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EFFECT OF GAMMA RAYS ON SEED GERMINATION AND PLANT GROWTH PARAMETERS OF THREE RICE VARIETIES CULTIVATED IN SRI LANKA

Development of rice varieties using induce mutation has seldom been applied in Sri Lanka. This study was carried out to determine the effect of gamma irradiation doses on seed germination and different plant growth parameters of three rice varieties. Two hundred grams of seeds of three rice varieties cultivated in Sri Lanka (Bg 94-1, Bg 1165-6, Suwandal) were subjected to gamma rays from 60Co source using 3 doses: 200, 300 and 400Gy. Irradiation was undertaken at the IAEA laboratories Seibersdorf, Austria in 2015. The experiment was designed as Split Plot with three replications and conducted at the plant house of Rice Research & Development Institute, Batalagoda. The effects of radiation doses on seed germination and different plant growth parameters were evaluated (radiosensitivity testing). With the increase in gamma doses seed germination, seedling emergence, seedling height, root length and plant survival in the field decreased. Highly significant differences were observed among the varieties for seedling height, root length and percentage of field survival. Gamma irradiation showed significant negative correlation with seed germination (-0.524), seedling emergence (-0.543), seedling height (-0.545), root length (-0.498) and field survival (-0.424). Percentage of field survival was the least affected character while percentage reduction was 8.56. The most efficient and optimum dose to induce rice mutation of the varieties under investigation is within the range of 200Gy - 300Gy. More pronounced adverse effect was observed for all the growth characters at the highest dose in all three varieties. Increasing doses above 400Gy caused severe morphological damages to the rice plants and increasing gamma irradiation doses has negative correlation with the germination and other plant growth parameters. A comprehensive study should be carried out to determine the optimum doses for different rice varieties which could be useful in rice varietal improvement programs in Sri Lanka.

Country or International Organization

Sri Lanka

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