SENSITIVITY OF THREE SOYBEAN VARIETIES FOR *BEMISIA AREGENTIFOLII* (HEMIPTERA: ALYRODIDAE) INFESTATION AND ROLE OF THE INTERNAL LEAF BIOCHEMICALS

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Abstract

Three soybean varieties (Giza 21, Giza 35 and Giza 82) were selected to study thier sensitivity to SLWF infestation under field condition in 2001 and 2002 growing seasons. Data revelead that SLWF eggs increased gradually through soybean growing season. In 200l season, there was no significant difference in the average number of SLWF eggs between Giza 21 and Giza 35, while the difference was significant between both varieties and Giza 82 until the 3rd week of July. Also, data showed that Giza 21 harbored the highest number of SLWF nymphs followed by Giza 35 and Giza 82. Generally, Giza 21 variety was the most susceptible variety for the SLWF infestation followed by Giza 35 and Giza 82, respectively, during the course of study.

In addation, both eggs and nymphs were higher in 2002 than in 200l season. The eggs was positively correlated with nymphal stage in all soybean tested varieties. There were clear differences in the population of SLWF between soybean varieties.

leaf bio-chemical structure affected on SLWF ovipostions and nymphal colonzations among soybean varities. It could be noticed that soybean varieties varied in thier components tested which resulted in a significant difference in most cases between cultivars.

INTRODUCTION

Bemisia argentiflii Bellows & Perring, is an important constraint pest on the production of food and fiber crops throughout the world (Inbar, 2003). Right now *B. argentfolii is* a key pest in both greenhouses and outdoor crops. Therefore, the situation is worsened by the rapid development of new biotypes progeny, which can complete their life cycle in less than three weeks under optimum conditions (Bethke *et al.,* 1991 and Byrne and Bellows, l991). As well as, mobilization and spread of the viruses diseases by the insect world-wide threat the agricultural industries (Lipa, 1999 and Abdullahi *et al.,* 2003). The problem reached a crisis level in both small-scale and large production systems (Brown, 1994 and Zanic *et al.,* 2003). The increase of worldwide concern regarding the adverse impact of *B. argentifolii* in crop production systems emphasizes the need to develop control strategies based on its biology, population dynamics, varietal resistance and distribution in relation to cultivated and wild host ecosystem (Henneberry and Faust, 1999 and Naranjo *et al.,* 2003).

Whiteflies recognization of thier plant hosts has attracted the attention for a long time (Lanteren and Noldus, 1990). Because of the plant leaf odour and color influnce *B. argentifolii* acceptected to thier hostes before Landing (pickett *et al.* 1992), the chemical cues of plant leaf detected by the pest after landing may play a more important role during the final acceptance of the host for feeding. Since, *Bemisia* species are phloem feeder, chemical stimuli from leaves offeres attractants or no contacts with deterents, the test probing will switch to exploratory probing. The stylet will probe deeper and deeper unitll it reaches the phloem and feed. Exploratory probing seems to be a trial and error procedure, it needs time for the insect to find the phloem. This is why the probing speed is fast. The chemical composition of the leaf wax is very complex, evoloved with plant secondary substances. It may play an imporatnt role in the insect feeding preference behavior (Wenru *et al.,* 1992).

Although chemicals have been proposed as a means to control *B. argentiflii* on soybean used for seed production, the application costs are high. (El-Kady and Devine, 2003 and Otoidobiga *et al.,* 2003). In addition, chemicals may be determintal to humans and other animals. An alternative strategy for controlling this pest is the identification and development of soybean cultivars resistant to SLWF feeding damage. Development of effective management stratigies for the pest requires an understanding of the mechanisms of internal plant compoment involoved in plant selection. Identification of soybean varietal resistance to the insect pest is essential for varitial enhancement and cultivar development.

Therefore, the goal of this study was to evaluate three soybean varities against SLWF infestation and the role of certain internal leaf chemical in inducing the plant resistance.

MATERIALS AND METHODS

1. Field Studies. The research was preformed at the Experimental Research Station, Faculty of Agriculture, Mansoura University, to evaluate three soybean varities to the SLWF (*B. argentifolii)* during 200l and 2002 growing seasons. Three soybean (GIycin max L.: Legurninosae) varities namely, Giza-21, Giza-35 and Giza-82 were chosen in this study. The varieties were cultivated in May, 17^{th} and 23^{rd} through 2001 and 2002 seasons, respectively.

II. Silverleaf whitefly. To evaluate SLWF populations, 15 plants from each host were selected randomly (three plants from each corner and three from the center of the area). As well as, three leaves from each plant were selected as follows: one from upper, one from middle and the other from the lower level of plant stem. Samples of plant leaves were transferred directly to the laboratory in plsatic bags, whereas SLWF eggs and nymphs were counted and recorded. The samples were taken at weekly intervals, starting from the vegetative stage until the samples became free from whitefly population or the harvest. To count SLWF eggs and nymphs on each host leaves, 7 leaf sectors (3 cm^2 each) from leaves margin was used and investigated under steromicroscope at the laboratory.

111. Laboratory studies.

Estimation of the soybean leaf components. Chlorophyll "A", "B", carotene7 amino acids, phenol, and humidity in soybean leaves were estimated at different time intervals to determine the relationship between these plant components and SLWF density under field conditions in 2002 season. These components were estimated as follows:

Soybean Leaf pigments or colors. Pigements or leaf colors (chlorophyll "A", "B" and carotene) were estimated according to Saric *et al.* (1967).

Amino acid estimation. Extraction of soybean leaf amino acids and its estimation were done as in Jayeramen (1985).

Phenol estimation. Phenol preparation and estimation of its concentration in soybean leaf samples were calculated according to A. O. A. C. (1970) and Dancil and George (1972)

Humidity estimation in soybean leaves. The humidity is one of the factors that plays an important role in insects attractiveness to the host plant. So, A. O. A. C. (1970) method was used to determine the water content in soybean leaves.

IV. Statistical Analysis. Analysis of variance of insect populations among the vatiries was done by Costat program (1990).

RESULTS AND DISCUSSION

I. SLWF Field Studies:

A. Rates of SLWF eggs and nymphs on the three soybean varities. Table (1) represents the differences among soybean varities regarding SLWF oviposition and nymphal colonization. Giza 21 varity was at the head of three varities and showed to be the most sutiable host for SLWF oviposition, which harbored a higher eggs and nymphal numbers (Table 1). The average SLWF oviposition and nymphal rates reached 31.33 and 29.91 eggs cm^2 and 240.79 and 181.03 nymphs/cm^2 in 2001 and 2002 resepectivelly. The next varity was Giza 35, which average numbers of eggs were 22.113 and 5.73/cm^2, whereas, the mean number of nymphsf cm^2 listed 175.06 and

67.58 in the two successive seasons in succession. In contrast, Giza 82 was not suitable host for both eggs oviposition and nymphal colonizations (Table 1). This means that Giza 86 is the resistant varity for SLWF infestation. Statistical differences were detected in both eggs and nymphs average numbers among the three varities ($P \geq 0.05$)

B. Seasooal infestation of *B. argentifolii* within three soybean variaties:

***B. argenotflii* eggs.** Figure 1 shows that SLWF eggs increased gradually through soybean growing season. At L. S. D. values of 0.54 and 0.38 and $P \geq 0.05$ %, there were no significant differences in the average number of SLWF eggs between Giza 21 and Giza 35, while the difference was significant between both varieties and Giza 82 at 1st and 3rd week of July 2001. Through the period from 3rd week of July to the 2nd week of August, SLWF deposited the highest number of eggs on Giza 35 followed by Giza 21 and Giza 82, respectively. Significant difference in the average number of SLWF eggs was found beetween Giza 21, giza 35 and Giza 82 at sampling dates of 3rd, 4th weeks of August and 1St week of Septmaber, respectively. (F values = 11.70 and 85.53).

SLWF eggs in 2002 season were represented in Figure 2 on three soybean varieties. *B. argentinfolli* eggs reached its maximum number at the 4th week of August for both Giza 21 and Giza 35. Meanwhile, the population reached its maximum average in Giza 82 through the 3rd week of August. No significant differences observed in the average number of SLWF eggs between Giza 35 and Giza 82 at the dates of 2nd week of August, and 1St and 2nd and weeks of September, respectively.

At L. S. D. values of 7.65 and 8.86 (F value = 346.12 and 349.05), there was a significant difference in the average number of SLWF eggs between Giza 21, Giza 35 and Giza 82. Generally, Giza 21 was the most susceptible variety for SLWF infestation followed by Giza 35 and Giza 82, respectively. This confirmed with the results shown in 2001 season.

Table 1. Rates of SLWF eggs ovipostion and nymphal colonization on different soybean varieties during 2001 and 2002 seasons

Seasons	SLWF life stages	Soybean varieties		
		Giza 21	Giza 35	Giza 82
2001	SLWF Eggs	31.33 a	22.13 b	1.39 c
2002		29.91 a	05.73b	2.91 c
2001	SLWF Nymphs	240.79 a	175.06 b	25.59 c
2002		181.03 a	67.58 b	14.99 c

Means within a row followed by the same letter are not significantly different ($P \geq - 0.05$).

B. argentifolii nymphs. Population densities of SLWF nymphal stage on soybean varieties are shown in Figures 3 and 4. In 2001 season, Figure 3 indicates that the highest number of SLWF nymphs were colonized on Giza 21 followed by Giza 35 and Giza 82. There were significant differences in the average number of SLWF nymphs among three soybean varities (At L. S. D. values ranged between 1 2.047 2nd 26.43 and $P \geq 0.05$).

Data in Figure 4 show that SLWF nymphs infestation was lower through the period from 4th week of June to the 1st week of August 2002. Then SLWF nymphs increased among soybean varieties.

Significant differences in the average number of whitefly nymphs between Giza 21, Giza 35 and Giza 82 in August 2002 at L. S. D. values ranged between 7.38 and 34.60 and $P \geq 0.05$ % ($F = 109.33$, 196.947 and 792.33). At 1st and 2nd weeks of September, 2002, the population of SLWF nymphs disappeared from Giza 35 while Giza 21 infested by highest number of SLWF nymphs and represented a significant difference compared to Giza 82. number of nymphs recorded on the foliage of soybean varieties after 2nd week of September.

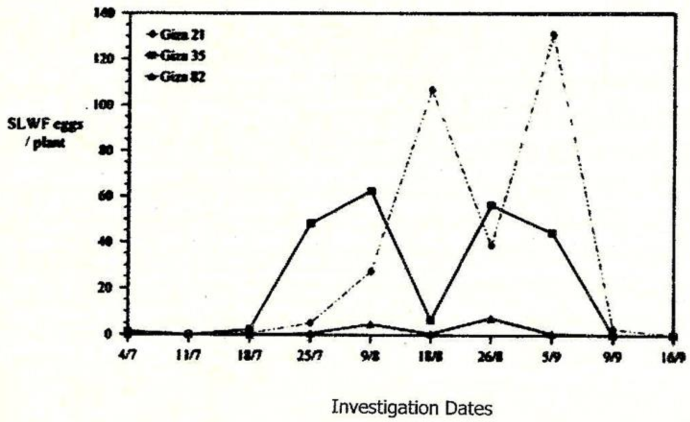

Fig. 1. Seasonal abundance of *Bemisia argentifolii* eggs on three soybean varieties in 2001 season.

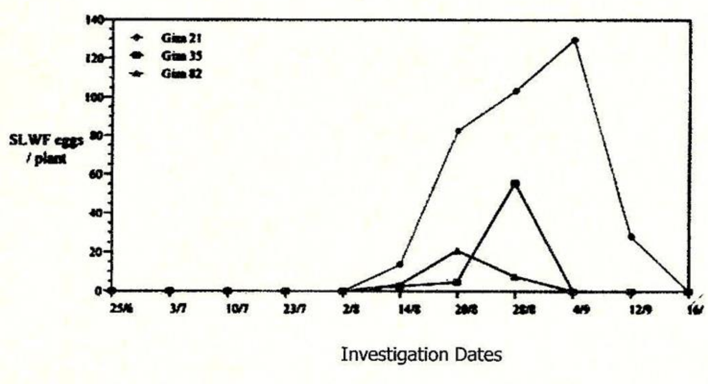

Fig. 2. Seasonal abundance of *Bemisia argentifolii* eggs on three soybean varieties in 2002 season.

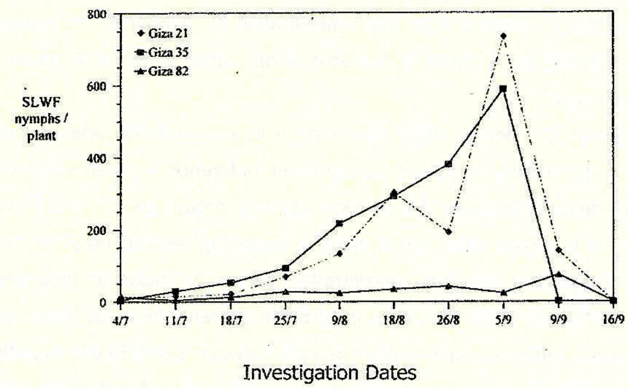

Fig. 3. Seasonal abundance of *Bemisia argentifolii* nymphs on three soybean varieties in 2001 season.

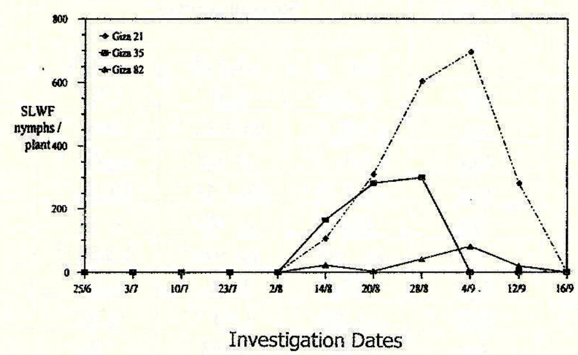

Fig. 4. Seasonal abundance of *Bemisia argentifolii* nymphs on three soybean varieties in 2002 season.

II Chemical components of soybean varieties:

I-Chlorophyll "A", 'B" and carotene in soybean leaves . Chlorophyll "A", "B" and carotene concentrations of soybean varieties showed in Table 2. Regarding, chlorophyll "A" (at L. S. D. value of 5.41 and F = 5.872) there were significant difference in its concentration in soybean leaves between Giza 21 and both Giza 35 and Giza 82 in the 2nd week of July. The concentration of chlorophyll "A" reached its maximum level during the 1st week of August then decreased up to 73.88, 82.58 % in the 3rd week of August.

Chlorophyll "B" showed slight difference in its concentration among soybean varieties during the season. As well as, no significant difference in the concentration of chlorophyll "B" detected between the soybean varieties through the 2nd and 3rd weeks of August at L. S. D. values 4.315 and 5. 025 (P = O.O5 %), respectively (Table 2).

On the other hand, carotene concentration reached its maximum level through the 1st week of August. Slight difference in carotene concentration was found among soybean varieties. Carotene concentrations ranged between 6.081-59.077 mg/100 gm dried leaves for Giza 21, while it ranged between 5.363 - 49.664 and 4.833 - 29.587 mg/100 gm dried leaves for Giza 35 and Giza 82, respectively (Table 2).

Table 2. Average of cholrophyl A, B and carotene concentration in leaves of different varieties of soybean.

Leaf components	Sampling date	Soybean variety*			L. S. D.
		Giza 21	Giza 35	Giza 82	
Chlorophyll A (mg/100 gm dried leaves)	9/7	13. 984 [a]	8.31 [a]	6.797 [b]	5.41
	5/8	63.01 2 [a]	63 .08.1 [a]	32.97 [b]	4.755
	20/8	1 6.4S 5 [a]	23.598 [a]	27.229 [a]	11.18
	10/9	39. 1 52 [a]	29. 1 47 [ab]	25.127 [b]	12.74
Chlorophyll B (mg/100 gm dried leaves)	9/7	3.075 [a]	2 .775 [a]	2. 96 [a]	4.315
	5/8	23. 195 [a]	23 .979 [a]	1 3.563 [b]	5.993
	20/8	5.874 [a]	8.682 [a]	8.287 [a]	5.410
	10/9	1 3.859 [a]	9.2 1 9 [a]	6.311 [b]	7.1 10
Carotene (mg/100 gm dried leaves)	9/7	6.39 [a]	5.363 [a]	7.568 [a]	5.023
	5/8	5 9.077 [a]	49.664 [a]	29 .5 87 [b]	17.981
	20/9	1 1.88 [a]	1 6.457 [a]	1 9.292 [a]	12.688
	10/9	6.081 [a]	5.7 1 [a]	4.833 [a]	4.850

[a] Means within a row followed by the same letter are not significantly different ($P \geq 0.05$).

B- Amino acids, phenols and humidity in soybean leaves. No significant differences in amino acids concentration observed among soybean varieties through the period from the 2nd week of July untill the 3rd week of August (Tabel 3). As well as,.slight significant difference found between Giza 82 and both Giza 21 and Giza 35 at the 2nd week of September at L. S. D. of 8.710 (F = 9.233, P ≥ 0.05 %).

Regarding phenol concentration in soybean leaves, Data in Table 3 shows that there was a significant difference in phenol concentration between Giza 21, Giza 35 and Giza 82 at L. S. D. value of 0.51 (F = 994.32, P ≥ 0.05 %) through the 2nd week of July. Phenol concentration increased gradually until the end of soybean growing season representing high significant difference between the three soybean cultivars.

Taking into account the difference in water content in soybean leaves, expressed as humidity percent, it is appear that there were no significant differences in humidity percent between Giza 35 and Giza 82 at different time intervals, while Giza 21 showed significant differences compared with both Giza 35 and Giza 82, respectively (Table 3).

Table 3. Average of amino acids, phenol concentration and humidity in leave of different soybean varieties during 2002 seaon.

Leaf components	Sampling date	Soybean variety*			L. S. D.
		Giza 21	Giza 35	Giza 82	
Amino acids	9/7	08.31 a	8.202 a	8.41 a	6.211
	5/8	20.10 a	20.96 a	20.84 a	8.476
	20/8	04.79 a	6.331 a	5.843 a	4.315
	10/9	20.32 a	25.871 a	10.589 b	8.710
Phenols	9/7	00.94 a	o,oo c	0.459 b	0.051
	5/8	000.017 a	0.019 a	0.019 a	0.0167
	20/8	00.191 a	0.102 c	0.157b	0.008
	10/9	00.181 b	0.125 c	0.247 a	0.009
Humidity	9/7	49.50 b	81 0a	86.0 a	12.53
	5/8	41.00 b	73. 0 a	79.0 a	1 1.003
	20/8	37.00 b	68.0 a	64.0 a	13.101
	10/9	17.00 b	63.0 a	69.0 a	11.183

* Means within a row followed by the same letter are not significantly different (P≥ 0.05).

CONCLUSION

One of the most ideal IPM strategies for field crops is the use of varieties that are resistant to insects (Buntin *et al.,* 1992). Term sensitivity used here is definition *as "the ability of certain varities to support large population of an insect, induced internal and external changes of plant structure and affecting the plant yield"'.* There are many benefits of using insect resistant varities. The most obvious is the savings to the grower by not applying pesticides, or in reducing the amount of pesticides applied. In addition to the economic benefitis accrued by reduced pesticide usage, environmental and social benefitis transcend to all citizens of the world. In this study, SLWF immatures were lower in June and July of both years and rose steadily until SLWF densities peaked in mid-to late September. Giza 21 variety is the most susceptible for infestation by SLWF followed by Giza 82 and Giza 35, respectively. Both eggs and nymphs were higher in season 2002 than 2001 season (Abdel-Baky *et al.,* 2004). A clear difference in SLWF population observed among soybean varieties. The variation may be due to varying in foliar pubescence between varieties, the difference in trichome density, as well as, the internal leaf chemical. The results were in harmany with McAuslane (1996) studies, who demonstrated that in choice tests, *B. argentifolii* adults laid significantly more eggs on the hirsute and pubescent isolines than on the glabrous isoline. In nochoice tests, the within-plant distribution of eggs laid on the 3 isolines differed and was related to trichome density. However, significantly more eggs were laid on hirsute. soybean than on glabrous soybean in between-isoline choice tests. Therefore, it is likely that the partial resistance of soybean varities observed in the field is caused, in part, by reduced ovipositional preference related to lack of foliar pubescence. However the effect of trichomes on oviposition preference is less pronounced when *B. argentifQlii* are closely confined with host plants.

In addition, Lambert *et al.* (1995) showed that unifoliate leaves became infested with SLWF nymphs and eggs four weeks after planting. Meanwhile, LA88-3 and F90-700 varieties had signiffcantly higher total SLWF populations than 11 and 8 varieties, respectively, at growth stage V7. They concluded that there were significant differences in soybean varietal response to *B.argentifolii* population densities and it can be used effectively to screen soybeans for resistance to whiteflies. On the other hand, Bhattacharrya *et al. (1999)* studied the inheritance of resistance to yellow mosaic virus spread by *B. tabaci* in Glycine soybean. Resistance reactions of F1 and F2 plants, and individua1 F2 derived F3 families indicated that resistance was controlled by a single dominant gene.

Regarding leaf bio-chemical structure, it could be noticed that soybean varieties varied in thier components tested which resulted in a significant difference in most cases between cultivars. Color is a very imoprtant factor in SLWF, host selection before landaing (Husian and Trehan; 1940, Mound, 1962 and van Lentern and Noldus, 1990). Since, chlorophyll A, B, and ceratine are a leaf pigements that affected SLWF host selection. Therefore, increasing concentrations of chlorophyll A and B pigements mean that soybean leaf color will be a dark/green and this not prefered to SLWF. On the other hand, increasing carotene concentration comapered with other pigements studied (chlorophyll A and B), this will turn soybean leaves to be a yellow/green color and then the leaves will be more attarctive for SLWF adults to feed and oviposit its eggs as SLWF adults and immtures affected greatly by leaf pigements because they feed on cell sap. So, increasing SLWF infestation will decrease the leaf pigements and then affected plant by reduction of the net photosynthetic rate (Lin *et al.,*1999). Moreover, they indicated that the reduced of photosynthetic rate was associated with reductions in chlorophyll variable fluorescence (Fv/m) and fluorescence yield. This finding indicates that SLWF infestation impairs, either directly or indirectly, the photochemical reaction of the photosynthetic system in cotton plants.

Furthermore, Chhabra *et al.* (1993) mentioned that the host mechanism of resistance revealed higher percents of reducing and non-reducing sugars, total phenols and free amino acids in the resistant genotypes than in the controls and susceptible genotype. In this respect, Bi *et al.* (2000) reported that applied nitrogen linearly increased densities of SLWF adult and immatures. Also, the nitrogen treatments linearly enhanced plant foliar photosynthetic rates and altered concentrations of soluble proteins, soluble amino acids and several soluble carbohydrates such as glucose, fructose and sucrose in cotton petiole. They also correlated glucose levels with densities of SLWF adults during the peak population size. In addition, Butter *et al.* (1992) reported that plant cuitivars having higher total phenolic and o-dihydroxyphenolic contents in leaves supported fewer whitefly eggs.

REFERENCES

1. Abdel-Baky, N. F., A. M., Abou El-Naga M. E. El-Naggar, and G. A. M. Heikal. 2004. Popualtion density and host preference of the silverleaf whitefly, *Bemisia argentifolii* Bellows & Perring, among three important summer crops. Egyptian J. Biol. Pest Control, 14 (1): 251 - 258.
2. Abdullahi, I., S. Winter, G. I. Atin, and G. Thottappilly. 2003. Molecular characterization of whitefly, *Bemisza tahaci* (Hemiptera Aleyrodidae) populations infesting cassava. Bull. Ent. Res., 93 (2): 97 - 106.
3. A. O. A. C. 1970. Agricultural Chemists Official Method of Analysis. Washington, DC., U.S.A.
4. Bethke, J. A., T. D. Paine, and G. S. Nuessly. 1991. Comparative biology, morphometrics, and development of two populations of *Bemisia tabaci* (Homoptera, Aleyrodidae) on cotton and poinsettia. Ann. Entomol. Soc. Am., 84, 47 - 411.
5. Bhattacharyya, P. K., H. H. Ram. and P. C Kole. 1999. Inheritance of resistance to yellow mosaic virus in interspecific crosses of soybean. Eyphytica, 108 (3): 157 - 159.
6. Bi, J. L., G. R., Ballmer, N. C., Toscano, M. A. Madore, P. Dugger and D. Richter. 2000. Effect of nitrogen fertility on cotton whitefly interactions. Proc. Beltwide Cotton Conferences, San Antonio, USA, 4-8 Jan. 2000, Vol. 2: 1135 - 1142.
7. Buntin, G. D., S. L. Ott and J. W. Johnson. 1992. Integration of plant resistance, insecticides, and planting date for management of the Hessian fly (Diptera: Cecidomyiidae) in winter wheat. J. Econ. Entomol., 85: 530 - 538.
8. Butter, N. S., B. K. Vir, G. Kaur, T. Singh and R. K. Raheja, 1992. Biochemical basis of resistance to whitefly, *BemisTa fabaci* Genn. (Aleyrodidae: Hemiptera) in cotton. Trop. Agric., G9 (2) : 119 - 122.
9. ByTne, D. N. and T. S. Bellows. 1991. Whitefly biology. Annu. Rev. Entomol., 36: 431 - 457.
10. Chhabra, K. S., B. S., Kooner, A. K. Sharma, and A. K. Saxena. 1993. Screening of blackgram genotypes against whitefly, jassids and yellow mosaic virus: role of phytochemicals in resistance. Indian J. Pulses Res., 6 (1): 76 - 81.
11. Dancil, H. O. and G. M. George, 1972. Peach seed dormancy in relation to inologeous inhibitions and applied growth substance. J. Amer. Soc. Hort. Sci., 97: 651 - 654.

12. El Kady, H. And G. J. Devine. 2003. Insecticide resistance in Egyptian populations of the cotton whitefly, *Bemisia* Devine, *tabaci* ~Hemiptera: Aleyrodidae). Pest. Manag. Sci., 59 (8): 865 - 871.

13. Henneberry, T. J. and R. M. Faust. 1999. Silverleaf whitefly: National Research, Action & Technology Transfer Plan, 1997-2001. 2nd review of 2nd 5-year plan, New Mexico, Jan. 31- Feb.2, USDA, 195 pp.

14. Husain, M. A. and K. N. Trehan. 1940. Final report on the secheme of investigations on the whitefly on cotton in the Punjab. Indian J. Agric. Sci., 10: 101 - 109.

15. Inbar, M. 2003. Ecological implications of the unque *Bemi~sla-plant* interactions. 3rd International *Bemisia* Workshop, Barcelona 1 7 - 20 March, p.34

16. Jayaraman, L. 1985. Laboratory Manual Biochemistry. WIfey Eastern, Limited _

17. Lambert, A. L., R. M. McPherson and B. Sparks. 1995. Evaluation of selected soybean genotypes for resistance to two whitefly species (Homoptera: Aleyrodidae) in the greenhouse. J. Ent. Sci., 30 (4): 519 - 526.

18. Lanteren, J. C. van and L. P. J. Noldus. 1990. Whitefly-plant relationship: behavioral and ecological aspects. In: whiteflies: thier Bionomics, Pest Status and Management. (Ed.) Gerling, D. Intercept, Andovar, UK. pp 47 - 89.

19. Lin, T. B., A. Y. Schwartz, Saranga, P. Dugger and D. Richter, 1999. Effect of silverleaf whitefly on cotton photosynthesis. Proc., Beltwide Cotton Conf., Orlando, Florida, Vol. 1 : 586 - 587 .

20. Lipa, J. J. 1999. Problems of plant quarantine discussed at the 14th International Plant Congress. Ochrona Roselin, 43 (10). p. 43.

21. McAuslane, H. J. 1996. Iufluence of leaf pubescence on ovipositional preference of *Bemisia argentifolii* (Homoptera: Aleyrodidae) on soybean Entomol. 25 (4): 834 - 841.

22. Mound, L. A. 1965. Studies on the olfaction and colour sensitivity of *Bemisia tabaci* (Genn.) (Homoptera, Alyrodidae). Entomol. exp. et appl., 5: 99-104.

23. Naranjo, S., P. Ellsworth and L. Canas. 2003. Population dynamics, sampling and damage of *Bemisia tabac7* in agricultural systems. 3rd International *Bemisia* Workshop, Barcelona 17-20 March, p. 33. (Abstract).

24. Otoidobiga, L. C., L. C. Vincent and R. K. Stewart. 2003. Field efficacy and baseline toxicities of pyriproxifen, acetarniprid, and diafenthiuron against *Bemisia tabaci* Gennadius (Homoptera: Aleyrodidae) in Burkina Faso (West Africa). J. Envrion. Sci Health B, 38 (6) : 757 - 769.

25. pickett, A., L. J., Wadhams, C. M. Woodcock and J. Hardie. 1992. The chrnical ecology of aphids. Ann. Rev. Entomol., 37: 67 - 90.

26. Saric, M. R., R. Kastrori, Carictic-Cupina and I. Geric. 1967. Ceniverzic et Univon sadup. aklikum Izpiziologize BiUaka-Beograd, Hauca, Haucua Anjiau, pp. 215.

27. Zanic, A., J. L., Cenis, B. Simon, S. Kacic, and M. Simala. 2003. Current status of *Bemisia* tabaci in Croatia. 3rd International *Bemisia* Workshop, Barcelona 17 - 20 March, p. 43.

28. Wenru, M., X. Rumei, and Z. Yun. I992. Feeding preference experiments using epicuticular was extractions by the greenhouse whitefly. J. BJ. Nor Univ., 28 (Sup.2): 5 pp.

حساسية ثلاثة أصناف من فول الصويا للأصابه بـــ *Bemisia argentifolii* (Hemiptera: Alyerodidae) ودور الصفات الكيميائية للعائل

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١. *معهد بحوث وقاية النباتات – الدقى – جيزة*
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أختبرت حساسية ثلاثة أصناف من فول الصويا (جيزة ٢١ – جيزة ٣٥ – جيزة ٨٥) حقليـا للإصابة بـــ*B.argentifolii* خلال موسم ٢٠٠١،٢٠٠٢ تشير النتائج أن وضع البيض للحشرة زاد تدريجيا من الزراعة وحتى الحصاد خلال موسمى الدراسة . أيضا لم يسجل إختلافات معنويـة فـى المتوسط تعداد البيض بين صنفى جيزة ٢١ وجيزة ٣٥ فى موسم ٢٠٠١ ولكن سـجلت إختلافـات معنوية بين كلا الصنفين وصنف جيزة ٨٥ حتى الأسبوع الثالث من يوليو بالإضافة إلى ذلـك فـإن حوريات الحشرتو كونت مستعمرات بكثافة عالية على صنف جيزة ٢١ يليه صنف جيزة ٣٥ ، بينما أنخفض تعداد الحوريات على صنف جيزة ٣٥ .

عموما ، يعتبر صنف جيزة ٢١ أكثر الاصناف تفضيلا للحشرة ومن ثم اكثرها حساسـية للإصـابة بالحشرة يلية صنفى جيزة ٣٥ وجيزة ٨٥ على التوالى خلال فترة الدراسة . أيضا دلت النتائج علـى إرتفاع معدلات وضع البيض وتعداد الحوريات فى موسم ٢٠٠١ .

خلصت الدراسة إلى أن التركيب الكيميائى للورقة أثر على معدلات الحشرة لوضع البيض وأختيـار الحوريات للعائل المناسب بين الأصناف الثلاث موضع الدراسة . ومن ثم يمكن ملاحظة أن أصناف فول الصويا أختلفت فى ترلكيبها الكيميائى ، الأمر الذى ادى على تفـاوت درجـة الإصـابة بـين الأصناف الثلاث.