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SUSCEPTIBILITY OF FOUR SOYBEAN VARIETIES TO INFESTATION WITH SOME SUCKING PESTS AND COTTON LEAFWORM AND THE EFFECT OF MAIN WEATHER FACTORS ON INFESTATION

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ABSTRACT

The population of six pests (cotton leafworm *Spodoptera littoralis* (Bosid), whitefly *Bemisia tabaci*, cotton aphid *Aphis gossypii*, jassids *Empoasca lypica* and spider mite *Tetranychus urtica*) infesting soybean varieties (Giza 21, G. 22, G. 35 and G. 111) was investigated during 2003 and 2004 seasons.

The results obtained revealed the following indications.

1. There were significant differences between the four soybean varieties in case of whitefly (adult and immature) population in two growing seasons and the highest mean numbers of white fly were recorded with Giza 21 and Giza 111 varieties in two seasons.
2. One peak was recorded with all soybean varieties in the two growing seasons in case of cotton leafworm (larvae) and the highest number was recorded on Giza 22 variety.
3. There were significant differences among all soybean varieties (G. 21, G. 22, G. 35, and G. 111) in case of *Aphis gossypii* in two seasons and the highest mean number of aphids was 341.79 insects/100 plant/week with Giza 35.
4. The population of jassids on soybean was considerably low during the two seasons and the pest started to appear on soybean during June and reached its maximum during the 1st of September.
5. In case of *Tetranychus urticae*, significant differences were recorded among all soybean varieties in the two seasons and the highest mean numbers were 305.43 pests/400 leaves with Giza 35 in 2003 season and 485.92 with Giza 111 in 2004 season.
6. The effect of the prevalling weather factors (Max. and Min. temperatures, relative humidity and wind speed on the infestation degree of soybean varieties with these insects revealed that there were insignificant correlation values except some factors on some soybean varieties.

INTRODUCTION

Recently soybean *Glycin max* Merr. has become an important economic crop, cultivated mainly for animal feeding and oil production. It is also used in manufacturing biscuit, milk powder, chocolates and soy-sauce.

soybean seeds contain 35 % proteins (Metwally, 1989). Soybean protein contains all the essential amino acids for human foods and animal feeding (Badehop and Hackler, 1971). It contains valuable amount of calcium, phosphorus and also thiamin (Vit. B_1) (Hamid, 1989). Soybean plants have been attacked by different insect pests causing severe damage to the plants such as cotton leafworm *Spodoptera littoralis* (Boisd), whitefly *Bemisia tabaci*, cotton aphid *Aphis gossypii*, jassids *Empoasca lypica* and spider mite *Tetranychus urticae*.

Several authors survyed the insect pests associated with soybean in the fields such as (Rodrigo, 1947; Turnipseed and Kogan, 1976; and Chaudhary, 1981) from different countries and Mansour *et al* (1974); Hamid

(1977); Kasim (1979), Mohamed (1981); Ghanim *et al* (1988); Awadalla *et al* (1991), El-Mezayyen (1993), Gamieh *et al* (2001) and Younes *et al* (2001).

The aim of the present work is to study the following topics:

1. Population dynamics of certain insect pests infesting soybean such as aphids *Aphis gossypii* (Glov), Whitefly, *Bemisia tabaci* (Geen), jassids *Empoasca lypica*, spider mite *Tetranychus urticae* and cotton leafworm *Spodoptera littoralis*.
2. The effect of certain prevailing weather factors on the population fluctuation of these insect pests.
3. Susceptibility of some soybean varieties to the infestation with mentioned insect pests.

MATERIALS AND METHODS

Experiments were conducted at the experimental farm of the agricultural research station, Kafr El-Sheikh Governorate, Egypt during two successive soybean growing seasons, 2003 and 2004 to evaluate the relative susceptibility of four varieties (Giza 21, Giza 22, Giza 35 and Giza 111) to infestation with *Spodoptera littoralis, Bemisia tabaci, Aphis gossypii, Empoasca lypica* and *Tetranychus urticae*. Four soybean varieties were planted in the last week of May (25 – 30 of May) in both seasons. Four feddans were divided into 16 equal plots. Each of the four varieties (treatments) was planted in four replicates. The treatments were distributed in a complete randomized block design.

The normal agricultural practices were followed and no insecticides were applied during the experimental period.

Examination of weekly samples (25 seedling/replicate) were initiated 20 days after sowing and continued till the 4th week of September. Fourty leaves were randomly selected from lower, middle and upper portions of the plant. Samples were transferred directly to the laboratory and the total numbers of immature stages (larvae and pupae) of the white fly and the red spider mite (moving stages) occuring on both surfaces of leaf were counted.

The effect of prevailing temperatures, relative humidity and wind speed on the population density of whitefly, cotton leafworm, aphids, jassids, and spider mites was studied. The records of three weather factors were obtained from the Agrometorological Station at Sakha, Kafr El-Sheikh.

Duncan multiple rang test was used to partition the means into significant ranges (Snedecor, 1957). A computer program (MRE G2) was used for calculating the simple correlation coefficients between the selected climatic factors (daily mean temperature, relative humidity and wind speed) and the populations of these pests.

RESULTS AND DISCUSSION

1. Susceptibility of soybean varieties to some pests:

1.1. White fly immature stages

Data showed in Table (1) and illustrated in Fig. (1 and 2) show weekly changes in the population of white fly immature stages during the two seasons (2003 and 2004). White flies appeared during the 4th week of June in small numbers in both growing seasons. Thereafter the population increased

gradually in August and the numbers of insect decreased gradually until the 4th week of Sep. The highest mean numbers of white fly immature stages were 599.29 and 558.21 insects/100 plants/week with Giza 21 and G. 111 in 2003 season and were 490.79 and 421.21 with Giza 111 and Giza 21 varieties in 2004 season, respectively.

There were two peaks of white fly immature stages in 2003 season in case of Giza 21 variety in the 1st week of August and first week of September as 1525 and 865 insects/100 plants/week, respectively, and Giza 22 in the 4th week of July and the 5th week of August as 1146 and 691 insects/100 plants/week, and Giza 35 in the 3rd week of July and the 2nd week of August as 2001 and 649, respectively.

Two peaks were also recorded on Giza 111 in the 3rd week of July and the 4th week of August as 1669 and 1537 insects, respectively.

In 2004 season, one peak was recorded with all soybean varieties, and the highest peak occurred with Giza 35 in the 2nd week of August as 1801 insects/100 plants/week and the lowest peak was recorded with Giza 22 in the 4th week of July as 759 insects/100 plants/week.

These results confirm those obtained by Ali (1993) who indicated that, the population of *Bemisia tabaci* reached its peak throughout August to early September.

1.2. Cotton leafworm, *Spodoptera littoralis* (Boisd) larvae

Data obtained during 2003 and 2004 seasons are presented in table (2) and illustrated in fig (3 and 4). The infestation of soybean with *S. littoralis* larvae in two seasons began in relatively low numbers in June and increased gradually reaching the peak of population in August and decreased gradually reaching low number at the end of Sep. The lower mean number of *S. littoralis* larvae was recorded on Giza 35 variety as 121.07 and 120.36 larvae/100 plants in two seasons 2003 and 2004 respectively.

There were two population peaks of *S. littoralis* (fig. 3) in 2003 season with Giza 21, and G. 22 varieties and the highest peak was recorded in the 2nd week of August and the lowest peak was recorded in the 2nd week of Sep. One peak occurred in case of Giza 35, G. 111 in the 3rd week and the 2nd week of August, respectively. One peak was observed with all soybean varieties in 2004 season and the highest one occurred with Giza 21 and G. 22 varieties in the 2nd week of August as (981) and (1004), respectively. On the other hand one peak was recoded in the 3rd week of August in case of Giza 35 and Giza 111 varieties. Giza 22 variety received the highest rates of infestation while Giza 35 variety had the lowest rates of infestation.

Awadalla *et al* (1991) reported that *Spodoptera littoralis* had three peaks on soybean, the first one occurred during the last week of July, the second one occurred on the second week of August while the third peak occurred on the second week of September.

Metwally (1989) mentioned that larvae of *Spodoptera littoralis* began to appear in few numbers on soybean by late April and reached its maximum during the first week of June, and Clark variety of soybean received the highest rates of infestation while the Galland variety had the lowest rates of infestation.

Table (1): Susceptibility of 4 soybean varieties to whitefly, *Bemisia tabaci* (immature stage) infestation during two growing seasons, at Sakha location.

Varieties	Weekly No. of insect/100 plants														Total	Av.
	June	July				August					September					
	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th		
2003 season																
Giza 21	66	84	152	239	463	1525	1156	1094	991	783	865	533	327	111	8390	599.29d
Giza 22	21	36	68	311	1146	787	665	502	411	691	589	252	137	53	5671	405.07a
Giza 35	59	366	527	2001	669	336	649	487	365	251	127	89	56	29	6011	429.36b
Giza 111	8	11	75	1669	527	193	118	771	1537	1274	961	503	122	46	7815	558.21c
2004 season																
Giza 21	15	29	51	66	363	1708	816	549	456	261	158	134	79	31	5897	421.21c
Giza 22	11	31	167	247	759	643	527	569	408	251	163	101	66	36	4721	337.21b
Giza 35	35	63	111	226	382	725	1801	788	589	469	317	254	106	48	3979	284.21a
Giza 111	27	54	119	361	606	863	1055	1195	729	667	509	388	219	79	6871	490.79d

Table (2): Susceptibility of 4 soybean varieties to cotton leafworm, *Spodoptera littoralis* (larvae) infestation during two growing seasons at Sakha location.

Varieties	Weekly No. of larvae/100 plants														Total	Av.
	June	July				August					September					
	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th		
2003 season																
Giza 21	112	249	308	447	526	631	779	508	365	211	103	196	87	7	4529	323.5ab
Giza 22	294	386	476	593	648	735	863	604	491	206	252	354	268	34	6204	443.14b
Giza 35	22	42	51	75	96	163	206	413	285	169	104	53	16	0	1695	121.07a
Giza 111	65	88	127	199	253	311	437	302	222	173	113	69	23	0	2382	170.14a
2004 season																
Giza 21	117	365	313	294	567	636	981	713	567	352	44	76	29	8	5062	361.57b
Giza 22	52	116	209	429	603	857	1004	704	591	276	427	109	75	15	5467	390.5b
Giza 35	9	20	35	61	114	261	321	606	134	69	14	16	22	3	1685	120.36a
Giza 111	11	32	64	83	97	154	315	464	261	158	72	129	28	5	1873	133.79a

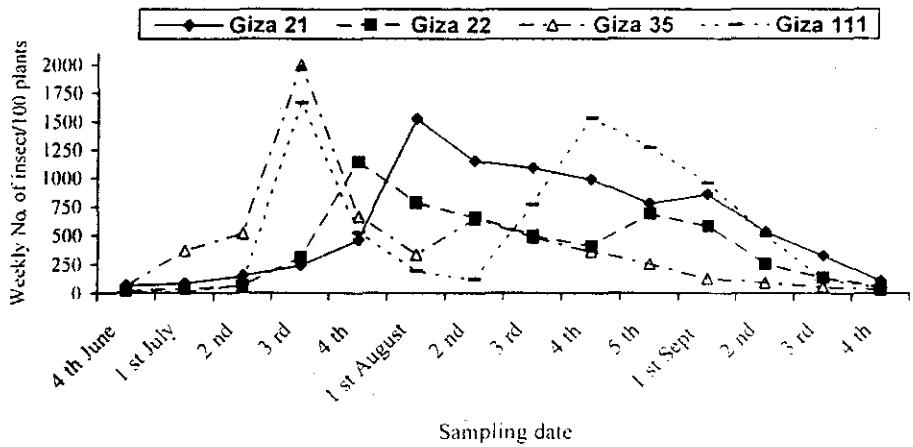

Fig. (1): Susceptibility of four soybean varieties to whitefly (immature stage) infestation during 2003 season.

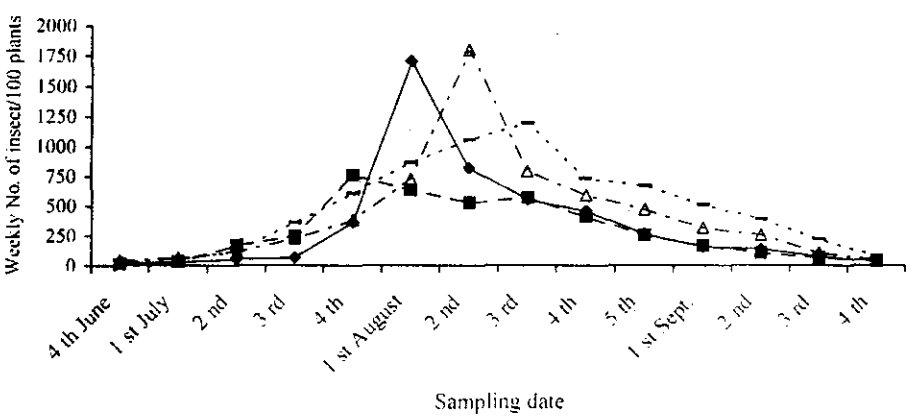

Fig. (2): Susceptibility of four soybean varieties to whitefly (immature stage) infestation during 2004 season.

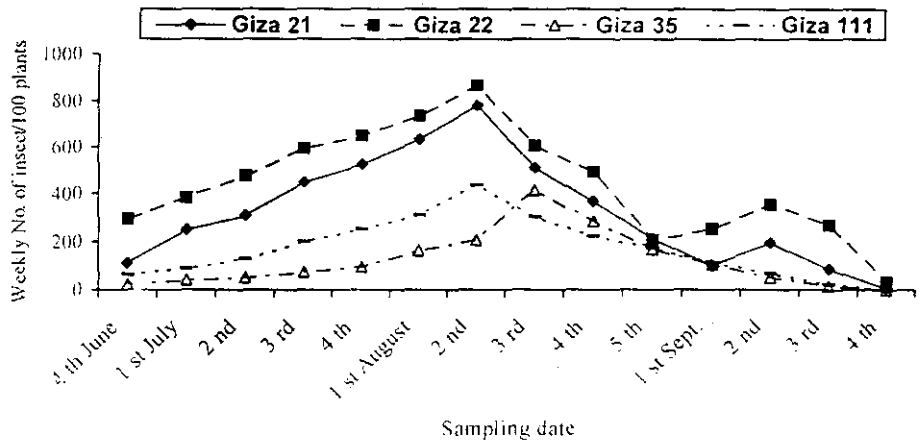

Fig. (3): Susceptibility of four soybean varieties to cotton leafworm (larvae) infestation during 2003 season.

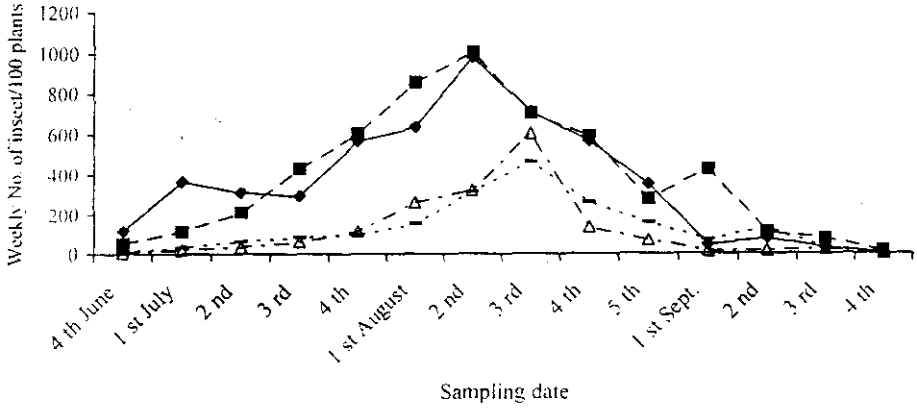

Fig. (4): Susceptibility of four soybean varieties to cotton leafworm (larvae) infestation during 2004 season.

1.3. *Aphis gossypii* population:

Data demonstrated in Table (3) and illustrated in Fig (5 and 6) showed weekly changes in the population of aphids during 2003 and 2004 seasons.

In 2003 season, the highest mean number of aphids were 198.07 and 165.57 insects/100 plants/week with Giza 35 and Giza 21 varieties respectively.

In 2004 soybean growing season, there were significant differences among all soybean varieties (Giza 21, G. 22, G. 35 and G. 111) and the highest mean number of aphids was 341.79 insects/100 plants/week with Giza 35 variety, and the lowest was 93.21 insects/100 plants/week with Giza 111 variety. One peak was recorded with all soybean varieties in both growing seasons (fig 5 and 6). Those peaks occurred on the 4th week of August in case of G. 21 and G. 35 and in the 1st week of September with G. 22 and G. 111 in 2003 season. These results agree with those obtained by Kasim (1979) who mentioned that the cotton aphid was found in high numbers on soybean plants from the beginning of the second half of August, and throughout September and October and in low numbers during June and July.

In 2004 season, one peak was recorded with Giza 21 in the 5th week of August and one peak with each of G. 22, G. 35, and G. 111 varieties in the 4th week of August.

Giza 111 soybean variety had the lowest rates of infestation with *A. gossypii* than the other varieties. These results are in agreement with that obtained by Metwally (1989) who mentioned that there was only one peak of *Aphis spp.* on soybean plants.

1.4. Jassids *Empoasca lypica* population:

Results in Table (4) and Fig (7 and 8) reveal that the population of jassids on soybean was considerably low during the two seasons.

In 2003 season, no significant differences were observed among the four soybean varieties and the highest mean of the insect population was 4.07 with Giza 21. On the contrary, there were significant differences among four soybean varieties in 2004 growing season and the highest mean density was 7.21 with Giza 21 variety. One peak was recorded with all soybean varieties as 19, 22, 25 and 26 insects/100 plants with Giza 21, 22, 35 and Giza 111 varieties, respectively in the 1st of September in 2003 soybean growing season.

In 2004 season one peak was occurred also with all varieties as 38, 23, 17 insect/100 plants with Giza 21, G. 22, and G. 35 respectively in the 1st of September and 13 insect/100 plants with G. 111 variety in the 2nd week of September. These results are agreement with those obtained by Shaheen (1977), Metwally (1989) and Ali (1993) who found that the population of *Empoasca lypica* on soybean plants had only one peak.

Table (3): Susceptibility of 4 soybean varieties to aphids, *Aphis gossypii* infestation during two growing seasons at Sakha location.

Varieties	Weekly No. of aphids/100 plants														Total	Av.
	June	July				August					September					
	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th		
2003 season																
Giza 21	0	0	9	0	0	21	94	317	796	601	382	96	2	0	2318	165.57b
Giza 22	0	0	0	0	0	0	0	4	39	195	406	28	16	5	693	49.50a
Giza 35	0	0	0	0	5	63	105	244	829	681	563	201	67	14	2773	198.07c
Giza 111	0	0	0	0	0	0	0	0	0	163	263	215	18	3	662	47.29a
2004 season																
Giza 21	0	8	0	0	0	61	93	205	427	719	502	106	74	11	2206	157.57c
Giza 22	0	0	4	0	0	6	88	197	786	249	158	36	12	0	1536	109.71b
Giza 35	0	0	0	0	17	99	518	856	1048	982	704	417	105	39	4785	341.79d
Giza 111	0	0	0	0	0	0	53	164	608	316	123	41	0	0	1305	93.21a

Table (4): Susceptibility of 4 soybean varieties to jassids, *Empoasca lypica* infestation during two growing seasons at Sakha location.

Varieties	Weekly No. of iassids/100 plants														Total	Av.
	June	July				August					September					
	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th		
2003 season																
Giza 21	3	1	2	0	0	8	0	0	5	6	19	13	0	0	57	4.07b
Giza 22	11	5	1	0	0	0	0	0	2	3	22	9	0	0	53	3.79ab
Giza 35	7	3	0	0	0	0	0	0	0	8	25	3	0	0	46	3.29a
Giza 111	9	5	0	0	0	0	0	0	0	4	26	6	0	0	50	3.57ab
2004 season																
Giza 21	7	21	13	0	0	0	0	0	1	9	38	11	1	0	101	7.21d
Giza 22	14	9	3	0	0	0	0	0	0	2	23	9	2	0	62	4.43c
Giza 35	6	3	0	0	0	0	0	0	0	5	17	0	0	0	31	2.21a
Giza 111	1	5	0	0	0	0	0	0	7	3	9	13	0	0	38	2.71b

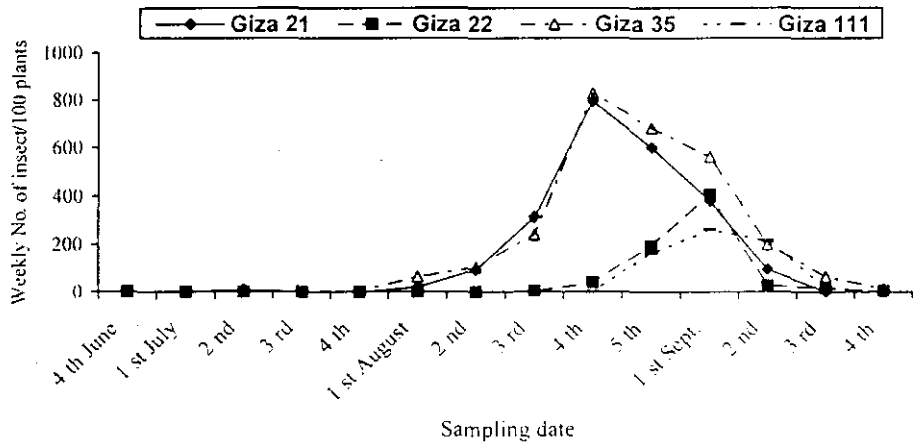

Fig. (5): Susceptibility of four soybean varieties to aphids infestation during 2003 season.

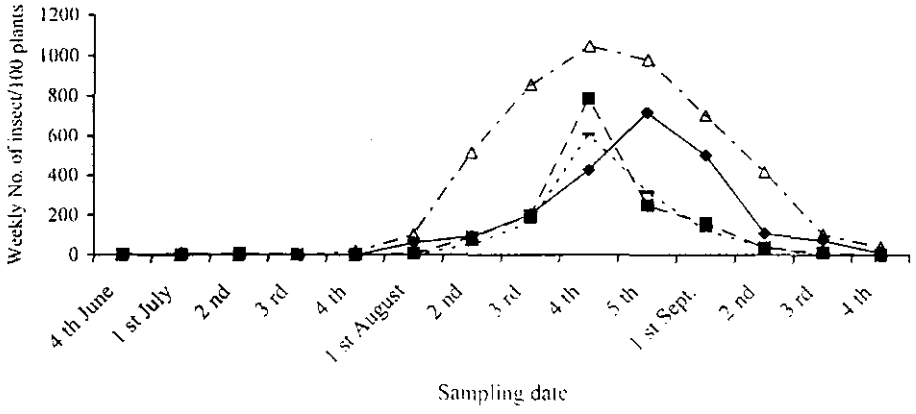

Fig. (6): Susceptibility of four soybean varieties to aphids infestation during 2004 season.

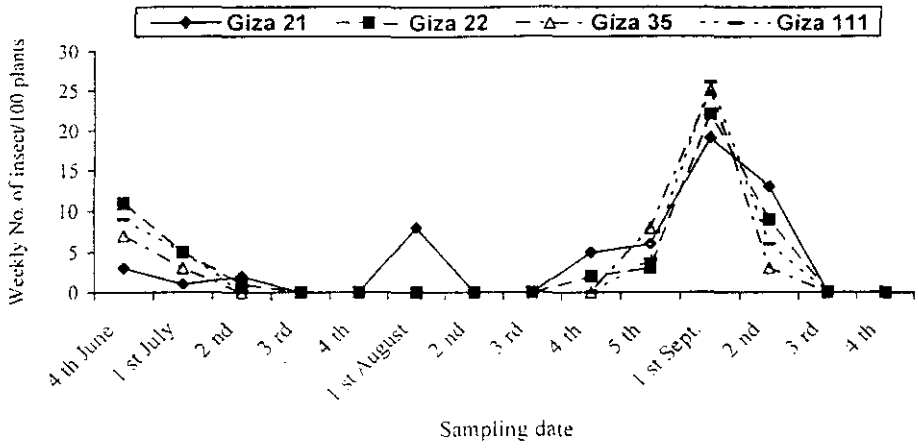

Fig. (7): Susceptibility of four soybean varieties to jassids infestation during 2003 season.

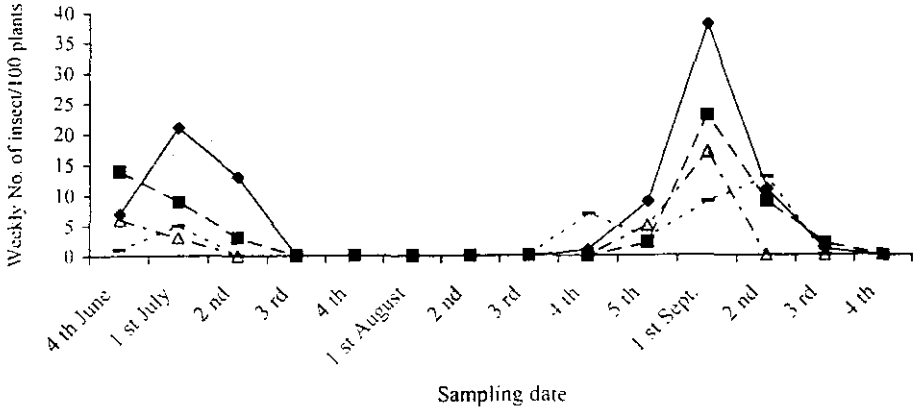

Fig. (8): Susceptibility of four soybean varieties to jassids infestation during 2004 season.

1.5. *Tetranychus urticae*:

Data presented in Table (5) and illustrated in Fig (9 and 10) revealed that, significant differences were observed among all soybean varieties in two seasons (2003 and 2004), and the highest mean numbers were 305.43 pest/400 leaves with Giza 35 in 2003 and 485.92 with Giza 111 in 2004 season. Two peaks were recorded with all soybean varieties in 2003 growing season. One peak occurred in the 3rd week of July and the 1st of Sep. with Giza 21, and the 1st of July as 419 and the 1st week of Sep. as 208 pest/400 leaves with Giza 22, and the 2nd week of July as 1066 and the 5th week of August as 367 with Giza 35, and the 3rd week of July as 1179 and the 5th week of August as 187 pest/400 leaves.

In 2004 growing season, two peaks were also recorded in the 1st week of July as 462 and the 1st week of Sep. as 245 with Giza 21, and in the 3rd week of July and 1st week of Sep. with Giza 22, and Giza 35, and in the 1st of July as (391) and the 5th week of August as (2263) with Giza 111.

It was observed that, Giza 111 and G. 35 varieties were the most susceptible ones to infestation with the moving stages of spider mite *T. urticae* in two growing seasons.

On the contrary, Giza 21 had the lowest susceptibility to infestation with *T. urtcae*. These results are in harmony with findings of Zaher *et al* (1980); Mohamed and Abdel Hafez (1981), Mohamed *et al* (1982), Turhan *et al.* (1983), Sawires *et al* (1990) and Gamieh *et al* (2001) who found that soybean genotypes varied in susceptibility to infestaiotn with *Tetranychus* spp.

2. The relationship between main weather factors (temperature, relative humidity, and wind velocity) and the population density of some insects on soybean varieties

2.1. White fly immatures:

Data in Table (6) indicated that, the simple correlation coefficients values were insignificant in all cases except that for Max. and Min. temperatures and relative humidity during 2004 season were positive and significant with G. 22 and G. 111 varieties, where (r = 0.596, 0.709, and 0.538), respectively with Giza 22 and (r = 0.612, 0.562) with G. 111. Negative correlation was observed with wind velocity in all cases, except on Giza 35 variety in two growing seasons.

2.2. Cotton leafworm larvae:

Data in Table (6) revealed a positive correlation between the recorded weather factors (Max., Min. temperatures and relative humidity) and the population of this pest on all soybean varieties in two growing seasons.

In 2003 season, positive and highly significant correlation was observed on Giza 21, G. 35, and G. 111 varieties with Minimum temperature (r = 0.685, 0.742, and 0.732) respectively and significant correlation with Giza 22, (r = 0.653). Highly significant correlation calculated with relative humidity in case of G. 22 variety, (r = 0.670) and significant correlation with G. 21, G. 35 and G. 111 varieties respectively.

Table (5): Susceptibility of 4 soybean varieties to spider mite, *Tetranychus urticae* (moving stages) infestation during two growing seasons at Sakha location.

Varieties	Weekly No. of spider mite (moving stages) /400 leaves														Total	Av.
	June	July				August					September					
	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th		
2003 season																
Giza 21	65	144	298	319	165	33	0	2	9	24	46	19	6	0	1040	74.29a
Giza 22	363	419	311	167	88	9	0	0	10	77	208	114	33	7	1806	129.0b
Giza 35	689	784	1066	653	197	65	0	12	89	367	224	94	32	4	4276	305.43d
Giza 111	193	366	855	1179	656	289	71	94	135	187	89	36	22	5	4177	298.36c
2004 season																
Giza 21	243	462	186	68	15	0	0	11	26	73	245	107	29	12	1478	105.57a
Giza 22	208	377	593	661	449	211	83	23	47	91	162	39	15	9	2969	212.07b
Giza 35	289	696	1016	1722	853	442	97	32	53	119	305	40	26	8	5698	407.0c
Giza 111	99	391	277	245	96	47	138	278	946	2263	1038	612	257	116	6803	485.92d

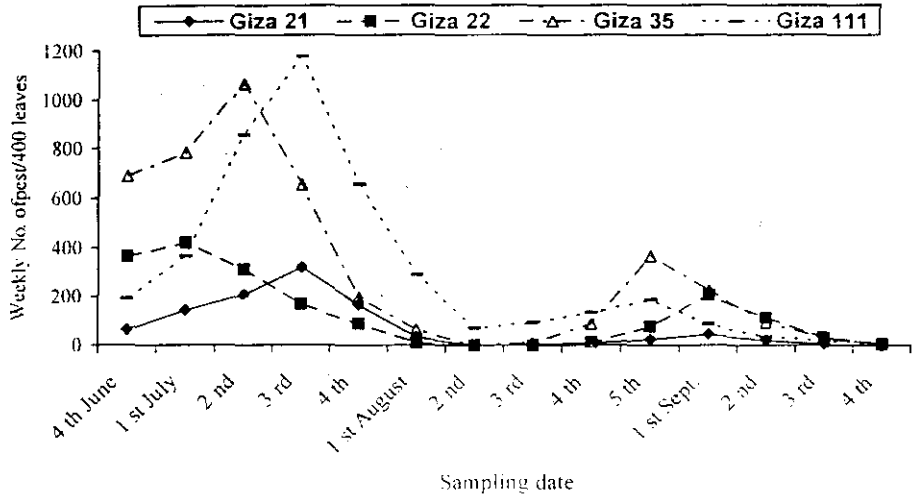

Fig. (9): Susceptibility of four soybean varieties to spider mites (moving stages) infestation during 2003 season.

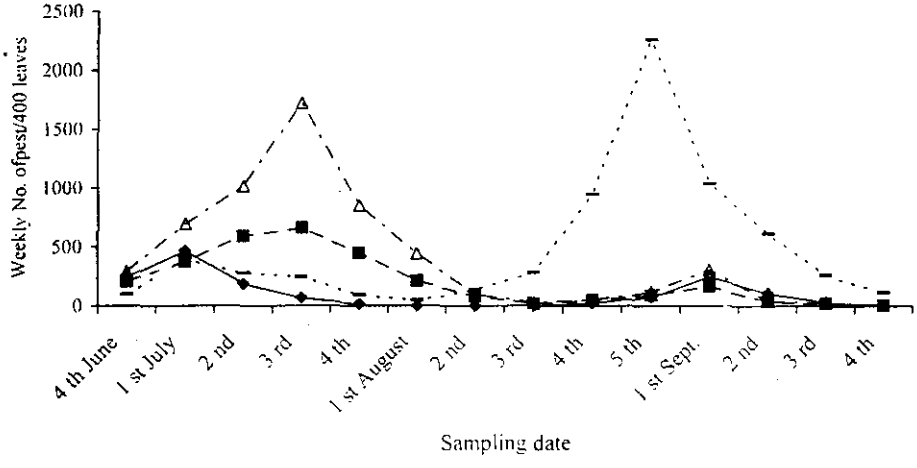

Fig. (10): Susceptibility of four soybean varieties to spider mites (moving stages) infestation during 2004 season.

In 2004 season, positive correlations were observed with Max., and Min. temperatures and relative humidity on all soybean varieties, and significant effect was recorded with Max. temperature and highly significant was observed with Min. temperature on Giza 22.

Generally negative correlation was observed with wind speed on all soybean varieties in two seasons.

2.3. *Aphis gossypii*:

In 2003 season, data in Table (6) revealed negative and insignificant correlations were observed with Max., and Min. temperatures, relative humidity and wind velocity on Giza 22, (r = 0.009, 0.332, 0.376 and 0.104, respectively) and Giza 111 (r = 0.80, 0.493, 0.434 and 0.144, respectively). On the other hand positive correlation was recorded on G. 21 and G. 35 with Max., Min. temperatures and relative humidity.

In 2004 season, negative correlations were recorded with Min. temperature and relative humidity on all soybean varieties. On the contrary, positive correlation was observed with Max. temperature and wind speed on all soybean varieties.

2.4. *Empoasca lypica*:

Data in Table (6) revealed negative and insignificant correlation with Max., Min. temperatures, and relative humidity on all soybean varieties during two seasons. Significant correlation was observed with relative humidity on Giza 22, G. 35, and G. 111 (r = 0.549, 0.538 and 0.541) in 2003 season respectively.

2.5. *Tetranychus urticae*:

Data in Table (6) revealed negative and insignificant correlation were observed with Max., Min. temperatures and relative humidity on Giza 21, G. 22 and G. 35 varieties. On the other hand, positive and significant correlations were recorded with Max., and Min. temperatures, relative humidity and wind speed on Giza 111 variety, where (r = 0.594, 0.821, 0.839 and 0.540) respectively in 2003 season.

In 2004 season, negative and highly significant correlations occurred with Max. temperature and relative humidity on Giza 21 variety, (r = 0.765 and 0.747, respectively). Insignificant effects were recorded with all weather factors on Giza 22, Giza 35 except in case of Min. temperature, where (r = 0.554) and Giza 111 variety.

These results agree with those obtained by Khalafalla *et al* (1993) who reported that the population density of cotton aphid and white fly was affected positively by the relative humidity and negatively by the wind velocity, while the relation was positively insignificant between weekly mean temperature and the population density of aphid. On the contrary, Younes *et al* (2001) reported that moving stages of *T. urticae* had significant positively correlated with temperature, while it was negatively correlated with R.H and significant positive correlation was detected between the tested weather factors and aphid population density in two growing season. On the contrary, white fly exhibited negative correlation with temperature, while exhibited positive correlation with R.H in both seasons.

Table (6): The relationship between main weather factors (temperature, relative humidity, and wind velocity) and the population density of some pests (*Bemisia tabaci, Aphis gossypii, Empoasca lypica, Spodoptera littoralis* and *Tetranychus urticae*) on the soybean varieties during 2003 and 2004 seasons.

Weather factors	Simple correlation coefficient (r)							
	2003 season				2004 season			
	Whitefly (immature)							
Max. temp.	0.208	-.056	0.087	0.353	0.505	0.596*	0.435	0.612*
Min. temp.	0.501	0.285	0.299	0.288	0.579*	0.709**	0.456	0.562*
R.H.	0.399	0.328	0.491	0.310	-0.509	0.538*	0.286	0.337
W.S	- 0.461	-0.249	0.210	-0.114	-0.295	-0.452	0.131	-0.079
	Cotton leafworm							
Max. temp.	0.078	0.138	0.446	0.108	0.377	0.551*	0.363	0.395
Min. temp.	0.685**	0.653*	0.742**	0.732**	0.651*	0.707**	0.483	0.388
R.H.	0.657*	0.670**	0.534*	0.589*	0.238	0.445	0.162	0.096
W.S	- 0.053	0.077	-0.284	-0.124	-0.055	-0.155	-0.191	0.121
	Aphids							
Max. temp.	0.381	-0.009	0.334	-0.80	0.200	0.192	0.314	0.251
Min. temp.	0.422	-0.332	0.273	-0.493	-0.013	-0.096	0.005	-0.066
R.H.	0.135	-0.376	0.034	-0.434	-0.121	-0.116	-0.116	-0.127
W.S	- 0.260	-0.104	-0.228	-0.144	0.424	0.577*	0.481	0.577*
	Jassids							
Max. temp.	0.066	-0.026	-.0.106	-0.053	-0.547*	-0.482	-0.204	-0.258
Min. temp.	- 0.389	-0.488	-0.427	-0.493	-0.277	-0.364	-0.171	-0.400
R.H.	- 0.263	-0.549*	-0.538*	-0.541*	-0.444	-0.564*	-0.385	-0.315
W.S	- 0.048	0.282	0.136	0.198	0.185	0.142	0.119	0.381
	Spider mites							
Max. temp.	- 0.112	-0.029	0.219	0.597*	-0.765	-0.068	0.066	0.223
Min. temp.	- 0.349	-0.234	-0.463	0.821**	-0.279	0.504	0.554*	-0.044
R.H.	- 0.316	-0.001	-0.175	0.839**	-0.747	0.104	0.171	-0.186
W.S	- 0.073	0.118	0.379	0.540*	0.202	-0.240	-0.239	-0.454

REFERENCES

Awadalla, S. S.; A. A. S. El-Zanan and R. M. Salem (1991). Studies on injurious insects infesting soybean plants and the efficiency of certain chemicals against these pests at Kafr El-Sheikh, Egypy. J. Agric. Sci. Mansoura Univ., 16 (2): 420 – 429.

Ali, F. I. (1993). Ecological studies on certain insect pests of maize and soybean in different soybean/maize intercropping system. Ph. D. Thesis, Fac. of Agric., Al-Azahar univ.

Bachatly, M. A. (1984). Ecological and biological studies on soybean pests. M. Sc. Thesis, Fac. of Agric., Zagazig Univ.

Chaudhary, R. P. (1981). In soybean seed quality and stand establishment. Proc. of Conf. for Scientists of Asia, January, 25 – 31 Colombo, Sri – Lank. (R. A. E., A., 1983, Vol. 71, 7546).

El-Mezayyen, G. A. A. H. (1993). Studies on some beneficial insects in Kafr El-Sheikh. Ph. D Thesis, Fac. of Agric., kafr El-Sheikh, Tanta Univ.

Ghanim, A. A.; A. A. A. Said and M. A. El-Adl (1988). Studies on injurious insects and efficiency of certain insecticides and their combination with insect growth regulators on these insects. J. Agric. Sci., Mansoura Univ., 13 (2): 941 – 953.

Gamieh, G. N. and Asmaa A. El-Basuony (2001). Population densities of piercing sucking pests in soybean fields as influenced by varieties, predators and leaf physical and chemical properties. J. Agric. Sci., Mansoura Univ., 26 (2): 1089 – 1099.

Hamid, M. A. A. (1977). Survey of insects on soybean. M. Sc. Thesis, Fac. of Agric., Al-Azhar Univ., Cairo

Hamid, M. A. A. (1989). Bionomic studies on the major soybean pests. Ph. D. Thesis, Fac. of Agric., Al-Azahar Univ., Cairo.

Kasim, Y. I. (1979). Studies on some natural enemies of some agricultural pests of soybean in Alexandria. M. Sc. Thesis, Fac. of Agric., Alex. Univ., Egypt.

Khalafalla, E. M. E.; R. M. Salem and Sh. E. E. Hammady (1993). Abundance and coincidence of the cotton aphid and whitefly on three cotton varieties as influnced by some climatic factors. Com. In. Sci. and Dev. Res. Vol. 41, No. 630.

Mansour, M. M.; K. A. Gouhar and M. W. Guirguis (1974). The susceptibility of five soybean varieties to infestation with different pests at Zagazig region, Egypt. Bull. Soc. Ent. Egypt, 58: 285 – 290.

Metwally, S. A. G. (1989). Ecological studies on some insect pests infesting certain legume crops in Qualyobia Governorate. Ph. D. Thesis, Fac. of Agric., Cairo Univ.

Mohamed, K. K. (1981). Ecological studies on general pests attacking soybean. Ph. D. Thesis, Fac. Of Agric., Assiut Univ.

Mohamed, L. L. and M. A. Abdel Hafez (1981). Susceptibility of some different varieties of soybean to infestation with spider mites. Agric. Res. Rev., 59 (1): 35 – 38.

Mohamed, L. L.; F. M. Hoda; M. M. El-Beharri and Z. R. Sawiris (1982). Susceptibility of sixteen different varieties of soybean to spider mite infestation. Proc. Egypt's National Con., Ent. (1): 203 – 214.

Rodrigo, P. A. (1947). Soybean culture in the Philippines. Phillilp. J. Agric., 13: 1 – 22, Manila (Cf. R. A. E., A., 1947, Vol. 38, 483).

Sawires, Z. R.; H. A. Taha and Safia Y. Abdalla (1990). Biological and ecological studies on *Tetranychus arabicus* and relative susceptibility of seventeen soybean genotypes to infestation. Agric. Res. Rev. 68 (1): 17 – 24.

Shaheen, A. H. (1977). Survey of pests attacking soybean plants in Egypt with some ecological notes. Agric. Res. Rev., 55, (1) : 59 – 65.

Snedecor, G. W. (1957). Statistical Method Applied to Experiments in Agriculture and Biology. The Iowa State College Press. Ames, Iowa 523.

Turnipseed, S. G. and M. Kogan (1976). Soybean Entomology Ann., Rev. Ent., 18: 247 – 282.

Turhan, N. ; A. Tunc; A. Belliu; A. Kismir and N. Kisakurek (1983). Studies on the determination of the insect and mite fauna of soybean (*Glycin Max.* L) in the Cuckurova district, Bitki – Koruma Bulteni 23 (3): 148 – 169.

Younes, A. A.; S. M. Soliman and Sohair E. Saadon (2001). Ecological studies on some sucking insects and mites associated with certain soybean cultivars. J. Agric. Sci., Mansoura Univ., 26 (7): 4551 – 4558.

Zaher, M. A.; M. A. Hanna; I. I. Mohamed and Z. R. Sawires (1980). Relative susceptibility of ten soybean varieties to mite infestation and probable causes of resistance. Proc. 1st Conf., Plant Prot. Res. Inst., 3: 41 – 51

حساسية أربعة أصناف من فول الصويا للإصابة ببعض الآفات الثاقبة الماصة ودودة ورق القطن وتأثير العوامل الجوية على درجة الإصابةبهذه الآفات.

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أختبرت حساسية أربعة أصناف من فول الصويا وهى (جيزة ٢١، جيزة ٢٢، جيزة ٣٥ وصنف جيزة ١١١) للإصابة ببعض الآفات الثاقبة الماصة (الذبابة البيضاء ، المن ، الجاسيد ، العنكبوت الأحمر) وكذلك دودة ورق القطن خلال موسمى الزراعة ٢٠٠٣ و ٢٠٠٤ وأسفرت النتائج عن الآتى:-

١- وجود اختلافات معنوية فى حساسية الأصناف للإصابة بالذبابة البيضاء خلال موسمى النمو، وقد سجل أن أعلى متوسط إصابة بالذبابة على صنف جيزة ٢١ وجيزة ١١١ أثناء موسمى النمو (٢٠٠٣ ، ٢٠٠٤).

٢- أما فى حالة الإصابة بدودة ورق القطن فقد سجلت قمة (فترة نشاط) واحدة مع كل أصناف فول الصويا ، وقد سجل أعلى متوسط إصابة بيرقات دودة ورق القطن على صنف جيزة ٢٢.

٣- أما بالنسبة لمن القطن فقد لوحظ وجود اختلافات معنوية بين الأصناف المذكورة فى درجة إصابتها بالمن خلال موسمى الزراعة (٢٠٠٣ ، ٢٠٠٤) وكان أعلى متوسط إصابة بالمن على صنف جيزة ٣٥ بمقدار ٣٤١,٧٩ حشرة/١٠٠ نبات/أسبوع.

٤- أما الإصابة بالجاسيد فكانت منخفضة خلال موسمى الزراعة (٢٠٠٣ ، ٢٠٠٤) وقد بدأت الإصابة على فول الصويا تظهر فى شهر يونيو وبلغت أقصى درجة لها فى الأسبوع الأول من سبتمبر.

٥- هناك اختلافات معنوية بين كل أصناف فول الصويا المذكورة فى درجة إصابتها بالعنكبوت الأحمر خلال موسمى الزراعة (٢٠٠٣ ، ٢٠٠٤)، وسجل أعلى متوسط إصابة على صنف جيزة ٣٥ ، جيزة ١١١.

٦- أوضحت النتائج أيضا أن هناك ارتباطا غير معنوى بين إصابة الأصناف بالآفات الثاقبة الماصة وبين عوامل الطقس المختلفة (حرارة – رطوبة – سرعة الرياح) باستثناء بعض العوامل على بعض أصناف فول الصويا حيث وجد ارتباط معنوى بين تعداد الذبابة البيضاء وبين درجة الحرارة العظمى والصغرى وكذلك الرطوبة النسبية على صنف جيزة ٢٢ وصنف جيزة ١١١ هناك أيضا ارتباط معنوى بين تعداد دودة ورق القطن ودرجات الحرارة الصغرى وكذلك الرطوبة النسبية على جميع أصناف فول الصويا أما بالنسبة للعنكبوت الأحمر فقد وجد ارتباط معنوى بين العوامل الجوية السابقة (حرارة – رطوبة – رياح) على صنف جيزة ١١١.