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Taiwan researchers create water-efficient rice varieties to cut greenhouse gas emissions

02 March 2026 | News

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The Taoyuan District Agricultural Research and Extension Station said it has developed three new rice cultivars that need less water and can help reduce greenhouse gas emissions thanks to their tolerance of pests, diseases and extreme weather.

Climate change over the years has led to extreme weather events such as droughts, high temperatures and uneven rainfall patterns, the station said on Tuesday last week.

High temperatures could cause more chalky rice grains in rice production, while water shortages often cause insufficient irrigation to fields and disrupted tillage in spring, it said.

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Volatile weather in the past few years has also led to increased cases of rice blast â?? a disease that can infect almost all parts of rice plants above the ground and is often caused by excessive moisture, the station said.

To stabilize rice production and ensure the quality, the station has cultivated new rice varieties that are more tolerant of diseases and droughts, with three important cultivars developed over the past few years, including â??Taoyuan No. 5â?• in 2019, â??Taoyuan No. 6â?• in 2021, and â??Taoyuan No. 7â?• in 2023.

Taoyuan No. 5 has high heat resistance and a chalky grain rate of less than 10 percent, the station said.

It can be harvested up to 10 days earlier than other late-maturing varieties, and its seedlings can be planted as late as April without its production and quality being affected, it said.

Taoyuan No. 5 helps ease the competition for irrigation water in February and March, the station said, adding that it helped save about 3,000m3 of irrigation water per hectare in spring.

Taoyuan No. 6 has good resistance to pests and diseases, and was developed to promote eco-friendly farming, it said.

It does not require any pesticides during its growing period and requires only 80 percent of the nitrogen fertilizer application rates recommended for rice grown in northern Taiwan, helping to reduce about 1 tonne of carbon dioxide per hectare, the station said.

Taoyuan No. 7 was developed based on â??Taoyuan No. 3â?• â?? a variety that won many local rice competitions for its excellent quality, but became prone to rice blast diseases due to climate change, it said.

The station said that by inserting rice blast-resistant gene fragments into Taoyuan No. 3, it successfully developed Taoyuan No. 7, which is highly resistant to rice blast even without fungicides being applied against the disease.

Taoyuan No. 7 almost doubled the production of Taoyuan No. 3 on average and saved NT$5,000 to NT$15,000 in labor costs and pesticide use, it said.

Its reduced fungicide use not only reduced pollution, but also helped prevent development of pathogensâ?? antimicrobial resistance, it said.

As of last year, a total of more than 50 hectares of farmland in water-stressed areas were planted with Taoyuan No. 5, while more than 100 hectares of farmland in Hsinchu Countyâ??s Hukou Township (æ¹?å£) were planted with Taoyuan No. 6, the station said.

Taoyuan No. 7 has also been cultivated in many rice fields across northern Taiwan, with a total planting area of up to 100 hectares, it said.