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GROWTH AND PRODUCTIVITY OF SOME VEGETABLE CROPS AS AFFECTED BY CHEMICAL AND BIOLOGICAL CONTROL OF WHITE-ROT DISEASE

By

SAMUEL SAADALLAHA AZMERIS TEWFIK

B.Sc. Agric. Sc. (Horticulture), Fac Ain Shams University, 2009

M.Sc. Agric. Sc. (Vegetable Crops), Ain Shams University, 2014

A thesis Submitted in Partial Fulfillment

Of

The Requirements for The Degree of

DOCTOR OF PHILOSOPHY
in
Agricultural Sciences
(Vegetable Crops)

Department of Horticulture

Faculty of Agriculture

Ain Shams University

2021

Approval Sheet

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ABSTRACT

Samuel Tewfik: Studies on Growth and Productivity of Some Vegetable Crops as Affected by Chemical and Biological Control of White-Rot Disease. Unpublished Ph.D. Thesis, Ain Shams Univ., Faculty of Agriculture, Horticulture Dept., 2021.

Field experiments were conducted on the autumn and winter seasons of 2016/2017 and, 2017/2018 at Qalyub, Qaluobia Governorate and Kafr Alzayaat area in El-Gharbia, Egypt. The main objective of this study determines the efficacy of several biological and chemical controls on the growth and productivity of lettuce and green bean crop management of white rot disease caused by *Sclerotinia sclerotiorum*. Also, management of onion white rot disease caused by *Sclerotium cepivorum* as well as on the growth and productivity of onion plants.

The main plots in onion experiment were divided into Three biological treatments including control (tap water), *Trichoderma asperellum* (85 g/100 L^{-1}), *Pseudomonas fluorescence* (500 ml/100 L^{-1}), were applied respectively. These treatments were combined with five chemical treatments (commercial fungicides) and applied as follows: Control, Iprodione (250 g/100 L^{-1}), Tebuconazole / Fluopyram (50 ml/100 L^{-1}), Tebuconazole (188 ml/100 L^{-1}), Azoxystrobin / Mefenoxam (200 ml/100 L^{1}) distributed in sup plot. Also, these treatments were sprayed three times on plants at (40-55-70) days after planting or (19-41 BBCH) stages by using knapsack sprayer by (300 L./Fed). The field plot area was 12 m^2 including 3 rows, each row was 4 m length and 1 m width, Seedling distance was 0.1 m apart on two side of row.

Lettuce experiment, biological and chemical control includes seven treatments, namely *Trichoderma asperellum* (85 g/100L^{-1}), Salicylic acid (100 g/100L^{-1}), Calcium chloride (200 g/100L^{-1}), Iprodione (250 g/100L^{-1}), Fluopyram with Tebuconazole (50 ml/100L^{-1}) and Tebuconazole (188 mg /100 L^{-1}). Which they tested for their ability for

increasing the lettuce crop productivity and reduce disease severity and incidence growth of white rot by treatment were sprayed in two times on plants at 3 - 6 leaves from planting or (15-19 BBCH) stages by using knapsack sprayer by 250 L./Fed.). The field plot area was 10.8 m^2 including 3 rows, each row was 4 m at length and 0.9 m width. Seedling distance was 20 cm apart at the two sides of row. On the other hand , Five biological control treatments, namely *Trichoderma asperellum* (85 $g/100L^{-1}$), *Bacillus megaterium* (250 $g/100L^{-1}$), *Trichoderma album* (250 $g/100L^{-1}$), Chitosan (200 $g/100L^{-1}$), and Hydrogen peroxidase (250 $g/100L^{-1}$) were applied plus three fungicides, namely Flutolanil (100 $g/100L^{-1}$), Tebuconazole with Fluopyram (50 $ml/100L^{-1}$) and Tebuconazole (188 $ml/100L^{-1}$) as well as control treatment for their ability in increasing green bean crop productivity and reducing disease severity and incidence growth of *white rot* by spraying two times on plants; at 35-45 days after emergence or 59-61 BBCH stages using knapsack sprayer at 300 L./Feddan. The field plot area was $12m^2$ including three rows, each row was 4 m at length and $1m^2$ widths, two seeds/hill were sown with 20 cm apart at the two sides of row.

Results indicated that *Trichoderma asperellum* dipping applied with Iprodione foliar applied treatment produced the highest values of plant length, leaf fresh and dry weight, total yield and marketable yield of onion bulbs per feddan, compared with the control in the two seasons. Finally, the non-treated control treatment was the lowest of crop productivity and control of disease efficacy of onion crop.

On Lettuce experiment, salicylic acid applied gave the highest values average leaf area and Iprodione significantly produced the highest values for average yield per plant compared with the other experiment treatments in both seasons. Also, Tebuconazole / Fluopyram and Calcium Chloride in the 1^{st} season and the 2^{nd} season, respectively, significantly increased chlorophyll reading compared with the other treatments. The obtained data showed that lettuce plants treated by Iprodione and salicylic

acid in the both seasons consecutively reduction of disease incidence, severity and increase percent control efficiency of lettuce plants compared with the other treatments in both seasons.

On Green Bean experiment, application of Tebuconazole / Fluopyram, Tebuconazole, and Hydrogen peroxidase significantly increased yield per plant, yield per Feddan and marketable yield per feddan, reduction of white rot disease incidence and severity in both seasons compared with the other treatments. Although, *B. megaterium*, tebuconazole, Flutolanil, chitosan, *T. album* and hydrogen peroxidase in the 1st season and tebuconazole, hydrogen peroxidase and *T. album* in the 2nd season significantly increased the total content of protein in the green bean dry pods.

Key Words: Onion, Lettuce, Green Bean, Yield, Biological control, Chemical control and White rot.

ACKNOWLEDGEMENT

I would like to express my sincere, special thanks and appreciation to my supervisor **Dr. Ahmed Abou El-Yazied Ahmed,** Professor of Vegetable Crops, Faculty of Agriculture, Ain Shams University, for his supervision, great support and continued help during the preparation of this work.

Special thanks also to **Dr. Hany Gamal Abd El-Gawad**, Associate Professor of Vegetable Crops, Faculty of Agriculture, Ain Shams University, for his help, valuable advices, and kind help.

Deep gratitude and thanks are also due to **Dr. Ahmed Mohsen Bondok,** Associate Professor of Plant Pathology, Faculty of Agriculture, Ain Shams University, for his kind supervision, advice, valuable assistance, during the preparation of this thesis.

Thanks, are also extended to **the staff members** of the Department of Horticulture and plant pathology, Faculty of Agriculture, Ain Shams University for their encouragement and help during this work.

Deeply kind regards to my mother Salwa for showing me the value of hard work, discipline, commitment, likewise for my father Saad as whom taught me to pursue my dreams with optimism. Also, Sami, Hany and Nevin for providing my confidence of myself, as well my friends without their love, unconditional support, and their encouragement continuous through this work. Finally, Great special thanks to Manal, John, Sabah, and Lili for being my motivation and supportive continually to achieving this thesis. So, I dedicated this thesis.