

Is this the rice super-gene?



Dew glistens on growing rice saplings. Researchers in China have pinpointed an elusive gene that plays a linchpin role in determining the harvest potential of rice, according to a study released on Sunday by the journal *Nature Genetics*.

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The productivity of a rice plant is determined by several traits -- the number and size of its grains; the height of the plant; and its flowering time, which reflects its response to the prevailing climate.

Years of previous work in rice research have helped scientists close in on the plant's Chromosome 7 for a gene that appears to affect all three characteristics -- and this appears to be the magic sequence.

The gene was identified by a team led by Qifa Zhang of Huangzhong Agricultural University in Wuhan, in an arduous exploit of field research.

The team planted 30,000 rice plants in a bid to track down the gene.

This was winnowed down to 1,082 plants that had a tell-tale low yield, as they had fewer and smaller grains, were short and flowered earlier. The culprit was found to be the lack of a gene called Ghd7.

When Ghd7 was slotted into these lagging plants, the yield traits were transformed. The time taken to flowering doubled, and the plants became almost two-thirds taller.

The investigators then took a snapshot of how Ghd7 functioned in 19 different strains of rice that originate from around Asia, ranging from Japan in the north to the Philippines, Myanmar and India in the south.

They found five different mutations, or versions, of the key gene.

Less active, or inactive, versions of Ghd7 were found in rice grown in cooler regions.

These mutations encouraged the plant to flower earlier, thus enabling it to be cultivated in areas where there is a short growing season and a temperate climate.

In contrast, highly active versions of the gene were present in regions that have long growing seasons, with day-long warmth and exposure to light. These versions delayed flowering and increased yield.

The findings "have fundamental implications" for improving yields of rice, the staple food in Asia and an important dietary component in the rest of the world, says the study.

Rice technologists can help farmers by tweaking the Ghd7 gene and matching specific variants of it to the climate where the plants are to be grown, it says.

Boosting rice harvests is essential, given the rise in Earth's population from around 6.5 billion today to more than nine billion by mid-century.

The price of rice and other cereals has surged in the past year in response to drought in the United States and Australia, and to incentives to grow biofuels rather than food crops.

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