

DBT-NIPGR study finds a new way to increase rice grain weight

New Delhi, Feb 10: Rice is consumed by millions of people daily all across the world. Due to increasing limitations of land availability, it is important to devise ways to increase rice grain size, which in turn will enhance yield. Rice grain size is one of the most promising aspects which can be used to increase yield.



In 2007, a gene called OsGW2 (Os stands for *Oryza sativa*, the scientific name for rice and GW2 is the name of the gene) was found to control grain width and weight in japonica rice. It was shown that japonica rice varieties with a mutated version of this gene, resulting in loss of its function, had increased grain width and weight. Interestingly, this mutation is absent in indica rice. However, OsGW2 was being expressed and was very much present in indica rice, even in different rice varieties.

A team of researchers at DBT- National Institute of Plant Genome Research (DBT-NIPGR), New Delhi began to look for answers to the question - what is OsGW2 doing in indica rice? To understand the role of OsGW2 in indica rice, they generated rice plants which had reduced function (knock down) of this gene. RNAi technology was used for this purpose. The first generation of grains showed significant increase in not only grain width and weight, but also length. When studying the function of a gene by this method, it is important to have homozygous plants. These were obtained in the third generation. The rice grain of this

generation also had bigger size. Grain width was increased by 4-19%, length by 4-6% and weight by 13-43%, approximately. Thus, the study showed that decreased function of OsGW2 increases grain size in indica rice.

Further, it showed that OsGW2 affects grain size by affecting both cell division and cell expansion. In the endosperm part of grain, OsGW2 affects the structure of starch granules. The gene affects grain size by controlling many other genes. Of these, 55 genes have previously been shown to affect rice grain development, and many others have putative roles in the process. Thus, our study establishes that OsGW2 can be used for improvement of rice crop by increasing grain size, and hence, yield.

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