STUDIES ON THE INTEGRATED PEST MANAGEMENT TO CONTROL CERTAIN SOLANACEOUS PESTS IN ORDER TO DECREASE THE PESTICIDE POLLUTION

BY

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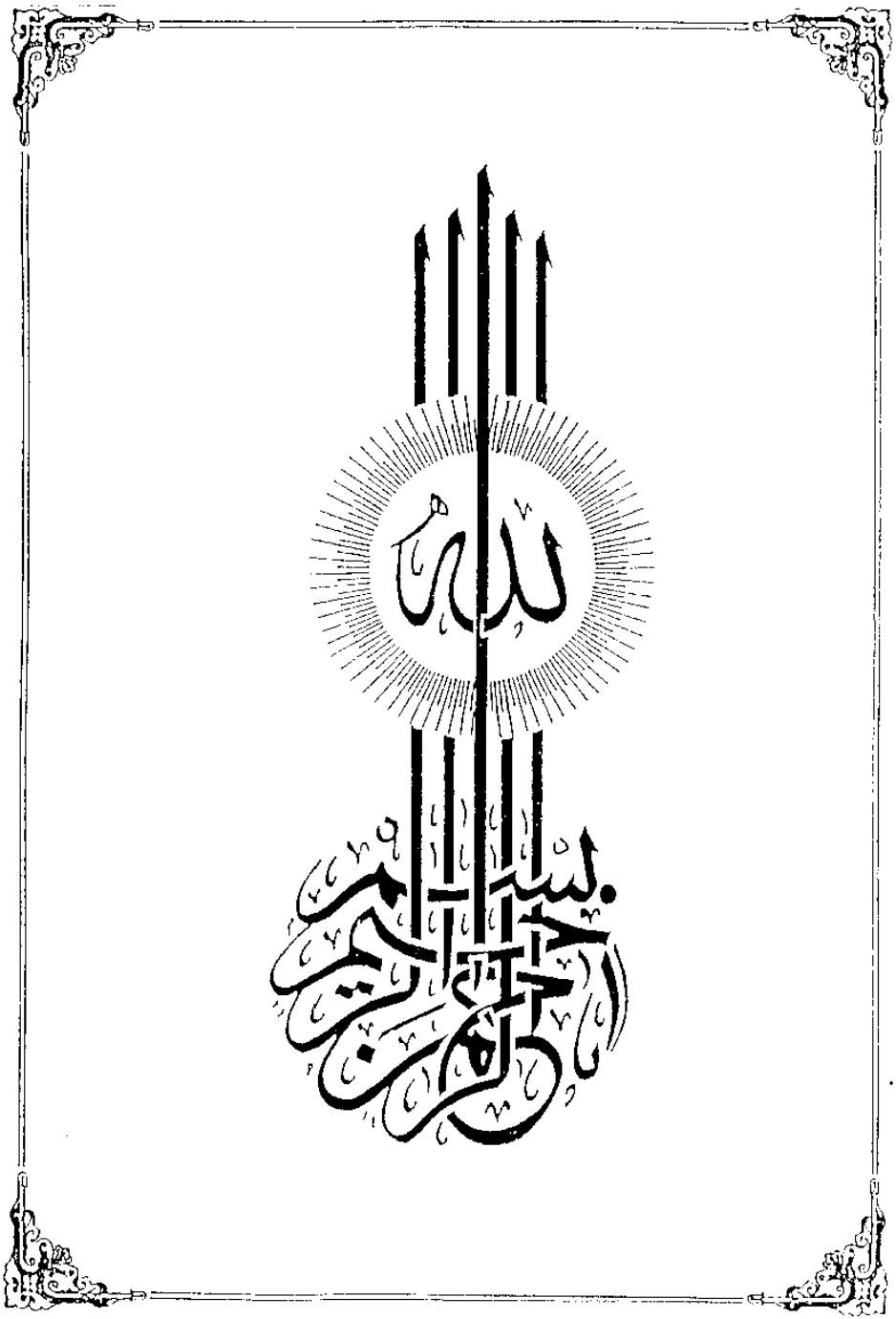

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INTRODUCTION

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The culture of the solanaceous crops has received a great impetus in Egypt during the past few years by reason of the increased demand for good vegetables and the satisfactory prices received therefore. However, cultivated crops are subject to attack by several of economic and serious pests (Hassan, 1974; Hammad and Abdel-Salam, 1967; Herakly, 1974 and Hemeida, 1981). According to annual reports of the Department of Agricultural Economics, Ministry of Agriculture, Egypt; tomatoes, Lycopersicon esculentum, potatoes, Solanum tuberosum, eggplant, Solanum melongena and pepper, Capsicum fruitescens, the most popular solanaceous vegetable crop used as food in Egypt (Hemeida, 1981).

At present, more than 6,00000 feddans are cultivated yearly in Egypt, with solanaceous crops. The followings are the areas of 1989, tomatoes (424963 fed. at three seasons; Nili, summer and winter) with mean productivity of 6.48 ton/fed. Area of potatoes is 206589 fed. with average productivity of 6.84 ton/fed. Area of pepper is 308081 fed., with mean productivity 6.5 ton/fed., and the area of eggplants is 19996 fed. with mean productivity 8.45 ton/fed.

Tomatoes, Lycopersicon esculentum represent an especially important vegetable crops among solanaceous. The

total areas cultivated with tomatoes only are 190867, 237459, 324782, 331720 and 345057 feddan in the years 1965, 1970, 1975, 1980 and 1985, respectively. The average yield per feddan being 6.41 and 10.36 tons in the years of 1965 and 1985, respectively. This production is relatively low as compared with 43.3, 39.7 and 33.6 tons per acre in England, Belgium and Holland, respectively. In Egypt, this may be due to many factors from which insects attack rank firstly. The cotton whitefly, B. tabaci (Genn.) and aphids causes direct damage by piercing and sucking the foliage of hosts and indirect damage as a vector of virus diseases. Both the adult and nymphal stages of whiteflies, alate and apterous forms of aphids causes direct damage which resulting in great and disasterous yield.

Nineteen viruses are known to be transmitted B. tabaci (Genn.). Among these, the tomato yellow leaf curl virus (TYLCV) is the main and serious transmitter virus. (Yassin, 1978).

The greenhouse whitefly has become the most important insect pest of a number greenhouse vegetable and flower crops (Wordlow et al., 1972).

Control of these pests, especially the cotton whitefly, B. tabaci (Genn.) is often difficult because of

the existence of several insect stages on the lower plant leaves and due to the phenomenon of the resistance to insecticides (Webb et al., 1974). Wild plants are important hosts from which aphids and whitefly disperse to economic crop (Hassan, 1957 and Muddathir, 1967).

Different factors affect the population density of these pests, i.e. the agricultural practices, planting dates, irrigations and fertilization regimes (Yiein and Smith, 1982; Lal, 1981; and Sharaf, 1984).

Control of adults are easier to kill than the larval forms. Since young, actively growing leaves are more susceptible to infestation and greater losses are generally induced when infection occurs early. Vector control should be carried out more frequently in the early phases of the crop.

Insect growth regulators may reduce population indirectly, e.g. through disruption of metamorphosis, sterilization and/or delayed mortality (Staal et al., 1973; Collmann and All, 1982).

Due to the high costs of insecticides and hazards of spraying on edible crop, the possibility that tomato varieties may exhibit differential susceptibility to B. tabaci was explored (Kisha, 1981).

The present work aimed to find out satisfactory control programme, minimizing the incidence of virus infestation which significantly harmed tomatoes and decrease the pesticide pollution. The following points are considered :

1- Population density , dynamics of whitefly, and aphids on solanaceous crops at Fayoum Governorate.

2- Weeds under solanaceous plants habitating whitefly, and aphids at Fayoum Governorate.

3- Relative susceptibility of tomatoes of different varieties to whitefly and aphid infestation.

4- Effect of certain agricultural practices on the population density and dynamics of the cotton whitefly and aphids infesting tomatoes of Nili plantation.

5- Integration of agricultural practices and insecticide management for controlling serious pests in tomato plantations.

6- Performance of Pyriproxyfen juvenoid, fenoxycarb carbamate and their binary mixtures on whitefly, virus infection and production of tomatoes.

REVIEW OF LITERATURE

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1- Symptoms of damage and economic importance of whitefly :

Pal and Tendon (1937) studied the leaf curl disease, in India, and concluded that the average incidence of leaf curl disease on tomato was normally about 6-10%, while nearly the whole of the crop rendered worthless in epidemic years. Diseased plants varied through the growing season where incidence was higher under environmental conditions favourable to the activity of the insect vector. Symptoms were extremely rare on seedlings in the nursery but most visible infection symptoms appeared after transplanting.

In India, Vasudeva and Samraj (1948) mentioned that tomato leaf curl was transmitted by B. gossypiperda, it showed vein clearing, stunting and marked reduction in leaf size. The leaflets were deformed and margins curled in-or-outwards. Infection of young plants rendered them stunted and seldom attained a size of more than 10 to 15 inches. In the case of late infection, the diseased plant bore few fruits, while in earlier infection a few number of flowers formed on the diseased plant.

In Venzuela, Wolf et al. (1949) reported that tobacco and tomato plants were the host reservoire of the virus between successive seasons.

Pollard (1955) stated that B. tabaci is a serious pest in Egypt and Sudan on cotton. It transmits the virus disease, leaf curl and also caused direct damage. The nymphs feed on the lower surface of the leaves.