CHAPTER I

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The sterile insect release method of suppressing or controlling insect populations was among the outstanding recent contributions to economic entomology. The success of this method of insect pest control depends, in fact, on the production of sterile males which should be active enough to compete effectively with normal males in finding their mates. Lepidopterous species which have been evaluated for the effects of irradiation require relatively large doses of gamma radiation to induce sterility. Mating competitiveness and longevity are adversely affected by sterilizing doses, but competitive moths will result when substerilizing doses are used. Moreover, individuals treated at substerilizing doses produce offspring which are nearly or completely sterile. This phenomenon is known as inherited sterility. This technique (inherited sterility) offers significant advantages over classical sterile release methods. Reduction of the radiation dosage minimizes somatic damage, which potentially increases the competitiveness of released individuals. F1 progeny resulting from matings of released males with fertile females are sterile and exert additional suppressive effects on reproduction. Thus, reproduction is suppressed in at least two generations with only one release.

The present investigation was planned with the aim of applying and evaluating the inherited sterility to cotton leafworm, S. littoralis as a new approach to its control.
The points studied in this work include:

1) The effect of substerilizing doses of gamma irradiation, when administered to the male adult stage on fecundity, fertility, mating frequency and sperm transfer.

2) Mating competitiveness of irradiated parent males and their $F_1$, $F_2$ and $F_3$ progeny.

3) Effect of gamma irradiation on the internal anatomy of the reproductive system.