

CHAPTER VI

SUMMARY

The present work is a biological and histological study on the effects of 3 substerilizing doses of gamma radiation (10, 15 and 20 krad) on the cotton leaf worm, Spodoptera littoralis (Boisd), to induce inherited sterility. Special attention was given to the effects on reproductive biology and inherited sterility throughout three generations and the histological changes in the gonads of the adults.

The obtained results can be summarized in the following:

- Effect of Gamma Irradiation on Reproduction of P₁, F₁, F₂ and F₃:

- 1- The greatest reduction in the number of eggs laid per female occurred in F₁ generation among the three tested doses applied to P₁ males. Also, the reduction in fecundity increased as the dose applied to P₁ males was increased.
- 2- There was an adverse relationship between the dose applied to P₁ males and the percent egg hatch among the parental adults and their following three generations. Also, the greatest reduction in egg hatch occurred among F₁ and F₂ generations. However, F₃ generation demonstrated a high degree of recovery from the reduction treatment.
- 3- The average number of spermatophores per mated female was not affected at any dose level tested among P₁, F₁, F₂ and F₃ generations.

- 4- The inherited deleterious effects had their greatest expression in F_1 and F_2 generation, the higher the dose applied to P_1 males, the lower was the % larvae survived to adult stage.
- 5- The increase in developmental time for both males and females among the three successive generations was positively correlated with the dose given to P_1 males.
- 6- The average pupal weight for both males and females of F_1 and F_2 generations was significantly reduced at any dose level tested compared with the untreated control. This reduction was directly related to the dose given to P_1 male.
- 7- The sex ratio among the progeny of irradiated males seemed about normal. It was nearly 1 : 1 which was normally obtained in the control treatment.

- Effect of Substerilizing Doses on the Mating Competitiveness of Parent Males and their F_1 , F_2 and F_3 Progeny:

- 1- Males irradiated by low doses of 10, 15 and 20 krad were fully competitive.
- 2- The F_1 , F_2 and F_3 males were also fully competitive against untreated males in mating with normal females.

- Effect of Gamma Radiation on the Internal Anatomy of the Reproductive System:

- 1- The volumes of the testes of the first, second and third generations were significantly affected by gamma radiation doses applied to parental males.

- 2- The lengths of the ovarioles were greatly reduced at the first and second generation especially at 15 and 20 krad. The third generation was not greatly affected.
- 3- Damage in the testis and ovaries was the highest among F_1 , and was minimized in the two other generations.