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EVALUATION OF SOME EGYPTIAN COTTON (*Gossypium barbadense* L.) VARIETIES AGAINST *Fusarium* ROOT-ROT UNDER GREENHOUSE CONDITION

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ABSTRACT

Cotton breeders in Egypt pay a great attention to development hybrids has resistance to several diseases and pests and give good yield. Pathogenicity tests of four Fusarium species ,namely: *Fusarium poae; Fusarium oxysporum; Fusarium subglutinane* and *Fusarium solani* (isolated from diseased cotton seedling). The diseases evaluation had spot line on the susceptibility of thirteen cultivars of Egyptian cotton (*Gossypium barbadense* L.), including Giza45, Giza70, Giza80, Giza81x83, Giza83, Giza84, Giza85, Giza86, Giza87, Giza88, Giza89, Giza86x89 and Giza90 under greenhouse conditions. The obtained results revealed that at least every cultivar was resistant for one of *Fusarium* spices. Giza85 was the most susceptible cultivars (26.67; 40; 13.33 and 40 %, respectively) pre-emergence% for all tested *Fusarium* species. At the same time, Giza88 recorded resistance reaction *(* 0.0; 6.67; 20 and 6.67% respectively*). Fusarium oxysporum* was the most pathogenic species (25.64% seedling death) followed by *Fusarium solani* and *Fusarium poae* (18.46 and 17.95%, respectively). The minimum incidence was noted in *Fusarium subglutinane* (9.74%), compared to 2.56% in check treat.

Keywords: Egyptian cotton, *Fusarium oxysporum*, *Fusarium solani* ,*Fusarium poae* , *Fusarium subglutinane*.

INTRODUCTION

Cotton production is constrained by various diseases, which lead to yield instability and reduced quality. Cotton rot-root disease is a debilitating disease of cotton in Africa. Seedling diseases are identifies a complex situation involving the interaction of several organisms and the environment. Certain fungi that cause these seedling diseases are carried either as seed association or seed borne. Other fungi can survive in the soil and attack the seeds or seedling. The organisms that cause seedling disease are found in all cotton-producing areas of the world, but populations differ from area to another. Soil-borne fungi commonly associated with cotton seedling diseases are species of *Pythium, Fusarium, Rhizoctonia, Macrophomina, Sclerutiom* and *Thielaviopsis* (Davis, *et al*. 1981). Species of *Fusarium* (*oxysporum* ; *subglutinane* ; *solani*; *equisiti* and *graminearum* are frequently isolated from diseased cotton seedlings, however *Fusarium oxysporum* f. sp. *vasinfectum*, usually considered to be of secondary importance (Bollenbacher & Fulton, 1959; Johnson *et al*., 1978 and Johnson & Doyle, 1986). In Egypt, *F. oxysporum* was frequently isolated from cotton seedlings infected with damping-off (Aly *et al*., 1996 and El-Samawaty, 1999). Also, *F. solani* was pathogenic for eighty-three percentage of collected isolates (Abd-Elsalam *et* *al*., 2006). In another study Johnson *et. al*. (1978) found that in Tennessee, *Fusarium* spp. were second to *Pythium* spp. in frequency of isolation from seedling suffering from post-emergence disease, but they were the least pathogenic group of isolated fungi. Some of the *Fusarium* isolates caused necrotic lesions on the hypocotyls but did not cause seedling mortality. Similarly, Johnson & Doyle (1986) found that *Fusarium* spp. were frequently isolated from infected seedling hypocotyls, but their frequently of isolation was negatively correlated with the field disease index. In contrast to these results, other workers have isolated *Fusarium* spp. which is highly virulent on cotton seedlings (Roy & Bourland, 1982; Batson & Borazjani, 1984 and Costa *et al*., 2005). Colyer (1988) revealed that fungi isolated from diseased seedlings collected in Louisiana. *Fusarium* spp. represented 42% of all fungi isolated, compared with 40% for *Rhizoctonia*. The main species were *F. oxysporum* and *F. solan*i , with low numbers of *F. equisiti* and *F. graminearum*. Many of the isolates caused root and hypocotyls necrosis. Batson &Trevathan (1988) also reported the pathogenicity of *F. solani* towards cotton seedlings. Wrather *et al*. (2002) isolated *Fusarium* spp. from more than 50% of the cotton seedlings collected each year. In similar study Chimbekujwo (2000) found that *F. solani* and *F. equiseti* composed 60% and 30%, respectively of all fungi isolated from diseased seedlings. In Egypt within the last several years, it was noted that the high incidence of cotton seedling disease associated with *Fusarium* spp. Where the control strategies are aimed primarily on *Fusarium* wilt and *Rhizoctonia* root rot. At the same time, a number of new cotton cultivars have been introduced into Egypt, where resistance is potentially the most economical method to manage seedling diseases because fungicide seed treatments could then be reduced or eliminated. The major aim of this study was to evaluate the susceptibility of some cotton cultivars against *Fusarium* rot root diseases.

MATERIALS AND METHODS

Plant materials:

In greenhous cotton diseases Department, Sakh Agriculture Research Station (2013). This experiment was conducted using thirteen cultivars of Egyptian cotton (*Gossypium barbadense* L.) include Giza 45, Giza 70, Giza 80, Giza 81x83, Giza 83, Giza 84, Giza 85, Giza 86, Giza 87, Giza 88, Giza 89,Giza 86x89 and Giza 90, were obtained from the Cotton Research Institute (CRI) .

Fungal culture:

Four *Fusarium* species were isolated from diseased cotton seedling with root-rot. Characterization of these species was performed during the course of the Ph.D. of the first author according to Papavizas & Davey (1959) ;Nelson *et al.* (1983) and Leslie & Summereli (2006). Identification of the selected species was confirmed by the Fungal Taxonomy Department, Plant Pathology Research Institute, Agricultural Research Centre, Giza, Egypt. *Fusarium* spp. used in this study were: *Fusarium poae* Peck.; *Fusarium oxysporum* Schl.; *Fusarium subglutinane* and *Fusarium solani* Mart. The tested species were maintained on potato-dextrose agar (PDA) slants in a refrigerator (5°C).

Inocula preparation:

Each fungal isolate was singly grown. The inoculum was prepared in Erlenmeyer flasks containing 50 g autoclaved substrate (120°C, 30 minutes, 1 atm) consisting of cornmeal-sand as described previously (Hwang 1988), diluted in 30 ml distilled water. 1cm diameter disks of fungi culture, previously cultured in potato dextrose agar (BDA) culture medium for seven days, were placed in each flask. After 10 days incubation at room temperature and shaken periodically to enhance colonization of medium. The substrate colonized by the pathogen was placed in paper bags and placed to air- dry for 48 hours. The colonized, dry substrate was then ground and stored at 4°C until needed.

Pathogenicity tests:

Each fungal species was singly grown on sterilized Sorghum-Sand medium. In 10- cm-diam. Plastic pots containing a steam-pasteurized soil, autoclaved for 1 h on each of two consecutive days before it was inoculated (120°C for 2 h), mixture consisting of clay and sand (3:1, vol : vol),which were arranged on a bench of the green-house . The soil was infested with each fungal species at a rate of 3% of each fungus culture, separately, by soil weight. The infested soil was watered daily for 7 days to obtain the optimum fungal growth and distributing of the pathogenic fungal growth before planting. The control treatment consisted of noninfested cornmeal-sand inoculum that was added to the soil mixture. Cotton seeds were surface sterilized by dipping in sodium hypochlorite solution (0.1%) for 2 min, and then the seeds were washed through serial sterilized distilled water before the planting. Ten seeds from each cotton cultivar, separately, were sown in each pot. Seed was planted 2 cm deep in each pot, with 10 seeds per pot and a set of 3 replicates were used for each fungus or control treatments for each cultivar. Pots were arranged in a completely random design in greenhouse and were watered as required. All pots were kept under green-house conditions. Pre-emergence damping-off was recorded 15 days after planting, while post-emergence damping-off, survival plant , dry weight - mg/plant (dried at 70°C for 24 h) and plant length-cm were recorded 30 days after planting.

Root rot severity was rated on a 0-4 scale, where:

0 = healthy;

1 = small, light brown lesions affectingB25% of the diameter of the tap root

2 = lesions on 25_49% of the diameter of the tap root

3= lesions on 50_74% of the diameter of the tap root and tap root constricted

4 = lesions on 75_100% of the diameter of the tap root, tap root girdled, limited lateral roots present, and plants wilted, stunted or dead

Statistical analysis:

Data analyses were conducted using Assistat-Statistical Attendance 7.7 beta software (Federal University of Campina Grande, Brazil- updated 2015). A complete randomized design was used in this experiment. Analysis of variance was assessed and means were compared using Tukey's Honest Significant Difference Test. (Silva&Azevedo, 2006 and 2009).

RESULTS AND DISCUSSION

The resistance/susceptibility of cotton cultivars was carried out under greenhouse conditions. Average disease severity and disease incidence data for *Fusarium* root-rot of all cultivars were recorded as pre-emergence damping-off; post-emergence damping-off and percent of standing plants.

Pre-emergence damping-off:

Average *Fusarium* root-rot disease as pre-emergence damping-off was recorded in (Table 1). Analysis of variance of the data indicated significant differences among the cultivars for every single species and among cultivars for all species. The results showed that among the 13 tested cultivars only Giza 87 and Giza 88 were highly resistant for *F. poae* (0.00%). Giza 45 and Giza 88 had the lowest susceptibility against *F. oxysporum* (6.67%), while Giza83; Giza85 and G86xG89 recorded high infection (40.0%). Only Giza70 exhibited no- pre-emergence damping-off for *F. subglutinane* while the other cultivars had positive reaction with non significant differences among them . *F. solani* caused damping-off for the all tested cultivars, except Giza 83 and G86 x G89.

Table 1. Pre-emergence damping-off percentage of 13 Egyptian cotton cultivars affected by four *Fusarium* species under greenhouse conditions.

Cultivars	*Fusarium poae*	*Fusarium oxysporum*	*Fusarium subglutinane*	*Fusarium solani*	Control
Giza 45	20.00 a AB	6.67 c B	6.67 ab B	26.67 ab A	6.67 a B
Giza 70	26.67 a A	20.00 bc A	0.00 b B	26.67 ab A	0.00 a B
Giza 80	20.00 a A	33.33 ab A	20.00 a A	20.00 bc A	0.00 a B
Giza 81x83	26.67a A	26.67 ab A	6.67 ab B	20.00 bc AB	6.67 a B
Giza 83	20.00a B	40.00 a A	13.33 ab BC	0.00 d C	0.00 a C
Giza 84	20.00a A	20.00 bc A	13.33 ab AB	20.00 bc A	0.00 a B
Giza 85	26.67a AB	40.00 a A	13.33 ab BC	40.00 a A	0.00 a C
Giza 86	13.33ab B	33.33ab A	6.67 ab B	13.33 bcd B	6.67 a B
Giza 87	0.00 b B	26.67ab A	6.67 ab B	13.33 bcd AB	0.00 a B
Giza 88	0.00 b B	6.67 c AB	20.00 a A	6.67 cd AB	0.00 a B
Giza 89	26.67a A	20.00 bc AB	6.67 ab B	13.33 bcd AB	6.67 a B
Giza 86x89	20.00a B	40.00 a A	6.67 ab BC	0.00 d C	0.00 a C
Giza 90	13.33ab B	20.00 bc B	6.67 ab B	40.00 a A	6.67 a B
mean	17.95b	25.64a	9.74c	18.46b	2.56d

The Tükey Test at a level of 5% of probability was applied. The averages followed by the same letter, for columns/lower case letters and for rows/upper case letters, do not differ statistically between themselves.

All cultivars, except Giza80 had significant differences of susceptibility to *Fusarium* species. On the other hand *Fusarium oxysporum* was the most effective for all tested cultivars when *F. subglutinane* was the less one. Data also showed that every cultivar was resistant at least for one of *Fusarium* species . Giza85 was the most susceptible cultivar for all tested *Fusarium* species.

Post-emergence damping-off:

The second most frequently symptom is post-emergence damping-off. Data in Table,2 revealed that *Fusarium subglutinane* and *F. solani* induced the highly mean reaction of post-emergence damping-off ranged from 6.67 to 26.67% . While, *F. poae* and *F. oxysporum* exhibited slightly effect. All cultivars had mean reaction ranged from slight (1.33%) to moderate (13.33%). At the same time every cultivar was affected by at least one of the four spices when Giza83 was affected by all *Fusarium* species.

Table 2. Post-emergence damping-off percentage of 13 Egyptian cotton cultivars affected by four *Fusarium* species under greenhouse conditions .

Cultivars	*Fusarium poae*	*Fusarium oxysporum*	*Fusarium subglutinane*	*Fusarium solani*	Control
Giza 45	0.00 b C	6.67 ab B	13.33 ab A	0 .00 d C	0 a C
Giza 70	6.67 ab B	6.67 ab B	0.00 c C	20.00 ab A	0 a C
Giza 80	13.33 a A	13.33 a A	6.67 bc B	0.00 d C	0 a C
Giza 81x83	0.00 b C	6.67 ab B	6.67 bcB	13.33 bc A	0 a C
Giza 83	13.33 a C	6.67 ab D	20.00 a B	26.67 a A	0 a E
Giza 84	0.00 b C	6.67 ab B	13.33 ab A	0.00 d C	0 a C
Giza 85	0.00 b B	13.33 a A	13.33 ab A	3.33 d B	0 a B
Giza 86	0.00 b B	0.00 b B	6.67 bc A	6.67 cd A	0 a B
Giza 87	0.00 b B	0.00 b B	6.67 bc A	0.00 d B	0 a B
Giza 88	0.00 b B	0.00 b B	0.00 c B	20.00 ab A	0 a B
Giza 89	6.67 ab A	0.00 b B	0.00 c B	6.67 cd A	0 a B
Giza 86x89	0.00 b C	0.00 b C	6.67 bc B	13.33 bc A	0 a C
Giza 90	0.00 b B	0.00 b B	6.67 bc A	0.00 d B	0 a B
mean	3.08 b	4.62 b	7.69 a	8.46 a	0 c

The Tükey Test at a level of 5% of probability was applied. The averages followed by the same letter, for columns/lower case letters and for rows/upper case letters, do not differ statistically between themselves.

Survival plants (standing %):

From data of Table, 3 it was observed that the tested cotton cultivars didn't exhibited significant difference among them for the final standing plants when inoculated by either *Fusarium poae ; F. solani* or *F. subglutinane*, as the check treatment exhibited similar reaction. *Fusarium oxysporum* appeared to influence the degree of disease expression as the significant difference of the final standing percent of plants. In general, cultivars G.45; G.81xG.83; G.84; G.86; G.87; G.88 and G.89 didn't show significant difference for the *Fusarium* inoculated treatment compared with the check treatment while the rest cultivars were differed significantly for all tested species. The mean reaction indicated that Giza 85 was the lowest standing percent. *Fusarium oxysporum* recorded the highest percent of plant lost from the inoculation.

Table 3. Survival plants percentage of 13 Egyptian cotton cultivars under artificial inoculation by four *Fusarium* species under greenhouse conditions.

Cultivars	*Fusarium poae*	*Fusarium oxysporum*	*Fusarium subglutinane*	*Fusarium solani*	Control
Giza 45	80.00 aA	86.67 abA	80.00 aA	73.3 aA	93.33 aA
Giza 70	66.67 aB	73.33 abcAB	100.0 aA	53.33 aB	100.0 aA
Giza 80	66.67 aB	53.33 bcB	66.67 aB	80.00 aAB	100.0 aA
Giza 81x83	73.33 aA	66.67 abcA	86.67 aA	66.67 aA	93.33 aA
Giza 83	66.67 aB	53.33 bcB	66.67 aB	73.33 aAB	100.0 aA
Giza 84	80.00 aA	73.33 abcA	73.33 aA	80.00 aA	100.0 aA
Giza 85	73.33 aAB	46.67 cB	73.33 aAB	60.00 aB	100.0 aA
Giza 86	86.67 aA	66.67 abcA	86.67 aA	80.00 aA	93.33 aA
Giza 87	100.0 aA	73.33 abcA	86.67 aA	86.67 aA	100.0 aA
Giza 88	100.0 aA	93.33 aA	80.00 aA	73.33 aA	100.0 aA
Giza 89	66.67 aA	80.00 abcA	93.33 aA	80.00 aA	93.33 aA
Giza 86x89	80.00 aAB	60.00 abcB	86.67 aAB	86.67 aAB	100.0 aA
Giza 90	86.67 aAB	80.00 abcAB	86.67 aAB	60.00 aB	93.33 aA
Mean	78.97 bc	69.74 d	82.05 b	73.33 cd	

The Tükey Test at a level of 5% of probability was applied. The averages followed by the same letter, for columns/lower case letters and for rows/upper case letters, do not differ statistically between themselves.

The role of *Fusarium* spp. as a pathogen of cotton seedlings, and other crops is well known. But Johnson and Doyle (1986) reported that *Fusarium* spp. were not important pathogens in cotton seedling disease complex, even though *Fusarium* spp. were the most frequently isolated fungi of cotton root rot (Johnson ***et al***. 1978; Aly ***et al***., 1996 and El-Samawaty, 1999). Pathogenicity assays to study the difference between four *Fusarium* species, were characterized *F. subglutinane : F. solani: F. oxysporum* and *F. poae*, obtained from diseased cotton seedlings showing typical root-rot and dampping-off symptoms. In this study, all cultivars were showed different levels of susceptibility to tested *Fusarium* species. At least every cultivar was resistant for one of *Fusarium* species and the most were susceptible for all tested *Fusarium* species. *F. oxysporum* was the most virulent for all tested cultivars, While both the *F. poae* and *F. solani* had nearly reaction for them ,but *F. subglutinane* was the least virulent. The differences observed in pathogenicity and virulence between studied *Fusarium* species may have resulted from differing the taxonomic kinships among *Fusarium* species (Khalil, *et al*. 2003). Among the 13 cultivars, Giza 87 and Giza88 were relatively resistant to *Fusarium*-induced damping- off at the four species inoculation. Pre-emergence damping-off in these relatively resistant cultivars was less than 10%. Final stand establishment was also greatest among the tested cultivars (89.34%). Giza 85 was the most susceptible cultivar to *Fusarium* infection (the incidence of pre-emergence damping-off was 25.0% and it saved by 70.67% of standing plants). Virulence among *Fusarium* species varied. *Fusarium oxysporum* induced 25.64% damping-off incidence while it ranged from 9.74-18.64% of the other species. All cotton cultivars reacted significantly differs to all species in *Fusarium* root- rot incidence. The results of 3 species were similar significantly for final stand plants and significant difference for *F. oxysporum*. The high level of virulence of species indicated that *Fusarium* species are an important causal pathogens in the etiology of cotton seedling disease. Giza87 and Giza88 were superior to check. These cultivars can be used in root-rot endemic areas because of their tolerance and also as donors in hybridization program for developing root-rot tolerant varieties. The differences observed in pathogenicity between this studied varieties and others may have resulted from differing in its genetic composition. These varieties can be used in root-rot endemic areas because of their resistance and also as donors in hybridization program for developing root-rot resistant varieties. The differing level in virulence of *Fusarium* species indicate that their an important cause in the etiology of cotton seedling disease

Disease severity

No significant differences in *Fusarium* root rot disease severity were found among the 13 cultivars. *Fusarium* four species were tested for their levels of aggressiveness one-month-old greenhouse-grown plants of cotton cultivars. The ANOVA showed no significant effects of the species upon the cultivars for the disease severity. Also showed no significant effects of the cultivars, species and/or interaction of species × cultivars with the disease severity. Symptoms of *Fusarium* root rot were observed on the most of the seedlings of all cultivarss, while the disease severity ranged from 1-3 as root discoloration according to the used scale Figure (1).

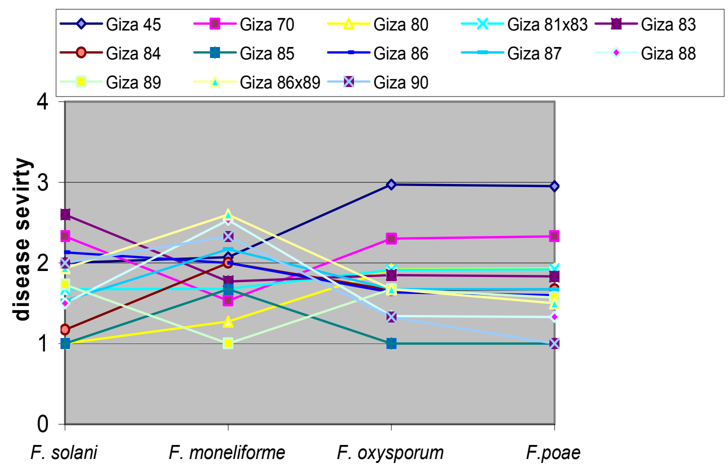

Fig.(1). Disease severity of percentage of 13 Egyptian cotton cultivars under artificial inoculation for four *Fusarium* spp. under greenhouse conditions . Root rot severity as a scale of 0 to 4, where: 0 = healthy; 1 = small brown lesions on <25% of exterior ircumference of the tap root; 2 = lesions on 25–49% of tap root; 3 = lesions on 50–74% and tap root constricted; and 4 = tap root girdled (75–100%) and plant wilted or dead.

Plant height and dry weight:

The *Fusarium* artificial inoculation lead to increased the Plant height and dry weight of all tested cultivars significantly from the control plants(table4-5).

Table 4. Reaction of plant height (as cm/plant) of percentage of 13 Egyptian cotton cultivars under artificial inoculation of four *Fusarium* spp. under greenhouse conditions .

Cultivars	*Fusarium poae*	*Fusarium oxysporum*	*Fusarium subglutinane*	*Fusarium solani*	Control
Giza 45	33.60 aB	40.39 aA	30.55 bcB	32.19 aB	21.57 aC
Giza 70	35.25 aA	37.22 abcdA	28.22 bcB	30.59 abB	22.77 aC
Giza 80	28,74 bB	35.60 bcdA	26.32 cB	25.53 cB	20.00 aC
Giza 81x83	33.37 abA	34.37 cdA	32.51 bA	27.62 abcB	20.20 aC
Giza 83	32.41 abA	34.84 bcdA	28.03 bcB	24.43 cB	19.67 aC
Giza 84	31.45 abB	34.07 dB	40.18 aA	25.89 bcC	20.90 aD
Giza 85	32.57 abB	34.22 cdB	39.76 aA	28.33 abcC	21.50 aD
Giza 86	32.00 abB	38.90 abcA	41.35 aA	26.74 bcC	22.53 aD
Giza 87	31.92 abB	37.90 abcdA	39.75 aA	25.34 cC	21.77 aC
Giza 88	32.94 abB	39.47 abA	39.23 aA	27.57 abcC	22.33 aD
Giza 89	34.04 aB	37.62 abcdAB	39.00 aA	25.56 cC	20.03 aD
Giza 86x89	33.42 abB	40.65 aA	41.78 aA	27.72 abcC	22.17 aD
Giza 90	32.72 abB	39.47 abcdA	38.54 aA	25.45 cC	21.60 aC
Mean	**32.65 c**	**37.12 a**	**35.81 b**	**27.15 d**	**21.31 e**

The Tükey Test at a level of 5% of probability was applied. The averages followed by the same letter, for columns/lower case letters and for rows/upper case letters, do not differ statistically between themselves.

Table 5. Reaction of dry weight of percentage of 13 Egyptian cotton cultivars under artificial inoculation of four *Fusarium* spp. under greenhouse conditions .

Cultivars	*Fusarium poae*	*Fusarium oxysporum*	*Fusarium subglutinane*	*Fusarium solani*	Control
Giza 45	272.10 abcA	145.30 fB	69.23 cB	126.93 aB	71.10 aB
Giza 70	331.73 aA	206.57 efB	57.83 cC	86.70 aC	64.53 aC
Giza 80	218.90 cA	246.43 defA	55.20 cB	90.97 aB	75.80 aB
Giza 81x83	257.06 abcA	221.80 dfeA	91.67 cB	69.90 aB	72.00 aB
Giza 83	264.60 abcA	219.27 defA	93.67 cB	72.67 aB	70.13 aB
Giza 84	347.00 abA	270.07 deA	314.17 abA	67.70 aB	58.63 aB
Giza 85	269.17 abcB	417.37 abA	228.37 bB	86.43 aC	60.50 aC
Giza 86	236.60 bcB	406.33 abcA	298.63 abB	75.77 aC	63.00 aC
Giza 87	209.47 cA	281.87 deA	229.97 bA	63.97 aB	56.40 aB
Giza 88	233.40 bcB	333.00 bcdA	325.73 abAB	84.07 aC	61.00 aC
Giza 89	252.83 abcA	298.50 cdeA	262.53 abA	65.43 aB	63.03 aB
Giza 86x89	259.53 abcC	494.73 aA	355.50 aB	70.80 aD	74.30 aD
Giza 90	251.77 abcA	314.37 bcdeA	292.67 abA	73.03 aB	97.77 aB
Mean	**264.42 b**	**296.59 a**	**205.76 c**	**79.57 d**	**67.99 d**

***Dry weight measured as mg/plant**

The Tükey Test at a level of 5% of probability was applied. The averages followed by the same letter, for columns/lower case letters and for rows/upper case letters, do not differ statistically between themselves.

A healthy cotton seedling root is white and firm, and the central root (taproot) is long with numerous secondary white roots. The *Fusarium* artificial inoculation lead to rotten areas (lesions) develop on infected roots. The interaction between *Fusarium* and cultivars exhibited root damage vary from slight injury (which the root may outgrow), to moderate injury (the plant lives but the main root is permanently damaged), to seedling death. When damage is severe, the taproot may be destroyed, leaving only shallow-growing lateral roots to support the plant, the root rot tolerant varieties produce numerous secondary roots to absorb water and nutrients as well as healthy roots.

CONCLUSIONS

Differing level was observed in virulence between *Fusarium* species and differences in pathogenicity between varieties which may have resulted from differing in its genetic composition. Every cultivar was resistant for one of *Fusarium* species and the most were susceptible for all tested species. Giza87 and Giza88 were superior to check. These cultivars can be used in root-rot endemic areas and also as donors in hybridization program for developing root-rot resistant varieties. It may be due to the fact that control strategies are aimed primarily on *Fusarium* wilt and *Rhizoctonia* root rot. The resistance becomes potentially the most economical method to manage seedling diseases because fungicide seed treatments could then be reduced or eliminated. At the same time, a number of new cotton cultivars have been introduced in Egypt. Further work for Egyptian cotton breeders is required to increasing the level of resistance to *Fusarium* root-rot in commercial cultivars.

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تقييم بعض اصناف القطن المصرى للاصابة باعفان الجذور الناتجة عن الفيوزاريوم تحت ظروف الصوبة

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يعتبر إنتاج القطن الهجين ذو المقاومة لعديد من الامراض والافات وذات المحصول الجيد محط انتباه مربى القطن اليوم. وقد اجريت اختبارات القدرة المرضية لاربعة انواع من الفطر فيوزاريوم، وهى فيوزاريوم بوا و فيوزاريوم اوكسياسبورام و فيوزاريوم مونيليفورم و فيوزاريوم سولانى(المعزولة من بادرات قطن مصابة). لتحديد حساسية ثلاثة عشر صنف من اصناف القطن المصرى وتشمل جيزة 45 و جيزة 70 و جيزة 80 و جيزة 81x 83 و جيزة 83 و جيزة 84 و جيزة 85 و جيزة 86 و جيزة 87 و جيزة 88 و جيزة 89 و جيزة 86x 89 و جيزة 90 تحت ظروف الصوبة (العدوى الصناعية). وقد أوضحت نتائج البحث ان كل صنف من الاصناف كان مقاوما لواحدا من انواع الفيوزاريوم على الاقل. وقد كان الصنف جيزة 85 اكثر الاصناف حساسية حيث اظهرت نسب اصابة26,67 و40و13,33و40 بالمائة على التوالى وفى نفس الوقت فقد سجل الصنف جيزة88 نسب مقاومة صفر و6,67 و20 و6,67 على التوالى . اما النوع فيوزاريوم اوكسياسبورام فقد كان اكثر الانواع شراسة (25,64 % اصابة) تبعة كل من فيوزاريوم سولانى وفيوزاريوم بوا (18,46 17,95 % على التوالى). اما اقل نسبة اصابة فكانت للفطر فيوزاريوم صبجلوتينان (9,74% اصابة) بالمقارنة (2,56% اصابة) للمعاملة الغير معداه.