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# FIELD EMERGENCE AND SEEDLING PERFORMANCE OF PHILIPPINE INBRED RICE VARIETY NSIC RC 218 (MABANGO 3) EXPOSED TO GAMMA RADIATION USING COBALT 60

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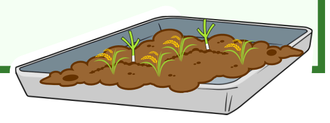
## INTRODUCTION & AIM

Mutation breeding offers a rapid and effective approach to create novel genetic variation in rice (*Oryza sativa* L.) and identify mutants with desirable traits. This study evaluated the radiosensitivity of the long-grain, soft, and aromatic inbred rice variety NSIC Rc 218 (Mabango 3). It specifically aimed to determine the seedling performance of NSIC Rc 218 in terms shoot and root lengths, germination percentage and median lethal dose (LD50).

## METHOD

Seeds were exposed to gamma radiation using a Ob-Servo Sanguis Cobalt-60 source, with doses ranging from 100 to 1000 Gy. For all treatments, 1,500 seeds were irradiated and grown under controlled conditions.

Seeds were sown at paddy soils in experimental trays and optimum nutrient and water management were applied.



Seedling vigor and shoot–root development were assessed at 9, 14, and 21 days after sowing.

## RESULTS & DISCUSSION

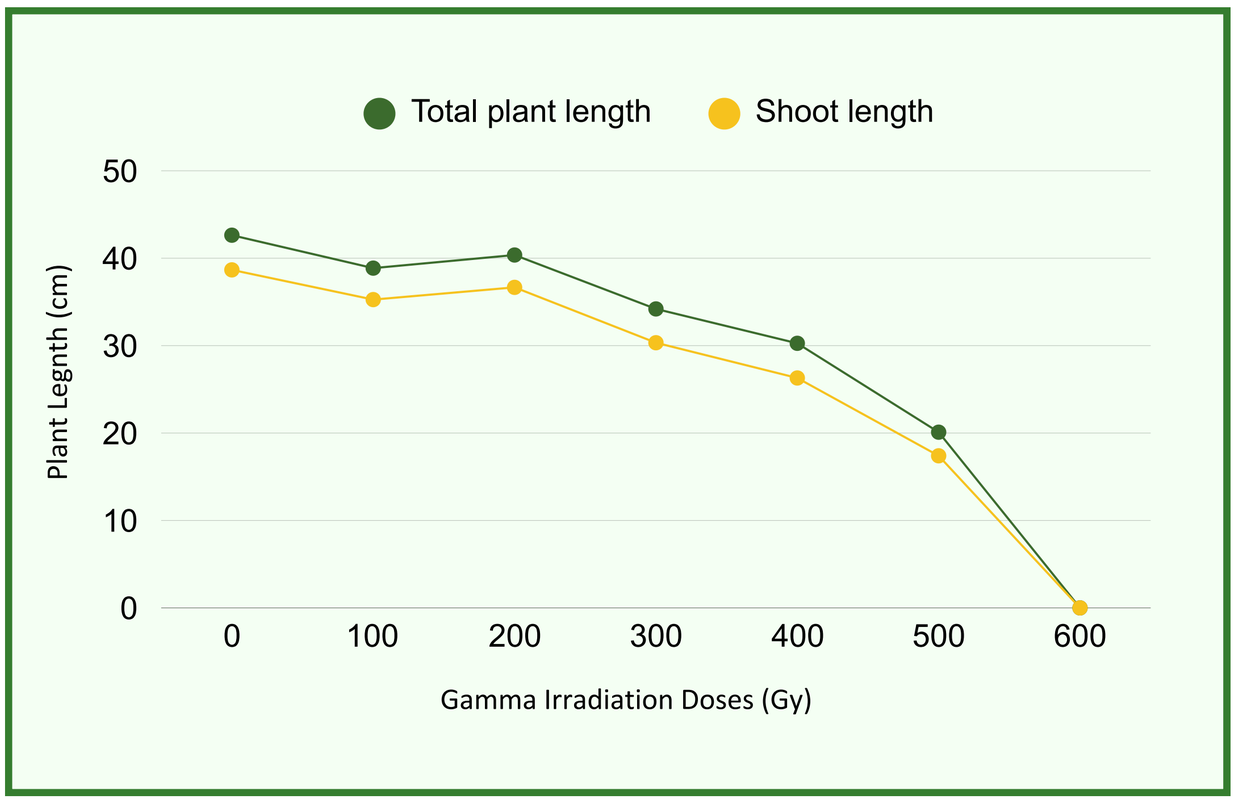



Figure 1. Shoot and total plant length of NSIC Rc 218 under different gamma doses after 21 days.

Results showed a clear dose-dependent response in early growth traits. Low-to-moderate doses (100–300 Gy) produced variable physiological effects, including slight stimulation of shoot growth at 100 and 200 Gy. In contrast, higher doses (≥500 Gy) caused sharp declines in germination and survival. No seedlings survived beyond 600 Gy, indicating the lethal threshold.

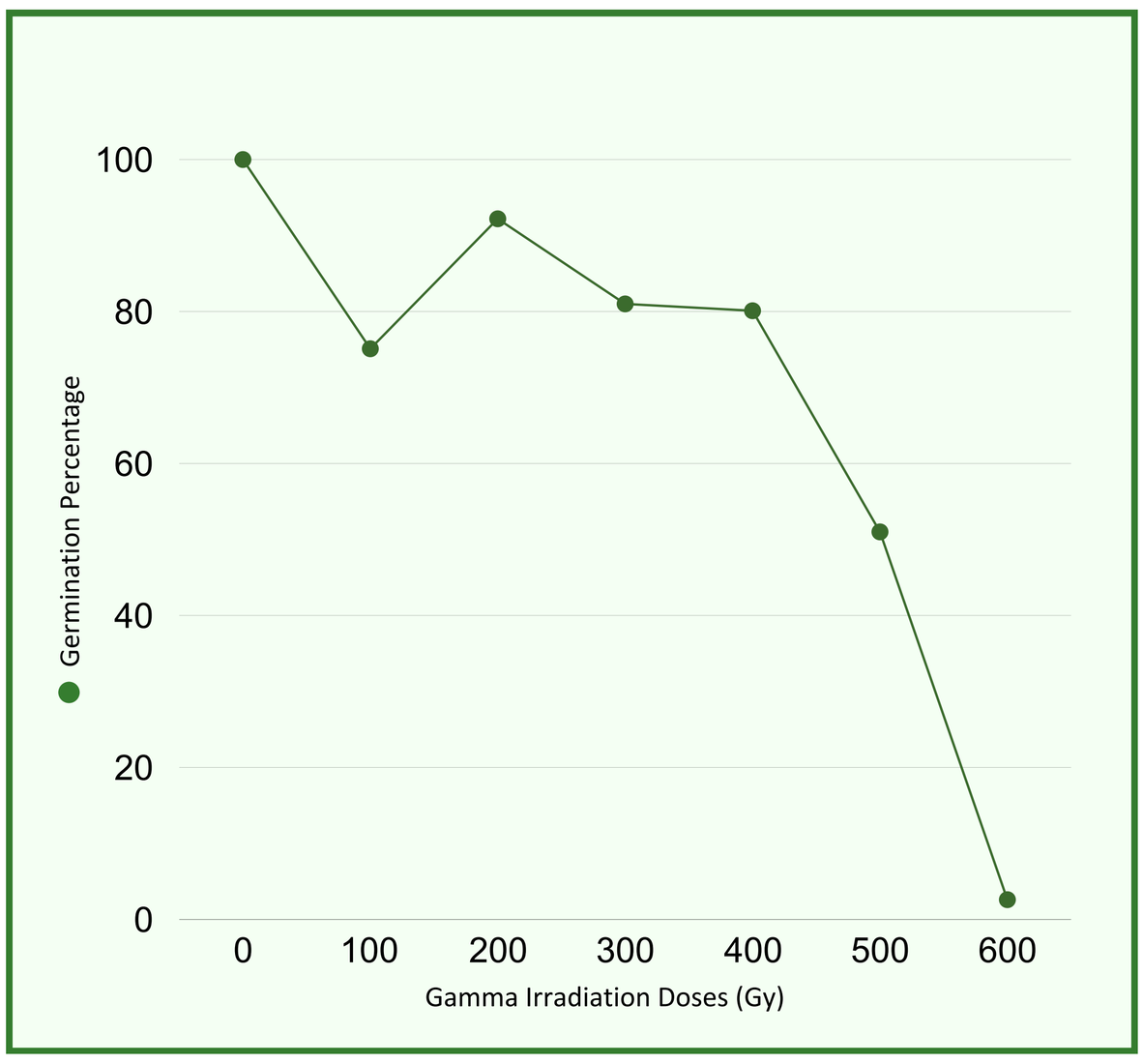



Figure 2. Seed germination of NSIC Rc 218 exposed to different gamma irradiation doses

Overall survival rates ranged from 59% to 77%, with **LD50** estimated at **450.92 Gy**. Optimal **stimulation of early growth traits occurred between 200 and 300 Gy**, suggesting this range as a practical mutagenic window for generating genetic variation while maintaining seedling viability.

## CONCLUSION

These findings provide essential baseline radiosensitivity data for NSIC Rc 218 which strengthen the foundation of mutation breeding in rice. This irradiation protocols are critical for developing mutants with improved yield, nutritional quality, and stress resilience. By refining dose–response knowledge, mutation breeding continues to play a key role in addressing global food security challenges.