EFFECT OF SOLAR HEATING, CHEMICAL DISINFESTANTS AND SOME BIOLOGICAL AGENTS ON LETTUCE FUSARIUM WILT CONTROL, YIELD AND QUALITY

By

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B.Sc. Agric. Sci. (Plant Production), Fac. Agric., Cairo Univ., 2012

THESIS

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Title of Thesis: Effect of Solar Heating, Chemical Disinfestants and Some Biological Agents on Lettuce Fusarium Wilt Control, Yield and Quality
Supervisors: Dr. Sayed Fathey El Sayed
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ABSTRACT

Isolation trials from lettuce plant with wilt symptoms collected from Giza, Qalubiya and Behera Governorates yielded *Fusarium oxysporum* Schlecht, *Macrophomina phaseolina* (Tassi) Goid and *Mucor* sp. Fresen. The isolates of the fungus *F. oxysporum* were exposed to pathogenicity test by using lettuce (cv. Aviram) seedlings. The all isolates infected the lettuce seedlings with different levels. Giza isolate as the most virulent morphologically and molecularly characterized as *F. oxysporum*. Also, it was failing to infect non-host plants in the host range test. Temperature degrees, relative humidity levels and root exudates of lettuce seedlings significantly influenced the growth and sporulation of the tested fungus on PDA medium. Three beneficial bacterial isolates (*Pseudomonas fluorescence*, *Bacillus circulence* and *Peanbacillus polymexa*) evaluated for their antagonistic activity against the fungus. In the lab, *Ps. fluorescence* gave the highest antagonistic effect on the fungus growth. In the greenhouse, the bacterial isolates were tested against the disease occurrence and compared with three commercial bioproducts (T34 biocontrol, ESRU biocontrol and algae extract). T34 biocontrol and ESRU biocontrol were the best treatments while the bacterial isolates were exerted no effect on the disease. In the field, solar heating, metam sodium, T34 biocontrol, ESRU biocontrol and Tebuconazole 6% fungicide were tested in naturally infested soil with the pathogen during 2015 and 2016 growing seasons. Solarization and metam sodium gave the highest reduction in the disease incidence and severity. Also, improved the growth and yield characteristics of the lettuce plants.

Keywords: Lettuce, Fusarium wilt, solar heating, metam sodium, biocontrol, rDNA, ITS region

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LIST OF ABBREVIATIONS AND INITIALS

Assiut University Mycological Center	:	AUMC
Biocontrol agents	:	BCAs
Carbon disulfide	:	C_2S
Chlorophyll	:	Chl
Colony forming unit	:	CFU
Compost	:	COM
Environmental Studies and Research Unit	:	ESRU
Food and Agriculture Organization	:	FAO
Fusarium oxysporum f. sp. *Lactucae*	:	FOL
Increased plant growth response	:	IGR
Internal Transcribed Spacer	:	ITS
Metam sodium	:	MS
Percent	:	%
Polymerase Chain Reaction	:	PCR
Potato dextrose agar	:	PDA
Relative humidity	:	R.H
Rice straw biochar	:	RSB
Total soluble solids	:	T.S.S
Vesicular abuscular mycorrhiza	:	VAM

CONTENTS