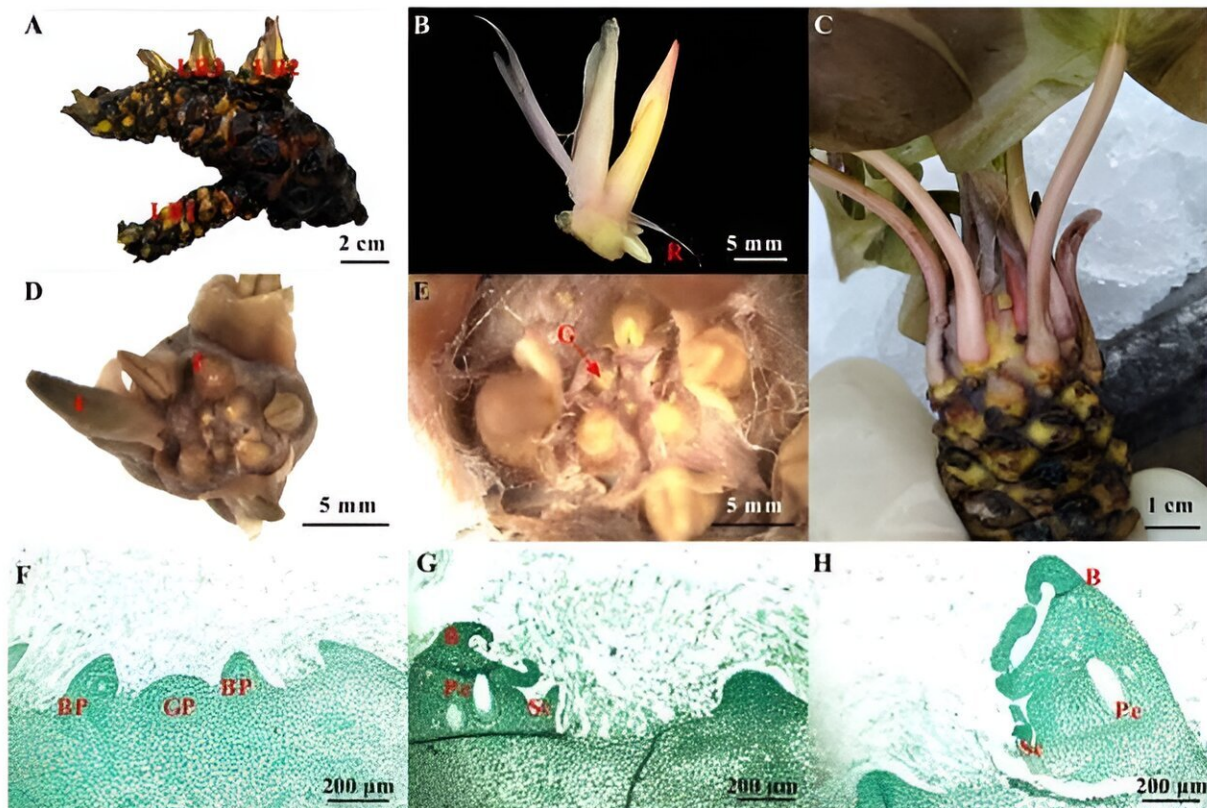


Unlocking the frost-defying secrets of the white water lily

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The morphology and anatomy of white water lily. Credit: *Horticulture Research* (2024). DOI: 10.1093/hr/uhae093

Agricultural productivity faces a chilling threat from cold stress, which can stunt plant growth and reduce yields. The white water lily, enduring

the harsh winters of high-altitude habitats, presents a unique model for studying cold adaptation.

With [climate variability](#) posing a risk to [food security](#), there is an urgent need to unravel the molecular and physiological underpinnings of the lily's resilience. This study rises to the challenge, delving into the strategies that enable the white [water](#) lily to withstand freezing conditions.

The collaborative research team from Nanjing Agricultural University has achieved a significant milestone with their findings, [published](#) in *Horticulture Research* on February 17, 2024. Employing an integrated multi-omic approach, the study provides a comprehensive dissection of the white water lily's cold adaptation strategies, offering a treasure trove of knowledge for agricultural science.

The white water lily's cold resistance is revealed as a tapestry of survival strategies, including a state of ecodormancy that maintains cellular integrity during winter. The lily's arsenal includes resource reallocation, morphological adaptations for osmoregulation, and enhanced antioxidant systems to counteract cold stress.

A deep dive into its transcriptome, phytohormones, and metabolome has uncovered a regulatory network central to its cold acclimation, with nitrogen metabolism and specific amino acid pathways playing pivotal roles.

The identification of metabolites like myo-inositol and L-proline as key players in its cold tolerance, and the intriguing underuse of unsaturated fatty acids, point to novel mechanisms of temperature regulation.

Dr. Qijiang Jin, the study's senior author, highlights the integration of diverse data as a cornerstone of their innovative approach. "Our research

not only illuminates the white water lily's survival tactics but also paves the way for enhancing cold resistance across [plant species](#)."

The study's findings are sown with the potential to cultivate a new era of cold-tolerant crops. By harnessing the adaptive strategies of the white water lily, the development of novel breeding techniques and the creation of stress-resilient plant varieties are on the horizon.

As [climate change](#) casts a shadow over food security, these insights could be the beacon of hope for sustainable agriculture.

More information: Penghe Qiu et al, Multi-omic dissection of the cold resistance traits of white water lily, *Horticulture Research* (2024). [DOI: 10.1093/hr/uhae093](https://doi.org/10.1093/hr/uhae093)

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