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Effects of gibberellin priming on seedling emergence and transcripts involved in mesocotyl elongation in rice under deep direct-seeding conditions

Key words: Mesocotyl, Rice (*Oryza sativa* L.), Direct-seeding, Gibberellins, Deep sowing, Transcriptomic analysis

Research Summary

This study mainly focused on the physiological and transcriptomic changes in rice mesocotyls in response to GA priming treatments under deep-sowing conditions, and the expression patterns of candidate DEGs potentially associated with mesocotyl elongation under different sowing depths:

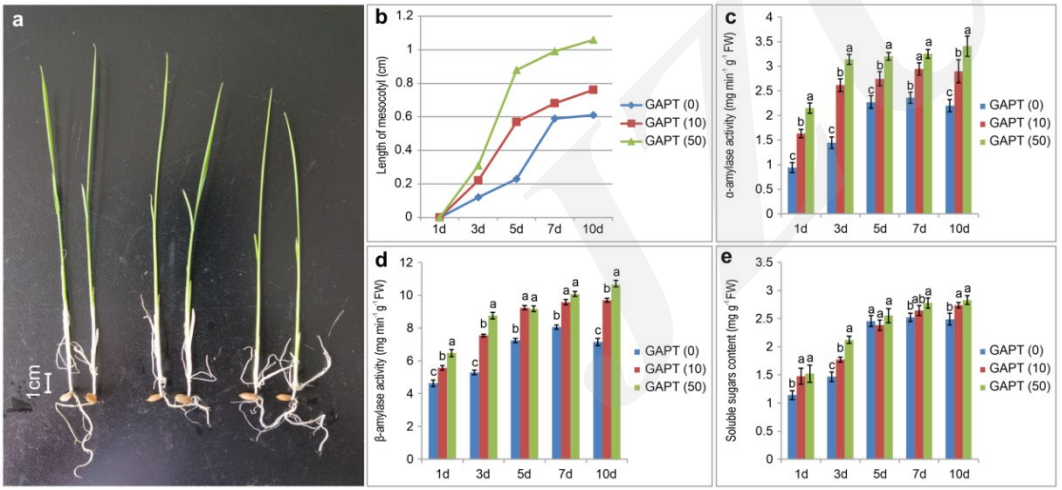
- **Mesocotyl elongation is the main factor responsible for the emergence and establishment of dry direct-seeding rice seedling under deep-sowing conditions.**
- **Amylase activity and soluble sugar content were related to mesocotyl elongation and seedling emergence of dry direct-seeding rice mediated by GA-priming under deep-sowing conditions.**

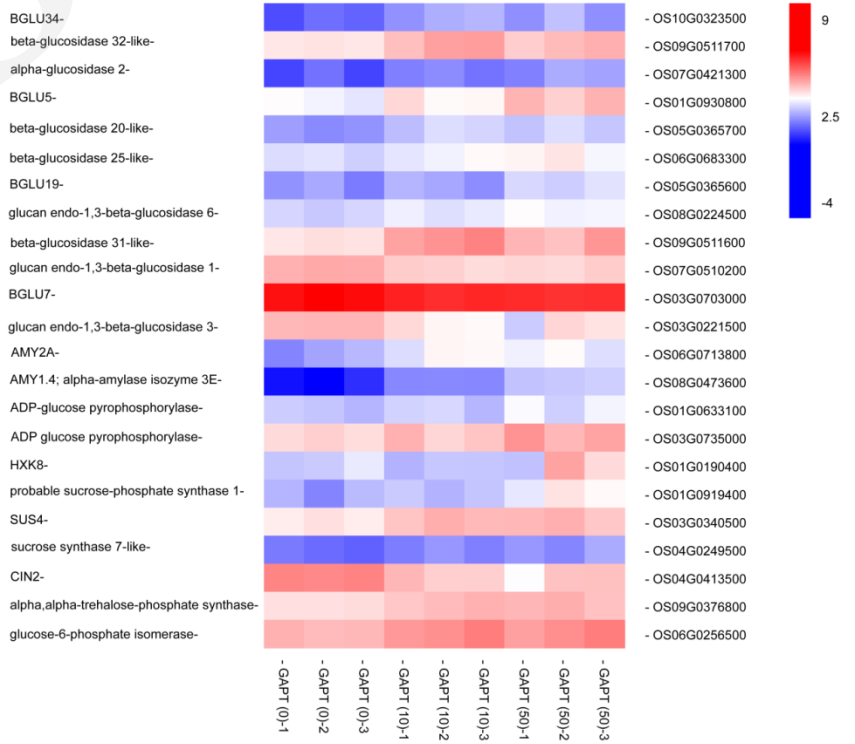
- **Genes related to transcription regulation, plant hormone biosynthesis or signaling, and starch and sucrose metabolism were probably involved in the promotion of rice mesocotyl elongation mediated by GA-priming.**
- ***MYBAS1*, *PIF1*, *BZR1*, *KAO*, *GH3.2*, *AMY2A* and *AMY1.4* as positive regulators, whereas *OsTCP5*, *SLN1*, *SAUR36* and *MIF1* as negative regulators, were highly related to deep-sowing tolerance of dry direct-seeding rice.**

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Innovation points

- GA priming treatments enhanced mesocotyl elongation and seedling emergence of dry direct-seeding rice under deep-sowing conditions by increasing the expression of essential sucrose and starch metabolism regulator genes, which in turn increased the amylase activity and soluble sugar content required to supply the energy essential for subsequent developmental processes.





Innovation points

- **TF genes *MYBAS1*, *PIF1*, *OsTCP5*, *SLN1*, and *MIF1*, plant hormone biosynthesis or signaling genes *BZR1*, *KAO*, *GH3.2*, and *SAUR36*, and starch and sucrose metabolism genes *AMY2A* and *AMY1.4*, were highly related to deep-sowing tolerance of dry direct-seeding rice.**

