HISTOLOGICAL AND BIOLOGICAL STUDIES ON THE EFFECTS OF GAMMA RADIATION ON THE ANGOUMOIS GRAIN MOTH, *Sitotroga cerealella* OLIV

By

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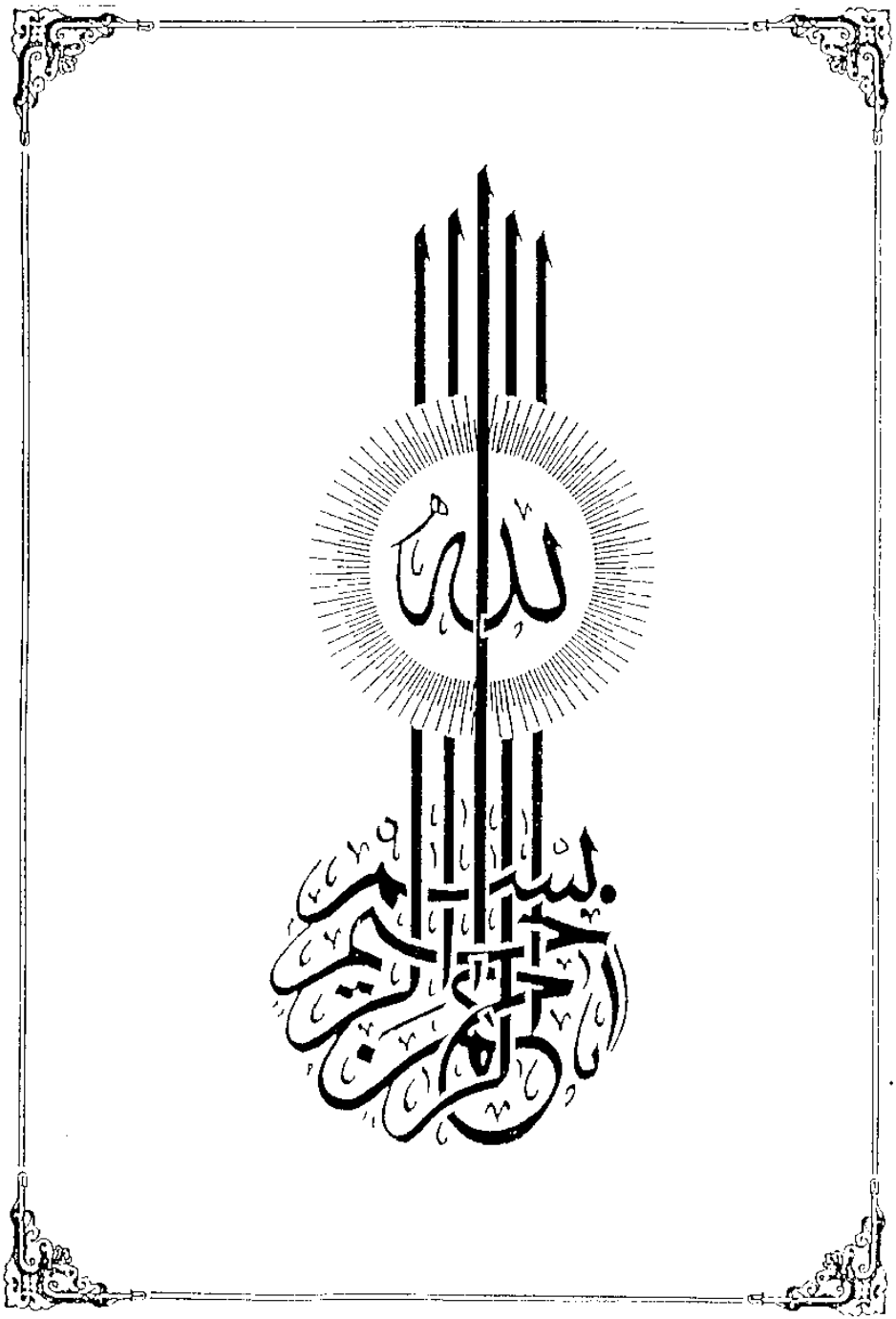

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ABSTRACT

The present work deals with the biological and histological effects of irradiation parental adults of *Sitotroga cerealella* with substerilized doses on the resulting progenies.

When parental adult males (P_1) were irradiated at 150, 200, 300 or 400 Gy and crossed with unirradiated females, the average number of spermatophores per mated female, fecundity and longevity of males and females were not affected among all generations at all tested doses, except in case of F_1o x N+ from P_1 males treated at 200, 300 or 400 Gy, where the average number of spermatophores was more than the control, the fecundity was reduced and there was significant increase in female longevity. The F_1 adults were more sterile than their irradiated P_1 males. F_2 adults gain some of their fertility and the recovery was continued also

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INTRODUCTION

1. INTRODUCTION

The control of Lepidopterous insect pests by applying the sterile insect release technique has received much attention, and some of these results appear to be promising. However, with most species, the initial expectation for this method has not been fulfilled. One problem with moths is the very high radiation doses, in the order of 300-1000 Gy, required to sterilize adult males. Insects that require 300 Gy or more to induce sterility, are more likely to incur severe physiological and somatic damage than the more radiosensitive species. The high doses render irradiated males much less competitive than the unirradiated males, due primarily to the inability of irradiated males to transfer sperms successfully (North and Holt, 1968 a and 1971). Emphasis, therefore, has shifted to a variation of the technique variously called inherited sterility, partial sterility, or semi-sterility. Thus, in the Lepidoptera, the F_1 progeny of an irradiated male parent with substerilizing doses, has a greater degree of sterility than the treated parent. The inheritance of sterility by Lepidopterian progeny is usually attributed to the presence of chromosome translocations (North and Holt, 1968 a) through physiologicl (North, 1975) or morphological dysfunction of sperm in the F_1 (Ashrafi and Ropple, 1973).