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World's first 'Golden Rice' ready for trial

Production of the vitamin-A enriched rice to start soon

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Bangladeshi rice scientists are all set to conduct field tests of the world's first vitamin A-enriched rice, popularly known as Golden Rice, before taking the variety to production phase.

The success in vitamin A-rich rice comes in quick succession of the world's first three zinc-rich rice varieties that Bangladesh released over the last couple of years.

Upon completing a successful trial of the genetically engineered Golden Rice in its transgenic screen house, Bangladesh Rice Research Institute (BRRI) is now taking the variety -- *GR-2 E BRRI dhan29* -- to confined field trials in the coming Boro season this November.

BRRI officials told The Daily Star that open-field and

SEE PAGE 2 COL 1

Golden rice next to regular rice. The golden one has beta carotene, a source for vitamin-A. PHOTO: COURTESY OF IRRI

BRRI Scientists inspecting Golden Rice at a transgenic screen house.

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FROM PAGE 1

multi-location trials will be conducted afterwards, setting into motion the last stage for its release to the farmers.

Agriculture Minister Matia Chowdhury told The Daily Star that BRRI scientists will go for confined field trials of Golden Rice soon. She said the National Technical Committee on Crop Biotechnology, upon a request from BRRI, gave consent to the field trials in its September 20 meeting.

BRRI Dhan-29, one of Bangladesh's most productive rice varieties, IR-64, a variety developed by the International Rice Research Institute (IRRI), and RC-28, a Filipino variety, have been genetically engineered to have greater expressions of a corn gene responsible for producing beta carotene (also known as provitamin A).

Rice does not contain any beta carotene. Dependence on rice as the predominant food source, therefore, necessarily leads to Vitamin A deficiency (VAD), most severely affecting small children and pregnant women.

Consumption of only 150 gram of Golden Rice a day is expected to supply half of the recommended daily intake (RDA) of vitamin A for an adult. People in Bangladesh depend on rice for 70 percent of their daily calorie intakes.

According to World Health Organisation (WHO) global database on vitamin A deficiency, one in every five pre-school children in Bangladesh is vitamin A-deficient. Among pregnant women, 23.7 percent suffer the deficiency.

IRRI says VAD is the main cause of preventable blindness in children and globally, some 6.7 million children die every year and another 3,50,000 go blind because they are vitamin A-deficient.

BRRI Director General Dr Jiban K Biswas told this correspondent that they would go for confined field trials of *GR-2 E BRRI dhan29* at the adjoining field of Bangladesh Agricultural Research Institute (BARI) in Gazipur.

BARI Director General Dr Md Rafiqul Islam Mondal said BRRI would use BARI's facilities to keep the under-trial Golden Rice isolated from other rice varieties grown in BRRI fields.

Partha S Biswas, a principal scientific officer of BRRI Plant Breeding Division who is also overseeing the Golden Rice programme, told The Daily Star that they have just reaped some grains of Golden Rice grown in the transgenic screen house and expecting over 12 µg/g (micrograms/gram) of beta carotene in them.

The genetic engineering technology to derive vitamin A in rice was first applied by Prof Ingo Potrykus of Swiss Federal Institute of Technology, and Prof Peter Beyer of the University of Freiburg, Germany back in 1999. Subsequently, the Golden Rice caught global attention when Time Magazine, Science did cover stories on it.

First generation Golden Rice (known as *GR-1*) was developed through infusing a gene from daffodil but later the second generation variety -- known as *GR-2* -- has been developed by taking a gene from corn as it gave much better output of provitamin A.

Some six lines (or types) of *GR-2* (scientifically called 'events') were developed and IRRI chose to work on one called *GR-2 R*, which it developed and subsequently released as a Golden Rice variety.

BRRI also did carry out screen house and field trials on this type (*GR-2 R*) for three years but eventually stopped upon an IRRI advice that Event *GR-2 E* will work better.

Prof Peter Beyer told The Daily Star that there were some problems with the Event *GR-2 R* and hoped the new Event should work well.

Dr Alamgir Hossain, a BRRI Chief Scientific Officer who worked with former IRRI biotechnologist Swapan K Datta on Golden Rice programme, hoped release of the transgenic rice will revolutionise fighting vitamin A-deficiency in the rice-eating Asian countries where the poor have confined access to vitamin A sources.

Born in Sirajganj of Bangladesh, Swapan K Datta was the first to infuse beta carotene-producing gene into BRRI Dhan-29 over a decade back.

In April 2011, Seattle-based Bill and Melinda Gates Foundation sanctioned a grant of over $10 million to IRRI to fund, develop and evaluate Golden Rice varieties for Bangladesh and the Philippines.

Officials concerned at IRRI and Gates Foundation confirmed that as the Golden Rice inventors and subsequent technology developer Syngenta allowed a royalty-free access to the patents, the new rice when released for commercial farming in Bangladesh will be of the same price as other rice varieties, and farmers will be able to share and replant the seeds as they wish.