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MUTATION INDUCTION FOR SORGHUM AND RICE USING GAMMA AND X-RAY RADIATIONS

It is well established that different mutagens have different effects on plants, resulting in different types and levels of damage, and consequently produce a range of induced mutations at different frequencies. We present a comparison between the effect of gamma and X-ray irradiations on one variety of sorghum and upland rice. Pure seeds of both sorghum and upland rice were exposed to gamma and X-rays radiations at six different doses: 0 (control), 75, 150, 300, 450 and 600 Gy. Three replicates of 20 seeds per dose were planted in standard soil mixture in plastic trays and maintained in a glass-house at Plant Breeding and Genetics Laboratory (PBGL). Different parameters such as germination %, survival % and plant height (cm) were scored on M1 plants after two weeks and one month of planting. The germination and survival percentage, after two weeks, for both sorghum and rice were high following the gamma radiation compared to X-ray radiation. The sorghum showed higher germination and survival percentage than rice at different doses of both gamma- and X-ray radiation. The reduction of 50% in growth rate (GR50) for sorghum and rice using gamma radiation were 300 and 250 Gy, while the GR50 for both crops using X-ray radiation were 250 and 150Gy, respectively. The rice germinated from seeds exposed to higher doses (600Gy), but did not survive more than two weeks. The results of the experiments indicated that higher dosage of gamma- and X-ray radiation reduced germination percentage, number of survival plants and plant height and rice was more sensitive to irradiation than sorghum. Three doses, GR50+20%, are proposed for bulk treatments of sorghum (240, 300 & 360 Gy) and rice (200, 250 & 300 Gy) using gamma-ray compared to 200, 250 & 300 for sorghum and 120, 150 & 180 Gy for rice using X-ray.

Country or International Organization

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Track Classification: Enhancing agricultural biodiversity through new mutation induction techniques