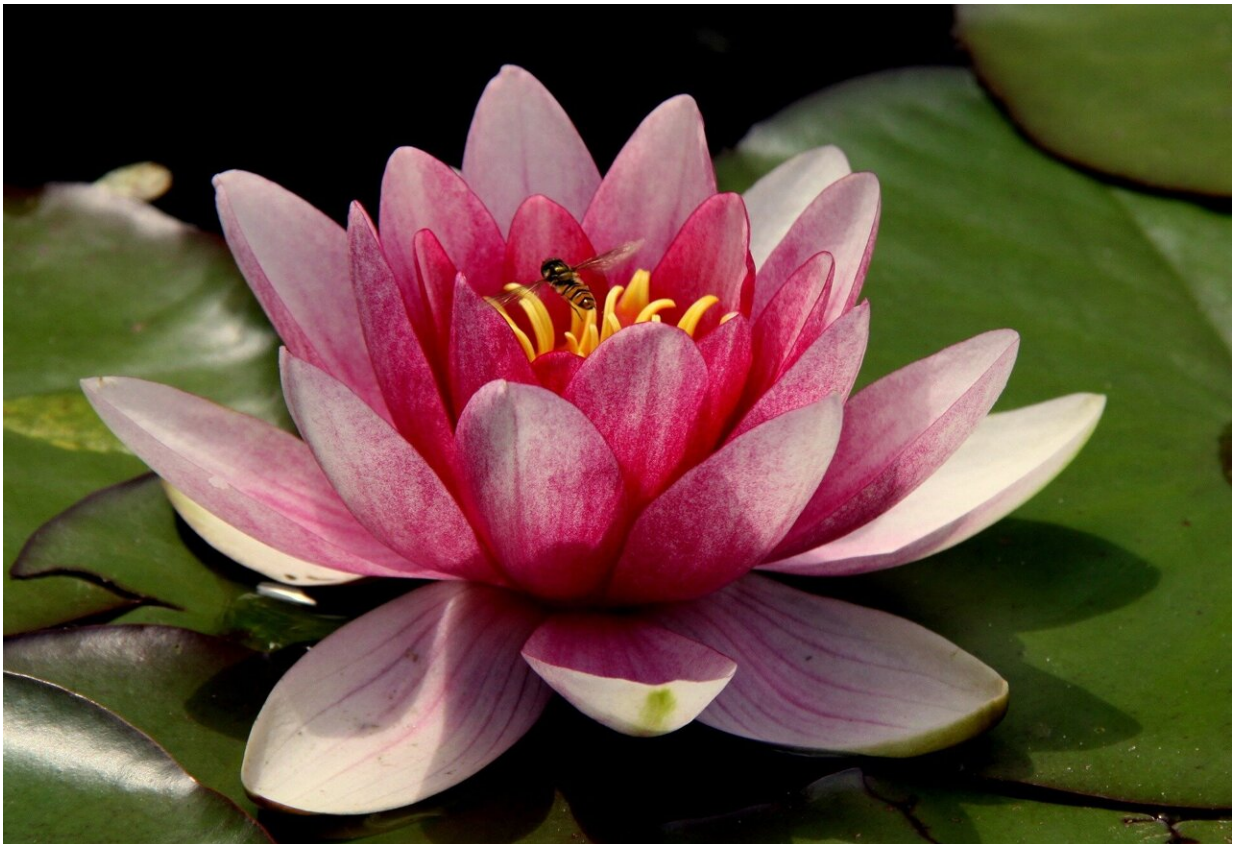


Distinct methylome patterns contribute to lotus ecotypic differentiation

June 28 2021, by Liu Jia



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Sacred lotus (*Nelumbo nucifera* Gaertn.) is an economically important aquatic flowering plant with gardening, medicinal, and food applications. Temperate and tropical lotus are two ecotypes of *N. nucifera* differing in

geographic distribution, morphology, flowering time, genetics, gene expression patterns and cis-regulations.

DNA methylation is an [epigenetic modification](#) participating in phenotypic diversity, plant development, and responses to environmental stress. However, the epigenetic mechanism of DNA methylation modification that may influence phenotypic adaptive differentiation in the storage organ of two ecotypes of lotus is still unclear.

In a study published online in *Molecular Ecology*, the researchers from Wuhan Botanical Garden of the Chinese Academy of Sciences and Wuhan Institute of Landscape Architecture investigated the adaptive epigenetic differentiation patterns of the two ecotypes of wild lotus in the DNA methylation epigenome and transcriptome levels using whole genome bisulfite sequencing and whole transcriptome sequencing.

The researchers found that the DNA of the temperate lotus was significantly more hypermethylated than that of the tropical ones, indicating that there was an increase in global DNA methylation in the enlargement lotus rhizome.

Meanwhile, they found that genes associated with differentially methylated regions in their promoters tended to be differentially expressed between the two ecotypes.

The mean transposable elements coverage in promoter and gene body for those with significant negative correlation between expression and methylation was significantly higher than those with significant positive correlation. DNA methylation in the promoter regions was significantly associated with the expression of the key genes involved in starch-bioynthetic, gibberellin-, and brassinosteroid-signaling pathways, and subsequently, in phenotypic differentiation of rhizome.

The study unveils valuable epigenetic differentiation patterns between the tropical and temperate lotus, and enhances the understanding of the formation of an important plant storage organ.

More information: Hui Li et al, Distinct methylome patterns contribute to ecotypic differentiation in the growth of the storage organ of a flowering plant (sacred lotus), *Molecular Ecology* (2021). [DOI: 10.1111/mec.15933](https://doi.org/10.1111/mec.15933)

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