Title Effects of gamma irradiation on the development and reproduction of *Plodia interpunctella* (Hübner) (Lepidoptera: Pyralidae)

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Abstract

The inhibitory effects of gamma irradiation were demonstrated on the development and reproduction including egg hatch, pupation, adult eclosion and oviposition of *Plodia interpunctella*. Failure of all these events increased with increasing doses from 0.1 to 1.0 kGy. However, the rates of developmental inhibition were different among three behavioral events. Egg hatch was almost completely inhibited by 0.5 kGy and higher doses. Pupation was completely inhibited by 0.25 kGy, but adult eclosion was not completely inhibited even by 1.0 kGy. In addition, different age groups within the egg and final larval stages differed in their susceptibility to 0.1 and 0.25 kGy doses; the rates of both hatching and pupation were lower when young individuals were irradiated. Fecundity and hatchability of eggs were greatly reduced when pupae were irradiated at 0.1 kGy and completely inhibited at 0.25 kGy and higher doses. This suggests that although some adults eclosed from pupae irradiated at 0.25 kGy and higher doses, they were not able to lay eggs. Our results suggest that irradiation at 0.5 kGy is appropriate for the inhibition of development and reproduction of *P. interpunctella*.