



## Suitable doses screening for mutagenesis in *Phytoseiulus persimilis* induced by $^{60}\text{Co-}\gamma^*$

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*Phytoseiulus persimilis* Athias-Henriot (Acari: Phytoseiidae) is a specialist predator of *Tetranychus* sp.; however, the lack of resistance to high temperatures and drought may result in the lower biological control efficiency of *P. persimilis* in the adverse climatic conditions. In breeding programs,  $^{60}\text{Co-}\gamma$  irradiation is commonly used to quickly screen suitable mutants, optimize biological characteristics, and improve resistance. It is expected that  $^{60}\text{Co-}\gamma$  irradiation could be useful in resistance screening in *P. persimilis*. The purpose of this study is to determine the suitable doses of  $^{60}\text{Co-}\gamma$  with high levels of mutagenesis in *P. persimilis*. *P. persimilis* individuals were irradiated using  $^{60}\text{Co-}\gamma$  at 0, 20, 40, 60, 70, 75, 80, 85, 90, 95, 100, 200, 300, and 400 Gy, with a dose rate of 0.5 Gy/min. The mortality of irradiated individuals was used to estimate the  $\text{LD}_{50}$ . The fecundity of survived individuals and egg hatch rate were applied to estimate the mutagenesis frequency. The mortality of *P. persimilis* increased with increasing irradiation dose with a rapid increase between 70 to 95 Gy. When irradiation dose exceeded 100 Gy, almost all *P. persimilis* died. The  $\text{LD}_{50}$  of irradiation dose was ca. 80 Gy. When irradiation doses increased from 70 to 95 Gy, sterility rate increased from 5% to 20%, fecundity decreased from 97% to 80%, and egg hatch rate decreased from 98% to 60%. We suggest that the appropriate irradiation doses of  $^{60}\text{Co-}\gamma$  inducing higher *P. persimilis* mutagenesis were between 70 Gy and 95 Gy. Results of this study allow future large-scale screening for resistant strains of *P. persimilis*.

**Keywords:** Phytoseiidae, irradiation, breeding, resistance,  $\text{LD}_{50}$