EVALUATION OF SOME NEW SOYBEAN (*GLYCINE MAX* L.) GENOTYPES

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ABSTRACT

Fourteen soybean entries; L-30, L-88, L-105, L-109, L-113, L-117, L-127, L-129, L-132, L-153, Giza 21, Giza 22, Giza 83 and Crawford were evaluated agronomically, pathologically and entomologically. Data in season 2005 showed that, L-113 had the least period for 50% flowering followed by Giza 83 and L-153 with averages of 31.3, 32.0 and 36.0 days, respectively. The same trend was observed in case of 90% maturity. Also, it is clear that L-117 had the first grade for seeds weight / plant (g) followed by L-88, L-127 and L-153 with averages of 38.73, 37.50, 36.42 and 35.15 (g), respectively. The previous four entries had the same arrangement in case of seeds weight/ plot (kg) with averages of 3.36, 3.18, 3.14 and 3.11 (kg), respectively and also with seeds yield / fed. (ton) with averages of 1.87, 1.77, 1.75 and 1.73 (ton), respectively. The same trend was cleared in the second season. On the other hand, L-129 had the highest seeds protein content followed by L-132, L-127 and Giza 21 with averages of 45.63, 41.43, 41.13, and 41.06%, respectively. In case of seeds oil content, L-105 had the highest value followed by L-30 and L-153 with averages of 22.10, 20.22 and 20.16%, respectively. In potted plant assay, all soybean entries were resistant (R) or moderately resistant (MR) to root rot caused by Rhizoctonia solani. Under greenhouse conditions, entries were inoculated with Fusarium solani, Macrophomina phaseolina, Rhizoctonia solani and Sclerotium_rolfsii. Generally, Giza 21 had the least pre-emergence damping-off followed by L-153, L-113 and L-88 with averages of 16.33, 16.42, 16.59 and 16.83%, respectively. Also in case of post-emergence damping-off, the four entries mentioned before with the same arrangement had the least values with averages of 4.01, 4.08, 4.36 and 4.42%, respectively. Under field conditions in 2005, L-117 had the least pre-emergence followed by L-88 and L-127 with averages of 16.33, 20.33 and 23.00%, respectively. In case of post-emergence, L-117 had the first grade followed by L-127 and L-88 with averages of 4.40, 5.42 and 6.57%, respectively. The highest value of survival plants was recorded with L-117 followed by L-88 and L-127 with averages of 79.27, 73.10 and 71.58, respectively. In the second season (2006), the same trend was recorded with light differences between entries arrangement. Under laboratory conditions, it is clear that L-105 had the least value of leaf area consumed % caused by cotton leafworm (Spedoptera littoralis Biosd.) followed by L-88, L-153 and L-132 with averages of 27.76, 32.36, 32.63 and 32.90%, respectively. Under field conditions, L-105 and L-153had the highest values of the number of hairs / 0.5 cm^2 with averages of 11.34 and 11.10 in the first season and 11.31 and 10.84 in the second season, respectively. Also, the last two entries had the least defoliation % with averages of 8.33 and 12.53% in the first season and 8.74 and 11.76% in the second season, respectively. Finally, it is clear that there is a negative correlation between hairiness and defoliation % except in case of L-109 and L-129.

***Keywords**: Soybean, Entries, Protein, Oil, F.solani, M.Phaseolina, R.solani, S. rolfsii, S.littoralis, Leaf area consumed, Hairiness and Defoliation.*

INTRODUCTION

Soybean (*Glycine max* L.) is one of the important legume crops in many parts of the world because it contains about 20% oil and 40% protein of dry seed weight (Ahmed, 2001). The differences between soybean cultivars agronomic characters might be due to the genetic factors that reflect differences in pods number / plant, 100 seed weight and seed yield / plant according to reports of Weaver *et al.*, (1991); Sharief and Bailly (1992) and Sharief *et al.*,(1998).

During germination of soybean seeds and its initial establishment in the soil, seedlings are extremely subjected to a wide range of seed and soil borne fungi resulting in considerable losses to soybean crop (Ilyas *et al.*, 1975; Barakat *et al.*, 1976; Patil and Mayee, 1977; Sinclair and Backman, 1989 and Rahhal *et al.*, 2000). El-Gantiry (1985) isolated and identified forty-two fungi associated with soybean seeds. Among the isolated fungi, genera of *Fusarium, Macrophomina, Sclerotinia, Rhizoctonia, Verticillium* and *Drechslera* were found with different degrees of pathogenicity. In this respect, Abd El-Baki *et al.*, (2003) reported that damping-off and root rot disease are the most important diseases that affect plant stand causing great losses in soybean yield, total nitrogen and protein contents in soybean seeds.

Leaf feeding insects, such as cotton leafworm; *Spedoptera littoralis* (Biosd.) are the most serious pests affecting soybean productivity all over the world especially in Egypt (Habeeb *et al.*, 1988). El-Dakrory (1979) found that significantly negative correlation exists between *S.littoralis* larvae which reached the pupal stage and the average number of hairs / cm^2 for two Egyptian cotton strains and two wild species. Habeeb *et al.* (1988) showed that the highly significant negative heterotic effect for leaf area consumed and defoliation were obtained in the two crosses; D19-10455 (highly resistant) X Crawford (susceptible) and Celest (highly resistant) X Crawford, whereas highly significant positive heterotic effects were detected for hairiness and leaf area consumed in both crosses and

1-Food Legumes Res. Sec., Field Crops Res. Inst. ARC.
2-Legume Diseases Res. Sec., Plant Pathology Res. Inst., ARC.
3-Plant Protection Res. Inst., ARC.

in the second cross for defoliation. Also, Awan *et al.*, (1996) studies the effect of *S. litura* larvae on 10 soybean varieties from 1st instar to pupation and they found that, improved Pelican, AVRDC-9, Columbus, Bossier and Franklen were resistant whereas T-15, Bragg, EF-177, Loppa and Davis were susceptible. Cui *et al.*, (1995) reported that, N5454.3; N4029.3; N3697; N3018; N3400.1 and N1178.22 were the least defoliation soybean entries to leaf feeding insects. Khalil,Nagah (2007) studied the resistance inheritance nature of six parental soybean entries, *i.e*, Pershing, G21, Holladay, G111, L 75-6648 and D75-12035 and its F_1 and F_2 to cotton leafworm and she found that the highest mean values of leaf tissue consumed and defoliation % were obtained from P_1 (Pershing) in all crosses while, the lowest mean values were obtained in P_2 (G21) in cross 1 (Pershing XG21), F_1 in cross 2 (Pershing X Holladay), P_4 in cross 3 (Pershing X L75-66481, P_5 in cross 4 (Pershing X G111) and P_6 and F_1 in cross 5 (Pershing X D75-12035).

The present work was designed to compare some commercial cultivars and new soybean genotypes for resistance to Rhizoctonia rot, evaluate the response of these cultivars and genotypes to *F.solani, M.phaseolina, R.solani* and *S.rolfsii* under greenhouse conditions. Evaluations the reactions of these cultivars and genotypes to damping-off disease under field conditions and evaluation the resistance of these cultivars and genotypes to cotton leafworm (*S.littoralis*) under laboratory and field conditions were also investigated.

MATERIALS AND METHODS

- ***Isolation and identification*:**

The soil dilution and plate counts techniques were used for isolating pure cultures of soil fungi according to Johanson *et al.* (1960). Pathogenic fungi which infected roots of soybean plants were isolated and subcultured on PDA medium, then identified according to Booth (1977), Domsch *et al.*, (1980) and Nelson *et al.*,(1983).

- ***Potted plant assay for Rhizoctonia root rot reaction:***

Ten seeds of each cultivar's were planted in a 15-cm Φ plastic pots containing 1 kg of soil sterilized with formalin 5%. Before the seeding, each pot was infested with an intact agar layer of 3-day-old culture of *Rhizoctonia solani* isolated on 10 ml of 1.5% water agar in a 10 cm Φ petri plate (Schmitthenner and Hilty, 1962). Pots were watered to saturation after planting and lightly once a day before. Fourteen days after planting, the seedlings were removed from the soil and their roots were rinsed with water. Seedlings were evaluated for root rot on scales from 1-5 where, 1=no lesions; 2=discrete, light or dark brown, superficial necrotic lesions; 3=adventitious root and / or tap root necrosis and decay; 4=extensive root rot; and 5=plant dead (Muyolo *et al.*, 1993). Each treatment was represented four times.

- ***Resistance response classifications:***

Genotypes were grouped according to disease severity as; resistant (R) if the mean disease score ranged between 1 and 2; moderately resistant (MR) if the mean disease score was 2.1 – 3.0; moderately susceptible (MS) if the mean disease score was 3.1 – 4.0; and susceptible (S) if the mean disease score was 4.1 – 5.0 (Muyolo *et al.*, 1993).

Pathogenicity tests:

Four pathogenic fungi, *i.e, Fusarium solani, Macrophomina phaseolina, Rhizoctonia solani* and *Sclerotium rolfsii* were grown in autoclaved barley sand medium for 15 days at 15 ± 2 °C. The fungal inoculum was added to 20-cm Φ pots at the rate of 2% of soil weight. The soil was previously sterilized with formalin solution (5%). Pots were watered for 7 successive days before planting. Soybean seeds were surface disinfested in a 0.3 % NaClo solution for 5 minutes, rinsed in sterile water, air dried and sown at the rate of 10 seeds / pot. Five replicates were used for each treatment and watered every other day. Disease incidence was recorded as the percentage of pre-emergence and post-emergence damping-off 10 and 30 days after sowing.

- ***Field experiments:***

The experiments were carried out in naturally infested soil at Etay El-Baroud Agric. Res. Station Farm, El-Behera Governorate, during two successive seasons 2005 and 2006. Four cultivars; Giza 21, Giza 22, Giza 83 and Crawford and ten genotypes named; L-30, L-88, L-105, L-109, L-113, L-117, L-127, L-129, L-132 and L-153 were used in this work (Table 1). Seeds were sown in the first of June 2005 and 2006, in 4 m long rows, four rows represented a replicate. All treatments were replicated three times and arranged in a completely randomized block design. Pre and post-emergence damping-off as well as survival plants were recorded 25, 45 and 90 days after sowing. At harvest, five guarded plants were taken at random on which the following characters were recorded as follows: 50% flowering, 90% pod maturity, plant height (cm), number of pods / plant, number of seeds / pod, weight of seeds / plant (g), 100 seed weight (g), weight of seeds /plot (9.6 m^2) kg and seed yield / fed (ton). Also, seeds protein and oil contents were determined according to Piper, 1950 and Walker *et al.*, 1972.

The study of soybean entries resistance to cotton leafworm [*Spedoptera littoralis* (Boisd.)] was evaluated using the following three criteria:

1-The area leaf tissue consumed: one fourth instar stage larvae were placed in a glass container, 1000 ml. capacity and were allowed to feed on fresh leaflets, excised randomly from the upper third of each plant including their petioles. The area of leaf tissue consumed after 24 h was

measured (Thobbi, 1962 and Meisner *et al.*, 1983).

2-Hairiness: number of hairs on the lower surface of the leaf was counted, and the leaflets from first trifoliolate of the upper third of plant were taken as a standard (Kamel, 1963). The binocular field (0.5 cm^2) was used to determine the average number of hairs for each plant.

3-Leaf feeding damage or foliage loss (defoliation%): visual ratings of three times (every seven days) beginning two weeks after flowering, on each plant in the field experiment without insect control under the natural field infection were recorded. A standard area diagram for estimating the percentage of defoliation was reported by Smith and Brim, (1979).

Data were statistically analyzed according to Snedecor and Gochran (1981).

Table (1): Pedigree, maturity group, flower color, country of origin, defoliation and pubescence type of studied soybean cultivars or lines.

No.	Cultivar or line	Pedigree	Maturity group	Flower color	Country of origin	Defoliation %	Pubescence type
1	L-30	Crawford X L-62-1686	III	Purple	Etay El-Baroud Egypt	5	Heavy
2	L-88	G 21 X 186k -73	III	White	Etay El-Baroud Egypt	5	Heavy
3	L-105	G 35 X Lamar	V	White	Etay El-Baroud Egypt	Zero	Heavy
4	L-109	L-86k-73 X Tracy M	III	White	Etay El-Baroud Egypt	3	Heavy
5	L-113	G 21 X Major	II	Purple	Etay El-Baroud Egypt	Zero	Heavy
6	L-117	D89-8940 X G 111	III	White	Etay El-Baroud Egypt	10	Heavy
7	L-127	D89-8940 X G 82	V	White	Etay El-Baroud Egypt	20	Normal
8	L-129	D76-8070 X G 35	III	White	Etay El-Baroud Egypt	5	Heavy
9	L-132	G 35 X G 83	III	Purple	Etay El-Baroud Egypt	10	Heavy
10	L-153	G 83 X G 21	III	White	Etay El-Baroud Egypt	10	Heavy
11	G 21	Crawford X Celest	IV	Purple	Egypt	20	Heavy
12	G22	Forrest X Crawford	IV	Purple	Egypt	30	Normal
13	G 83	Selectio from MBB-133	II	White	Egypt	30	Normal
14	Crawford	William X Columbus	IV	Purple	United States	30	Normal

RESULTS AND DISCUSSION

Data presented in Table (2) show that, in 2005 season soybean entries in most studied agronomic traits were significantly different. The earliest flowering entries (number of days to 50% flowering) were noticed with L-113 followed by G 83, L-153, L-129, L-132 and L-30 with averages of 31.3, 32.0, 36.0, 37.3, 37.3 and 38.0 days, respectively. In this respect, the same trend was cleared in case of 90 % pod maturity where the previous six entries had the best values but with light different arrangements. L-113 had the best value followed by G 83, L-153, L-30, L-129 and L-132 with averages of 105.0, 106.7, 115.7, 116.3, 117.3 and 118.0 days, respectively. The highest plants were obtained from L-129 followed by L-30, L-88, L-105, L-117 and G 22 with averages of 107.3, 96.0, 95.7, 91.0, 81.7 and 80.0 cm, respectively. In case of the number of pods / plant, L-105 had the first grade followed byL-117, L-88, G 21, L-127 and L-153 with averages of 120.5, 115.1, 90.9, 88.4, 87.2 and 85.2, respectively. On the other hand, L-88, L-105 and L-132 had the same average (2.73) for the number of seeds / pod followed by L-117, L-30 and G 22 with averages of 2.70, 2.60 and 2.60, respectively. The excessive mean weight of seeds / plant (g) were showed with L-117, L-88, L-127, L-153, G 21 and Crawford with averages of 38.73, 37.50, 36.42, 35.15, 32.90 and 31.50 (g), respectively. L-113 had the highest value of 100 seed weight

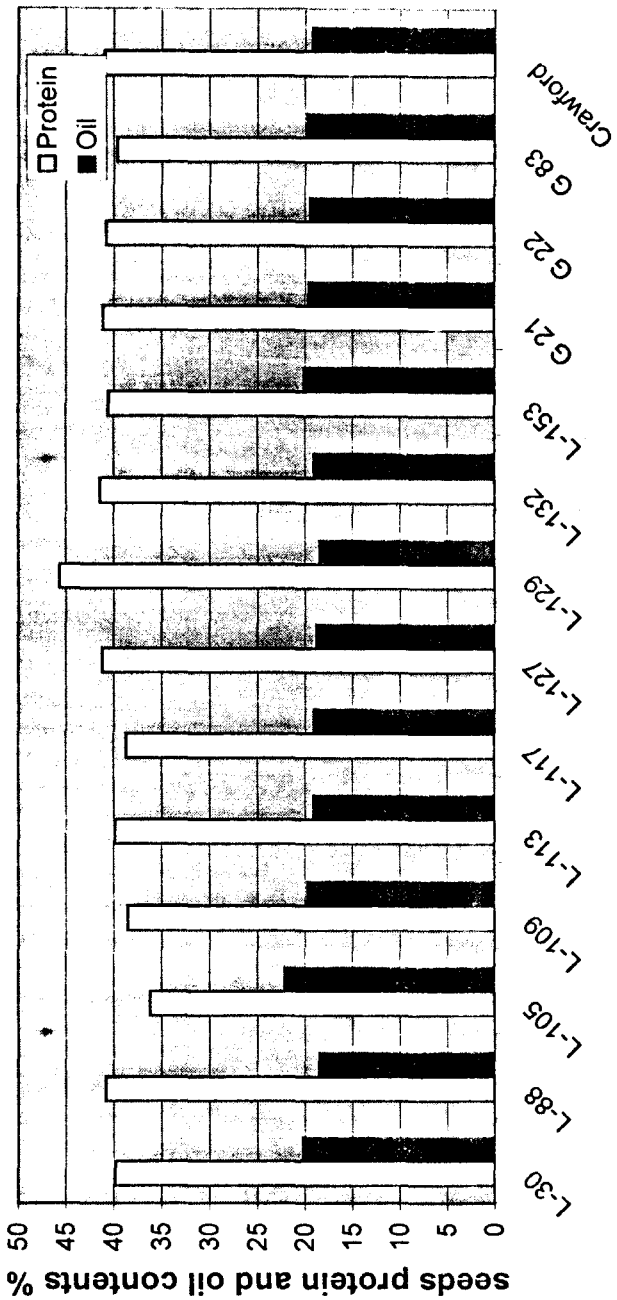

Fig.(1): Relations between soybean entries and its seeds protein and oil contents.

followed by L-153, L-127, L-132, G 21 and G 83 with averages of 18.04, 17.15, 17.00, 16.65, 15.94 and 15.30 (g), respectively. From the above data, it can be noticed that the results of the weight of seeds / plant are in harmony with the number of pods / plant except in case of L-105, although it had the first grade with the last parameter, it may be due to its small size seeds. Finally, from the same table it is clear that, the weight of seeds / plot (kg) and seed yield / fed (ton) are in harmony with the weight of seeds / plant (g) especially in case of L-117, L-88, L-127, L-153, G 21 and Crawford, but slight differences were detected among the other entries. In the second season, the results were nearly the same as in the first season especially with L-117, L-88, L-127, L-153, G 21 and Crawford (Table 3). Also, Radi (1999) and Rahhal *et al.*, (2000) found some differences between soybean entries which tested. These may be due to the differences of its growth habit, genetic factors and maturity groups as reported by Weaver *et al.*,(1991); Sharief and Bially (1992) and Sharief *et al.*, (1998).

Figure (1) shows the percentages of protein and oil seeds contents. Data clear that L-129 had the highest value of seeds protein content followed by L-132, L-127 and G 21 with averages of 45.63, 41.43, 41.13 and 41.06, respectively. The other entries had protein content ranged from 40.93 to 36.16 %. On the other hand, the same figure clears seeds oil content where L-105 had the highest value followed by L-30 and L-153 with averages of 22.10, 20.23 and 20.16 % and oil seed contents of the other entries ranged from 19.73 to 18.46 %. These results are in agreement with the findings of Ahmed (2001) who reported that soybean seeds contain about 20 % oil and 40 % protein of dry seed weight. Also, it can be noticed that there is a reversible relation between seeds content of both protein and oil.

Table (2): Means of some growth parameters among the tested soybean entries during season 2005.

Entry	Flowering (50%) days	Maturity (90%) days	Plant height (cm)	No.of pods per plant	No. of seeds per pod	Weight of seeds/ plant (g)	100-seeds weight (g)	Weight of seeds per plot (kg)	Seed yield per fed. (ton)
L-30	38.0	116.3	96.0	75.2	2.60	28.21	14.90	2.68	1.49
L-88	39.0	118.7	95.7	90.9	2.73	37.50	15.08	3.18	1.77
L-105	45.0	139.3	91.0	120.5	2.73	29.54	10.35	2.48	1.38
L-109	38.3	120.7	62.7	65.7	2.33	21.96	12.91	2.05	1.14
L-113	31.3	105.0	49.7	62.9	2.33	25.23	18.04	2.58	1.43
L-117	39.0	118.0	81.7	115.1	2.70	38.73	13.10	3.36	1.87
L-127	39.3	120.0	66.0	87.2	2.46	36.42	17.00	3.14	1.75
L-129	37.3	117.3	107.3	65.5	2.43	23.60	15.89	2.28	1.27
L-132	37.3	118.0	75.7	69.5	2.74	26.95	16.65	2.62	1.46
L-153	36.0	115.7	79.0	85.2	2.53	35.15	17.15	3.11	1.73
G 21	39.7	122.3	74.7	88.4	2.23	32.90	15.94	2.96	1.65
G 22	40.0	120.7	80.0	72.2	2.60	27.63	14.74	2.65	1.47
G 83	32.0	106.7	54.3	55.7	2.56	20.33	15.30	2.08	1.16
Crawford	39.7	118.7	78.0	83.9	2.56	31.50	15.02	2.85	1.58
L.S.D0.05	1.81	2.08	4.49	4.48	0.19	1.44	0.73	0.27	0.15

Potted plant assay for root rot reaction:

Soybean entries expressed a range from resistance (R) to moderately susceptible (MS) responses for the infection by *R.solani*. Data in fig (2) clear that soybean entries were resistant or moderately resistant to root rot. L-30, L-132, G 21, L-105, L-88, L-113, G 83, L-129 and L-153 were resistant with disease severity ratings between 1.63 and 1.95 and Crawford, L-117, G 22, L-109 and L-127 were moderately resistant with disease severity ratings from 2.06 to 2.37. In this respect, Rahhal *et al* .,(2000) reported that G 21, G 35, G 83 and Crawford were resistant and G 22, G 82, Holladay and Toamo were moderately resistant. The statistical analysis was highly significant between entries (L.S.D 0.05=0.29 and L.S.D 0.01=0.39). Paxton and Chambrlain (1969) reported that, increased phytoalexin and stem woodiness in younger soybean plants have a possible resistance mechanism to Phytophthora stem rot. The same finding has been mentioned by Muyolo *et al.* ,(1993) in case of *R.solani*.

Pathogenicity tests:

Data in Table (4) indicate that all tested soybean entries were susceptible to the infection with *F.solani, M.phaseolina,, R.solani and S.rolfsii* but in different responses. In case of *F.solani*, G 21 had the least pre – emergence damping – off followed by L-129, L-105 and L-113 with averages of 11.33, 13.00, 13.33 and 13.67 %, respectively. On the other hand, L-88 had the least pre-emergence caused by *M.phaseolina* followed

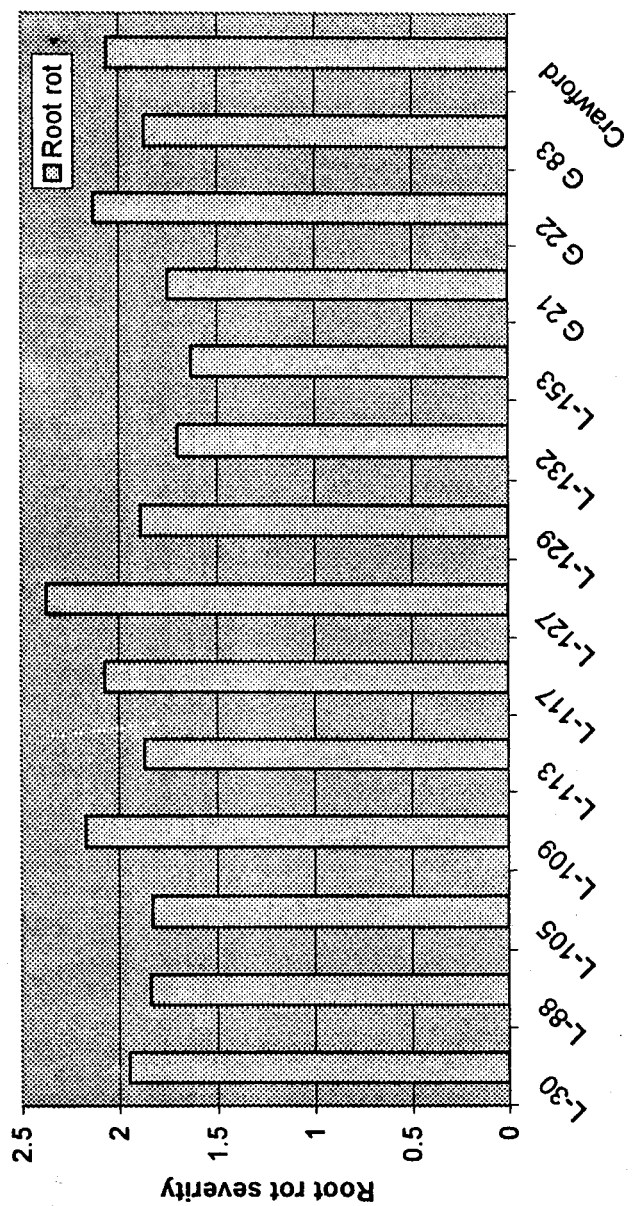

Fig (2): Reactions of some soybean entries to Rhizoctonia root rot in potted plant assays.

by L-113, L-153 and G 21 with averages of 17.00, 19.00, 19.00 and 19.33 %, respectively. Also, data in the same table show that L-153 had the least pre-emergence caused by *R.solani* followed by G 21, L-88 and L-113 with averages of 17.67, 18.33, 19.00 and 19.00 %, respectively. Finally, G 22 had the least pre-emergence caused by *S.rolfsii* followed by L-127, L-132 and L-153 with averages of 13.00, 13.67, 14.33 and 14.33 %, respectively. The least general averages of the pre-emergence of the above four fungi were 16.33, 16.42, 16.58 and 16.83 % in case of G 21, L-153, L-113 and L-88, respectively. In this respect, on the basis of virulence, the pathogenic fungi could be arranged in descending order as *R.solani, M.phaseolina, F.solani* and *S.rolfsii* with averages of 23.71, 21.98, 16.83 and 15.81 %, respectively. These results are in agreement with the findings of Rahhal *et al.* (2000) who mentioned the same descending order for the same fungi but with different soybean cultivars. The statistical analysis was highly significant between entries, fungi and the interaction between them (p=0.01).

Table (3): Means of some growth parameters among the tested soybean entries during season 2006.

Entry	Flowering (50%) days	Maturity (90%) days	Plant height (cm)	No.of pods per plant	No.of seeds per pod	Weight of seeds per plant (g)	100-seeds weight (g)	Weight of seeds per plot (kg)	Seed yield per fed. (ton)
L-30	37.3	117.6	94.3	68.0	2.33	26.96	15.78	2.60	1.44
L-88	38.6	118.6	92.3	85.9	2.60	35.00	15.60	3.08	1.71
L-105	45.6	136.6	82.0	106.5	2.56	28.45	10.65	2.40	1.34
L-109	38.6	119.3	57.3	60.8	2.36	20.67	13.07	2.15	1.19
L-113	31.3	106.6	42.6	51.1	2.26	24.26	19.30	2.48	1.38
L-117	8.6	117.6	76.6	100.6	2.63	35.86	13.61	3.16	1.76
L-127	38.6	119.3	58.3	82.0	2.43	34.25	17.49	3.00	1.67
L-129	37.6	117.0	98.6	60.9	2.33	22.64	15.11	2.24	1.24
L-132	37.6	117.0	73.0	61.3	2.63	25.40	17.44	2.50	1.39
L-153	36.6	116.0	75.6	77.7	2.46	34.00	17.83	2.96	1.65
G 21	39.3	120.6	73.0	81.9	2.26	32.11	16.57	2.76	1.54
G 22	39.3	119.3	73.0	66.6	2.56	26.13	15.36	2.57	1.43
G 83	30.6	106.0	51.0	50.4	2.43	19.50	16.10	2.00	1.11
Crawford	39.3	119.3	73.6	80.8	2.43	30.13	15.82	2.76	1.54
L.S.D0.05	1.89	7.31	4.74	3.93	0.13	1.64	1.04	0.29	0.15

In case of post-emergence damping-off, L-105 had the least average with *F.solani* and the ascending order to G 21, L-132, L-88 and L-113 with averages of 2.30, 2.40, 2.47, 2.97 and 2.97 %, respectively. On the other hand, L-113 had the least values in case of *M.phaseolina* and *R.solani* with averages of 4.60 and 4.23 %, respectively. Finally, G 21 had the least average with *S.rolfsii* followed by L-132, L-153 and G 22 with averages of 3.10, 4.10, 4.17 and 4.40 %, respectively. Generally, the pathogenic fungi could be arranged in desending order as *R.solani, M.phaseolina, S.rolfsii* and *F.solani* with averages of 5.75, 5.59, 5.01 and 3.32 %, respectively. These results are closely in agreement with the findings of Rahhal *et al.* , (2000). Data also clear that G 21 had the least post-emergence damping-off values followed by L-113, L-153 and L-88 with averages of 4.01, 4.08, 4.36 and 4.42 %, respectively. The differences between entries, fungi and the interaction between them were highly significant. In this respect, Mahrous and Ibrahim (1984) reported that the tested fungi differed greatly in their pathogenic potentialities where *M.phaseolina* and *R.solani* were the most pathogenic fungi followed by *F.solani.* Many investigators discussed the reaction of different soybean cultivars inoculated with soil borne fungi and appeared that reactions of soybean cultivars differed causing the ranking of cultivars within a differential set to change (Stephens *et al.*, 1993).

Table (4): Effect of some damping-off fungi agents on the incidence of pre- and post-emergence damping-off in some soybean entries (pot experiment).

Entry	Pre-emergence damping-off (%)					Post-emergence damping-off (%)				
	A	B	C	D	$\bar{x}$	A	B	C	D	$\bar{x}$
L- 30	18.67	20.00	28.00	17.00	20.92	3.83	5.37	6.00	5.50	5.18
L-88	14.33	17.00	19.00	17.00	16.83	2.97	4.97	5.30	4.43	4.42
L-105	13.33	22.00	23.00	15.67	18.50	2.30	6.33	4.77	6.13	4.88
L-109	16.00	21.33	24.00	17.67	19.75	3.77	5.90	6.37	6.23	5.57
L-113	13.67	19.00	19.00	14.67	16.59	2.97	4.60	4.23	4.53	4.08
L-117	18.00	22.67	22.00	17.00	19.92	3.80	6.13	6.93	6.50	5.84
L-127	26.33	25.67	25.00	13.67	22.67	3.20	5.17	5.50	5.20	4.77
L-129	13.00	26.67	24.67	17.00	20.34	3.80	6.07	4.70	6.33	5.23
L-132	16.33	23.67	28.33	14.33	20.67	2.47	6.57	5.67	4.10	4.70
L-153	14.67	19.00	17.67	14.33	16.42	2.90	5.43	4.93	4.17	4.36
G 21	11.33	19.33	18.33	16.33	16.33	2.40	4.80	5.73	3.10	4.01
G 22	21.00	24.33	28.00	13.00	21.58	3.80	6.17	6.60	4.40	5.24
G 83	18.00	22.67	26.67	18.33	21.42	4.20	5.77	6.53	5.00	5.38
Crawford	21.00	24.33	28.33	15.33	22.25	4.13	4.97	7.17	4.47	5.19
Mean	16.83	21.98	23.71	15.81		3.32	5.59	5.75	5.01	
		L.S.D 0.05	L.S.D 0.01			L.S.D 0.05		L.S.D 0.01		
	E :	1.35	1.78			0.35		0.46		
	F :	0.72	0.95			0.19		0.25		
	E x F:	2.70	3.57			0.70		0.93		

E : Entry F : Fungi $\bar{x}$: Mean A : *F.solani* B : *M.phaseolina* C : *R.solani* D : *S.rolfsii*

Field experiments:

Table (5) clears the reaction of soybean entries to damping-off under field conditions. Data show that highly significant differences in susceptibility occurred among the entries to pre- and post-emergence damping-off and finally in survival plants. In the first season, L-117 had the least pre-emergence damping-off followed by L-88, L-127, G 21 and L-153 with averages of 16.33. 20.33, 23.00, 28.33 and 29.33 % ,respectively. On the other hand, the above five entries had the least post-emergence damping-off with light different arrangement where L-117, L-127, L-88, L-153 and G 21 had the lowest values with averages of 4.40, 5.42, 6.57, 7.35 and 8.88 %, respectively. According to the results of pre- and post-emergence damping-off, it is clear that L-117, L-88, L-127, L-153 and G 21 proved to have the highest values of survived plants with averages of 79.27, 73.10, 71.58, 64.32 and 62.79 %, respectively. Data obtained during the second season were almost the same as in the first season as it clear in the same table, but minor differences were observed with the arrangement of the some entries in the pre- and post-emergence damping-off and in survival plants. Many investigators reported that soybean entries displayed different degrees of susceptibility to the infection with soil borne fungi (Muyolo *et al.*,1993; Gopal and Jagadeeshwar, 1997 and Rahhal *et al.*, 2000).

Table (6) appears the percentages of leaf area consumed and defoliation caused by cotton leaf worm *S.littoralis* and also the hairiness of some soybean entries. Also the correlation (r) between hairiness and defoliation clears in the same table. Under laboratory conditions, it is clear that L-105 had the least damaged leaves where its leaf area consumed was 27.76 % followed by L-88, L-109, L-153 and L-132 with averages of 32.16, 32.36, 32.63 and 32.90 %, respectively. The other entries had leaf area consumed ranged between 34.36 and 72.46 %. Also, it is clear that Crawford had the highest value, so it can be concluded that this variety is susceptible to cotton leaf worm under laboratory conditions and this results is in an agreement with the results mentioned by Habeeb *et al.*, 1988. The statistical analysis showed that the differences between entries were significant. Under field conditions, it is clear that L-105 and L-153 had the highest values of the number of hair / binocular field (0.5 cm^2) with averages of 11.34 and 11.10 in the first season and 11.31 and 10.84 in the second season, respectively. In contrast, G 22, G 83 and Crawford had the least values with averages of 4.79, 5.85 and

5.88 in the first season and 4.99, 5.68 and 6.13 in the second season, respectively. At the same time, it can be noticed that L-105 and L-153 had the least defoliation % with averages of 8.33 and 12.53 in the first season and 8.74 and 11.76 % in the second season, respectively. On the other hand Crawford, G 22 and G 83 had the highest defoliation % with averages of 33.62, 27.97 and 27.49 % in the first season and 34.03, 33.62 and 27.74 % in the second season. From the above data it can be concluded that, there is a reversible relation between hairiness and defoliation % and these results are in harmony with the results mentioned by Habeeb *et al.*, (1988) and Awan *et al.*, (1996). Also, data in the same table clear that, there is negative correlation between hairiness and defoliation % except in case of L-109 and L-129. In this respect, El-Dakrory (1979) found a significant negative correlation between the larvae which reached the pupal stage and the average number of hair / cm².

Table (5): Reaction of new soybean entries (*Glycine max* L.) to damping-off under field conditions during 2005 and 2006 seasons.

Entry	2005			2006		
	Pre-	Post-	Survival	Pre-	Post-	Survival
L-30	31.33	9.73	58.93	32.33	10.73	56.93
L-88	20.33	6.57	73.10	20.33	7.98	71.69
L-105	32.33	10.68	56.98	40.00	10.73	49.27
L-109	38.33	11.32	50.35	42.00	13.13	44.87
L-113	30.33	9.67	60.00	40.00	11.02	48.98
L-117	16.33	4.40	79.27	15.33	7.27	77.40
L-127	23.00	5.42	71.58	18.33	8.98	72.69
L-129	34.00	10.17	55.83	40.00	11.20	48.80
L-132	34.33	9.38	56.28	39.67	11.23	49.10
L-153	29.33	7.35	64.32	23.67	9.58	66.75
G 21	28.33	8.88	62.79	28.00	10.00	62.00
G 22	34.33	10.68	54.98	35.33	11.52	53.15
G 83	41.00	12.88	46.12	46.67	14.02	39.32
Crawford	32.67	9.12	58.22	29.00	10.73	60.27
Mean	30.43	9.02	60.63	32.19	10.58	57.23
L.S.D0.05	5.32	1.31	5.45	3.94	1.79	3.88
L.S.D0.01	7.19	1.77	7.36	5.33	2.42	5.25

Table (6): Hairiness of some soybean entries and its relation to leaf area consumed and defoliation caused by cotton leaf worm.

Entry	Leaf area cons-umed	2005			2006		
		Hairiness*	Defoliation**	r #	Hairiness*	Defoliation**	r #
L-30	40.56	8.48	21.91	- 0.25	8.56	20.50	- 0.38
L-88	32.16	9.11	13.17	- 0.88	9.01	13.68	- 0.21
L-105	27.76	11.34	8.33	- 0.70	11.31	8.74	- 0.30
L-109	32.36	9.64	13.30	+ 0.39	9.82	13.94	+ 0.64
L-113	35.06	9.64	18.22	- 0.87	9.44	18.11	- 0.41
L-117	43.96	8.54	21.34	- 0.86	8.22	23.05	- 0.94
L-127	50.96	6.57	27.03	- 0.31	6.75	27.70	- 0.68
L-129	34.36	9.63	16.73	+ 0.91	9.72	15.94	+ 0.91
L-132	32.90	9.86	14.09	- 0.80	9.67	16.04	- 0.93
L-153	32.63	11.10	12.53	- 0.72	10.84	11.76	- 0.80
G 21	48.96	8.54	26.95	- 0.98	8.71	27.03	- 1.00
G 22	72.26	4.79	27.97	- 1 .00	4.99	33.62	- 0.06
G 83	38.93	5.85	27.49	- 0.94	5.68	27.74	- 0.76
Crawford	72.46	5.88	33.62	- 0.17	6.13	34.03	- 0.76
L.S.D 0.05	1.33	0.23	2.08		0.19	2.12	
L.S.D 0.01	N.S	0.31	2.81		0.25	2.87	

* Values of number of hairs / binocular field (0.5 cm^2) transformed into$\sqrt{}$

** Values of leaf feeding damage (defoliation %) transformed into an angle.

\# The correlation between hairiness and defoliation %.

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الملخص العربى

تقييم بعض التراكيب الوراثيه الجديده فى فول الصويا

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تم تقييم ١٠ تراكيب وراثيه وأربعة أصناف من فول الصويا محصوليا ومرضيا وحشريا وهـى ل – ٣٠ ، ل–٨٨ ، ل– ١٠٥ ، ل– ١٠٩ ، ل– ١١٣ ، ل– ١١٧ ، ل– ١٢٧ ، ل– ١٢٩ ، ل– ١٣٢ ، ل– ١٥٣ ، جيزه ٢١ ، جيزه ٢٢ ، جيزه ٣٣ ، كراوفورد. أظهـرت النتائج للموسم الأول ٢٠٠٥ أن ل– ١١٣ كان الأقصر فترة لنسبة ٥٠ % تزهير يليه جيـزه ٨٣ ، ل– ١٥٣ بمتوسـطات ٣١,٣ ، ٣٢,٠ ، ٣٦,٠ يوما على الترتيب. نفس الاتجاه كان واضحا عند تقدير ٩٠ % نضج . أيضا اتضح أن ل – ١١٧ احتل المرتبه الأولى فـى صـفة محصول البذور/ نبات (جم) يليه ل– ٨٨ ، ل– ١٢٧ ، ل–١٥٣ بمتوسطات ٣٨,٧٣ ، ٥٠ , ٣٧ ، ٣٦,٤٢ ، ٣٥,١٥ (جـم) علـى الترتيب. وجد أيضا أن الأربعة تراكيب السابقه كان لها نفس الترتيب فى صفة وزن البذور / قطعه تجريبيه (كجم) بمتوسـطات ٣,٣٦ ، ٣,١٨ ، ٣,١٤ ، ٣,١١ ، ٣ (كجم) كذلك لصفة وزن البذور / فدان (طـن) بمتوسـطات ١,٨٧ ، ١,٧٧ ، ١,٧٥ ، ١,٧٣ طـن علـى الترتيب. وظهر نفس الاتجاه بصوره عامه فى الموسم التالى ٢٠٠٦ . من ناحيه أخرى أظهر ل– ١٢٩ تفوقا فـى محتـوى البـذور مـن البروتين يليه ل– ١٣٢ ، ل– ١٢٧ ، جيزه ٢١ بمتوسطات ٤٥,٦٣ ، ٤٣,٤١ ، ٤١,١٣ ، ٤١,٠٦ % على الترتيب. أما فـى حالـة محتوى البذور من الزيت فوجد أن ل– ١٠٥ له الترتيب الأول يليه ل– ٣٠ ، ل– ١٥٣ بمتوسطات ٢٢,١٠ ، ٢٢,٢٥ ، ٢٠,١٦ % علـى الترتيب.

فى حالة الزراعه فى الأصص فان التراكيب الوراثيه السابقه كانت اما مقاومه أو متوسطة المقاومه لأعفان الجذور المتسببه عن فطـر ريزوكتونيا سولانى. كذلك درست مقاومة هذه التراكيب لأعفان ما قبل وما بعد الظهـور المتـسببه عـن فطريـات فيوزاريـوم سـولانى، ماكروفومينا فاسيولينا، ريزوكتونيا سولانى، سكليروشيم رولفسياى وذلك تحت ظروف الصوبه. بصورة عامه كان الصنف جيـزه ٢١ الأقـل فى الاصابه بأعفان ما قبل الظهور يليه ل– ١٥٣ ، ل– ١١٣ ، ل– ٨٨ بمتوسطات ٣٣,١٦ ، ٤٢,١٦ ، ٨٣,١٦ % على الترتيب. كـذلك فى حالة أعفان ما بعد الظهور فان الصنف جيزه ٢١ والثلاثة تركيبات السابقه أظهرت درجه عاليـه للمقاومـه وبـنفس الترتيـب الـسابق بمتوسطات ٤,٠١ ، ٤,٠٨ ، ٤,٣٦ ، ٤,٤٢ % على الترتيب. أما تحت الظروف الحقليه ففى موسم ٢٠٠٥ أظهر ل– ١١٧ مقاومه عاليه لأعفان ما قبل الظهور واحتل الترتيب الأول يليه ل– ٨٨ ، ل– ١٢٧ بمتوسطات ٣٣,١٦ ، ٣٣,٢٠ ، ٢٣,٠٠% على الترتيب.

أما فى حالة أعفان ما بعد الظهور فكان ل– ١١٧ أيضا له الترتيب الأول يليه ل– ١٢٧ ثـم ل– ٨٨ بمتوسـطات ٤٠,٤ ، ٤٢,٥ ، ٥٧,٦ % على الترتيب. أما أعلى متوسط للنباتات الحيه الباقيه فظهرت مع ل–١١٧ يليه ل– ٨٨ ثـم ل–١٢٧ بمتوسـطات ٢١,٧٩ ، ١٠,٧٣ ، ٧١,٥٨% على الترتيب

وفى الموسم التالى ٢٠٠٦ ظهر نفس الاتجاه ولكن مع بعض الاختلافات الطفيفه فى ترتيب بعض التراكيب الوراثيه.

تحت الظروف المعمليه أظهرت الدراسات الحشريه أن ل–١٠٥ كان الاقل فى المساحه المستهلكه من الورقه المتسببه عن تغذيـة دودة ورق القطن يليه ل–٨٨ ، ل–١٠٩ ، ل–١٥٣ بمتوسطات ٢٧,٧٦ ، ٣٢,١٦ ، ٣٢,٦٣ ، ٣٢,٩٠% علـى الترتيـب. أمـا تحـت الظروف الحقليه فاظهرت التراكيب الوراثيه ل–١٠٥، ل–١٥٣ أكثر عددا للشعيرات /٠,٥سم٢ من سطح الورقه بمتوسطات ١١,٣٤، ١١,١٠ فى الموسم الأول ، ١١,٣١، ١٠,٨٤ فى الموسم الثانى على الترتيب. أيضا أظهر التركيبان السابقان أقل نسبه فقـد فـى الأوراق بمتوسـط ٨,٣٣، ١٢,٥٣% فى الموسم الأول ، ٨,٧٣ ، ١١,٧٦ % فى الموسم الثانى على الترتيب. أخيرا كان هناك تلازم سالب واضح بـين عـدد شعيرات السطح ونسبة الفقد فى الأوراق ما عدا فى حالة التركيبين ل–١٠٩، ل–١٢٩.