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قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%

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بالرسالة صفحات لم ترد بالاصل

٤٠٢٢

FORECASTING OF POTATO LATE BLIGHT UNDER THE EGYPTIAN ENVIRONMENTAL CONDITIONS

By

MOHAMED ALI FAHIM MOHAMED
B.Sc. Agric. Sci. (Plant Pathology), Cairo University, 1996

A thesis submitted in partial fulfillment
of
the requirement for the degree of
Master of Science

in
Agricultural Science
(Plant Pathology)

Department of Plant Pathology
Faculty of Agriculture
Ain Shams University

2002

APPROVAL SHEET

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ABSTRACT

Mohamed Ali Fahim, "Forecasting of potato late blight under the Egyptian environmental conditions", Unpublished M.Sc. thesis, Department of Plant Pathology, Faculty of Agriculture, Ain Shams University, 2002.

Potato late blight caused by *Phytophthora infestans* (Mont.) De Bary, is an important destructive disease causes a considerable loss of potatoes crop all-over the world.

The potato late blight forecasting service in other countries has proved very success since enabled the farmers to protect their potato crop against late blight by timely preventive spraying. The purpose of the present study is to find out the possibility of forecasting late blight of potato for the main potato production regions in Egypt. So, that adequate blight preventive spraying could be applied by farmers.

The disease was detected during winter seasons in 1998/1999 to 2000/2001 in potato growing regions. Disease severity was low as 5-20% in Badrashin, Kafr El-zayat and Bosaily provinces during winter season 1998/1999, and very high 80-95% in Badrashin, Kom Hamada, Badr, Meet Ghamr and Salhia provinces during winter seasons 1999/2000-2000/2001. Also, the disease was less than 20% in Kafr El-zayat and Bosaily during winter seasons 1999/2000-2000/2001. There were positive relationships between late blight disease severity and environmental conditions during winter periods.

Three systems were selected and tested for describing the occurrence of late blight epidemic by combining weather conditions factors (disease severity value). These systems were of Beaumont 1947, Cook 1949 and Hyre 1954. As results of this study, new system was created by modifying Hyre system to be appropriate the Egyptian conditions.

Accumulative day-degree centigrade (DDC) model was developed and tested to predict the physiological time of potato plant, which related to the appearance of the first late blight on foliage. The model based upon accumulated day-degree above 10°C from the date of planting. The DDC thresholds were different in potato production areas, it depend on the temperature trend in different climatic locations.

The relationships between environmental conditions and disease severity were determined and analyzed by using linear and multiple regressions. The disease progress curves, disease rates and the area under disease progress curve (AUDPC) were estimated and used for comparison epidemic and non-epidemic years. Those characters were used to set mathematical models for disease severities prediction. Also, the AUDPC was used to develop a method for estimating or predicting the loss in tuber yield. A single and multiple regression equations were used to estimate the yield loss associated with any progress curve. The difference between estimated loss (computed from the equation) and actual loss derived by weighing, was less than 5%.

Key words: Potato, *Phytophthora infestans*, Late blight, Epidemic disease, Environmental conditions, Disease survey, Disease forecasting, Day-degree centigrade (DDC), Area under disease progress curve (AUDPC), Multiple regression, Yield loss.

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