EPIDEMIOLOGY AND MANAGEMENT OF THE DOWNY MILDEW DISEASE OF CUCURBITS UNDER PROTECTED AGRICULTURE IN ISMAILIA

By

MAHMOUD ABD EL-HAMED EL-KORACHY

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NAME : MAHMOUD ABD EL-HAMED EL-KORACHY

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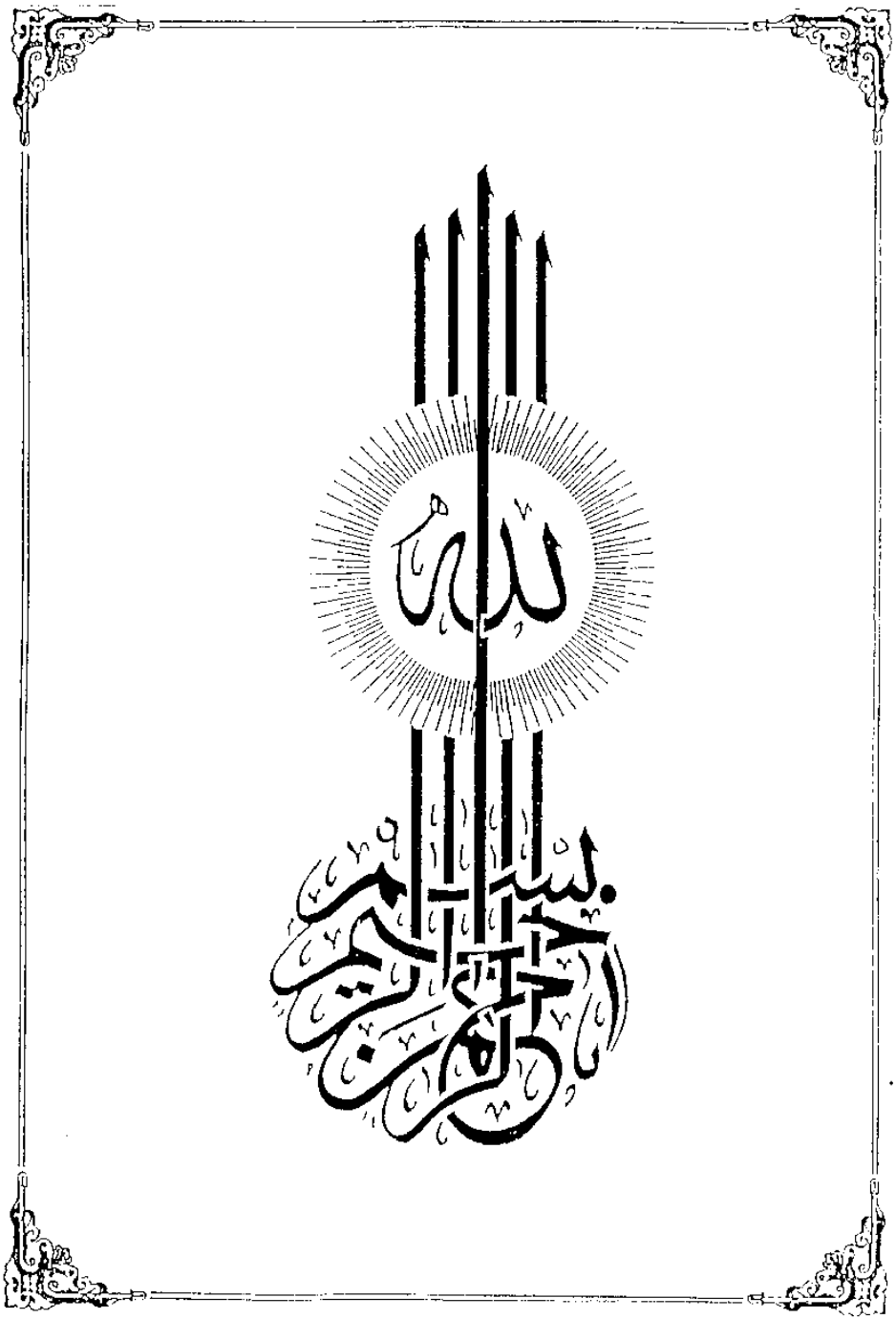
HAS BEEN APPROVED BY :

Prof.Dr. Mohamed M.EL-Zayat : M. M. El-Zayat

Prof.Dr. Farid F.Mehiar : F. F. Mehiar

Prof.Dr. Seif A.Sari EL-Deen : Dr. Seif El-Deen

DATE / /



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By

MAHMOUD ABD EL-HAMED EL-KORACHY

B. SC. ZAGAZIG UNIVERSITY
1979

M. SC. PLANT PATHOLOGY
SUEZ CANAL UNIVERSITY
1987

UNDER THE SUPERVISION
OF

PROF. DR. MOHAMED M. EL-ZAYAT

PROF. AND HEAD OF PLANT PATHOLOGY, FACULTY
AGRIC. AND HEAD OF AGRIC. SCIENCES DEPT.,
INSTITUTE OF ENVIRONMENTAL STUDIES AND RESEA.
AIN-SHAMS UNIVERSITY

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CONTENTS

INTRODUCTION

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There is a great need for intensifying agriculture production in Egypt. Demands for agriculture products are increasing at the same time with limitations in increasing productive land and shortage of water required. Hence, recent agriculture policy introduced the new technology of protected agriculture to save nearly about one million feddan used in growing vegetable crops to be planted with other crops needed as well as saving irrigation water by introducing new advanced techniques for irrigation in the plastic houses and tunnels.

Thus, production of vegetables including cucurbits under protected agriculture is now going on at different parts of the country. Ismailia is one of the major regions of vegetable production in Egypt and thus this new technology of protected agriculture is increasing at that region.

There are some stresses facing crop production in protected agriculture especially pest management, due to the modified atmosphere of this system. There is a great change in humidity and temperatures along with the use of new highly expensive varieties of vegetable crops.

Cucurbits are important crops planted under the protected agriculture in Ismailia. One of the major proplems facing its production is the spread of downy mildew disease caused by the fungus "Pseudoperonospora cubensis" (Berk. & Curt.) Rostow. Losses

due to this disease are increasing not only in protected agriculture but also outdoors in open fields. It occur all over the world on wild and cultivated plants. It has been reported in 70 countries; (Samoucha and Cohen, 1984). The fungus was found to infect the plants in the openfield and protected crops (Spencer, 1981). Hence, there is a great need of understanding the epidemiology of this disease under Ismailia region and its management in order to minimize losses.

The present investigation was under taken to study the different factors affecting downy mildew, the most important disease of cucumber under different plastic houses and tunnels conditions as compared with open field. These include the time of apearance, percentage and intensity of infection and relation to modified atmosphere and weather of outdoors, effect of environmental conditions on the progress of downy mildew epidemices, assessment of losses especially those cuased by downy mildew in relation to disease intensity, susceptibility of some cultivars to downy mildew in realtion to their morphology and chemical composition, effect of agriculture practices on disease management, effect of some fungicides on the fungus and disease management either used separately or alternately used in green houses as well as under field condition, effeciency of some means of fungicidal application i.e. Dorsal high volume spray, dusting, fogging and mist in disease management was also investigated.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

1- Diseases of cucumber grown under field, tunnels and plastichouse conditions :

Cucurbits are some of the most important vegetable crops mostly consumed shortly after harvest. These crops are liable to the attacke by many disease. However, the severity of any of these disease is affected by the microclimate where the crop is grown.

According to Walker (1952) and Middleton and Bohon (1952) cucurbits are attacked by many fungal disease. They reported the seed decay and seedling blight caused by Pythium irregulare Buis, P. utimum Trow and Rhizoctonia solani Kuehn; root rot caused by P. aphanidermatum (Edson) Fitz., P. irregulare, P. ultimum and Fusarium solani F. cucurbitae Snyder & Hansen; Fusarium wilt caused by F. oxysporum F. sp. melonis (Leach & Currence) Snyder & Hansen for muskmelon and F. oxysporum F. sp. niveum (E.F. Smith) Snyder & Hansen for watermelon; downy mildew caused by Pseudoperonospora cubensis (Berk. & Curt.) Rostow; powdery mildew caused by Erysiphe cichoracearum D.C. and Sphaerotheca humuli var. fuliginea (Schl.) Salmon; anthracnose caused by Colletotrichum lagenarium (Pass.) Ell. & Halst.; scabe caused by Cladosporium cucumerinum Ell. & Arth.; Alternaria leaf spot caused by Alternaria cucumerina (Ell. & Ev.) J.A. Elliott, Sclerotinia disease caused by Sclerotinia Sclerotiorum (Lib) de Bary; and fruit rots caused by different fungi in cluding Phytophthora capsici Leonian, Phy. drechsleri Tucker, Phy. prasitica Dast., P.

aphanidermatum, P. ultimum, Choanephora cucurbitarum (Berk. & Rav.) Thaxt. and Rhizopus nigricans Ehr.

Ali et al. (1972) surveyed the plant diseases reported on Egyptian crops including cucurbits up to 1970. According to those authors and to Melchers (1931), powdery mildew caused by the fungus Erysiphe cichoracearum was reported on cucurbits as early as 1925 by Briton-Jones. This disease has later been studied by other investigators in the country (Sidky 1955, Lashin 1967 and Abdel Sattar et al. 1985). Root rot caused by R. solani and other fungi was reported by Briton-Jones (1925) and later Roushdi and Sirry (1962), Sheir (1969).

Jones (1935) was the first to report the fusarium wilt of cucurbits in Egypt, which was later thoroughly investigated by Stino (1953), Youssef (1962), Stino and Ragab (1968).

In (1938), Fikry reported the anthracnose disease caused by C. lagenarium. Wasfy (1967), Satour and El-Shinawy (1977) and El-Tobshy and Zayed (1978) later on investigated the fruit rots of cucurbits in Egypt and identified their causal fungi.

El-Helaly et al. (1968) studied choanephora blossom end rot of vegetable in Egypt and its control.

In (1975), Ibrahim et al. reported the presence of A. cucumerina causing leaf spot of watermelon.

In (1981), El-Kazzaz reported the presence of S. fuliginea as the causal of powdery mildew on many cucurbits in Egypt.

Jtfletcher (1984) mentioned that, greenhouse diseases accompained for were : cucumber Domping-off (P. ultimum, P.aphanidermatum and other Pythium spp., R. solani., root-rot (P. spp., Phytophthora spp., Olipidium spp., black root (Phomopsis sclerotioides, root mat (Agrobacterium rhizogenes, basar rots (P. spp., Phy. spp., R. solani, grey mould pers. ex Fr. (Botrytis cinerea. pers. ex Fr. black stem rot (Didymella bryoniae, Mycospherella melonis (Passerini) Chin and Walker, white rot (S. sclerotiorum), Fusarium wilt (F. oxysporium f.sp. cucumerinum (E.F.Lm) Snyd & Hansen, powder mildew (S. fuliginea and Leveillula turicu (Lew) Salm., Cercospora leaf spot (Cercospora melonis (B.&C.) Ell. & Ev., anthracnose (Colletotrichum lagenarium leaf spot (A. cucumarina, Ulocladium atrum, downy mildew Ps. cubensis Verticillium wilt (Verticillium albo-atrum (Reinke & Berthold) and V. dahalia (Kelb.), (Cl. cucumarinum Watermelon mosic virus, Zucchini yellow mosic and Root-knot nematode.

Bedlan (1986) described at Austria : powdery mildew (E. cichoracearum downy mildew (Ps.cubensis), grey mould (B. cinerea), Wits (F. oxysporum f. sp. cucumerinum) and P.debaryanum stem and fruit rot (D.bryoniae), anthracnose (C.lagenarium) and gummosis (C.cucuneriuum).

Peterson et al.(1986) reported that in USA Wautoma originated from cross between the gynoecious inbred GY14 and the monoecious