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Population Density of Soybean Piercing Sucking Pests in Relation to Varieties, Chlorophyll and some Weather Factors

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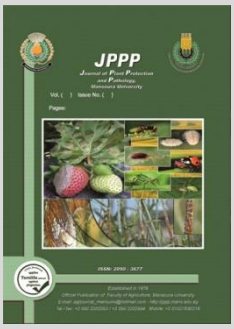

ABSTRACT

Two field experiments were carried out at the experimental farm of the Faculty of Agriculture, Benha University, Qalubiya governorate during two seasons, 2015 and 2016. The experiments aimed to study susceptibility of five soybean varieties (Giza 21, Giza 22, Giza 35, Giza111 and Crawford) under natural infestation with piercing sucking pests mainly; *Bemisia tabaci* (Genna). *Aphis sp.*, and *Tetranychus urtica* (Koch). Also to investigate relationship between these pests and some climatic factors and leaflets characteristic. The obtained results showed that, *B. tabace* started to appear on the 4th week of June and reached the highest infestation was on 4th July. The infestation by *Aphis* and *T. urticae* appeared earlier on 3rd week of June and increased gradually until reached its peak on 3rd July. Susceptibility of the tested soybean varieties to infestation with the pests varied significantly between each other. Crawford variety had the highest infestation (susceptible), except Giza. 21 with *B.tabace* in the 2nd season. On the other hand, Giza 35 variety was more resistant with *Aphis* and *T. urticae*, the lowest infestation with *B. tabace* was found in Giza 22. Relationship among soybean cultivars, infestation level of temperature and humidity was significant. On the other hand, there was a negative significant relationship between the chlorophyll content and infestation with the pests.

Keywords: soybean, varieties, climatic factors, susceptibility, infestation, piercing sucking pests

INTRODUCTION

Soybean (Glycine max (L.) Mirrill) is one of the most important leguminous crops in many countries and reached a prominent position among other crops in the world. Its seeds contain high nutritional value, providing 40% protein and 20% edible oil, besides minerals and vitamins. Whitefly, Aphids and spider mites considered the main sucking pests infesting soybean plants and caused a great damage and yield losses significantly decreased with spider mite infestation. Chemical control of the pests creates several problems i.e., environmental pollution, destruction of beneficial insects and pest resistance to many pesticide (John *et. al*., 1986). Therefore, it is necessary to select tolerant or resistant varieties as one of the simplest and useful tactics in the integrated pest management programs (Dent, 1991). However, soybean varieties exhibited variable reactions to sucking pests infestation on plant physical properties or chemical components of leaflets (Hildebrand *e.t al*.1986 and Gamieh and El- Basuony, 2001) .

Also (Taha *et. al.* 1995) mentioned that the population fluctuation of whitefly *B. tabace* immature stages on five soybean cultivars gave different level of infestations moreover , (Taha *et. al.* 2001) reported that population fluctuation of sucking pests on cotton affected by temperature and relative humidity.

The present study was conducted to throw the light to reveal the population fluctuation of sucking pests and susceptibility of these soybean varieties to infestation and their relationship between these pests and some climatic factors.

MATERIALS AND METHODS

The present experiments were carried out at Faculty of Agriculture farm, Moshtohor, Benha University, Quliobia Governorate, during two successive soybean growing seasons 2015 and 2016. This work aimed to study the population density of *Bemisia tabaci* (Genna). , *Aphis sp.*, and *Tetranychus urtica* Koch., on five soybean varieties under some climatic factors and leaflets characteristic. The five soybean varieties (Giza 21, Giza 22, Giza 35, Giza111 and Crawford) were sown at 25th May in 2015 and 1st June in 2016. An area of about 210m^2 was divided to 20 equal plots as four for each varity.The randomized complete block design was followed in the area; the tested varieties were exposed to normal field and no insecticides were used in the experiment.

After 18 day from sowing data weekly random sample of 25 leaflets/plot (one leaf per plant), was placed in papers bag and transferred to the laboratory,, to count number of immature stages, of *B. tabaci* (nymphs), by the aid of binocular microscope. Also 100 plants / plot /week were taken randomly, to count number of aphid and motile stages of *T. urtica*. The daily records of climatic factors were obtained by the Laboratory Center of Agricultural Climate, Giza, Egypt, to calculate the correlation between the pests and these factors.

Ten plants were randomly chosen during each stages (seedling, vegetative, flowering and fruiting growth), to determine leaf chlorophyll content using chlorophyll meter SPAD-502 (vegetative sample) calculate the Simple correlation was used to reveal the relationship between these aspects and pest infestations. Statistical analysis using (F)

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test and L.S.D. was used to reveal differences between means of the different treatments.

RESULTS AND DISCUSSION

1. Population density of pests

Data in Table (1) showed that, the population density of immature stages of *B. tbaci*, *Aphis* individuals and motile stages of *T. urtica* on the tested soybean varieties Giza 21, Giza22, Giza35, Giza111 and Crawford during 2015 season.

Presence of *B. tabaci* on the varieties extended from the 4th week of June, up to 2nd week of August. The highest peak of the insect was recorded during the 4th week of July 700, 675, 622.5, 597.5 and 562.5 nymphs/100 leaflet on Giza 21, Crawford, Giza 111, Giza 22 and Giza 35, respectively. In the same table the highest no. of nymphs/100 leaflet was recorded on Giza 21 variety with a seasonal mean number (331.2) followed by Crawford, Giza 111 and Giza 22 with (302.1), (275.3) and (257.1) respectively; Giza 35variety recorded the lowest number (203.7).

Concerning *Aphis*, it extended from the 3rd week of June, up to 2nd week of August. The highest number of *Aphis* individuals was recorded during last week of July (2037.5, 1987.5,1975, 1800 and 1625 individuals/100 plants on Crawford, Giza 21, Giza 111, Giza 35 and Giza 22, respectively. The same table showed that the highest no. of individuals/100 plants was recorded on Crawford variety with a seasonal mean number of (764.4) followed by Giza 21, Giza 111and Giza 35 which recorded (701.9), (673.6) and (635.5) respectively,. The lowest number (591.1) was recorded on Giza 22 variety.

As for *T. urticae*, it started from the 3rd week of June, up to 2nd week of August. The highest peak was found during 4th week of July 55, 55, 42.5, 37.5 and 35 individuals/100 plants on Crawford, Giza 21, Giza 111, Giza 35 and Giza 22, respectively. Also the highest no. these pests /100 plants were found on Crawford (24.4) followed by Giza 21, Giza 111and Giza 22 with 20.8, 19.7 and 17.2 respectively, Giza 35 harbored the lowest number of *T. urticae* 16.9.

Table 1. Mean number of pests on the soybean varieties, during 2015 season.

Investigation dates		*B. tabaci*/ 100 leaflets					*Aphis sp.*/100plants					*T. urticae*/100plants				
		Giza 21	Giza 22	Giza 35	Giza 111	Crawford	Giza 21	Giza 22	Giza 35	Giza 111	Crawford	Giza 21	Giza 22	Giza 35	Giza 111	Crawford
June	18/06	-	-	-	-	-	257.5 ±5.74	155 ±1.43	160 ±2.76	202.5 ±2.85	320 ±8.92	22.5 ±0.41	12.5 ±0.21	17.5 ±0.41	22.5 ±0.21	27.5 ±0.21
	25/06	147.5 ±0.64	75 ±0.9	50 ±1.41	77.5 ±1.08	97.5 ±2.9	147.5 ±0.89	140 ±2.26	142.5 ±2.65	147.5 ±2.85	207.5 ±2.88	25 ±0.55	17.5 ±0.21	20 ±0.5	22.5 ±0.41	27.5 ±0.64
July	02/07	485 ±13.7	467.5 ±12.16	287.5 ±4.58	477.5 ±5.30	472.5 ±10.2	200 ±8.66	200 ±8.66	222.5 ±5.48	262.5 ±7.15	320 ±9.77	22.5 ±0.41	12.5 ±0.21	15 ±0.25	15 ±0.25	25 ±0.55
	09/07	407.5 ±14.3	337.5 ±12.03	262.5 ±6.7	352.5 ±6.43	362.5 ±8.17	262.5 ±5.69	162.5 ±1.08	175 ±2.79	187.5 ±3.24	312.5 ±3.24	17.5 ±0.21	15 ±0.25	15 ±0.25	17.5 ±0.21	22.5 ±0.21
	16/07	507.5 ±14.3	437.5 ±12.03	362.5 ±6.7	425.5 ±6.43	462.5 ±8.17	602.5 ±4.12	527.5 ±2.72	572.5 ±2.55	530 ±3.92	680 ±3.95	17.5 ±0.41	20 ±0	22.5 ±0.21	20 ±0.35	25 ±0.25
	23/07	700 ±7.81	597.5 ±4.26	562.5 ±4.72	622.5 ±9.32	675 ±10.7	1322.5 ±11.16	1115 ±1.43	1185 ±5.75	1232.5 ±19.3	1415 ±14.8	55 ±0.25	35 ±0.9	37.5 ±0.64	42.5 ±0.9	55 ±1.14
	30/07	112.5 ±1.08	42.5 ±1.29	25 ±1.25	75 ±2.16	87.5 ±2.07	1987.5 ±23.34	1625 ±12.93	1800 ±19.6	1975 ±16.3	2037.5 ±23.1	12.5 ±0.21	20 ±0.35	7.5 ±0.41	7.5 ±0.41	15 ±0.25
August	06/08	207.5 ±1.88	62.5 ±1.08	55 ±2.77	87.5 ±2.07	197.5 ±1.43	1387.5 ±8.54	1237.5 ±2.72	1337.5 ±8.17	1387.5 ±13.8	1412.5 ±6.7	12.5 ±0.21	15 ±0.25	12.5 ±0.21	22.5 ±0.41	12.5 ±0.41
	13/08	82.5 ±1.02	37.5 ±1.88	25 ±1.25	57.5 ±0.96	62.5 ±2.07	150 ±3.95	125 ±3.75	125 ±3.75	137.5 ±2.07	175 ±6.7	2.5 ±0.21	7.5 ±0.21	5 ±0.25	7.5 ±0.41	10 ±0.35
Total		2650	2057.5	1630	2202.5	2417.5	6317.5	5287.5	5720	6062.5	6880	187.5	155	152.5	177.5	220
Mean		331.2a	257.1c	203.7d	275.3bc	302.1ab	701.9b	591.1d	635.5c	673.6bc	764.4a	20.8b	17.2c	16.9c	19.7b	24.4a
F. value				3.932*					4.256*					3.908*		
L.S. D				66.89					100.6					4.798		

Means followed by the same letter are not significant at 0.05 DMRT.

During 2016 season, data in Table (2) revealed that population of *B. tabaci* on all varieties extended from the 4th week of June, up to 2nd week of August. The highest record was during the 1st week of July 700, 675, 550, 512.5 and 425 nymphs/100 leaflets on Giza 21, Crawford, Giza 111, 35 and Giza 22, respectively. Also the highest no. of nymphs recorded on Giza 21 with a seasonal mean of 428.12 followed by Giza 111, Crawford, Giza 22 and Giza 35 378.12, 360.93 and 332.81 respectively, also Giza 35variety recorded the lowest number of nymphs/100 leaflet, 329.68.

Presence of *Aphis* extended on all varieties from the 3rd week of June, up to 2nd week of August. The peak *Aphis* was recorded during the end of July; 567.5, 490, 470, 462.5 and 412.5 individuals/100 plants on Crawford, Giza35, 111, 21 and Giza 22, respectively. The same Table show the highest seasonal mean (374.6) on Crawford variety number followed by Giza 21, 111and Giza 35 which 336.3, 329.1 and 313.6 respectively Giza 22 variety recorded the lowest number (260.8).

Number of the *T. urticae*, recorded during the 2nd week of July were 50, 40, 30, 25 and 22.5 individuals/100 plants on Crawford, Giza 21, 111, Giza 22 and Giza 35, respectively. The same table showed that the highest no. of *T. urticae* on Crawford variety with mean number of 33.6 followed by Giza 21, 111and Giza 22; 31.1, 30 and 25, respectively, Giza 35 showed the lowest numbers of this pest (22.5).

The data in Tables (1&2) cleared that the susceptibility of the five soybean varieties to infestation with the three pests varied significantly between each other. The results concluded that, Crawford showed the highest infestation with three pests except with *B. tabace* in the 2nd season. On the other hand, Giza 35 variety was more

resistant with *Aphis* and *T. urticae*, the lowest infestation with was *B. tabace* Giza 22, the other varieties had a moderate infestation by the three pests. The results are agreement with these of Gamieh and El- Basuony (2001). Giza 111 was less infested with the mite while Crawford harbored the highest numbers of spider mite eggs. Salman *et al.(*2002) divided sensitivity of soybean varieties to susceptible for spider mites (Giza 21 and Crawford) and resistant as Giza 111 ,Giza 35 , 82 and Clark. The data similarity with Mogouz *et al.* (2006) recorded the highest number of whiteflies was found on Giza 21 followed by Giza 111.Also Mostafa (2014) found that, Giza 21variety was more susceptible, to the same pest than Giza 35 variety was more resistant during 2011 and 2012 seasons.

Table 2. Mean number of pests on the soybean varieties, during 2016 season.

Investigation dates		*B. tabaci*/ 100 leaflets					*Aphis sp.*/100plants					*T. urticae*/100plants				
		Giza 21	Giza 22	Giza 35	Giza 111	Crawford	Giza 21	Giza 22	Giza 35	Giza 111	Crawford	Giza 21	Giza 22	Giza 35	Giza 111	Crawford
June	18/06	-	-	-	-	-	125 ±2.79	87.5 ±2.07	100 ±2.04	137.5 ±2.07	162.5 ±2.07	35 ±1.14	22.5 ±0.41	30 ±0.41	25 ±0.55	27.5 ±0.55
	25/06	312.5 ±10.8	337.5 ±2.07	300 ±1.10	450 ±6.45	312.5 ±1.25	212.5 ±3.69	1875 ±3.24	175 ±1.25	237.5 ±5.41	275 ±3.56	37.5 ±1.29	25 ±0.59	32.5 ±0.41	32.5 ±0.41	40 ±0.35
July	02/07	700 ±10.1	425 ±2.16	512.5 ±7.36	550 ±10.8	675 ±5.20	337.5 ±4.46	237.5 ±3.24	275 ±2.16	337.5 ±8.36	332.5 ±3.59	32.5 ±0.96	20 ±0.35	27.5 ±0.55	42.5 ±0.65	40 ±0.90
	09/07	487.5 ±12.2	325 ±3.75	225 ±2.79	325 ±7.50	337.5 ±4.56	425 ±4.50	297.5 ±3.73	360 ±2.76	370 ±4.59	395 ±3.81	40 ±0.86	25 ±0.41	22.5 ±0.25	30 ±0.60	50 ±0.50
	16/07	437.5 ±5.41	312.5 ±8.36	412.5 ±8.9	300 ±10.8	312.5 ±2.39	545 ±5.49	362.5 ±4.46	447.5 ±3.08	397.5 ±6.53	445 ±3.89	32.5 ±0.64	27.5 ±0.21	15 ±0.25	30 ±0.35	35 ±0.55
	23/07	612.5 ±4.46	450 ±3.06	437.5 ±6.93	550 ±5.40	575 ±5.95	482.5 ±3.84	375 ±2.79	512.5 ±3.32	442.5 ±6.19	517.5 ±3.73	27.5 ±0.54	30 ±0.35	15 ±0.25	30 ±0.35	30 ±0.35
	30/07	412.5 ±7.78	450 ±10.4	412.5 ±4.46	487.5 ±4.78	412.5 ±5.15	462.5 ±3.54	412.5 ±3.69	490 ±3.40	470 ±4.37	567.5 ±6.20	22.5 ±0.41	22.5 ±0.64	20 ±0.61	27.5 ±0.41	30 ±0.50
August	06/08	312.5 ±6.93	250 ±1.76	237.5 ±3.69	250 ±1.25	162.5 ±1.25	312.5 ±2.72	262.5 ±2.07	312.5 ±3.69	407.5 ±5.79	467.5 ±7.43	32.5 ±0.81	27.5 ±0.41	22.5 ±0.41	32.5 ±0.80	27.5 ±0.41
	13/08	150 ±1.76	112.5 ±1.08	100 ±1.76	112.5 ±1.25	100 ±2.04	125 ±2.79	125 ±1.25	150 ±1.76	162.5 ±2.07	212.5 ±3.24	20 ±0.35	25 ±0.43	17.5 ±0.21	20 ±0.35	22.5 ±0.41
Total		3425	2662.5	2637.5	3025	2887.5	3027.5	2347.5	2822.5	2962.5	3375	280	225	202.5	270	302.5
Mean		428.12a	332.81c	329.68c	378.12b	360.93 b	336.3 ab	260.8 c	313.6 b	329.1b	374.6 a	31.1a	25 bc	22.5 c	30 ab	33.6 a
F. value		6.326*					1.925*					1.578*				
L.S. D		44.01					92.62					11.27				

2- Climatic factors and population density:

Data in Table (3) showed that, the simultaneous effect of the three selected weather factors minimum and maximum temperature and percentage of relative humidity on population density of *B. tabaci*, *Aphis* and *T. urticae*, 2015 and 2016 seasons,

The result of *B. tabaci* refer that minimum temperature during the two seasons and maximum temperature in 2016 only had insignificant negative effects on this insect. Maximum temperature in the second season had significant positive effects on the seasonal fluctuations of *B, tabaci.* Relative humidity had insignificant negative effects, in the both seasons, on the insect population of the varieties except Giza 22, 111 and Crawford had significant andr positive effects in 2016 season.

Table 3. Climatic factors in relation to population density of the three pests on the soybean varieties, during 2015 and 2016 seasons.

seasons	Correlatin (Temp.& RH%)		Giza 21			Giza 22			Giza 35			Giza 111			Crawford		
			B.tbace	*Aphid*	*T.urticae*	*B.tbace*	*Aphid*	*T.urticae*	*B.tbace*	*Aphid*	*T.urticae*	*B.tbace*	*Aphid*	*T.urticae*	*B.tbace*	*Aphid*	*T.urticae*
2015	Mean No. of pest		331.2	701.9	20.8	257.1	591.1	17.2	203.7	635.5	16.9	275.3	673.6	19.7	302.1	764.4	24.4
	Min	(r)	-0.126	0.61	-0.182	-0.171	0.609	0.191	-0.048	0.606	-0.192	-0.138	0.597	-0.145	-0.095	0.595	-0.191
	Tep.	P	0.766	0.081	0.64	0.685	0.82	0.622	0.911	0.84	0.621	0.745	0.89	0.709	0.822	0.91	0.623
	Max	(r)	0.22	0.637	0.261	0.101	0.624	0.422	0. 262	0.614	0.256	0.137	0.604	0.408	0.248	0.631	0.232
	Tmp.	P	0.601	0.065	0.497	0.811	0.072	0.258	0.53	0.079	0.506	0.746	0.085	0.276	0.553	0.068	0.548
	RH%	(r)	-0.553	-0.255	-0.792	-0.434	-0.254	-0.694	-0.597	-0.234	-0.788	-0.457	-0.214	-0.928	-0.556	-0.261	-0.765
		P	0.155	0.509	0.011	0.282	0.51	0.038	0.118	0.545	0.012	0.255	0.581	0	0.153	0.498	0.016
2016	Mean No. of pest		428.12	336.3	31.1	332.81	260.8	25	329.68	313.6	22.5	378.12	329.1	30	360.93	374.6	33.6
	Min	(r)	-0.419	-0.076	-0.502	-0.388	-0.002	-0.26	-0.35	-0.048	-0.214	-0.318	-0.116	-0.205	-0.237	-0.089	0.044
	Tep.	P	0.301	0.847	0.168	0.342	0.995	0.499	0.395	0.903	0.58	0.443	0.766	0.597	0.572	0.819	0.911
	Max	(r)	-0.52	-0.38	0.481	-0.4	-0.375	0.031	-0.375	-0.47	0.539	-0.356	-0.262	0.1	-0.57	-0.264	0.057
	Tmp.	P	0.187	0.313	0.19	0.327	0.32	0.936	0.36	0.201	0.135	0.387	0.497	0.798	0.14	0.493	0.884
	RH%	(r)	-0.043	-0.28	-0.36	0.039	-0.144	-0.468	-0.122	-0.181	0.186	0.201	-0.182	0.022	0.199	-0.174	0.125
		P	0.919	0.466	0.342	0.927	0.712	0.203	0.774	0.64	0.632	0.633	0.639	0.956	0.636	0.655	0.749

As for population *Aphis* insect, the results revealed that, in 2015 minimum and maximum temperatures had significant positive effects, but they had insignificant negative effects in 2016. Relative humidity had insignificant negative effects in both seasons for all varieties.

Concerning *T. urticae*, the results in both seasons assured that, minimum temperature had insignificant negative effects, while had positive effects on this pest on Giza 22 variety. Also, maximum temperature had positive effects on the seasonal fluctuations in the two seasons. Relative humidity showed insignificant negative effects with all varieties, except with Giza 35, Giza 111 and Crawford had significant positive effects in 2016. The results are in agreement with those of Helaly *et al.* (1990), mean temperature and relative humidity showed insignificant effect on the population of *T. urticae*.

On the other hand, Taha *et al.* (2001) revealed that these was a significant relationship between the infestation of soybean sucking pests and the climatic factors, temperature and relative humidity. Younes *et al.* (2001) found that, there was a Significant positive correlation between the tested weather factors and aphid population density in two seasons, but whitefly exhibited negative correlation with R.H in both seasons. Magouz *et al.* (2006) revealed that, the population of whitefly affected insignificantly by temperature and relative humidity on Giza 21, 22 and 111) during 2003 and 2004 seasons. Ali *et al.* (2013) found highly positive significant correlation between population of *A. craccivora* and maximum, minimum temperature and mean relative humidity. Amaar *et al.* (2014) revealed that minimum and maximum temperatures had insignificant negative effects on seasonal fluctuation of *T. urticae* during 2011, but in the second season were significant negative effects. On the other hand, Selem *et al.* (2016) found that minimum and maximum temperatures in case of *T. urticae* had a significant positive effect during 2014 and 2015 seasons, and RH% had insignificant positive effect in both seasons. This relation was insignificant positive and negative effects on the mean number of *A. craccivora* population throughout both seasons.

3- Leaflets chlorophyll content and population density of the pests 2015 and 2016 seasons.

1- *B. tabaci*

Data presented in Table (4) showed that, the chlorophyll content of the different soybean varieties during 2015 and 2016 seasons through different stages of growth and correlation with number of *B. tabaci* /100 leaflets. The results revealed that, there was a negative correlation between the chlorophyll content in all varieties and number of the insect in both seasons. It's cleared that Giza 21 and 35 had the highest chlorophyll content (44.8 and 43.6 in the two seasons, respectively), with the lowest number of the insect on Giza35 variety (203.7 & 329.68 in the two seasons, respectively), the highest number was on Giza 21 variety (331.2 and 428.12) in the two seasons, respectively.

Table 4. Correlation between Leaf chlorophyll content and population density of *B. tabaci* on the soybean varieties, during 2015 and 2016 seasons.

Varieties	Mean. No. of insects		Growth stages							
			Seedling		Vegetative		Flowering		Fruiting	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Giza 21	331.2	428.12	28.4	28	30.5	38.6	42.5	41.5	44.8	42.2
Giza 22	257.1	332.81	29	29.4	30.5	38.1	41.4	41.8	40.2	41.7
Giza 35	203.7	329.68	30.6	30.5	31.3	39.3	42	43.6	44.8	42.5
Giza 111	275.3	387.12	27	27.2	26	38	38.4	42.2	39.8	41.4
Crawford	302.1	360.93	29	29	29	38.1	40.7	42.6	42.1	42.1
(r)			-0.598	-0.796	-0.258	-0.195	-0.01	-0.628	-0.013	-0.124
P			0.286	0.107	0.675	0.754	0.987	0.256	0.983	0.843

r = correlation coefficient p = probability

2- *Aphis sp.*

Data in Table (5) cleared that, negative correlation between the different varieties chlorophyll content and number of *Aphis* /100 plants in both seasons. It's cleared that, Giza 21 and Giza 35 had the highest values in chlorophyll content (44.8 and 43.6 in the two seasons, respectively), when the lowest number on *Aphis* of Giza 35 variety (203.7 & 329.68) and the highest number on Giza 21(331.2 and 428.12) in the two seasons, respectively.

Table 5. Correlation between Leaf chlorophyll content and population density of *Aphis* on the soybean varieties during 2015 and 2016 seasons.

Varieties	Mean. No. of insects		Growth stages							
			Seedling		Vegetative		Flowering		Fruiting	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Giza 21	701.9	336.3	28.4	28	30.5	38.6	42.5	41.5	44.8	42.2
Giza 22	591.1	260.8	29	29.4	30.5	38.1	41.4	41.8	40.2	41.7
Giza 35	635.5	313.6	30.6	30.5	31.3	39.3	42	43.6	44.8	42.5
Giza 111	673.6	329.1	27	27.2	26	38	38.4	42.2	39.8	41.4
Crawford	764.4	374.6	29	29	29	38.1	40.7	42.6	42.1	42.1
(r)			-0.229	-0.301	-0.304	-0.056	-0.133	0.171	0.206	0.253
P			0.710	0.623	0.619	0.929	0.832	0.783	0.739	0.681

3- *T. urticae*

Data arranged in Table (6) assured that, the chlorophyll content in the different varieties of soybean during 2015 and 2016 seasons through the different stages of growth and it,s correlation with number of *T. urticae* /100 plants. The Results showed that there was negative correlation between chlorophyll content and number of this pest in both seasons. Also it,s cleared that, Giza 21 and 35 had the chlorophyll content (44.8 and 43.6 in the two seasons, respectively)The lowest numbers of *T. urticae* were recorded on G35 variety (16.9 & 22.5 in the two respctie seasons,) and the highest number were on Crawford variety (24.4 and 33.6) in the same seasons, respectively.

Table 6. Correlation between leaf chlorophyll content and population density of *T. urticae* on the soybean varieties, during 2015 and 2016 seasons.

Varieties	Mean. No. of insects		Growth stages							
			Seedling		Vegetative		Flowering		Fruiting	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Giza 21	20.8	31.1	28.4	28	30.5	38.6	42.5	41.5	44.8	42.2
Giza 22	17.2	25	29	29.4	30.5	38.1	41.4	41.8	40.2	41.7
Giza 35	16.9	22.5	30.6	30.5	31.3	39.3	42	43.6	44.8	42.5
Giza 111	19.7	30	27	27.2	26	38	38.4	42.2	39.8	41.4
Crawford	24.4	33.6	29	29	29	38.1	40.7	42.6	42.1	42.1
(r)			-0.318	-0.678	-0.341	-0.599	-0.182	-0.599	0.001	-0.231
P			0.602	0.209	0.575	0.286	0.770	0.286	0.998	0.708

Reddall *et al.* (2004) revealed that, spider mites reduce stomatal conductance, transpiration, chlorophyll content, and photosynthesis on cotton.

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الكثافة العددية لبعض افات فول الصويا الثاقبة الماصة وعلاقتها بالأصناف والكلوروفيل وبعض الظروف الجوية

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اجريت هذه الدراسة بمزرعة كلية الزراعة بمشتهر جامعة بنها بمحافظة القليوبية خلال موسمى ٢٠١٥ - ٢٠١٦ وكانت الاصناف المزروعة جيزة ٢١ وجيزة ٢٢ وجيزة ٣٥ وجيزة ١١١ وكروفورد لتقدير الكثافة العددية وكذلك حساسية أصناف فول الصويا المختبرة للإصابة ب (الذبابة البيضاء – المن – العنكبوت الاحمر) وعلاقتها ببعض العوامل الجوية ومحتوى الورقة من الكلوروفيل . ومن اهم النتائج التى تم الحصول عليها الاتى : بدأت الاصابة بالذبابة البيضاء فى الاسبوع الرابع من شهر يونيو حتى وصلت الى ذروتها فى الاسبوع الاخير من شهر يوليو بينما بدأت الاصابة بالمن والعنكبوت الاحمر فى الاسبوع الثالث من يونيو وازدادت تدريجيا حتى وصلت الى اعلى تعداد لها فى الاسبوع الثالث من شهر يوليو . واختلفت حساسية الاصناف من صنف لأخر واظهر الصنف كراوفورد اعلى حساسية للإصابة بالآفات الثلاث فيما عدا الموسم الثانى حيث سجل الصنف جيزة ٢١ اعلى اصابة مع الذبابة البيضاء فقط كذلك كان الصنف جيزه ٣٥ الاقل اصابة بالمن والعنكبوت الحمر بينما سجل الصنف ٢٢ اقل اصابة مع الذبابة البيضاء كما سجلت بقية الاصناف اصابة متوسطة بالآفات الثلاث . وقد اظهرت النتائج وجود ارتباط بين مستويات اصابة الاصناف بالآفات الثاقبة الماصة وتأثير العوامل الجوية المختلفة (درجة الحرارة الصغرى والعظمى وكذلك الرطوبة النسبية) . من ناحية اخرى اظهرت النتائج ارتباطا سالبا بين محتوى الاوراق من الكلوروفيل وإصابة اصناف فول الصويا خلال موسمى الزراعة على جميع مراحل النمو فيما عدا مرحلة الاثمار خلال الموسمين ومرحلة الازهار اثناء الموسم الاول والذى اظهر ارتباطا موجبا.