بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــسـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

INTEGRATED CONTROL MANAGEMENT OF CUCURBITS DOWNY MILDEW DISEASE

By

MAGDY ABDEL-LATIF EMAM

B. Sc. Agric. Science (Plant Pathology)
Cairo University, El-Fayoum Branch 1994

Thesis
Submitted in Partial Fulfillment of the
Requirements for the Degree of

MASTER OF SCIENCE

In
Agriculture
(Plant Pathology)

DEPARTEMENT OF PLANT PATHOLOGY
FACULTY OF AGRICULTURE
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APPROVAL SHEET

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Title of Thesis: INTEGRATED CONTROL MANAGEMENT OF CUCURBITSDOWNY MILDEW DISEASE .....

Supervisors: Prof. Dr.Effat Abdel-Mgeed Zaher, Prof. Dr. Fawzy Abdel-Zaher Khalil
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Department: Plant Pathology.....

Branch:.....**Approval:**.....

Abstract

Results indicated that the causal fungus of downy mildew disease of cucurbits was identified as *Pseudoperonospora cubensis* (Berk & Curt.) Rostow, according to the criteria of the sporangial stage. Results showed that there were a positive correlation between the different inoculum potential and the percentage of disease severity. Results indicated that Cucumis was the most susceptible genera and gained the highest disease severity percentage for its varieties reaction, while the genera Luffa recorded resistant reaction to downy mildew. Results demonstrated that the 1st week of July is the most appropriate sowing date. Where recorded the lowest disease severity followed by 15th July. The planting at the last week of July was unsuitable due to the highest disease severity. It was clear that under greenhouse and open field conditions, increasing levels of nitrogen fertilizer increased the percentage of disease severity with downy mildew. While increasing doses of both potassium (K) and phosphorus (P) fertilizers decreased the percentage of disease severity. Results showed that using ethephon , cobalt (Co++) as cobalt sulfate and salicylic acid (SA) as chemical inducers for resistant induction against cucumber downy meldew gained effective reaction with different concentrations as foliar application . Results reported that Previcur N was the best fungicide reducing the percentage of downy mildew severity, followed by Sandofan, Mikal and Acropat respectively, Dacober and Diathane M-45 were the least effective in reducing of disease severity. While Ridomil, Sandocure and Cupravite were moderate in their effective against downy mildew. It was obvious that disease forecast and early warning system had bean used for the first time in Egypt and the whole Arabian and African countries using the last generation of remote measuring agriculture weather stations for real time data around the world named (ADCON telemetry model A733) to collect the micro-meteorological factors in plant canopy. A computer model named by the author (**Egy-Mildew**) was designed, validated and implemented in 1998 and 1999 cucumber plants successive growing Nilli seasons. It was also stated that **Egy-Mildew** was the first cucumber downy mildew disease forecast and early warning computerized model for the first time allover the Middle East area. There was only one warning massage (spray) in August in 1998 , while there were two warning massages throughout August in cucumber plants growing Nilli season 1999.

Key words: Cucumber downy mildew, *Pseudoperonospora cubensis* , host range, disease forecast , disease early warning , resistance induction and chemical control.

CONTENTS

INTRODUCTION

Cucurbits are considered one of the most economic vegetable crops as an agriculture activity and commodity in Egypt, for both local consumption and for exportation purposes. Cucurbits are cultivated in Egypt throughout the year (open fields and protected agriculture) in many governorates,. According to the report of the Ministry of Agriculture, Economic Statistics Department in 2000-2001, the total cultivated area reached approximately 400296 feddan, represented about 35% of the total vegetable crops area.

Cucurbits downy mildew caused by *Pseudoperonospora cubensis* (Burk. & Curt.) Rostow is one of the major problems facing Cucurbits production, causing serious losses in both open field and protected agriculture. The disease was found in Cuba during 1868, and 20 years later in Japan, then it has been reported from different areas of the world, cucumber and muskmelon are the most seriously affected host plants in the U.S.A., other hosts are watermelon, squash, pumpkin, gourd, wild cucumber and other species of the family; cucurbitaceae. In Egypt, Jones (1935) found that watermelon was liable to be infected by the fungus causing downy mildew.

Losses caused by downy mildew on Cucurbits may reach to 30-80% from fruit yield when the percentage of infection reaches to 50-100 % (El-Nagar *et al.* 1991). Disease control can be achieved by using resistant cultivars and / or chemicals and may lose it is efficacy if new pathotypes or fungicide-tolerant forms of the fungus appear. These facts shift the disease control strategy towards integrated control management suggesting that; efforts should be made to

improve fitness or natural resistance of cucurbits against downy mildew disease.

This study spotted only on cucumber downy mildew, concerning that cucumber plants considered the most susceptible cucurbits to downy mildew disease and has the largest cultivated area of cucurbits crops in Egypt under both greenhouse and field conditions.

Therefore, the present investigation includes the following aspects:

Disease symptoms and identification of the causal agent.

1. Screening for host range and varietal reaction.
2. Effect of some agriculture practices on cucumber downy mildew, such as sowing dates and plant fertilizer.
4. Induction of resistance in cucumber to downy mildew.
5. Effectiveness assessment for some fungicides against *P. cubensis*
6. Effect of disease forecast and early warning system on avoiding cucumber downy mildew outbreaks and timing fungicides applications:
   - 6.1. Creating, designing and validating a computerized early warning model for cucumber downy mildew.

REVIEW OF LITERATURE

1. Etiology

Cucurbits downy mildew caused by *Pseudoperonospora cubensis* (Burk. & Curt.) Rostow is one of the major problems facing cucurbits production, causing serious losses in both open field and protected agriculture. Downy mildew disease was first described in 1868 on the basis of specimens of cucurbitaceous plants collected in Cuba and sent to Berkeley in England. It was not recorded again until 1880, when Halsted described it on cucumber growing in a greenhouse in New Jersey. At the same time, Farlow described the disease on specimens of cucumber from Japan, Massachusetts, Florida and Texas. In the United States it still occurs as a major disease chiefly along the Atlantic seaboard. Cucumber and Muskmelon are the most seriously affected host plants in the United States. Other hosts include watermelon, squash, pumpkin, gourd, wild cucumber, star cucumber and several other species of the Cucurbitaceae. (Walker, 1957).

There are other numerous reports in the literatures pertaining to the distribution of cucurbits downy mildew in many parts of world, such as: Thomas (1970), Curger (1974), Palti (1974) and (1980), Tahvonen (1985) ,Forsberg (1985) , Varady and Ducrot (1985) and Brunelli and Davi (1987).