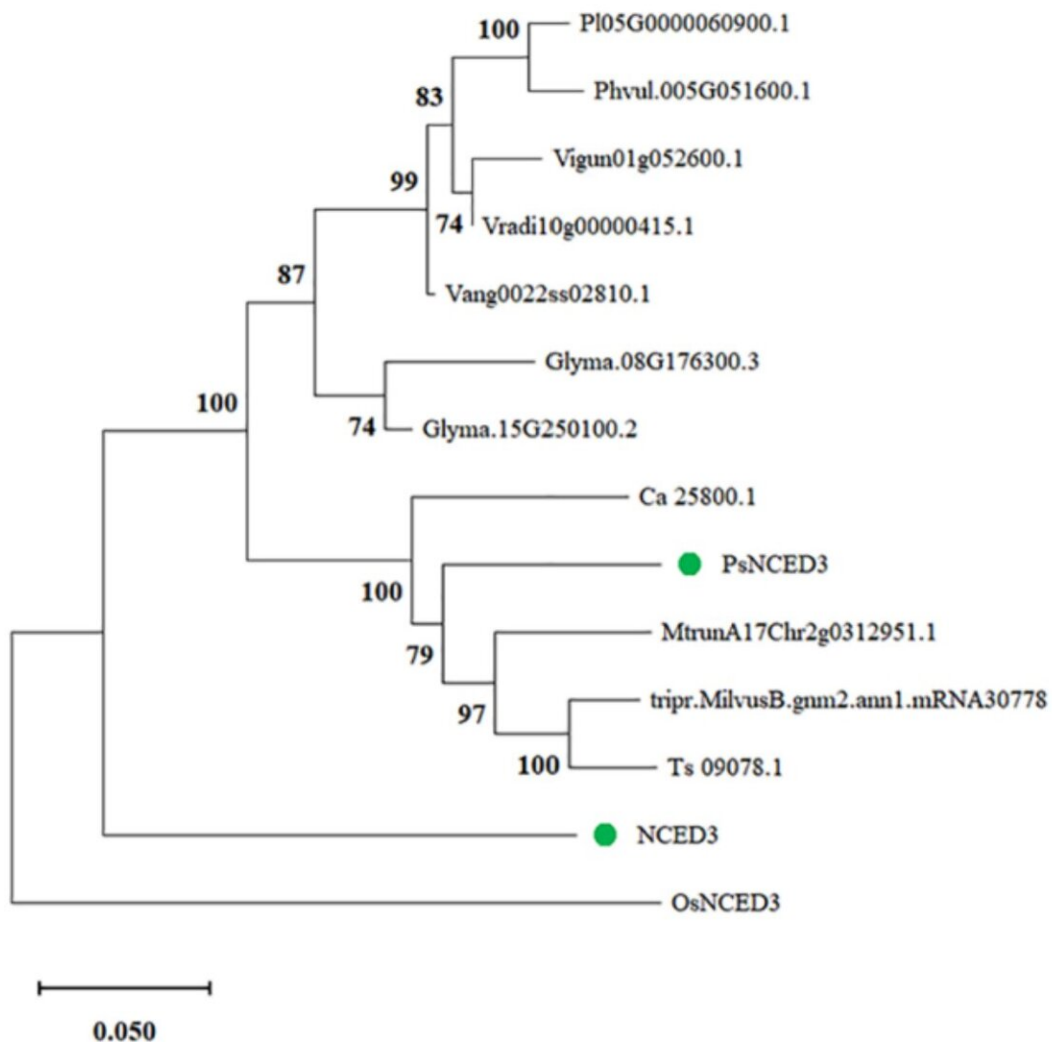


Artificially modulating stomatal development may improve crop stress tolerance

June 7 2023, by Zhang Nannan



The phylogenetic tree shows the relationship between NCED3 proteins. Amino acid sequences were included in the phylogenetic analysis from the following species: *Arabidopsis thaliana*; *Cicer arietinum*; *Glycine max*; *Medicago*

truncatula; *Oryza sativa*; *Phaseolus lunatus*; *Phaseolus vulgaris*; *Pisum sativum*; *Trifolium pratense*; *Trifolium subterraneum*; *Vigna angularis*; *Vigna radiata*; *Vigna unguiculata*. Phylogenetic analysis was performed with MEGA-X, and the phylogenetic tree was constructed by the neighbor-joining method with bootstrap analysis (2,000 replicates). Credit: *Physiologia Plantarum* (2023). DOI: 10.1111/ppl.13943

Two MYB transcriptional regulators, FLP and its paralogous AtMYB88, redundantly regulate the symmetric division of guard mother cells and the abiotic stress response in *Arabidopsis thaliana*. Only one orthologue gene of FLP has been identified in pea (*Pisum sativum* FLP; PsFLP).

The study of stomatal development in pea is of great significance for the improvement of some important agronomic traits in legumes. However, studies on the biological function of PsFLP in pea have never been reported.

In a study published in *Physiologia Plantarum*, researchers from the Xishuangbanna Tropical Botanical Garden (XTBG) of the Chinese Academy of Sciences and their collaborators investigated the gene function of PsFLP using virus-induced gene silencing (VIGS) technology.

By silencing PsFLP with VIGS technology, the researchers obtained pea strains with abnormal stomatal clusters, suggesting that PsFLP may be involved in the symmetric division of stomata. The number of stomatal units per unit area was significantly higher in the silent strains than in the wild type.

The quantitative real-time PCR (qRT-PCR) data showed that PsFLP could inhibit the expression of CYCA2;3 and CDKA;1 and positively

regulate the expression levels of AAO3, NCED3, and SnRK2.3 in *Arabidopsis thaliana*.

Thus, PsFLP not only regulates the symmetric division of stomata, but also may regulate ABA synthesis [genes](#) and transduction genes, thereby participating in drought stress response pathways.

"Our study provides new insights into improving plant stress tolerance by artificially modulating stomatal development," said Prof. Chen Jianghua of XTBG.

The results suggest that appropriately changing the number of stomata and adjusting the stomatal density can maintain the photosynthetic rate of plants and effectively prevent [water loss](#), enhance the drought resistance of plants, and improve crop yield.

More information: Conghui Ning et al, An R₂R₃ MYB Transcription Factor PsFLP Regulates the Symmetric Division of Guard Mother Cells During Stomatal Development in *Pisum sativum*, *Physiologia Plantarum* (2023). [DOI: 10.1111/ppl.13943](https://doi.org/10.1111/ppl.13943)

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