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STUDIES ON CUCUMBER DAMPING-OFF AND ROOT-ROT DISEASES UNDER PROTECTIVE CULTIVATION

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ABSTRACT Soil borne pathogens have been reported to attack cucumber at different developmental stages under protective cultivation. *Fusarium solani* Sacc. (Mart.) was the most frequently isolated fungus of total isolates from El-Sharkia and El-Ismailia governorates during 2000 and 2001 growing seasons, followed by *Rhizoctonia solani* Kűhn and *Sclerotium sclerotiorum* (Lib.) de-Bary , while *Pythium* spp. was the least one. *S. sclerotiorum*, *F. solani* + *Pythium* spp. and *F. solani* behaved the highest percentage of pre-, post-emergence damping-off and root-rot respectively. While, *Pythium* spp. caused the lowest percentage of healthy survival plants.

Sandy soil type exhibited the highest percentage of Bablon healthy survival (Susceptible cv.), while clay soil type gave the same result in case of Samen (Resistant cv.). The field holding capacity of 20% resulted in the highest percentage of damping-off and root-rot diseases of both cucumber cv. (Bablon and Samen). Conversely, 40% field holding capacity exhibited the highest percentage of Bablon and Samen healthy survival plants. The most suitable pH was 7.5, which increased the survival plants of both cucumber cvs. and decreased the diseases incidence at the same time.

INTRODUCTION

Cucumbers damping-off and root-rot diseases caused severe losses especially under greenhouse condition, reached in some cases to 100% losses and was generally 64% (Nageo *et al.*, 1994).

Fusarium solani Sacc (Mart.)., *Rhizoctonia solani* Kühn, *Sclerotinia sclerotiorum* (Lib.) de-Bary and *Pythium* spp. were reported by many phytopathologists as the caused organisms of cucumber dampng-off and root-rot diseases (Tello *et al.*, 1990; Zhang *et al.*, 1990; Bedlan, 1992; Wölk and Sarkar, 1994; Abd El-Zaher *et al.*, 1997 and Lin *et al.*, 2001).

Soil type, as well as soil moisture and pH often the most

important factors limiting the plant growth. Many attempts have been made to measure the effect of soil type on root elongation and their relation with soil inhabitants (Chamber and Hardie, 1964 and Bettiol *et al.*, 1997). Water is essential for plant growth. It is needed in much large quantities which need for plant nutrients (Iida *et al.*, 1983). Nutrition and its amendment played an important role in the disease incidence or in contrast, the disease control, such as (reduce the plant root mortality, reduce spore and sclerotial germination or suppressing the fungal action. Singh *et al.*, 1995 and Bettiol *et al.*, 1997.

The soil pH is fluctuating in their favorability from some pathogenic fungi to another (Abada, 1994 and Jeong *et al.*, 1997).

This study was aimed to isolate and identify the causal organisms of cucumber damping-off and root-rot diseases, from different localities at El-Sharkia and El-Ismailia governorates under protective cultivation. The effect of some factors (soil type, soil pH and soil moisture on cucumber damping-off and root-rot diseases incidence, under greenhouse conditions, was also determined.

MATERIALS AND METHODS

1. Survey of disease:

Survey studies of cucumber damping-off and root-rot have been carried out during the two successive growing seasons (2000/2001 and 2001/2002) in different localities of El-Sharkia (El-Salhia, Beni-Hellal and Abo-Hamad) and El-Ismailia (El-Kassasin, El-Tal El-Keber and El-Ismailia) governorates.

Each aforementioned localities was represented by three greenhouses. One hundred plants were chosen from each greenhouse at random sample and the percentage of cucumber damping-off and root-rot was calculated.

II. Isolation, purification and identification of the causal organisms:

1. Isolation and purification of the isolated fungi:

Samples of the disease cucumber roots, exhibiting typical symptoms of damping-off and root-rot diseases collected from different protected greenhouse in El-Sharkia (El-Salhia, Beni-Hellal and Abo-Hamad) and El-Ismailia (El-Kassasin, El-Tal El-Keber and El-Ismailia). Roots of diseased plants were washed carefully with tap water and then cut into small

pieces and divided in two groups; the first one was surface sterilized by immersing it in mercuric chloride solution (1/1000) for two minutes, and washed thoroughly for several times using sterilized distilled water, then used to isolate the internal organisms. The second group was used without sterilization to isolate the surface organisms.

The sterilizated and unsterilizated root-pieces were dried between two sterilized filter papers, plated on plain agar in petri-dishes, and incubated at 20 and/or 28 ± 2°C for 3-5 days. The isolated fungi were purified using single spore and/or hyphal tip techniques as described by Hansen (1926) and Brown (1924).

2. Identification of the isolated fungi:

The isolated fungi from cucmber roots were identified in the laboratory of plant pathology Fac. Agric., Zagazig Univ., Zagazig according to Gilman (1971); Booth (1977); Domsch *et al.* (1980) and Barnett (1998).

III. Pathogenicity tests:

Pathogenicity tests of the isolated fungi was carried out under greenhouse conditions at the Fac. Agric., Zagazig Univ. Pots (20 cm. in diameter) were sterilized by immersing them in 5% formalin solution for 15 minutes, then left for several days to get rid of the poisonous effect of formalin. Sand loam soil (50% sand and 50% loam) was autoclaved at 121°C for two hrs. and left for two weeks before cultivation. Inoculum was prepared by growing isolated fungi each separately in 500 ml. conical flasks containing 200 ml. of autoclaved potato broth liquid medium. Inoculated flasks were incubated at 20°C for seven days for *Pythium* spp. and *Sclerotinia sclerotiorum*, and at 28°C for 10-15 days in case of *Rhizoctonia solani* as well as *Fusarium solani*.

Sterilized pots were filled with (3kg.) autoclaved soil and infested separately with each of fungal inoculum as follows:

The fungal growth was mixed with the soil at the rate of 3-5% of soil weight (v/w). The infested soil was watered and left for 10-15 days before sowing to stimulate the fungal growth and ensure its distribution in the soil. The control pots were inoculated only with the pure sterilized medium at the same rate.

Seeds of Bablon and Samen cucumber cultivars were surface sterilized by immersing them in

0.01% mercuric chloride solution for one minute. Then washed several times with sterile distilled water and left to dry. Sterilized seeds were sown at the rate of 10 seeds/pot and three replicates were used for each particular treatments. All pots were kept under greenhouse conditions at 25-28°C and irrigated when needed.

Disease incidence was recorded as the percentage of pre-emergence damping-off, post-emergence damping-off and healthy survival plants after 15, 30 and 45 days from sowing, respectively. Inoculated fungi were tentatively reisolated from the infected plants and checked microscopically to complete Kockh's postulates.

IV. Factors affecting cucumber damping - off and root - rot disease incidence:

1. Soil type:

The effect of three different soil types (sand, loam and clay) on the incidence of cucumber damping-off and root-rot diseases was studied under greenhouse conditions.

The above mentioned types of soil were autoclaved as mentioned before in pathogen-icity test. The formalin sterilized pots (20 cm in diameter) were divided into two groups for each soil type and filed with autocaved soil. The first groups was infested with one of pathogenic fungi (*F. solani*, *Pythium* spp., *R. solani* and *S. sclerotiorum*) as previously mentioned in pathogenicity test while, the second one was left without infestation to serve as a control treatment.

Pots were planted with tested cultivars at the rates of ten surface sterilized seeds/pot. Three replicates were used in each treatment. Data were recorded as mentioned before in pathogenicity test.

2. Soil moisture content

Four level of sandy loam soil moisture (*i.e.* 20%, 40% and 80% of field holding capacity), were applied. Field holding capacity of soil was determined according to the method described by Rhichards (1954).

Soil in pots was separately infested with *F. solani*, *Pythium* spp., *R. solani* and *S. sclerotiorum* individually as mentioned before in pathogenicity test. Then, the soil moisture contents were adjusted to the required levels using tap water previously stored for several days to get chlorid gas in water.

Adjustment of soil moisture level was carried out every two

days intervals from the beginning of the planting till the end of the experiment.

Equilibrium of both air and water in soil spaces was enhanced by the small pores located beneath the bottom of each pot.

Ten surface sterilized cucumber seeds were sown in each pot. The control treatments were carried out at the same level in un-infested soil. Each particular treatment was replicated three times.

Data were recorded after 15, 30 and 45 days from sowing as the percentage of damping-off and root-rot disease incidence and healthy survival plants.

3. Soil pH:

Soils of different pH values were prepared by mixing the soil with microionized sulpher at 0.0, 2.5 and 5.0% (w/w) or hydrated lime at 5.0% to obtain various degrees of pH (*i.e.* 7.5, 6.5, 5.5 and 8.5), respectively. Three replicates were used for each particular treatment, while three pots were used without infestation to serve as a control.

One week after soil intestation, the all above mentioned treatments were sown with cucumber seeds (10 seeds/pot). The percentage of damping-off and root-rot disease incidence as well as healthy survival plants were calculated after 30 and 45 days respectively as previously mentioned in pathogenicity test.

V. Statistical Analysis

All obtained data were statistically analyzed according to Snedecor and Cochran (1980).

RESULTS AND DISCUSSION

Survey studies have been carried out during the two successive growing seasons (2000/2001 and 2001/2002) in different localities of El-Sharkia (El-Salhia, Bani-Hellal and Abo-Hammad) and El-Ismailia (El-Kassasin, El-Tal El-Keber and El-Ismailia) governorates.

Data in Table (1) indicate that, the frequently isolated fungi were identified as *Fusarium solani* Sacc. (Mart), *Rhizoctonia solani* Kühn, *Sclerotium sclerotiorum* (Lib.) de-Bary and *Pythium* spp.

The aforementioned fungi were isolated and identified from all districts of both El-Sharkia and El-Ismailia governorates. It is also clear that, *F. solani* was the most frequently isolated fungus of total isolates, followed by *R.solani* and *S. sclerotiorum* while *Pythium* spp. was the lowest frequently ones.

Differences in frequency of isolation found between localities might be due to microenvironmental conditions. These pathogenic fungi were previously reported by other workers as the causal organisms of cucumber damping-off and root-rot (Tello *et al.*, 1990; Zhang *et al.*, 1990, Bedlan, 1992, Abd El-Zaher *et al.*, 1997, Celar, 2000 and Lin *et al.*, 2001).

Data presented in Table (2) show the pathogenicity test of the isolated fungi (*F. solani*, *R. solani*, *S. sclerotiorum* and *Pythium* spp.). It is clear that from the data in Table (2), all the isolated fungi were pathogenic and differed in their virulence. *Pythium* spp. gave the lowest percentage of healthy survival plants and high percentage of post-emergence damping-off. While, *F. solani* lead to highest percentage of root-rot.

Differences in the results of pathogenicity tests might be attributed to physiological inhibitors and anatomical changes in plant essential for their pathogenicity success and also to host parasite environmental interaction (Sarhan and Hegazi, 1988). The same results are obtained by Jons *et al.*, (1996) and Liang *et al.*, (1996).

The effectiveness of several soil types (sandy, clay and sandy loam) on cucumber damping-off and root-rot was evaluated under greenhouse condition of Fac. Agric., Zagazig Univ. Data tabulated in Tables (3 and 4) indicate that, sandy soil exhibited the highest percentage of healthy survival plants than clay soil in case of susceptible cultivar (Bablon).

On the other hand, sandy loam soil exhibited the lowest percentage of healthy survival of resistant cultivar (Samen) than sand and clay ones, which showed the highest percentage of survival cucumber plants. These results are in harmony with those obtained by Imohamed, (2000). The environmental condition of sandy soil (good aerification, low water holding capacity) allow good growth of host root thus become resistant to infection. Nevertheless, the condition of clay (bad aerification and high water holding capacity) predispose host root to infection.

Water is essential for plant growth and population in their neighbourhood. It is needed in much larger quantities than are the plant nutrients. The effect of soil moisture content on cucumber disease incidence was studied

Table(1): Frequency of occurring isolated fungi from root-rotted cucumber plants collected from different protected area at different districts of El-Sharkia and El-Ismailia governorates .

Isolates	El-Sharkia (A)							El-Ismailia (B)							
	El-Salhia		Bani-Hellal		Abo-Hammad		Mean of (A)	El-Kassasin		El-Talelkeber		Ismailia		Mean of (B)	Mean of (A) and (B)
	Isolates	Frequency	Isolates	Frequency	Isolates	Frequency		Isolates	Frequency	Isolates	Frequency	Isolates	Frequency		
Pythium spp.	7	17.94	9	25.71	4	14.28	6.67	10	30.30	6	16.21	5	18.51	7.00	6.83
Sclerotinia sclerotiorum	5	12.82	7	20.00	5	17.85	5.67	6	18.18	11	29.72	9	33.33	8.67	7.17
Fusarium solani	12	30.76	12	34.28	9	32.14	11.00	8	24.24	13	35.13	5	18.51	8.67	9.83
Rhizoctonia solani	15	38.46	7	20.00	10	35.71	10.67	9	27.27	7	18.91	8	29.62	8.00	9.33
Total	39	100.00	35	100.00	28	100.00		33	100.00	37	100.00	27	100.00		

Table (2): Pathogenicity test of the pathogenic fungi causing damping-off and root-rot diseases of cucumbers.

Treatment	Pre-emergence Damping - off%	Post-emergence Damping - off%	Root - rot%	Healthy survival%
Control	0.00	0.00	0.00	100.00
Fusarium solani	33.33	20.00	16.66	30.00
Pythium spp.	56.66	20.00	13.33	10.00
Sclerotinia sclerotiorum	66.66	6.66	13.33	13.33
Rhizoctonia solani	60.00	13.33	6.66	20.00
LSD at 5% for				
Cultivars (A)	0.914	N.S.	0.573	1.221
Isolates (B)	0.914	0.591	0.573	1.221
AxB	2.047	N.S.	N.S.	N.S.

Table(3) :Effect of soil type on damping - off and Root -rot disease incidence of Samen cucumber cultivar, under greenhouse conditions.

Soil type	Pre - emergence%						Post emergence%						Root - rot%						Healthy survival%					
	Pythium spp.	*S. sclerotiorum*	*F. solani*	*R.solani*	control	Average	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	*R. solani*	control	Average	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	*R. solani*	control	Average	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	*R. solani*	control	Average
Sandy	26.60	30.00	26.60	16.60	0.00	19.96	20.00	16.6	30.00	13.30	0.00	15.98	6.60	6.60	11.60	20.0	0.00	8.96	46.60	46.60	20.00	50.00	100.0	52.6
Clay	20.00	20.00	11.60	30.00	0.00	16.32	0.00	20.0	23.30	3.30	0.00	9.32	3.30	6.60	20.00	10.0	0.00	7.98	76.60	50.00	33.30	66.60	100.0	65.3
Sandy loam	36.60	46.60	30.00	50.00	0.00	32.64	3.30	6.60	23.30	23.30	0.00	11.30	16.60	10.00	16.60	16.6	0.00	11.9	43.30	36.60	23.30	6.60	100.0	41.9
Average	27.73	32.20	22.73	32.20	0.00		7.77	14.4	25.53	13.30	0.00		8.83	7.73	16.07	15.5	0.00		55.50	44.40	25.53	41.07	100.0	

LSD at 5% for

Fungi (A)	**0.848**	**0.651**	**0.657**	**1.404**
Soil type (B)	**0.657**	**0.503**	**N.S.**	**1.086**
AxB	**1.471**	**1.126**	**N.S.**	**2.433**

Table(4) :Effect of soil type on damping - off and Root -rot disease incidence of Bablon cucumber cultivar, under greenhouse conditions.

Soil types	Pre - emergence%						Post emergence%						Root - rot%						Healthy survival%					
	Pythium spp.	*S. sclerotiorum*	*F.solani*	*R. solani*	control	Average	*Pythium* spp.	*S.sclerotiorum*	*F.solani*	*R. solani*	control	Average	*Pythium* spp.	*S. sclerotiorum*	*F.solani*	*R.solani*	control	Average	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	*R. solani*	control	Average
Sandy	60.00	83.00	50.00	40.00	0.00	46.60	3.30	9.00	10.00	6.60	0.00	3.98	0.00	10.00	26.60	13.3	0.00	9.98	0.37	6.60	13.30	40.00	100.00	32.0
Clay	66.60	53.00	43.00	36.60	0.00	39.84	16.60	10.0	10.00	23.30	0.00	11.98	13.30	13.00	23.00	16.6	0.00	13.1	3.30	23.0	23.00	23.30	100.00	34.5
Sandy loam	63.30	20.00	86.60	56.60	0.00	45.30	11.60	20.0	10.00	13.30	0.00	10.98	10.00	16.00	3.30	20.0	0.00	9.86	3.30	43.0	0.00	10.00	100.00	31.2
Average	63.30	52.00	59.87	44.40	0.00		10.50	10.0	10.00	14.40	0.00		7.77	13.00	17.63	16.6	0.00		2.32	24.2	12.10	24.43	100.00	

LSD at 5% for

Fungi (A)	**0.895**	**0.680**	**0.706**	**0.755**
Soil type (B)	**N.S.**	**0.527**	**N.S.**	**0.585**
AxB	**1.552**	**1.178**	**1.222**	**1.312**

Table(5) :Effect of different field holding capacity on the percentage of Samen cucumber cultivar damping - off and root - rot disease incidence, under greenhouse conditions.

Moisture level	Pre - emergence%						Post emergence%						Root - rot%						Healthy survival%					
	Pythium spp.	*S. sclerotiorum*	*F. solani*	*R.a solani*	control	Average	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	*R. solani*	control	Average	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	*R. solani*	control	Average	Pythium spp.	*S. sclerotiorum*	*F. solani*	*R. solani*	control	Average
20%	13.33	10.00	13.33	13.33	6.66	11.33	10.00	6.66	13.33	16.66	10.00	11.33	20.00	23.33	16.66	13.33	6.66	16.00	56.66	60.00	56.66	56.66	76.66	61.3
40%	3.33	3.33	10.00	6.66	0.00	4.66	6.66	3.33	6.66	3.33	0.00	4.00	3.33	6.66	3.33	6.66	0.00	4.00	86.66	86.66	80.00	83.33	100.00	87.3
60%	6.66	3.33	6.66	3.33	0.00	4.00	6.66	6.66	6.66	6.66	3.33	5.99	10.00	10.00	6.66	13.33	6.66	9.33	76.66	80.00	80.00	76.66	90.00	80.6
80%	10.00	10.00	6.66	6.66	6.66	8.00	10.00	13.33	10.00	6.66	10.00	10.00	13.33	13.33	13.33	13.33	6.66	12.00	66.66	63.33	70.00	73.33	76.66	70.0
Average	8.33	6.67	9.16	7.50	3.33		8.33	7.50	9.16	8.33	5.83		11.67	13.33	10.00	11.66	5.00		71.66	72.50	71.67	72.50	85.83	

LSD. at 5% for

Soil moisture (A)	0.485	0.534	0.511	0.674
Fungi (B)	N.S.	N.S.	0.574	0.751
AxB	N.S.	N.S.	N.S.	N.S.

Table(6) :Effect of different field holding capacity on the percentage of Bablon cucumber cultivar damping - off and root - rot disease incidence, under greenhouse conditions.

Moisture level	Pre - emergence%						Post emergence%						Root - rot%						Healthy survival%					
	Pythium spp.	*S. sclerotiorum*	*F. solani*	*R.a solani*	control	Average	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	*R. solani*	control	Average	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	*R. solani*	control	Average	Pythium spp.	*S. sclerotiorum*	*F. solani*	*R. solani*	control	Average
20%	20.00	16.66	13.33	10.00	10.00	14.00	13.33	10.00	13.33	16.66	10.00	12.66	13.33	16.66	6.66	16.66	10.00	12.66	53.33	56.66	66.66	60.00	70.00	61.3
40%	6.66	3.33	13.33	10.00	0.00	6.66	10.00	6.66	3.33	3.33	0.00	4.66	6.66	10.00	6.66	6.66	0.00	6.00	76.66	80.00	76.66	80.00	100.00	82.6
60%	10.00	6.66	16.66	13.33	3.33	10.00	10.00	10.00	6.66	6.66	0.00	6.66	6.66	10.00	10.00	3.33	0.00	6.00	73.33	73.33	66.66	76.66	96.66	77.3
80%	13.33	6.66	6.66	6.66	3.33	7.33	13.33	16.66	10.00	13.33	6.66	12.00	10.00	10.00	6.66	3.33	3.33	6.66	63.33	66.66	76.66	76.66	86.66	73.9
Average	12.50	8.33	12.50	10.00	4.17		11.67	10.83	8.33	10.00	4.17		9.16	11.67	7.50	7.50	3.33		66.66	69.16	71.66	73.33	88.33	

LSD. at 5% for

Soil moisture (A)	0.371	0.483	0.445	0.700
Fungi (B)	0.414	N.S.	0.497	0.783
AxB	N.S.	N.S.	N.S.	N.S.

Table(7) :Effect of soil PH on the percentage of damping - off and root - rot disease incidence of cucumber Bablon cultivar, under greenhouse.

pH level	Pre - emergence%						Post emergence%						Root - rot%						Healthy survival%					
	R. solani	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	control	Average	*R. solani*	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	control	Average	*R. solani*	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	control	Average	*R. solani*	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	control	Average
5.5	13.33	16.66	10.00	6.66	6.66	10.66	26.66	13.33	16.66	13.33	13.33	16.66	16.66	13.33	3.33	6.66	6.66	9.33	43.33	56.66	70.00	73.33	73.33	63.3
6.5	6.66	13.33	16.66	6.66	3.33	9.33	26.66	16.66	10.00	13.33	10.00	15.33	13.33	6.66	10.00	13.33	3.33	9.33	53.33	63.33	63.33	66.66	83.33	66.0
7.5	6.66	0.00	3.33	6.66	3.33	4.00	10.00	6.66	0.00	3.33	3.33	4.66	3.33	0.00	3.33	3.33	0.00	2.00	80.00	93.33	93.33	86.66	93.33	89.3
8.5	23.33	16.66	20.00	23.33	16.66	20.00	16.66	23.33	26.66	33.33	23.33	24.66	13.33	16.66	23.33	16.66	20.00	18.00	46.66	43.33	30.00	26.66	40.00	37.3
Average	12.50	11.66	12.50	10.83	7.50		20.00	15.00	13.33	15.83	12.50		11.66	9.16	10.00	10.00	7.50		55.83	64.16	64.17	63.33	72.50	

LSD. at 5% for

Fungi (A)	N.S.	N.S.	N.S.	1.009
pH level (B)	0.443	0.565	0.357	0.903
AxB	N.S.	N.S.	0.803	N.S.

Table(8) :Effect of soil PH on the percentage of damping - off and root - rot disease incidence of cucumber Samen cultivar, under greenhouse.

pH level	Pre - emergence%						Post emergence%						Root - rot%						Healthy survival%					
	R. solani	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	control	Average	*R. solani*	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	control	Average	*R. solani*	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	control	Average	*R. solani*	*Pythium* spp.	*S. sclerotiorum*	*F. solani*	control	Average
5.5	23.33	20.00	26.66	13.33	16.66	20.00	20.00	16.66	23.33	20.00	13.33	18.66	20.00	23.33	16.66	6.66	6.66	14.66	36.67	40.00	33.33	60.00	63.33	46.6
6.5	16.66	13.33	6.66	13.33	10.00	12.00	13.33	20.00	23.33	26.66	6.66	18.00	20.00	10.00	13.33	23.33	3.33	14.00	50.00	56.66	56.66	36.66	80.00	56.0
7.5	3.33	6.66	3.33	10.00	3.33	5.33	6.66	13.33	13.33	3.33	3.33	8.00	6.66	3.33	3.33	3.33	6.66	4.66	83.33	76.66	80.00	83.33	86.66	82.0
8.5	26.66	23.33	23.33	20.00	23.33	23.33	36.33	33.33	23.33	36.33	20.00	29.86	20.00	23.33	13.33	16.66	16.66	18.00	17.00	20.00	40.00	27.00	40.00	28.8
Average	17.50	15.83	15.00	14.17	13.33		19.08	20.83	20.83	21.58	10.83		16.67	15.00	11.66	12.50	8.33		46.75	48.33	52.50	51.75	67.50	

LSD. at 5% for				
Fungi (A)	N.S.	0.517	0.552	1.012
pH level (B)	0.452	0.460	0.491	0.906
AxB	N.S.	1.031	1.103	2.026

under greenhouse conditions.

Data in Tables (5 and 6) reveald that, 40% field holding capacity exhibited the highest percentage of Samen and Bablon cucumber cultivars (resistant and susceptible ones) healthy survival plants. While, 20% field holding capacity resulted in the highest percentage of cucumber damping-off and root-rot diseases in both cucumber cvs. These results were also in accordance with those obtained by Zhang *et al.*(1990) and Paternotte (1992).

Soil pH played an important role in the disease incidence. Data obtained in Table (7 and 8) reveled that, the most suitable soil pH was 7.5, which increased the survival plants and decreased the percentage of damping-off and root-rot disease incidence.

Also, data indicated that, the pH 8.5 of soil was not favorable for healthy survival plants. Soil with pH 7.5 favorable for *Pythium* spp. and *S. sclerotiorum*, while soils with pH 8.5 were less favorable for *F. solani* and *S. sclerotiorum*. These findings was confirmed by several research workers, among them Dan-Jensen (1992); Abada (1994) and Jeong *et al.* (1997).

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دراسات علي أمراض موت بادرات وعفن جذور الخيار تحت الزراعات المحمية

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توجد العديد من المسببات المرضية الموجودة بالتربة وتهاجم الخيار خلال مراحل نموه المختلفة تحت نظم الزراعات المحمية:

تم عزل فطر فيوزاريوم سولاني بأعلى معدل تكراري للفطريات المعزولة متبوعاً بفطر ريزوكتونيا سولاني ثم سكليروشيوم سكليرتيورم، بينما كان جنس البيثيوم أقلهم جميعاً في تكرار عزله. وما سبق كان علي مستوي نطاق محافظتي الشرقية والإسماعيلية خلال موسمي ٢٠٠١، ٢٠٠٢.

سبب فطر سكليروشيوم سكليروتيورم أعلي نسبة حدوث مرض الموت ما قبل الظهور فوق سطح التربة. بينما تسبب كلاً من فطر فيوزاريوم سولاني وجنس البيثيوم في مرض الموت ما بعد الظهور فوق سطح التربة. بينما كان الفطر فيوزاريوم سولاني أكثر تلك الفطريات سبباً في حدوث مرض عفن الجذور هذا وقد تسبب جنس البيثيوم في الحصول علي أقل نسبة للنباتات الحية.

إتضح من الدراسة أنه لتقليل حدوث أمراض الخيار وبالتالي زيادة النباتات الحية لكلا صنفي الخيار (بابلون و سامين) هو الزراعة في تربة رملية أو طميية ذات ٤٠% سعة حقلية وذات رقم الأس ايدروجيني ٧,٥.