

## EFFECT OF GAMMA IRRADIATION ON GROWTH AND YIELD OF RED ONION (*Allium cepa* L.)

N.N. Ahamed<sup>1</sup>, L.M. Rifnas<sup>1\*</sup>, N.P. Vidanapathirana<sup>1</sup>, A.C. Rifas<sup>3</sup>,  
S. Sutharsan<sup>2</sup>, A.J.M.C.M. Siriwardana<sup>1</sup>

### ABSTRACT

Plant diversification and the specification method for changing numerous morphological traits of agricultural crops both heavily rely on mutation induction. The experiment's objective was to evaluate gamma irradiation's effects on onion growth and yield. In the lab of the Horticultural Crop Research and Developmental Institute in Gannoruwa, Sri Lanka, fresh bulbs of *Allium cepa* were treated using a "Gamma chamber 1200 Cobalt-60" research irradiator. The experiment set up in two steps. In the first step, onion bulbs were subjected to a series of gamma irradiation doses 0 Gy, 30 Gy, 60 Gy, 90 Gy, 120 Gy and 150 Gy respectively. The second step was carried out based on the results of first experiment, adjusting the exposed doses to 0 Gy, 20 Gy, 25 Gy, 30 Gy, 35 Gy and 40 Gy. Treated bulbs were established in open field in RCBD with four replications and each replication contained twenty-five bulbs. Sprouting and survival percentage, plant height, number of leaves, leaf weight, number of bulb/plant, average bulb weight and total yield were measured and data were analysed using SAS software. The treatment means were compared using Duncan's test at 0.05 level. Our results revealed that sprouting percentage of red onion treated with different level of gamma irradiation is significant on experiment 1 and not significant ( $p \geq 0.05$ ) at experiment 2. Plant survivability was significantly high in both experiments. Further, the measured parameters showed significant differences between the treatments and the values showed progressive reduction with the increase in gamma dose. The gamma irradiation dose 20 Gy was not significant on number of leaves and a number of bulbs per plants. Further, lower doses showed highest values in total yield compared to control. Hence, it could be concluded that the exposing the red onion bulbs to 20 Gy of gamma irradiation dose has the potential to use in future breeding programmes to get an optimum production.

**Keywords:** *Allium cepa*, Gamma Radiation, Growth, Mutation, Yield

---

<sup>1</sup> Department of Agro-Technology, University of Colombo, Institute for Agro-Technology and Rural Sciences, Hambantota, Sri Lanka

<sup>2</sup> Department of Crop Science, Faculty of Agriculture, Eastern University, Sri Lanka

<sup>3</sup> School of Agriculture, Palamunai, Sri Lanka

\*Corresponding Author – rifnas@uciars.cmb.ac.lk