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## Tuning drought resistance by using a root-specific expression transcription factor PdNF-YB21 in Arabidopsis thaliana

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**摘要**

Root growth is essential for plant survival under drought stress. Root growth includes diameter growth and longitudinal growth, which play different roles in the regulation of drought tolerance. However, the specific role of root growth in woody and herbaceous plants under drought stress remains largely uncharacterized. In a previous study, we confirmed that a root-specific transcription factor, NUCLEAR FACTOR Y subunit B21 (NF-YB21), positively regulated drought resistance by promoting root diameter growth and longitudinal growth in poplar. In the present study, we further analyzed induction of NF-YB21 in Arabidopsis in response to drought and exogenous abscisic acid (ABA) treatment. In PdNF-YB21 promoter-driven GUS transgenic Arabidopsis plants, PdNF-YB21 was predominantly expressed in the root and was induced by osmotic stress. Overexpression of PdNF-YB21 in Arabidopsis enhanced drought resistance by promoting growth in root length but not in root diameter. Physiological analysis suggested that PdNF-YB21 promoted increase in root length, root hydraulic conductivity, root water-use efficiency (WUE), chlorophyll content, photosynthetic rate, and biomass accumulation under drought stress. The present findings suggest that PdNF-YB21 plays an important role in regulation of root length and drought resistance in a herbaceous plant species. The results provide an explanation for the different mechanisms in herbaceous and woody plants involved in regulation of drought resistance by promoting growth in root length or diameter, and will be useful for breeding cultivars with enhanced drought tolerance.

服务人员 孙小满

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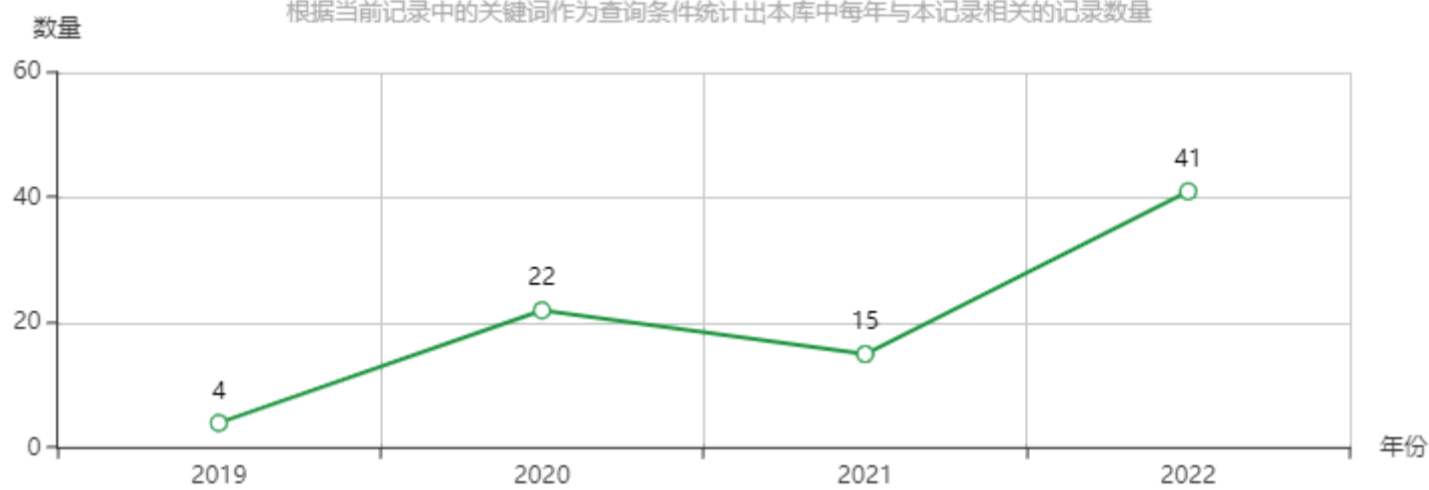
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