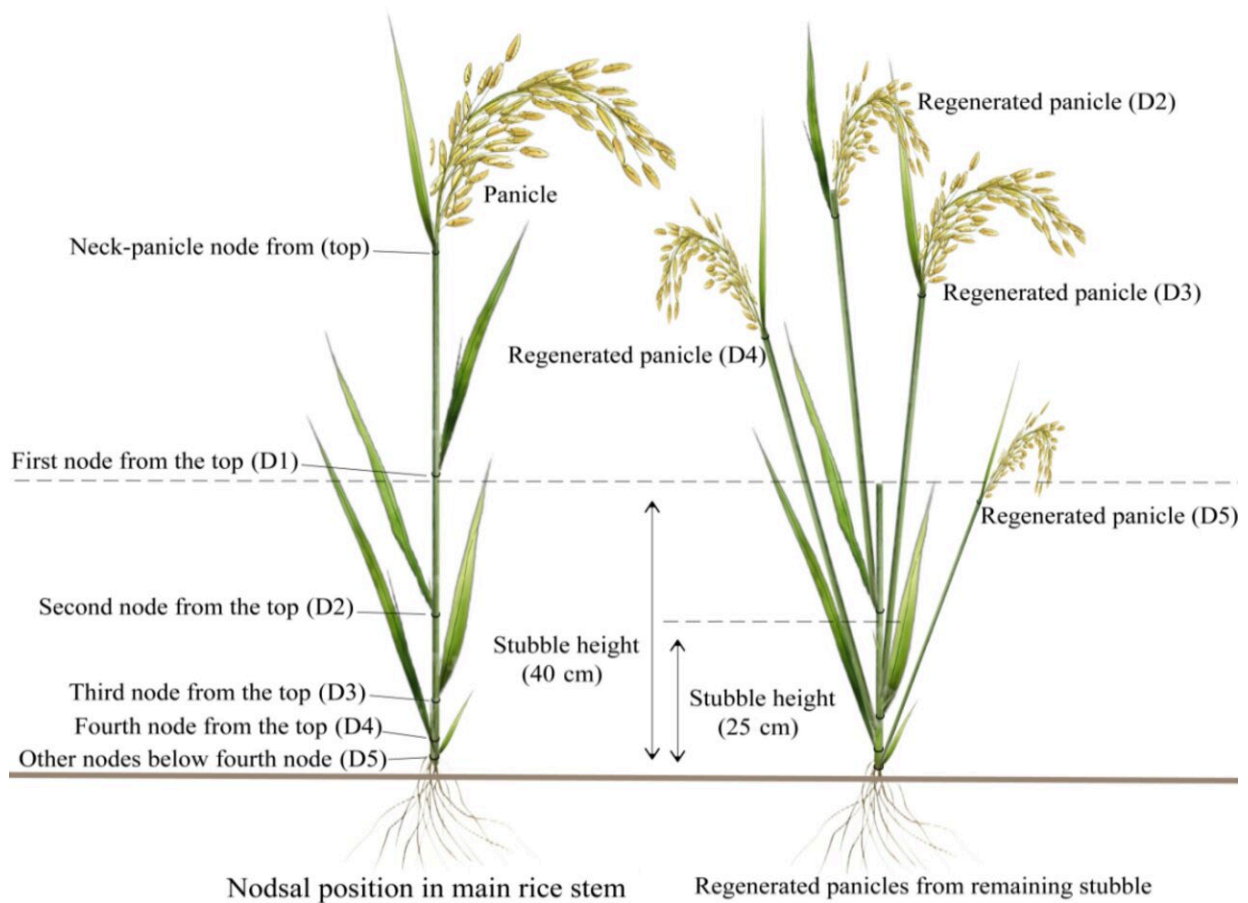


# Enhancing ratoon rice yield and sustainability through innovative breeding and mechanization

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Diagrams of the nodes and regenerated panicles in ratoon rice systems. Credit: *Technology in Agronomy* (2024). DOI: 10.48130/tia-0024-0012

A research team has reviewed the advancements and prospects of ratoon rice cultivation in China, highlighting its significant rise due to improved breeding methods and cultivation technology. They examined key aspects such as cultivar selection, stubble height, and water and fertilizer management, emphasizing the need for precise rhizosphere regulation to enhance rice regeneration capacity and ratoon crop yields.

Future applications aim to improve mechanization, quality, and efficiency in ratoon [rice](#) farming, addressing current challenges like low regeneration rates, inadequate machinery, and water management issues to support sustainable agricultural development.

Rice ratooning, an age-old cultivation technique recorded as early as the Xi Jin Dynasty, involves harvesting the main crop and allowing new plants to sprout from the stubble. Despite its historical use, the method faced issues of low and unstable yields due to unsuitable varieties and cultivation techniques.

With advancements in hybrid rice technology and mechanization, ratoon rice gained popularity, especially in food-deficit regions. However, challenges such as yield decline from mechanical damage during harvesting persist.

A research article [published](#) in *Technology in Agronomy* on 26 June 2024, explores high-yield ratoon rice formation and its physiological mechanisms to enhance yield and sustainability.

This review article explores the complex genetic inheritance of regenerative and high-yield agronomic traits in rice, emphasizing the critical role of suitable cultivar screening for successful ratoon rice development. Researchers review the identification of the RRA3 (Rice Ratooning Ability 3) gene through genome-wide association analysis, demonstrating its significant influence on regeneration and yield traits in

ratoon rice. However, genetic breeding remains challenging due to genotype-environment interactions.

Historically, limited research in China confined ratoon rice screening to existing varieties. Progress in the 1970s–1980s showed a shift towards traits like yield performance and stress resistance. Despite advancements, achieving consistently [high yields](#) across diverse regions remains difficult.

This review underscores the importance of detailed investigations into agronomic traits and developing identification criteria to predict elite lines with strong regeneration capacities. The article further highlights recent breeding achievements and the classification of ratoon rice varieties into early, medium, and late-maturing types, tailored to varying ecological conditions.

Practical challenges, such as yield decline from mechanical damage during harvesting, remain significant. Researchers call for in-depth studies on agronomic traits and optimal stubble height management to enhance regeneration rates and yield, providing a foundation for future improvements in ratoon rice cultivation.

According to the study's senior researcher, Wenxiong Lin, "Enhancing the regeneration rate of rice is crucial for achieving high yields and super high yields of ratoon rice. Furthermore, while there have been significant advancements in researching medium-maturing ratooning rice (medium-duration) with notable application results regarding utilization types of ratoon rice, studies on early-maturing rice (shorter-duration) and late-maturing (longer-duration) ratooning rice varieties remain insufficiently explored, and necessitate further investigation."

China has made significant advancements in ratoon rice research and yield. However, challenges like low regeneration rates and insufficient

studies on early and late-maturing varieties persist.

Future efforts should prioritize improving rice quality, developing resilient varieties, and upgrading essential technologies and infrastructure. Developing specialized machinery for varied terrains and promoting the environmental benefits of ratoon rice can help establish a strong brand identity, ensuring high-quality standards, premium pricing, and overall industry efficiency.

**More information:** Ting Chen et al, Studies and prospectives of mechanically harvested ratooning rice in China, *Technology in Agronomy* (2024). [DOI: 10.48130/tia-0024-0012](https://doi.org/10.48130/tia-0024-0012)

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