequences homologous to *Tpn1* are present in multiple copies in the genome of Japanese morning glory.