

FAO/IAEA International Symposium on Plant Mutation Breeding and Biotechnology



Contribution ID: 163

Type: Oral

APPLICATION OF MUTATION TECHNIQUES AND GENOTYPE x ENVIRONMENT INTERACTION FOR GRAIN YIELD AND YIELD COMPONENTS OF ION BEAM INDUCED MUTANT RICE LINES TESTED IN MULTIPLE LOCATIONS IN MALAYSIA

Genotypes evaluation for stability and high yielding in rice is an important factor for sustainable rice production and food security. These evaluations are essential, especially when the objective of the breeding program is to select rice with high yield adaptability and stability. Based on this background, this work was carried out to evaluate and select high yielding rice genotype induced by ion beam irradiation. Rice variety of MR219 seeds were subjected to 0, 10, 20, 40, 60, 80, 100, 120, 160, and 200 Gy to determine the optimum doses to produce high mutant frequency and spectrum. After several series of selection and fixation, 15 potential lines with the required adaptive traits were recovered at M6 generation during the 2009 –2 012 seasons (M0–M6). The selected mutant lines were then tested in five locations in two planting seasons to select high yielding and stable genotype in a randomized complete block design with three replications across the environments. The pooled analysis of variance revealed highly significant differences among genotypes, locations, seasons, and genotypes by environment (G×E interaction) for all the traits. Based on univariate and multivariate stability parameters, rice genotypes were classified into three main categories. First group were genotypes having high stability along with high yield per hectare. These genotypes include ML4 and ML6 and are widely adapted to diverse environmental conditions. The second group is genotype that exhibited high yield per hectare but low stability and, this genotype (ML9) is suitable for specific environments. The last group is genotypes with low yield per hectare and high stability which includes genotypes MR220, Binadhan4, and Binadhan7. The last genotypes group is more suitable for breeding specific traits or perhaps has yield component compensation. Rice mutant ML4 and ML6 were recommended for commercial cultivation in Malaysia.

Country or International Organization

Malaysia

Author: Dr YUSOP, Mohd Rafii (Universiti Putra Malaysia)

Co-authors: Dr HARUN, Abd Rahim (Malaysian Nuclear Agency); Dr RAMLI, Asfaliza (Malaysian Agricultural Research and Development Institute); Dr HUSSIN, Ghazali (Malaysian Agricultural Research and Development Institute); Dr ISMAIL, Mohd Razi (Universiti Putra Malaysia); Prof. ABDULLAH, Norhani (Universiti Putra Malaysia); Dr OLADOSU, Yusuff (Universiti Putra Malaysia)

Presenter: Dr YUSOP, Mohd Rafii (Universiti Putra Malaysia)

Track Classification: Mutation breeding for adaptation to climate change in seed propagated crops