

Improved Short-stature Rice Created by Radiation-induced Mutation

A new mutant variety of rice, named Calrose 76, has recently been released to farmers in California. The mutant was the result of irradiating seeds of the rice variety Calrose with gamma rays from a cobalt-60 source. The variety is the result of co-operative research between Dr. J.N. Rutger, U.S. Department of Agriculture research geneticist at Davis, California, Prof. M.L. Peterson, University of California, and Dr. Chao-Hwa Hu, an IAEA fellow.

The short stature mutant variety, Calrose 76, and the widely-grown tall variety, CS-M3.



The mutant that was ultimately released as a new variety was selected in the second generation following irradiation of the Calrose seeds. Selections were also made in a non-irradiated control population, but none proved to be desirable.

After its selection in 1971, the mutant was subsequently tested for several years for agronomic performance, grain yield and quality characteristics. It was found to have the same yielding capacity as the widely grown check variety, CS-M3. It also did not differ in seedling vigour or in heading date, but its mature stem is about 35 cm shorter and less susceptible to lodging. Therefore, it yields more grain under conditions of high soil fertility.

The short stature is inherited by a single recessive gene, allelic to the gene for short stature widely used in rice cultivars of the International Rice Research Institute in the Philippines (IRRI). The radiation-induced mutant has the advantage that the gene for short stature now exists in a genotype which is adapted to Californian conditions and which possesses the required cold tolerance and grain qualities. Attempts to transfer short stature from the tropical variety IR8 (produced by IRRI) have been complicated by sterility, cold susceptibility, and unacceptable grain quality. The radiation-induced mutant is used now also in crosses to confer the desired short stature to other rice varieties.

The mutated gene for short stature confers lodging resistance to short progenies from crosses with tall varieties. Tall progenies are completely lodged ("holes" in photograph) while short lines remain erect.

