J. Agric. Sci. Mansoura Univ., 27(10): 6709 - 6718, 2002

RESPONSE OF CERTAIN MUNGBEAN (*Vigna radiata* (L.) Wilczek) CULTIVARS TO SOIL BORNE FUNGI AND ROOT-KNOT NEMATODE

Abd El-Moity, Samiha M.H.*,Sawsan A.S.M* and M.A.M. El-Saedy**

*** Institute of Plant Pathology, Agric. Res. Center, Sabahia, Alex. Egypt,**

**** Dept. of Plant Pathology, Fac. of Agric., El-Shatby, Alex. Univ. Egypt**

ABSTRACT

Seven mungbean cultivars were studied under greenhouse and field conditions for their response to soil-borne fungi and root-knot nematode, *Meloidogyne incognita*. In greenhouse experiment, all cultivars were found to be highly susceptible to *R. solani* except V 2010 cultivar which was found moderately susceptible. The cultivars V 2010, L. 275, VC 1000 and Ganyang-Xia were less susceptible to *F. oxysporum*. However, the cultivars T44 and L.64 were moderately susceptible. In case of *M. phaseolina*, all cultivars were found to be less susceptible and V 2010 cultivar was the best. The cultivar L. 275 was susceptible to *M. incognita* while L 64, V 2010, T44 and VC 1000 were moderately susceptible. The cultivars Ganyang-Xia and VC 1000 were resistant. Under field natural infection, L. 64 cultivar gave the highest percentage of survival plants.

Keywords: Wilt, Pre-emergance, Post-emergence, *Fusarium, Rhizoctonia, Macrophomina, Meloidogyne, Mungbean, Vigna, Soil borne fungi.*

INTRODUCTION

Mungbean, *Vigna radiata* L. (Wilczek) has been recently receiving considerable attention as a leguminous crop grown in Egypt. It is cultivated in different type of soils due to its early maturation and high yielding nutritional seed crop, 800-1000 kg/feddan (Mosalem, 1999), and drought resistance (Ashour *et al.*, 1993). It also used as summer forage legume (Abd El-Sattar *et al.*, 2000). The seeds contain about 25-28 % protein and 52-65% carbohydrates. In addition to its high protein and vitamin C contents, its flour is used for making bread and as a source of starch production (Abdel-Lateef, 1996).

Many investigators have dealt with a variety of root infecting fungi in mungbean such as *Rhizoctonia solani*, *Macophomina phaseolina* and *Fusarium oxysporum* (Vidhyasekaran *et al.*, 1978; Camporota 1982; Charya and Reddy, 1982; Nik, 1983; Saxena, 1984; Anderson, 1985; Bhate *et al.* 1985; Kaushik *et al.*, 1987; Shahzad and Ghaffar, 1996 and Devi and Snigh 1997).

Root-knot nematode, *Meloidgyne incognita* was repored to cause a severe damage to mungbean roots (Ali, 1995; Fazal *et al.*, 1996; Shahzad and Ghaffar, 1996; and Samathanam and Sethi; 1997).

Cultivation of resistant cultivars is considered the best method for diseases management. In this respect, several authors tested different mungbean cultivars against the causal pathogens of root-rots, wilt diseases and root-knot nematode (Vidhyasekaran *et al.*, 1978; Charya and Reddy,

1982; Nik, 1983; Bhate *et al.*, 1985; Kaushik *et al.*, 1987; Abdul Hamid *et al.*, 1993; Devi and Snigh, 1997 and Abd El-Moity and Ghowail. 2002).

The present study was planned to determine the relative susceptibility and plant growth behavior of seven cultivars of mungbean to the infection with root-rot (*R. solani* and *M. phaseolina*) and wilt (*F. oxysporum*) fungal pathogens as well as root-knot nematode, *M. incognita* in greenhouse and in the field.

MATERIALS AND METHODS

I. Greenhouse experiment

Seven mungbean cultivars namely L. 275, L.64, Ganyang-xia, V 2010, T 44, VC 2719 and VC 1000 were tested for their susceptibility to *R. solani*, *F. oxysporum*, *M. phaseolina* and root-knot nematode, *M. incognita*.

Isolation and identification of root-rot and wilt fungi:

Mungbean root samples were collected from Agriculture Research Station, Faculty of Agriculture, Alexandria University Egypt. Roots and basal stems of diseased plants showing typical symptoms of root-rot and wilt diseases were carefully washed with running tap water, cut into small pieces, surface sterilized by immersing in 2 % sodium hypochlorite for 3 minutes, then washed twice in sterilized distilled water. The sterilized plant pieces were dried between two sterilized filter papers, placed on potato-dextrose agar (PDA) medium and incubated at 25°C for one week. The isolated colonies were purified by using the single spore or hyphal tip techniques, and then identified according to their morphological characters using compound microscope depending on the descriptions of Gillman (1957), Booth (1971) and Barnett and Hunter (1972). Stock cultures were maintained on PDA slants and kept in refrigerator at 5°C for further studies.

Nematode inoculum preparation

The root-knot nematode, *M. incognita* culture was reared on eggplant (*Solanum melongena* L.) cv. Black Beauty from a single egg mass in the greenhouse. Nematode eggs were extracted from infected eggplant roots with sodium hypochlorite according to Hussey and Barker, 1973.

Pathogenicity test:

This experiment was done to determine the pathogenic potential of the most important fungi isolated from diseased mungbean plants. Sterlized pots, 15 cm in diameter were potted with autoclaved sandy clay soil (1:1, V:V) and infested with inocula at the rate of 5 % (W:W) of *R. solani*, *F. oxysporum* and *M. phaseolina*. Inocula were prepared by growing the fungi on autoclaved sand-sorghum grains medium (25 : 75 W/W) in 500 ml bottels and incubated at 25 C for 2 weeks. Ten surface sterlized seeds of mungbean VC 1000 were planted in each pot, 7 days after soil inoculation. Pots were irrigated daily. Data of wilt and root-rot diseases were recorded after 30 days.

Reaction of mungbean cultivars to the tested fungi

Sterilized pots, 15 cm in diameter, were filled with autoclaved sandy clay soil (1:1, V:V) and infested with *M. phaseolina*, *F .oxysporum* and *R. solani* at the rate of 3 % of soil weight.

Five surface sterilized seeds of each seven mungbean cultivars were planted in each pot, 7 days after soil infestation. Non infested pots were served as control treatments. Pre- and post-emergence damping-off were recorded. The tested cultivars were classified according to the following groups: the first group includes least susceptible, cultivars which showed more than 75% healthy plants, the second group includes moderately susceptible cultivars, showing 50-75% healthy plants and the third group includes highly susceptible cultivars showing less than 50% healthy plants.

Reaction of mungbean cultivars to *M. incognita*

Pots (15 cm diameter) with five seedlings each, 7 days old were used for each cultivar. Pots were inoculated with 10.000 nematode egg/pot. Nematode inocula were pipetted into 5 holes in the soil around the root system.

The experiment was terminated 45 days after nematode infestation. Galled roots were placed in an aqueous solution of phloxin B (0.15 g/L water) for 15 min to expose the nematode egg masses. Numbers of root galls and egg masses were determined. Roots were rated for resistance and susceptibility according to the numbers of egg masses. Plants with average numbers of 0-10 egg masses were considered resistant, 11-50 as moderately susceptible, 51-100 as susceptible and more than 100 egg masses as highly susceptible.

The experiment was laid out in factorial in a complete randomized block design with four replicates. At the end of experiment both length and dry weight of roots and shoots were determined. The data were statistically analyzed according to Snedecor and Cochran (1982).

II- Field experiments

The field experiment was conducted at Agricultural Research Station of Faculty of Agriculture, Alexandria University, Egypt, during the summer of 1999 and 2000 seasons. A randomized complete block design with four replicates was used in each year. The field was divided into 28 plots. Each plot with 5 rows at 0.6 m apart and 3.0 m long. Seven cultivars, L.275, L64, Gayang-xia, V 2010, T 44, VC 2719 and VC 1000 were planted.

Two seeds of each cultivar were placed in hills of 10 cm within rows. Before sowing, mungbean seeds were inoculated with the specific *Rhizobium* strain obtained from the General Organization of Agricultural Egnalization Fund (GOAEF), Ministry of Agriculture, Egypt, then sown in 15 and 17 May of 1999 and 2000 seasons, respectively. Other cultural practices were applied according to mungbean recommendations to each plot. All plants were counted after complete emergence, and before harvest to calculate the percentage of pre- and post-emergence damping off as well as healthy survived plants. The yield of each mungbean cultivar was determined. Data were statisticaly analyzed according to Snedecor and Cochoran (1982).

RESULTS AND DISCUSSION

I. Greenhouse experiment

Pathogcenicity test

Pathogcenicity of the tesed fungi against mungbean VC 1000 cultivar indicated that the fungi *R.solani, M. phaseolina* and *F. oxysporum* were pathogenic but *R.solani* was more pathogenic than the other fungi. Pre-emergance damping-off was more than post-emrgence damping-off.

Cultivar susceptibility

Data in Table (1) indicate that all the tested fungi were pathogenic but varied in their virulence according to pre- and post-emergence damping-off. *R.solani* had the highest percentage of pre-emergence damping-off (58.09%) followed by *F.oxysporum* (25.5 %). However, *M. phaseolina* caused the lowest percentage (4.8 %). On the other hand, *M.phaseolina* had the highest percentage of post-emergence damping-off (10.2 %) followed by *R. solani* (9.5 %) and *F. oxysporum* (3.4 %). Similar results were obtained by Abou-Zeid *et al.*, 1987 whom found that the average of pre-emergence damping-off was higher than that recorded of post-emergence damping-off in soybean.

Data also indicated that *R.solani* infested soil showed that cultivar V2010 was moderately susceptible (53.4% healthy plants) However, the other cultivars were highly susceptible (13.4% to 40%) such data is in agreement with finding abtained by Anderson, (1986) and Anamika and Khare, 1998). In case of *F. oxysporum*, the cultivars V 2010, L.275, VC 1000 and Ganyang-xia were least susceptible (95.2, 90.5, 80.0 and 76.2%), respectiviely and the cultivars VC 2719 and T44 were moderately susceptible (61.9, 52.4%) respectiviely. However, L.64 was highly susceptible (41.6%). All tested cultivars were resistant to *M. phaseolina* (76.2 % to 95.5 %) but V 2010 cultivar was the best (95.5%). Such data is in agreement with findings abtained by Nik, (1983), Bhate *et al.*(1985) and Devi and Singh (1997). Bhate *et al.* (1985) found that of 24 cultivars of *V. radiata* tested in a plot infested with *M. phaseolina*, 12 were moderately resistant, 11 moderately susceptible and 1 highly susceptible.

Data in Table (2) showed the reaction of the tested cultivars against root-knot nematode, *M. incognita.* Results indicated that the cultivar L.275 was susceptible to *M. incognita* as a great numbers of root galls (103.3) and nematode egg masses (81.7) were observed on the infected roots. The cultivars L.64, V 2010, T44 and VC1000 were considered moderately susceptible. On the other hand, the cultivars Ganyang-xia and VC 2719 could be considered as resistant cultivars which showed the lowest numbers of galls and egg masses (11.7 and 6.3) and (14.3 and 5), respectively. Similar results were obtained by Abdul Hamid *et al.*, 1993, whom found that of six mungbean cultivars and accessions there were one highly resistant and one moderately resistant. Other accessions showed varing degrees of susceptibilty.

Table 1: Percentage of pre and post-emergence damping-off caused by soil-borne fungi and survival plants of different mungbean cultivars

Cultivar	Pre-emergence (%)					Post-emergence (%)					Survival plants (%)				
	M. phase-olina	*F. oxyspo-rum*	*R. solani*	Control	Mean	*M. phase-olina*	*F. oxyspo-rum*	*R. solani*	Control	Mean	*M. phase-olina*	*F. oxyspo-rum*	*R. solani*	Control	Mean
L. 275	0.0 d	9.5 c	73.4 ab	0.0 d	27.6 BC	14.3 b	0.0 C	13.2 b	0.0 C	9.2 A	85.7 bc	90.5 b	13.4 d	100 a	63.2 B
L. 64	14.3 c	48.9 b	86.6 a	0.0 d	49.9 A	9.5 b	9.5 b	0.0 c	0.0 C	6.4 A	76.2 bc	41.6 cd	13.4 d	100 a	43.7 C
Ganyang-xia	9.5 c	19.1 c	46.6 b	0.0 d	25.1 B	4.8 b	4.8 b	13.4 b	0.0 C	7.6 A	95.7 bc	76.2 bc	40.0 cd	100 a	67.3 A
V 2010	0.0 d	0.0 d	40.0 b	0.0 d	13.3 C	4.5 b	4.8 b	6.6 b	0.0 C	5.3 A	95.5 ab	95.2 ab	53.4 cd	100 a	81.4 A
T 44	4.8 c	42.9 b	40.0 b	0.0 d	29.2 B	9.5 b	4.8 b	26.6 a	0.0 C	13.6 A	85.7 bc	52.4 cd	33.4 d	100 a	57.2 BC
VC 2719	4.8 c	38.1 bc	53.4 b	0.0 d	32.1 B	14.3 b	0.0 C	6.6 b	0.0 C	7.0 A	81.0 bc	61.9 c	40.0 cd	100 a	61.0 BC
VC1000	0.0 d	20.0 C	66.6 ab	0.0 d	28.9 B	14.3 b	0.0 C	0.0 C	0.0 C	4.8 A	85.7 bc	80.0 bc	33.4 d	100 a	66.4 B
Mean	4.8 c	25.5 B	58.09 A	0.0 C		10.02	3.4 B	9.5 A	0.0 B		83.8 B	71.1 c	32.4 D	100 A	

Means followed by the same small or capital letter(s), in columns and rows for each character, are not significantly different at $p = 0.05$

Table 3: Root and shoot length of mungbean cultivars infected with soil-borne fungi and root-knot nematode, *Meloidogyne incognita*

Cultivar	Root length (cm)						Shoot length (cm)					
	M. phase-olina	*F. oxyspo-rum*	*R. solani*	*M. incog-nita*	Control	Mean	*M. phase-olina*	*F. oxyspo-rum*	*R. solani*	*M. incog-nita*	Control	Mean
	19.0 bc	12.3 c	17.0 bc	16.7 bc	28.7 ab	18.7 AB	18.7 bc	17.7 bc	15.0 c	19.0 bc	19.3 bc	17.9 B
L. 64	10.7 cd	23.0 bc	11.3 cd	15.3 c	34.3 a	18.9 AB	17.00 c	24.7 b	11.3 c	20.7 bc	28.3 ab	20.4 AB
Ganyang-xia	19.7 bc	11.7 c	12.3 c	14.3 c	33.7 a	18.3 AB	14.7 bc	14.7 c	11.7 c	19.7 bc	28.3 ab	18.8 B
V 2010	19.0 bc	23.0 bc	16.0 bc	14.3 c	34.7 a	21.4 A	20.3 bc	22.0 bc	18.0 bc	20.3 bc	32.0 a	22.5 A
T 44	20.3 bc	17.7 bc	17.0 bc	14.7 c	31.3 a	20.2 A	19.0 bc	24.3 b	12.7 c	19.3 bc	29.3 ab	20.9 AB
VC 2719	12.7 c	18.7 bc	4.0 d	15.3 c	29.0 ab	16.0 B	15.0 c	22.0 bc	4.0 d	23.0 bc	29.7 ab	18.7 B
VC 1000	23.3 b	14.3 c	12.0 c	15.7 c	32.3 a	19.5 A	18.7 bc	22.0 bc	12.7 c	21.0 bc	25.0 ab	9.9 AB
Mean	17.8 B	17.2 B	12.8 C	15.2 BC	32.1 A		18.3 C	21.0 B	12.2 D	20.4 BC	27.4 A	

Means followed by the same small or capital letter (s), in columns and rows for each character, are not significantly different at $p = 0.05$

Table 2:Number of root galls and egg masses of *Meloidogyne incognita* developed on mungbean cultivars

Cultivar	Number of nematode		Reaction*
	Galls	Egg masses	
L. 275	103.3 a	81.7 a	S
L. 64	53.3 b	37.3 b	MS
Ganyang-xia	11.7 d	6.3 cd	R
V 2010	13.3 d	11.3 cd	MS
T 44	16.3 cd	15.0 c	MS
VC 2719	14.3 d	5.0 d	R
VC 1000	20.3 c	10.3 cd	MS

*** S = Susceptible, MS = Moderately susceptible, R = Resistant. Values within each column followed by the same letter(s) are not significantly different at *p* = 0.05**

Root and shoot length

Data recorded in Table (3) clearly indicate that there are significant differences between infected and noninfected plants in both root and shoot lengths. *R. solani* and *M. incognita* caused the least values of root and shoot lengths (12.8 and 15.2 Cm) respectively. The mungbean cultivar V2010 gave the best result of root and shoot lengths under the conditions of the experiment.

Root and shoot dry weight

Data in Table (4) showed that there were significant differences between infected and noninfected plants in both root and shoot dry weights. *M. incognita* caused the least values of root dry weight (0.078gm). However *M. phaseolina* gave the highest value of root dry weight (0.206gm). *F. oxysporum* caused the highest value of shoot dry weight (0.817gm) However *M. incognita, M. phaseolina* and *R. solani* caused the least values (0.606, 0.596 and 0.576gm) respectively.

The mungbean cultivar V2010 and Ganyang-xia gave the best results of root and shoot dry weight under the conditions of the experiment.

II. Field experiment

Data in Table (5) shows the reaction of the 7 tested mungbean cultivars to soil borne fungi under the natural infection at two successive seasons, 1999 and 2000.

According to percentage of survival plants, it was found that the best cultivars at 1999 season were L.275, L.64 and T44 (66.4%, 65.8% and 61.4%) respectively. Hcwever the cultivars L.64 and VC 2719 were the best at the second season (83.3% and 76.2%) respectively. Vidhyasekaran *et al.* (1978) found, in field trials with 19 tolerant lines of *Phaseolus aureus* (*V. radiata),* that only 2 lines showed consistent high resistance to root-rot.

For seed yield, the cultivars Gayang-xia, VC2719 and V 2010 gave the highest values (2.17, 1.98 and 1.92 kg/plot), respectively at the first season and the cultivars V 2010 and T44 at the second season (2.27 and 1.99 kg/plot) respectively. Therefor, these cultivars could be of great value for mungbean growers.

Table 4: Root and shoot dry weight of mungbean cultivars infected with soil-borne fungi and root-knot nematode, *Meloidogyne incognita*

Cultivar	Root dry weight / plant (gm)						Shoot dry weight / plant (gm)					
	M. phase-olina	*F. oxyspo-rum*	*R. solani*	*M. incog-nita*	Control	Mean	*M. phase-olina*	*F. oxyspo-rum*	*R. solani*	*M. incog-nita*	Control	Mean
	0.197 c	0.089 d	0.145 cd	0.070 d	0.217 c	0.141 BC	0.609 b	0.478 bc	0.615 b	0.467 bc	0.624 b	0.557 B
L. 64	0.249 c	0.114 cd	0.179 bc	0.075 d	0.574 a	0.238 A	0.594 b	0.775 b	0.280 c	0.754 b	1.086 ab	0.700AB
Ganyang-xia	0.186 c	0.352 bc	0.185 c	0.055 d	0.358 bc	0.227 A	0.623 b	1.053 ab	0.626 b	0.576 b	1.194 ab	0.815 A
	0.283 bc	0.094 d	0.210 c	0.061 d	0.420 b	0.214 A	0.647 b	0.901 ab	1.058 ab	0.522 bc	1.235 a	0.873 A
T 44	0.248 c	0.169 c	0.164 c	0.095 d	0.320 bc	0.199AB	0.724 b	0.981 ab	0.736 b	0.535 b	1.045 ab	0.804 A
VC 2719	0.119 cd	0.136 cd	0.031 d	0.068 d	0.214 c	0.114 C	0.345 bc	0.875 ab	0.079 c	0.587 b	0.997 ab	0.577 B
VC 1000	0.164 c	0.140 cd	0.094 d	0.128 cd	0.213 C	0.147 BC	0.631 b	0.653 b	0.638 b	0.801 ab	0.910 ab	0.727AB
Mean	0.206 B	0.157 CB	0.144 C	0.078 D	0.331 A		0.596 C	0.817 B	0.576 C	0.606 C	1.013 A	

Means followed by the same small or capital letter (s), in columns and rows for each character, are not significantly different at $p = 0.05$.

Table 5:Response of mungbean cultivars to natural infection with soil-borne fungi under field conditions

Cultivar	Summer 1999			Summer 2000		
	Pre- & post-emergence damping-off	*Healthy survival*	*Yield/plot* (Kg)	*Pre- & post-emergence damping-off*	*Healthy survival*	*Yield/plot* (Kg)
L. 275	33.6 b	66.4 a	1.88 bc	36.5 a	63.0 c	1.64 d
L. 64	34.2 b	65.8 a	1.86 bc	16.8 c	83.3 a	1.06 f
Ganyang-xia	40.1 ab	59.9 bcd	2.17 a	29.0 ab	71.0 bc	1.80 c
V2010	48.1 ab	51.9 d	1.92 b	32.4 ab	67.6 bc	2.27 a
T 44	38.6 b	61.4 abc	1.75 c	32.9 ab	67.1 bc	1.99 b
VC 2719	49.3 a	50.7 d	1.98 b	23.9 bc	76.2 ab	1.35 e
VC 1000	44.9 ab	55.1 cd	1.88 bc	30.0 ab	70.0 bc	1.74 cd

Means followed by the same letter (s), in each column, are not significantly different at p = 0.05.

REFERENCES

Abd El-Lateef, E.M. (1996). Mungbean (*Vigna radiata* (L) Wilczek) yield response to late, foliar application nitrogen and potassium under different levels of phosphatic fertilization. Proc. 7th Conf. Agronomy, 9-10 Sep. 1996, 229-237.

Abd El-Moity; M.H. Samiha and I. Salma; Ghowail. (2002). Effect of soil type on root-rot diease of mungbean (*Vigna radiata* (L.) Wilczek) cultivars. Egypt, J. Appl. Sci., 17(11).

Abd El-Sattar, A.M.; M.M. Shaaban and M.F. El-masry. (2000). Yield potential and nutrients uptake and utilization of some vigna genotypes. Minufiya J. Agric. Res., 25: 969-986.

Abou-Zeid, N.M.; Mona M. Ragab and K.A. Abada. (1987). Comparison of soybean cultivars in relation to their susceptibility to root-rot and wilt diseases. Agric. Res. Rev., Egypt, 65: 255-261.

Abdul Hamid wani, Mashkoor M.Allam and Anjum, P. Ansari (1993). Evaluation of cultivars and accessions of mungbean against *Meloidogyne incognita*. Ann. appl. Biol. 122:120-121.

Ali. S.S. (1995). Nematodes associated with mungbean in Gwalior district. Indian Journal of Pulses Research, 8: 100-101.

Anamika Tiwari and M.W. Khare (1998). Variability among isolates of *Rhizocotonia solani* infecting mungbean. Indian Phytopathology, 51(4) 334-337.

Anderson, T.R. (1985). Root-rot and wilt of mungbean in Ontario. Canadian Plant Disease Survey 65 (1): 3-5 (c.f. Rev. Plant Pathology. 65 (3): 1643).

Ashour. N.I.; T.G. Behairy; E.M. Abd El- Lateef and M.M. Selim (1993). Mungbean (*Vigna radiata*, L., Wilczek). A new introduction crop in Egypt. Effect of planting date on growth and yield. Bull. NRC. Egypt. 18 (4): 325-334.

Barnett, H. L. and M. A. Hunter. (1972). Illustrated Genera of Imperfect Fungi. Burgess Publ. Com., Academic Press 241 pp.

Bhate, S.B; P.G. Utikar and P.A. Shinde. (1985). Reaction of mung bean varieties to damping-off and root-rot. Journal of Maharashtra Agricukltual Universities 10: (2) 230. (c.f. Rev. Plant Pathology. 65: 1016).

Booth, C. (1971). The genus Fusarinm. CMI, Kew, Surray, England, pp. 237.

Camporota, P. (1982). Research on the ecology of parasitic fungi in the soil. XVII. Measurement of the infections potential of soils and substrates infested by *Rhizoctonia soloni* Kühn, causal agent of seedling daming-off. Agronomie 2: 437-442.

Charya, M.A.S. and S.M. Reddy. (1982). Toxic effect of *Fusarium exysporum* on seed germination and growth of mung (*Vigna radiata*). Indian Botanical Reporter 1 (2): 169-170 (c.f/ Rev. Plant Pathology 62: 1734).

Devi, T.P. and R.H. Singh. (1997). Seed transmission of *Macrophomina phaseolina* (Tassi) Goid in *Vigna radiata*. Legume Research 20:121-123.

Fazal, M.; M.I. Khan, M. Imran and Z.A. Siddigui. (1996). Evaluation of five nematicides as seed treatment for control of *Meloidogyne incognita* infecting green gram, *Vigna radiata*. Nematologia Mediteranea 24: 279-281.

Gillman, J. C. (1957). A Manual of Soil Fungi. Ames, Collegiate Press 392pp.

Hussey, R.S. and K.R. Barker. (1973). A comparison of methods of collecting inocula of *Meloidogyne spp*. including a new technique. Plant Disease Reporter 57:1925-1928.

Kaushik, C.D.; J.N. Chand and Satyavir. (1987). Seed-borne nature of *Rhizoctonia btaticola* causing late blight of mungbean. Indian Journal of Mycology and Plant Pathology 17:154-157 (c.f. Rev. Plant Pathology. 68: 3482.

Mosalem, M. E. (1999). Response of two mungbean (Vigna radiata (L.) Wilczek) varietes to plant density. J Agric. Sci. Mansoura Univ. 24: 55-64.

Nik, W.Z. (1983). Seed-borne fungi of soybean (*Glycine max* (L.) Merrill) and mungbean (*Vigna radiata* (L.) Wilzeck) and their pathogenic polential. Malaysian Applied Biology 12: 21- 28. (c.f. Rev. Plant Pathology. 64: 5547.

Samathanam, G.J. and C.L. Sethi. (1997). Growth of mungbean as influenced by different initial inoculum levels of *Meloidogyne incognita*. Indian Journal of Nematology 26: 32-40.

Saxena, R.M. (1984). Evaluation of infection percentage and crop loss estimates of some seed borne infections of green gram and black gram in Uttar Pradesh. Indian Journal of Plant Pathology 2: 146-148 (c.f. Rev. Plant pathology 64: 5260).

Shahzad, S. and A. Ghaffar. (1996). Chemical control of *Fusarium oxysporum* and *Meloilogyne incognita* infection on mungbean. Pakistan Journal of Nematology 14: 121-127 Nem. Abst. 66: 309).

Snedecor, C.W. and W.G. Cochran. (1982). Statistical Methods. 7th ed. Iowa State Univ. Press, Ames, Iowa, USA.

Vidhyasekaran, P.;G. Arjunan and K. Ranganathan. (1978). Resistance in some mung varieties against root-rot. Indian Phytopathology 30: 404.

استجابة أصناف من فول المنج (العدس الصيفى) للإصابة بفطريات التربة ونيماتودا تعقد الجذور

سميحة محمد حافظ عبد المعطى[١]، سوسن أحمد سالم محجوب[١] ومحمد أنور محمد الصعيدى[٢]

١- معهد بحوث أمراض النبات – مركز البحوث الزراعية الصبحية – الإسكندرية

٢- كلية الزراعة — جامعة الإسكندرية. الشاطبى

تم دراسة سبعة أصناف من فول المنج وذلك تحت ظروف كل من الصوبة والعدوى الطبيعية فى الحقل.

وجد فى تجارب الصوبة أن كل أصناف فول المنج المستخدمة وهى إل ٢٧٥، إل ٦٤، جيانج- إكسا، فى ٢٠١٠، تى ٤٤، فى سى ٢٧١٩ وفى سى ١٠٠٠. كانت شديدة القابلية للإصابة بالفطر ريزكتونيا سولانى ماعدا الصنف فى ٢٠١٠ كان متوسط القابلية للإصابة. كما وجد أن الأصناف فى ٢٠١٠ وإل ٢٧٥ و فى سى١٠٠٠ وجيانج- إكسا أقل قابلية للإصابة بالفطر فيوزاريوم أوكسيسيورم بينما الصنفان تى ٤٤ و إل ٦٤ متوسطى القابلية للإصابة بنفس الفطر. وفى حالة العدوى بالفطر ميكروفومنا فاسيولينا كانت كل الأصناف قليلة القابلية للإصابة. وجد أيضا أن الصنفين جيانج- إكسا وفى سى ١٠٠٠ مقاومة للإصابة بنيماتودا تعقد الجذور ميلودوجين انكوجنيتا.

تحت الظروف الحقلية كان الصنف إل ٦٤ أكثرها مقاومة للإصابة بفطريات التربة فى كلا الموسمين.