

**SYNERGISTIC EFFECTS OF SOME SURFACTANTS
ON CERTAIN INSECTICIDES AND IGRs
AGAINST THE MOSQUITO, CULEX PIPIENS L.**

THESIS

SUBMITTED TO THE FACULTY OF SCIENCE
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MASTER OF SCIENCE

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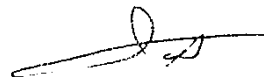
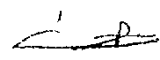
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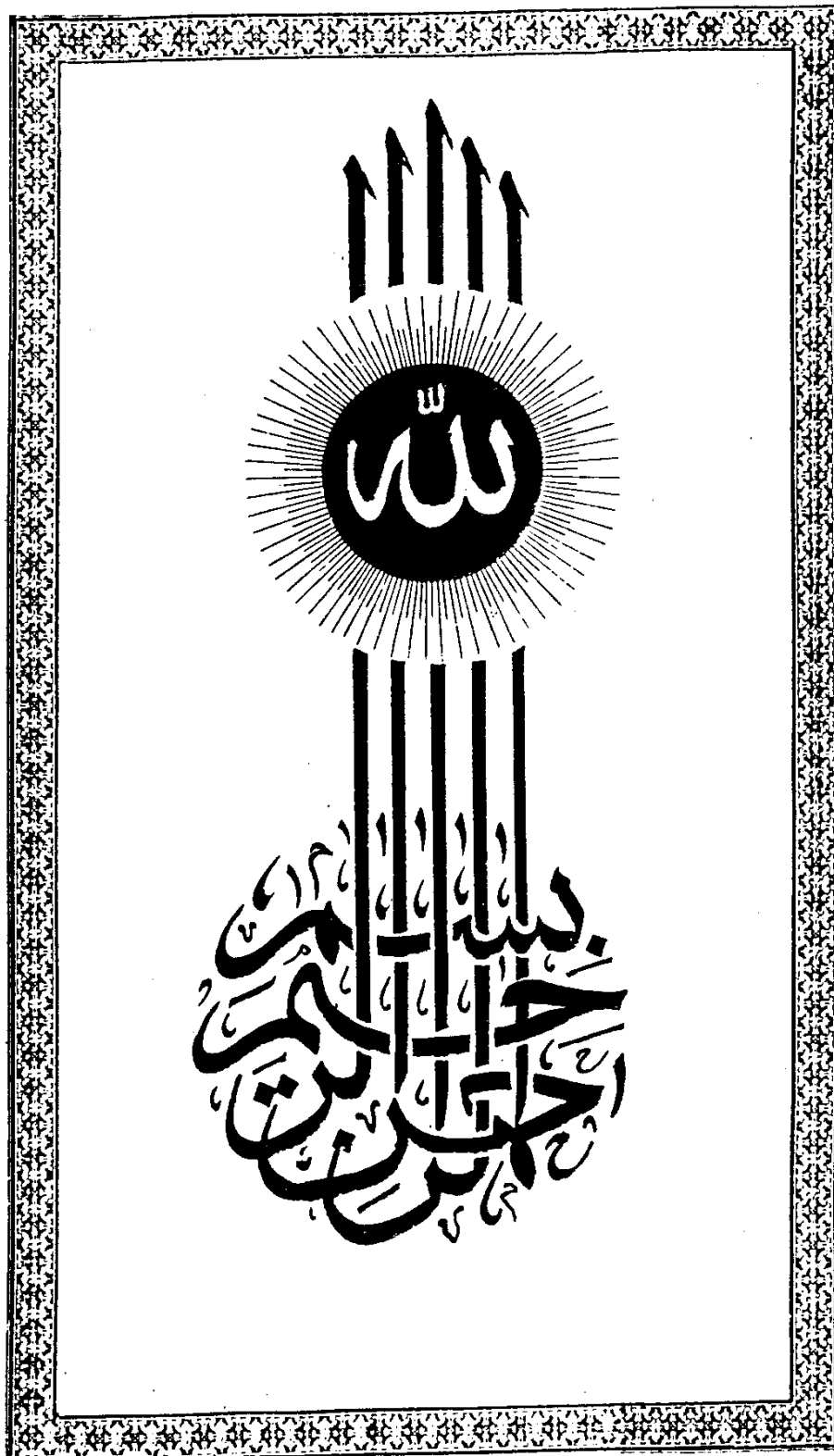
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INTRODUCTION

I. INTRODUCTION

Mosquitoes are still the world's number one vector of human and domestic animals diseases and are conspicuous nuisance pests as well, even after massive efforts for eradication or control. In certain countries, control programs are dramatically effective, but in other areas the control is not feasible for the foreseeable future, mainly because of technical problems and mosquito resistance to chemical insecticides.

Insect growth regulators (IGRs) are playing an increasing prominent role in controlling insect pests in diverse situations. They are initially introduced in the 1970s for the control of mosquitoes. A variety of IGRs are now used against other pests. They are among those materials which have been classified as "biorationals" to distinguish them from conventional pesticides.

For many people, the term "biorational" implies that IGRs are natural, biodegradable and specific to the target pest. Conventional pesticides, on the other hand, are synthetic and often perceived as being persistent and having a broad

spectrum of activity. However, there are actually several similarities between IGRs and conventional pesticides, although IGRs are quite different in terms of their mode of action and this gives them some particular benefits in pest control. Several compounds are currently under development as mosquito larvicides. Altosid (methoprene) and Dimilin definitely have shown promise as practical control agents.

Exposure to low doses of a juvenile hormone mimic (JHM) or IGRs during the larval stage may allow the insect to develop into the adult form, but still causes subtle effects on reproduction success. Levinson (1975) suggested the term "insectistatics" for those agents that interfere with normal processes of growth and reproduction without necessarily leading to mortality.

Insecticides also induce changes in the fecundity of insects. Organophosphates and other insecticides have shown a reducing effect on the fecundity and fertility; and, in general, showed a high biological activity against mosquitoes and other pests.

Compounds known as surfactants (surface-active agents or adjuncts) have emulsifying, spreading and wetting properties.

They are used to formulate emulsifiable concentrates, wettable powders and other insecticidal formulations. Although much is known of their chemical and physical properties, little is known about the effects of these materials on insects. Various surfactants were, therefore, tested in the laboratory and in field cages to determine if they would cause mortality to many insect pests; and if their use would enhance the effectiveness of a chemical insecticide against the tested insects. In general, several studies are needed and much remains to be done and many surprises await those who are interested in looking further.

Taking into account all the above mentioned considerations, the present investigation aims at finding the perspectives which may support, in the future, the integrated control programs of mosquitoes in Egypt; such as the importance of some naturally occurring surfactants and insect growth regulators or inhibitor agents which may act after further investigations as alternatives to currently used organic synthetic insecticides.

The objectives of the present investigation concern the following points:

1. Evaluation of the susceptibility of two geographic strains of Culex pipiens L. larvae to different insecticides, IGRs and the possible use of two common surface-active agents (surfactants) as synergists.

2. Investigation of the effects of certain insecticide(s) and IGR(s) and their combinations with surfactants on some important parameters of biological activities of Cx. pipiens.