ROLE OF THE GENOTYPE AND ITS INTERACTION WITH THE INHABITING OREDACEOUS ARTHROPODS IN IMPROVING SOYBEAN PRODUCTIVITY IN EL-MINIA GOVERNORATE

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Abstract

This work was conducted in the research farm of Mallawi Agricultural Research Station, Minia Province, Egypt during two successive seasons, 2003 and 2004, to study the role of genotype and its interaction with four inhabiting predaceous arthropods, i.e. ladybird beetles, *Coccinella undecimpunctata* L. (Coleoptera: Coccinellidae); lacewing, *Chrysoperla carnea* (Stephens) (Neuroptera : Chrysopidae); the rove beetle, *Paderus alfierii* (Koch) (Coleoptera : Staphylinidae) and unidentified true spiders (Araneidae), in improving the productivity of 19 soybean i.e. H3Z, H24Z, H26Z, H30Z, H37ZBC, H75ZBC, H48/S1, H52/S2, H60/BS, H65/S, F10H54, F9H2/12, H15L5, H16L2, H20L1, Giza 82, Giza 11, Clark and Crawford. Direct count sampling technique was used to estimate adult stages. The results obtained in this study indicated significant differences among those species of predaceous arthropods and all genotypes of soybean throughout the two combined investigation seasons.

The results indicated significant differences among soybean genotype in all traits studied where plant heights of the genotypes H26Z, H24Z, Giza 111, F10H54/BS, H48/S1, H20L1, F9H2/12 and H15L5 significantly surpassed the other genotypes. The shorter the earlier flowered and matured plants were belong the genotypes Giza 82, H48/S1, H60/BS, H73ZBC, H3Z, H30Z, H15L5, H20L1, H16L2 and Clark, where the earliest of them is Giza 82, which matured two weeks earlier than genotypes. The highest numbers of pods and seeds per plant were recorded to the genotype H73ZBC followed by H24Z, H60/BS, H30Z, Giza 111, H26Z. the new released variety Giza 111 was recorded as the highest genotype for seed yield per feddan followed by the commercial variety Crawford. Giza 111 also gave the highest seed yield per feddan followed by the genotype H30Z, H26Z, F10H54/BS and H15L5. It is recommended that Giza 111, H30Z, H26Z, F10H54/BS, H60/BS, and H15L5 are to be considered as the best high yield and resistant genotypes to cotton leaf worm for the Middle Egypt Region. Improving productivity in El-Minia province will be increased through growing such high yield and resistant genotypes to cotton leaf worm resulting decreasing the costs of production and reducing the environmental pollution via avoiding pesticide use in soybean fields.

INTRODUCTION

Soybean is considered as one of the most important food legume and oil crops in the world. Because the multiple utilization of soybean in Egypt, several efforts have been devoted to improve its seed quality and yield through breeding programs and agronomic practices. Cooperation between different qualified professionals in agriculture plays an important role in this regard. The present investigation aims to studying the role of soybean genotype and its interaction with the inhabiting predaceous arthropods in improving the productivity of soybean in El-Minia Province. This improvement of soybean comes through decreasing the infection of soybean plants with injurious pests, therefore it will be considered as protective procedure to the environment from pesticides and as a part of integrated pest management programme. It has been shown that increasing densities in soybean plants caused an increasing in plant height (Ali, 1993); also there was an increasing in both seed weight per plant and seed yield per feddan as the effect of increasing of the density of soybean plants (Abdel-Hafez, 1999; Hassan *et al.,* 2002 and Shams El-Din *et al.,* 1997). Other studies on different crops such as cotton, alfalfa, and soybean involved the effect of predaceous arthropods (Abdel-Galil *et al.,* 2002; Ibrahim *et al.,* 1979; Ismail, 2003 and Whigham *et al.,* 1978).

MATERIALS AND METHODS

Two field experiments were conducted at the experimental farm Malawi Agricultural Research Station, Minia Province, Middle Egypt, during two successive seasons 2003 and 2004, to study the effect of inhabiting procedures arthropods in increasing the productivity of soybean genotypes in Minia Province. The soil of the farm is clay loam with pH pf 8.05 and total of 0.09% N content was clover-sown soil in both last successive winter-growing seasons. The experimental design of the trial was RCBD (randomized complete block design) with four replicates occupied a total area of 12 m^2 representing 1/350 of a feddan. Each plot of the experiment involved five 4-miters-length rows and 60 cm a part.

The soybean genotypes used in the current research were:

1. H3Z (Crawford x L62-1686).
2. H24Z (Elgin x L62-1686).
3. H26Z (L62-1686 x Corosy 79)

4. H30Z (L75-6648 x Corosy 79).
5. H73ZBC (L75-6648 x Harden).
6. H75ZBC (Calland x Harden) x L75-6648.
7. H48/S1 (Mapple Presto x L76-0272).
8. H52/S2 (Mapple Presto x L76-0272).
9. H60/BS (Mapple Presto x L760272).
10. H65/S (Lakota x L76-0272).
11. F10H54/BS (L76-0049) x Crawford).
12. H15L5 (Crawford x D79-10426).
13. H15L5 (Crawford x D79-10426).
14. H16L2 (H2L4 x Lakota).
15. H20L1 (Clark x Mapple Presto).
16. Giza 82 (Crawford x Mapple Presto: released in 1995 for both the mono-and inter-cropping systems. It takes into account in intensification programs as an early maturing and high yield variety that could be planted over long period of time from April until June without reduction in yield.
17. Giza 111 (Crawford x Celest): released in 1995 as a highly resistant cultivar to cotton leaf worm and high stable genotype in a wide range of environments.
18. Clark: the check variety in Middle-and Upper-Egypt regions.
19. Crawford: the check variety in Northern-and Delta regions.

Sampling technique:

The direct count was used as sampling method. Samples were started from the first week of June till the second week of October in both successive growing seasons. Samples of 100 plants taken every week from each soybean genotype. The predaceous arthropods counted in this study involved the adults of ladybird beetles, *Coccinella undecimpunctata* L. (Coleoptera : Coccinellidae); lacewing, *Chrysoperla carnea* (Stephens) (Neuroptera : Chrysopidae); the rove beetle, *Paderus alfierii* (Koch) (Coleoptera : Staphylinidae) and unidentified true spiders (Araneidae).

Seeds inoculated with Okadin of each genotype of soybean were sown on May 20^{th} in both seasons. As recommended and just after sowing and before watering the soil, the phosphorous and nitrogenous fertilizers were added to the soil at the rate of 15 Kg P_2O_5 as calcium super-phosphate (15.5% P_2O_5) AND 15 Kg nitrogen in the form of urea (46.5% N) per feddan, respectively.

Data of flowering, maturity and plant height were collected throughout the growing season. At harvest, ten plants were randomized selected from the middle rows of each plot to collect the means of number of branches, pods and seeds per plant, seed index (weight of 100 seeds) and seed yield per plant. Seed yield per plot was collected from the three middle rows in the plot and threshold plot.

Data of all characters was statistically analyzed according to Sendecor and Cochran (1981) and the means of each treatment were compared by the value of LSD (least significant difference test) at the of 5% probability.

RESULTS AND DISCUSSION

1-The role of soybean genotypes traits in improving their productivity:

1-1: Plant height:

Results presented in Table (1) showed that the plants of the genotypes H26Z, H24Z, Giza 111, F10H54/Bs, H48/S1, F9H2/12 and H15L5 were significantly taller than the other genotypes , while the plants of the genotypes H73ZBC, H75ZBC, H30Z, H52/S2, H3Z, Clark, H16L2, Giza 82, Crawford, H65/S and H60/BS were recorded as the shorter plants. The differences of plant height among soybean genotypes can be attributed to the growth habit of each genotype controlled either by genetic factors or environmental agents. The results are agreement with those obtained by Mohamed (1988) and Abdel-Hafez (1999).

1-2: Number of days from sowing to flowering and to harvest maturity:

The results indicated that soybean genotypes significantly differed in number of days from sowing to both flowering and maturity. The earliest flowered genotypes were Giza 82, followed by H48/S1, H60/BS, H73ZBC, H3Z, H30Z, H15L5, H20L1, H16L2, and Clark with values ranged from 28.6 to 32.7 days, respectively. The same soybean genotypes also matured earlier than the other genotypes that take a range between 103-114.1 days. However, the least genotype in both flowering and maturity was H24Z followed by the genotype H26Z. It is not surprising to get these differences between all genotypes of soybean under study since they belong to different maturity groups. However, the results obtained are in agreement with those obtained by El-Karamity (1996).

1-3: Number of branches per plant:

Means number of branches per plant of the genotype (H26Z) followed by H24Z, H75ZBC, F10H54/BS, Giza 111, and H60/BS were higher than that of the other genotypes. However, the genotypes H20L1, H16L2, H3Z, H30Z, and Giza 82 showed the lowest number of branches per plant. The differences between those genotypes may be due to their genetic potential for branching. The results obtained in this regard are in agreement with those reported by Tawfik *et al.* (1991), Ali (1993) and Abdel-Hafez (1999).

1-4: Number of pods and seeds per plant:

There were significant differences among soybean genotypes in both number of pods and number of seeds per plant. The genotype H73ZBC followed by H24Z, H60/BS, H30Z, Giza 111 and H26Z showed the highest numbers of both pods and seeds per plant, while the lowest numbers of pods and seeds per plant were obtained the genotypes H20L1, H15L5, H16L2, H52/S2, F9H2/12, Giza 82 and H65/S. the plants of the genotypes H3Z, H75ZBC, F10H54/BS, Clark and Crawford showed that they are inferior to those already mentioned as the highest genotypes in numbers of both pods and seeds per plant. The results obtained for these both traits, which show the differences among genotypes may be due to the effects of different genetic factors controlling the growth behaviour of the genotypes and their interaction with the environmental agents prevailed during the growing season of soybean. It is well known that the vigorous growth reflects on the accumulation of dry matter, plant height, number of branches and hence on numbers of pods and seeds per plant. The results obtained are in acceptance with those findings of Ali (1993) and El-Karamity (1996).

1-5: Weight of seeds per plant and weight of 100 seeds (seed index):

The results indicated that soybean genotype Giza 111 gave the highest seed yield per plant (23.9 g) and H60/BS (17.9 g). On the contrary, the genotypes H20L1, H3Z, H48/S1, H75ZBC, H65/S and H16L2 were significantly lower than the other genotypes in seed yield per plant. Concerning the differences between soybean, also genotypes in weight of 100 seeds (seed index), seeds of the genotypes Giza 111 gave the higher weight of seeds (16.9g) than the others followed by Crawford (16.2g) and H15L5 (15.8g) it is considered as superior to almost all soybean genotypes in this trait, while the weight of 100 seeds for the genotype H3Z was the lowest of all soybean genotypes (12.1g). Increasing seed weight in some genotypes more than others may be due to the increase of the metabolic process in such genotypes and consequently increasing of accumulating metabolites in fruiting organs and seeds and since all these processes are controlled by genetic factors and their interaction with the environmental conditions prevailed throughout the growing season. These obtained results are in high agreement with those obtained by both Ali (1993) and Abdel-Hafez (1999).

1-6: Seed yield per feddan:

Significant differences among soybean genotypes for this trait in both combined seasons. The highest seed yield (ton) per feddan was recorded also to the soybean genotype Giza 111 (1.905 ton0 indicating its validity to be grown in El-Minia region followed by H30Z (1.689 ton), H26Z (1.601 ton), F10H54/BS (1.590 ton), H60/BS (1.580 ton), H73ZBC (1.567 ton) and H15L5 (1.500 ton). The commercial check genotype Clark (1.368 ton) and Crawford (1.480 ton) were inferior to those high yield genotypes H48/S1 (0.948 ton), H3Z (0.990 ton), H75ZBC (1.027 ton), H52/S2 (1.067 ton), H65/S (1.090 ton), F9H2/12 (1.11 ton), H20L1 (1.233 ton) and Giza 82 (1.275 ton). The superiority of Giza 111 and its companions of soybean considerable genetic potentials and their interaction with the prevailed environmental factors in both growing seasons. The results obtained in this study are in agreement with those reported by El-Karamity (1996).

2- The role of predaceous arthropods in improving the productivity of soybean genotypes:

2-1: The Ladybird beetle, *Coccinella undecimpunctata:*

Data presented in Table (2) indicate that the mean numbers of the Ladybird beetles of the combined 2003 and 2004 seasons by direct count of sampling methods. High population density at 1st week of August on soybean genotype (H15L5) was 45 individuals, while the lowest population density of 1.67 on average individuals was recorded at 1st week of June on the commercial variety Crawford. The population densities on soybean genotypes from number 2 through 12 and from number 14 through 19 ranged between 3.33 to 39.33 individuals in the two successive seasons.

2-2: The Lacewing, *Chrysoperla carnea* stephens:

Data presented in Table (3) show that a high population density of **Lacewing** 40.7 individuals was recorded at the 1st week of August on soybean Giza 82 averaged

(40.7), while the lowest population density of individuals were recorded at 2nd week of June on the commercial variety Clark (average 1.7). The population densities on soybean genotypes from number 1 through 15 and from number 17 through 19 ranged from 3.33 to 39.33 individuals on an average in the two successive seasons, respectively.

2-3: Rove beetle *Paederus alfierii* Koch:

Data presented in Table (4) indicated that a high population density of 29 individuals of **rove beetles** was recorded at the 4th week of August on soybean genotype (H73ZBC), while the lowest population density of 1-1.3 individuals was recorded at 2nd week of June and the 4th week of September on soybean genotypes from number 12 through 19 all over the two successive seasons.

2-4: Identification, true spiders:

Data presented in Table (5) showed that a high population density of 10.67 individuals of true spiders was recorded at the 4th week of August on soybean genotype (H52/S2), while the lowest population density of 0.33 individuals was recorded at 1st week of June on the commercial variety Clark. However population densities on all soybean genotypes ranged from 0.67 to 7.67 individuals as an exception of the previous mentioned.

From all the results obtained in this study, it is clear that there are significant differences between the populations densities of all arthropods counted on all the 19 soybean genotypes through the two successive seasons. However, there were high significant differences between all species of predaceous arthropods through the two successive seasons and all genotypes of soybean. It could also be concluded that all genotypes of soybean are relatively attractive to predaceous arthropods that reflect on increasing soybean productivity i.e. yield and its components.

Such study can be considered an improving pest control strategy through the conservation of predaceous arthropods populations as biological control agents occurred naturally that reflects in improving the productivity of soybean genotypes.

According to the present findings, it is recommended that the best genotypes to be grown in Middle Egypt are Giza 111, H30Z, H26Z and H60/BS since they are showing high yield potential and resistance to cotton leaf worm. Therefore, growing these genotypes of soybean would be of great usefulness in improving the productivity and save the environment from pollution through avoiding the use of pesticides and leave the natural inhabiting predaceous arthropods to do their job.

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Table (1): Means of some agronomic, yield and yield component characters of some genotypes of soybean as combined data of 2003 and 2004 seasons.

Characters / Genotypes	Plant height (cm)	Days to flow.	Days to mat.	No. of branch/ plant	No. of pods/ plant	No. of seeds/ plant	Seed weight/ plant	Seed index	Seed yield/ fed. (ton)
1. H3Z	79.0	32.3	113.0	1.30	55.2	117.3	13.4	12.1	0.990
2. H24Z	116.7	49.0	148.7	3.20	70.7	149.1	17.5	13.1	1.483
3. H26Z	121.7	46.7	134.1	3.60	64.3	134.2	18.4	14.2	1.601
4. H30Z	85.1	32.3	113.3	1.97	65.2	141.6	18.9	15.2	1.689
5. H73ZBC	91.7	32.0	113.0	3.17	73.8	150.0	18.1	14.7	1.567
6. H75ZBC	90.0	34.3	120.0	3.13	54.5	119.2	14.9	13.0	1.027
7. H48/51	101.7	31.3	114.0	2.40	50.7	110.1	13.7	12.2	0.928
8. H52/52	81.7	34.0	115.0	2.43	49.0	109.3	15.6	14.3	1.067
9. H60/BS	71.7	31.7	114.0	2.47	67.3	146.2	17.9	13.3	1.580
10.H65/5	73.3	33.7	118.6	2.37	50.6	115.2	15.1	13.9	1.090
11.F10H54/BS	105.0	35.0	121.8	3.10	64.0	132.1	16.1	12.9	1.590
12. F9H2/12	96.7	34.7	121.0	2.37	49.1	111.1	14.0	13.8	1.110
13. H15L5	95.0	32.3	112.7	2.13	40.5	102.5	16.3	15.8	1.500
14. H16L2	76.7	32.7	114.1	1.13	43.8	106.5	15.6	14.7	1.480
15. H20L1	98.3	32.3	112.3	1.10	39.9	102.1	13.1	12.8	1.233
16. Giza 82	76.7	28.6	103.0	1.97	49.6	114.3	15.7	14.3	1.275
17. Giza 11	108.7	33.7	119.2	2.60	65.2	140.5	23.9	16.9	1.905
18. Clark	77.3	32.7	113.0	2.30	51.0	121.2	17.4	15.2	1.368
19. Crawford	73.5	33.7	117.7	2.25	53.9	128.7	18.7	16.2	1.480
LSD 0.05	13.6	1.85	2.2	ns	12.1	ns	4.3	2.6	0.197

Table (2): Weekly mean numbers of ladybird, *C. undecimpunctata* on some soybean genotypes for 2003 and 2004 combined seasons.

Genotype / No. of sample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	LSD 0.05
1	3.33	2.67	2.33	2.67	2.00	2.00	3.33	4.67	4.00	2.00	2.33	2.33	1.67	3.0	2.0	2.0	1.67	3.33	1.67	
2	8.33	4.33	5.33	5.00	6.67	7.67	6.67	8.33	9.67	9.00	6.67	3.0	3.33	2.0	1.67	2.67	1.33	1.67	7.0	3.2
3	9.00	8.00	8.00	9.67	5.00	8.00	6.67	6.33	6.33	6.00	8.33	7.0	3.67	4.67	5.0	4.67	3.33	3.67	4.67	2.9
4	15.4	14.0	12.67	10.0	12.67	13.3	14.7	10.7	18.0	14.67	10.7	13.3	11.0	14.0	11.3	14.0	12.3	12.7	13.0	4.2
5	15.3	13.3	11.00	11.3	13.67	13.3	15.67	13.0	9.67	13.00	17.0	10.33	12.0	15.3	11.0	13.3	9.67	10.0	7.67	4.54
6	15.7	15.3	18.70	14.0	17.00	14.7	13.00	16.7	17.0	16.3	21.3	28.0	30.3	23.7	23.7	22.0	25.0	23.7	15.7	6.03
7	12.3	7.33	7.33	8.33	11.30	15.7	11.30	14.33	15.7	10.3	23.3	28.0	24.7	23.3	29.3	28.0	25.0	27.0	11.0	8.36
8	12.7	10.3	13.67	10.7	12.33	13.3	12.00	13.33	15.0	12.0	29.0	33.7	37.7	37.3	34.3	25.7	29.7	22.6	10.3	10.8
9	31.0	27.3	26.00	21.7	27.00	22.3	23.00	25.0	23.7	22.0	35.7	39.3	45.0	39.3	43.0	31.3	33.0	27.3	21.7	11.0
10	18.3	16.7	16.00	15.3	14.67	18.3	12.70	16.0	14.7	17.0	19.3	16.0	22.3	18.0	17.3	12.0	12.7	13.3	14.0	NS
11	3.33	3.00	3.33	2.70	4.00	3.00	2.33	2.67	2.67	4.33	2.0	4.67	4.33	3.33	4.0	3.67	4.0	3.0	2.33	NS
12	22.7	16.7	19.70	15.3	14.00	16.0	20.70	17.0	20.7	20.3	22.7	17.7	14.3	16.7	18.0	14.7	12.7	16.3	19.7	NS
13	8.00	9.00	12.30	12.7	13.33	17.0	13.30	9.67	17.33	12.0	11.0	13.7	12.67	12.0	10.33	12.3	9.33	10.7	14.0	NS
14	5.67	5.70	5.00	4.67	3.33	2.67	6.00	4.00	7.33	7.67	13.7	8.67	11.0	10.7	11.33	9.67	12.67	7.67	6.67	5.08
15	3.00	2.30	2.00	3.33	3.33	2.33	1.33	2.67	2.00	3.33	2.67	2.33	2.33	7.0	1.67	2.67	2.33	3.67	2.67	NS
16	2.33	1.67	1.33	2.67	2.67	2.00	1.67	1.33	1.33	2.33	3.0	2.33	3.00	3.0	2.67	3.33	1.33	1.0	1.33	NS
17	2.00	3.00	2.33	2.67	2.67	3.00	2.33	3.00	2.00	1.67	2.67	1.33	2.33	1.67	2.0	3.0	2.67	2.0	1.33	NS
18	3.00	1.33	2.00	3.00	1.07	1.33	1.33	1.33	1.67	2.00	1.67	1.33	2.00	1.67	1.67	1.67	1.67	2.0	2.0	NS

Table (3): Weekly mean numbers of lacewing, *C. carnea* on some soybean genotypes for 2003 and 2004 combined seasons.

Genotype / No. of sample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	LSD 0.05
1	8.66	8.67	8.70	8.67	8.66	8.67	8.66	8.67	8.67	8.66	8.70	8.67	8.70	8.67	8.66	8.70	8.67	8.70	8.70	NS
2	9.67	9.33	11.33	10.7	10.3	8.33	11.7	9.30	8.30	4.70	1.70	1.30	2.00	1.70	1.70	3.00	2.00	1.70	4.67	4.14
3	8.00	7.33	8.67	7.70	8.30	5.00	7.30	6.00	4.70	4.70	5.30	4.00	4.70	4.70	2.30	5.00	4.70	4.00	13.0	4.01
4	13.7	14.33	16.0	15.0	11.7	15.3	15.0	9.00	15.0	9.70	9.00	7.60	5.30	5.70	5.70	3.70	3.70	3.33	13.0	4.35
5	13.7	17.63	14.33	16.0	19.6	15.3	16.0	14.7	16.7	19.7	12.3	14.0	12.7	12.0	11.0	9.30	11.0	7.00	16.67	5.50
6	20.0	20.33	14.33	20.0	15.3	20.7	21.7	24.0	15.0	18.7	20.7	16.3	27.3	23.7	18.7	19.0	20.3	20.3	8.67	8.60
7	18.0	17.67	16.67	16.7	16.7	12.0	16.7	12.7	18.7	17.3	16.7	23.0	18.0	20.0	16.3	18.0	19.0	26.0	16.0	NS
8	18.0	14.0	9.67	17.3	15.3	17.7	14.0	16.3	17.0	9.70	18.0	13.3	17.7	20.0	19.0	16.3	16.7	12.3	12.67	3.3
9	15.0	14.33	17.0	13.0	13.3	16.3	13.0	13.0	16.3	12.3	24.3	30.3	29.0	26.0	37.0	40.7	36.3	33.7	14.33	10.1
10	15.7	14.67	14.33	17.7	14.3	14.3	15.7	15.3	15.7	15.0	16.7	13.3	11.3	14.0	7.70	7.70	8.70	8.70	8.70	NS
11	16.1	15.8	16.9	16.0	16.3	15.1	15.3	16.2	16.6	15.8	163	15.2	15.7	16.7	16.0	17.0	17.0	16.3	17.0	NS
12	30.0	19.0	25.67	21.7	20.7	21.7	17.3	22.0	16.3	23.7	16.7	18.7	16.7	11.0	14.3	12.7	11.0	10.3	18.0	7.83
13	14.33	16.3	8.00	13.3	16.3	14.0	14.7	15.0	15.7	16.3	8.70	6.00	8.30	5.70	4.30	4.70	4.70	5.00	11.67	5.04
14	14.67	16.7	11.33	17.7	15.3	13.0	11.0	16.33	15.3	15.0	11.7	9.00	7.00	6.00	6.00	5.30	4.30	7.30	6.33	2.12
15	4.67	9.70	5.33	2.70	3.70	7.00	3.00	6.00	11.3	12.0	4.70	3.30	3.00	1.70	2.70	2.30	1.70	2.30	3.33	2.82
16	2.33	3.33	4.33	3.00	4.30	2.30	5.00	4.33	13.0	6.70	3.00	2.33	2.30	3.00	1.70	3.00	3.00	2.00	2.00	2.11
17	3.33	4.00	2.70	4.70	2.70	3.30	3.30	3.00	4.70	4.30	3.30	2.30	2.00	1.70	1.30	2.00	1.30	2.30	2.33	NS
18	2.00	1.67	2.00	2.67	2.70	4.30	2.30	4.00	2.70	2.67	3.30	2.70	2.00	2.00	1.30	1.70	1.70	1.30	2.67	NS

Table (4): Weekly mean numbers of rove beetle, *P. alfierii* on some soybean genotypes for 2003 and 2004 combined seasons.

Genotype No. of sample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	LSD 0.05
1	7.1	7.2	7.0	7.1	7.1	7.2	7.1	7.2	7.0	7.1	7.1	7.2	7.1	7.2	7.0	7.1	7.1	7.2	7.0	NS
2	6.0	4.7	3.7	7.3	4.3	5.0	3.7	5.0	4.3	3.3	1.7	1.0	1.7	1.3	1.0	1.3	1.0	1.0	1.0	2.73
3	2.0	1.7	2.0	2.0	1.7	0.67	5.7	1.0	1.7	1.0	1.7	1.3	2.0	1.7	1.7	2.0	3.0	1.7	3.67	NS
4	5.3	4.0	4.3	4.7	4.3	4.3	6.3	3.3	3.0	4.3	3.0	2.0	2.7	2.3	2.0	2.3	3.0	2.3	16.7	NS
5	13.0	16.0	13.7	14.3	15.7	13.7	12.0	16.3	13.7	13.0	2.7	2.3	1.7	8.7	2.3	2.7	4.0	2.7	13.7	3.67
6	17.3	16.7	16.0	15.3	15.7	17.0	17.0	18.0	15.3	12.7	9.3	11.0	10.3	7.3	7.3	7.0	6.7	7.7	21.7	7.7
7	16.0	16.7	17.0	19.0	27.7	22.0	23.3	20.3	22.3	22.7	9.0	8.0	11.0	6.7	8.3	11.0	7.0	6.3	13.7	7.99
8	13.0	12.3	13.0	11.7	12.3	14.0	13.7	12.6	13.7	14.0	11.7	5.3	4.7	5.7	7.3	6.7	5.3	6.7	13.7	3.66
9	13.3	14.7	5.0	3.3	6.0	5.7	6.3	4.7	3.3	4.7	12.0	14.3	13.7	14.3	16.7	14.3	13.7	9.7	4.33	4.24
10	15.7	18.7	6.0	5.7	6.7	8.7	6.7	6.7	7.0	8.7	7.3	7.3	8.0	8.7	10.0	6.3	5.3	4.0	6.0	NS
11	13.2	13.0	15.1	14.8	13.5	13.1	12.9	13.5	13.6	14.1	14.6	15.1	13.8	13.6	14.1	14.6	13.8	13.7	13.7	NS
12	30.3	24.7	24.0	25.0	29.0	22.7	23.3	17.7	15.3	24.0	3.0	3.7	3.7	3.7	5.7	4.0	3.3	3.3	23.3	5.7
13	14.0	15.0	5.0	6.3	5.3	4.3	6.0	3.3	2.3	12.7	2.3	2.3	2.7	2.3	2.7	3.7	2.3	4.0	13.0	2.64
14	8.0	7.76.3	6.3	4.7	7.3	7.3	3.7	8.0	4.3	3.7	3.3	2.7	2.7	5.0	3.7	3.7	4.0	3.7	4.67	NS
15	3.0	3.0	2.3	1.3	2.7	3.3	2.0	2.0	2.0	1.0	2.7	3.0	2.7	2.7	2.7	2.3	3.7	2.7	1.33	NS
16	3.0	2.3	1.3	2.3	1.7	3.7	1.7	2.3	2.7	2.0	3.0	2.3	2.3	2.3	1.7	1.3	1.0	1.7	1.67	NS
17	2.33	1.3	1.7	2.0	1.0	3.7	1.3	0.67	0.67	1.7	2.3	3.0	2.0	2.0	2.3	2.7	2.0	1.3	1.3	NS
18	2.0	1.7	2.0	1.0	1.7	1.3	0.67	0.67	5.0	1.7	2.3	3.3	3.0	1.3	1.0	1.3	1.3	1.0	1.3	NS

Table (5): Weekly mean numbers of unidentified true spiders on some soybean genotypes for 2003 and 2004 combined seasons.

Genotype / No. of sample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	LSD 0.05
1	0.67	0.67	0.33	0.67	0.33	0.33	0.67	0.67	0.67	0.67	0.33	0.33	0.67	0.67	0.67	0.67	0.33	0.33	1.0	NS
2	2.67	2.67	1.33	2.0	2.67	2.33	1.67	3.33	6.0	4.67	0.67	0.67	0.33	0.33	0.33	0.33	0.66	0.66	2.0	1.62
3	4.33	3.0	4.0	3.0	1.67	2.33	5.67	4.33	3.33	4.0	1.67	0.67	0.33	0.67	0.67	1.33	1.33	1.0	3.0	1.68
4	3.0	3.0	1.33	2.67	2.33	2.6	2.33	3.0	4.33	3.33	1.33	1.33	1.33	2.0	1.67	2.67	3.0	2.0	4.0	NS
5	6.33	5.33	5.33	6.33	6.0	11.0	5.0	4.33	6.0	5.0	1.33	1.67	2.0	2.0	2.0	1.67	2.0	1.33	3.33	2.52
6	2.33	3.0	4.33	2.67	4.33	4.33	4.0	3.33	4.33	7.0	4.0	4.33	6.67	4.67	4.67	5.0	2.67	4.67	4.67	2.61
7	6.33	7.0	4.67	7.0	6.62	4.33	4.33	4.67	4.0	3.33	3.0	2.67	2.33	2.33	4.0	3.33	4.0	3.33	4.33	2.6
8	3.0	5.0	3.0	4.0	2.33	2.33	2.67	3.0	4.33	4.33	5.33	3.67	4.0	6.33	4.67	4.67	5.0	2.67	4.67	NS
9	7.0	3.0	3.33	3.33	3.33	5.33	3.67	3.33	3.33	4.33	6.0	3.67	6.33	4.67	5.33	8.33	8.0	7.0	2.33	2.8
10	2.67	4.0	3.67	3.33	3.67	3.33	2.67	4.67	3.67	5.0	4.0	5.67	3.0	2.67	3.0	2.67	3.0	4.33	3.0	NS
11	3.33	3.0	3.33	2.67	4.0	3.0	2.33	2.67	2.67	13.0	6.0	3.0	4.33	3.33	4.0	3.67	4.0	3.0	7.0	NS
12	5.0	4.67	4.0	5.67	3.67	4.33	6.67	10.67	6.0	4.0	3.0	1.67	2.0	2.67	2.0	1.67	3.33	2.67	5.33	2.93
13	3.33	3.0	2.67	4.0	2.33	2.67	3.33	7.67	2.67	6.67	3.33	3.0	3.33	4.0	3.33	4.0	3.0	3.33	3.67	NS
14	8.67	6.0	5.0	5.33	5.0	7.67	5.33	8.0	5.33	10.0	2.67	2.67	2.67	3.33	2.67	2.67	3.0	4.33	3.67	2.94
15	6.67	3.67	3.33	3.67	5.33	3.67	3.0	3.67	2.67	2.33	2.67	5.33	4.0	5.33	3.33	3.0	2.67	3.0	2.67	NS
16	3.67	4.0	3.67	3.33	2.33	2.67	4.0	4.67	4.67	4.67	3.0	4.67	3.67	2.0	3.0	2.67	1.67	2.0	2.33	NS
17	3.0	4.33	3.33	2.0	4.33	3.67	3.0	5.0	3.67	3.67	5.0	3.0	2.67	3.0	3.33	3.67	3.67	2.33	2.0	NS
18	2.67	2.33	2.33	1.33	4.0	2.33	2.67	3.67	2.0	2.67	3.67	1.67	2.67	2.33	3.0	2.33	2.33	1.0	4.67	NS

دور الطرز الوراثى وتفاعله مع المفترسات المستوطنة فى تحسين إنتاجية محصول فول الصويا فى محافظة المنيا

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قسم بحوث المحاصيل البقولية – معهد بحوث المحاصيل الحقلية– معهد بحوث وقاية النباتات**– مركز البحوث الزراعية– الجيزة*

اجرى هذا البحث فى المزرعة البحثية لمحطة البحوث الزراعية بملوى وفيه أقيمت تجربتان حقليتان بهدف دراسة دور الطراز الوراثى وتفاعله مع المفترسات المستوطنة فى تحسين إنتاجية محصول فول الصويا فى منطقة مصر الوسطى عامى ٢٠٠٣، ٢٠٠٤ م وكانت النتائج المتحصل عليها كما يلى:

- إختلفت الطرز الوراثية لفول الصويا معنويا في جميع الصفات المدروسة وفي تفاعلها مع المفترسات المستوطنة وقد تفوقت الطرز الوراثية هجين ٢٦، جيزة ١١١، هجين ٥٤ عائله، هجين٤٨/اس ١، هجين٢ عائله٩ظ١٢، هجين١٥ عائله ٥ بالنسبة لصفة ارتفاع النبات عن بقية الطرز تحت الدراسة علي الترتيب.
- وجد أن الصنف جيزة ٨٢ هو أكثر الطرز الوراثية تبكيرا في كل من التزهير والنضج وتلاه هجين ٤٨/اس ١، هجين ٦٠، هجين ٧٣، هجين ٣، هجين ١٥، هجين ١٦ ثم كلارك.
- أظهرت السلالة هجين ٢٦ أعلي عدد من الفروع لكل نبات عن بقية الطرز الوراثية من فول الصويا تحت الدراسة.
- أظهرت الدراسة هجين ٧٣ أكبر عدد من القرون والبذور لكل نبات عن بقية الطرز الوراثية من فول الصويا وقد تلاها الطرز الوراثية هجين ٢٤، هجين ٦٠، هجين ٣٠، جيزة ١١١ ثم هجين ٢٦.
- سجل الصنف جيزة ١١١ أعلي محصول من وزن البذور للنبات الفردي وكذلك وزن المائة بذرة والمعروف بدليل البذور وتلاه الصنف المقارنة التجاري كراوفورد.
- تفوق أيضا الصنف جيزة ١١١ في محصول الفدان من البذور بالطن وتلاه هجين ٣٠، ع ١٠ هـ ٥٤، هجين٦٠، هجين ٢٣، ثم ع ١٥ هـ ٥ في حين تضائل محصول صنفي المقارنة كلارك وكرافورد عن تلك السلالات المتفوقة في المحصول.

- أظهرت النتائج المتحصل عليها من خلال تكنيك تقدير العـد المباشـر للحشـرات البالغـة للمفترسات الأربعة تحت الدراسة وجود اختلافات معنوية فيما بين تلك الأنواع من الأعـداء الحيوية وتفاعلها مع الطرز الوراثية لفول الصويا.

ووفق ما تم الحصول من نتائج يوصي في منطقة مصر الوسطي بزراعة الطرز الوراثية التالية عالية المحصول المقاومة لدودة ورق القطن جيزة ١١١، هجين ٣٠، هجين ٢٦ ثم هجين ٦٠ حيث تمتاز بكل المواصفات المرغوبة لتحسين انتاجية فول الصويا والمحافظة علي البيئة من أضرار التلوث بأستخدام المبيدات في حقول فول الصويا بترك المفترسات الطبيعية للقيام بهـذا الدور.