

Ecological Studies on Aphid Species Infesting Different Leguminous Vegetable Plant Varieties with Regard to their Seasonal Abundance.

Hagar S. S. Awadalla¹, H. A.EL-Kady¹, E. F. EL- Khyatt², and M. A. M. Hegab¹

¹Econ. Ento. Dept., Fac. Agric., Damietta Univ.

²Plant Prot., Dept., Fac. Agric., Banha Univ.



ABSTRACT

The present work was conducted to survey and study the seasonal abundance of different aphid insects infesting some leguminous plants varieties (broad bean, pea, cowpea and bean plants) in Diarb-Nigm district, Sharkia Governorate, Egypt during 2014/15 and 2015/16 seasons. The aphids species were collected by using plant samples from leguminous plants. Results showed that aphid species infested leguminous vegetable plants were *Aphis craccivora* Kock, *Myzus persicae* (Sulz) *Acyrtosiphon pisum* (Harris) and *Aphis gossypii* Glov. Two peaks of high population density for *A. craccivora*, *M. persicae* and *A. pisum* occurred on broad bean and pea plants during the fourth week of January and the first & second week of March. While in case of cowpea and bean plants two peaks of population density for *A. craccivora*, *M. persicae* and *A. gossypii* were recorded at the second week of July and the second week of August, respectively. Varieties such as broad bean, pea, cowpea and bean plants influenced the population density of aphids insects, Improved Giza 3 broad bean, Mastar B pea, Cream7 cowpea and Bronco bean varieties showed lowest mean number of insects/sample. Chemical analysis results showed a positive relationship between protein & carbohydrate contents and aphid insects infestations on all tested leguminous plant varieties, while a reverse relationship between pH values & aphid insects infestations and also with quantity of yield was also shown.

INTRODUCTION

Aphid species are serious insect pests of leguminous plants. Several investigators recorded the role of some aphid species in transmitting the pathogens of plant diseases (Maramorosch, 1969, Harris and Maramorosch, 1977, 1980, El-Dafrawy *et al.*, 2000 and Hegab and Ola-Hegab, 2009). The fauna of these insects in the field of vegetable crops and fruit trees were studied in Egypt (El-Zohairy *et al.* 1989, El-Zohairy and Ola-Hegab 2008; Han *et al.* 1991, Soliman, 1993; Nosser, 1996 and Hashem, 2005). Considerable data are reported on the aphid species found on vegetable plants. But still there is great shortage in the knowledge concerning other important insect pests infesting leguminous plants. The aim of the present work is to survey aphid insects on some leguminous plants (broad bean, pea, cowpea and bean plants) and also to study the seasonal abundance of the dominant species as well as to estimate the effects of plant varieties and their chemical constituents on the population density of aphid insects during 2014/15 and 2015/16 seasons.

MATERIALS AND METHODS

An area of about 2000 m² was chosen to carry out this study at Diarb- Nigm district, Sharkia Governorate, the experimental design used in all growing seasons of broad bean, pea, cowpea and bean, plants was a completely randomized block design with three replications. Treatments were distributed randomly within blocks. Each plot consisted (10 meters wide and 8 meters long). The space between holes was 25-30 cm. The sowing date of winter plantation was the second week of November while the sowing date of summer plantation was during the last week of April during 2014/15 and 2015/16 seasons. All plots received normal agricultural practices and were kept free of any pesticide treatments.

The four broad bean varieties (Improved Giza 3, Giza 714, Giza 843 and Sakha 1) and the varieties of pea were Master B, Loncoline, Prediction and Brogres as

well as the cowpea plant varieties were used Cream 7, Qaha 1, Dokki 331 and Azmerly. While bean varieties were Bronco, Giza 6, Giza 3 and Nerina. Sampling started when the age of the plants reached about one month old and continued at weekly intervals throughout the growing seasons.

Weekly samples were taken by plant samples technique (Terminal growths were taken from randomly chosen ten plants of each variety) to survey the aphid insects on the aforementioned leguminous vegetable plant varieties.

These samples were placed in paper bags and transferred to the laboratory for inspection using a binocular microscope. The total numbers of existing aphid individuals on both surfaces of the leaves and stems were recorded. The amounts of yield for each experimental unites were also counted. The effect of different varieties of the aforementioned host plants on the population density of the aphid insects along with resulted yield quantity were statistically analyzed according to completely randomized block design (Little and Hills 1975). Chemical analyses of broad bean, pea, cowpea and bean plant varieties were carried out in central laboratory, Faculty of Agriculture, Zagazig University to determine the total protein and carbohydrate contents, pH values, Phosphorous, Calcium and Potassium contents.

RESULTS AND DISCUSSION

Survey of aphid insects on some leguminous vegetable plants:

Broad bean and pea plants:

Survey of aphid species infesting broad bean and pea plants are shown in (Table 1). The obtained data show the incidence of three aphid insects species belonging to Family: - Aphidadae on broad bean and pea plants. The following aphid species arranged descendingly according to their abundance as follows: *Aphis craccivora* Kock, *Myzus persicae* (Sulz) and *Acyrtosiphon pisum* (Harris) were recorded on

broad bean and pea plants during 2014/15 and 2015/16 seasons.

Cowpea and bean plants:

The data presented in (Table 1) showed the incidence of three aphid species belonging to Family: Aphidadae on cowpea and bean plants in Diarb – Nigm district, Sharkia Governorate. The collected aphid insects were arranged descendingly according to their abundance as follows: *Aphis craccivora* Koch, *Aphis gossypii* Glov. and *Myzus persicae* (Sulz) were recorded on cowpea and bean plants.

Date presented in Table (1) also showed that, the total number of *A. craccivora* were the highest number on broad bean followed by cowpea and represented by 8147 and 8997 individuals on broad bean during 2014/15 and 2015/16 seasons, respectively. While on cowpea were 5609 and 6058 individuals during the two seasons, respectively.

Table 1. Total number of aphid insects infesting some leguminous plants in Diarb-Nigm district, Sharkia Governorate collected by using sweeping net technique during the seasons of 2014/15 and 2015/16.

Aphid insects	Total number of aphids insects							
	2014/2015			2015/2016				
	Broad bean	Pea	Cowpea	Bean	Broad bean	Pea	Cowpea	Bean
<i>Aphis craccivora</i> Koch.	8147	4441	5609	4508	8997	4844	6058	4911
<i>Myzus persicae</i> (Sulzer)	3978	2988	3136	2342	4666	3528	3374	2976
<i>Acrythosiphon pisum</i> (Harris)	2460	3124	00	00	3336	3395	00	00
<i>Aphis gossypii</i> (Glov.)	00	00	3756	3960	00	00	4414	4358

Seasonal abundance of the dominant aphids insects infesting some leguminous plants.

On broad bean and pea plants:

Date illustrated in Fig.(1) indicated that *A. craccivora* in the first season 2014/15 appeared in the second week of December on broad bean and in third week of December on pea and increased gradually to reached its highest number on the two host plants on the fourth week of January 2015 and represented by 270 and 156 individuals. /sample at 14.8°C and 62.9 % R.H. After this peak the aphids number fluctuated until reached the second peak of abundance in the second week of March on broad bean (represented by 252 individuals. /sample at 19.1°C and 58.3 % R.H) and in the first week of March on pea plants with a total number of 96aphids/sample at 18.5°C with 65.6 % R.H. After this, the aphids number tended to decline until reached its minimum number at the first week of April at 20.8°C and 58.3 %R.H. during 2014/15 season.

Moreover, *M. persicae* in the first season appeared in the third week of December on the two host plant broad bean and pea and increased gradually to reached its highest number on the fourth week of January 2015 and represented by 52 and 42 individuals. /sample at 14.8°C and 62.9 % R.H . Fig.(1). After this peak the aphids number fluctuated until reached the second peak of abundance in the second week of March on broad bean (represented by 68 individuals. /sample at 19.1°C and 58.3 % R.H) and in the first week of March on pea plants with a total number of 62 aphids /sample at 18.5°C with 65.6 % R.H. After this, the aphids number tended to decline until reached its minimum number at the fourth week of March 21.8°C and 54.8 % R.H. during 2014/15 season (Fig. (1)).

On the other hand, *M. persicae* rerecorded the lowest total number on cowpea and bean represented by 3136 and 2342 individuals during the first season, and 3374 and 2976 individuals during the second season, respectively. It is clear that the total number of *A. pisum* were the highest number on pea plants followed by broad bean and represented by 3124 and 3395 individuals on pea in 2014/15 and 2015/16 seasons, respectively. While on broad bean were 2460 and 3336 individuals during the two seasons, respectively. It is worth to mention that *A. gossypii* recorded the highest total number on bean and cowpea and represented by 3960 and 3756. individuals during the first season , respectively These results agree with the findings of Hegab *et. al.* (1988) and El- Zohairy *et. al.* (1989) as they showed that plant sample technique was the most efficient method to survey all aphid insects in different field crops.

While, date illustrated in Fig. (1) indicated that *A. pisum* in the first season 2014/15 appeared in the third week of December on broad bean and pea plants and increased gradually to reach its highest number on the two host plants on the fourth week of January 2015 and represented by 48 and 56 individuals. /sample, respectively at 14.8°C and 62.9 % R.H. After this peak the aphids number fluctuated until reached the second peak of abundance in the second week of March on broad bean (represented by 42 individuals/sample at 19.1°C and 58.3 % R.H) and in the first week of March on pea plants with a total number of 68 aphids /sample at 18.5°C with 65.6 % R.H. After this, the aphids number tended to decline until reached its minimum number at the fourth week of March 21.8°C and 54.8 %R.H. during 2014/15 season. Similar results were obtained in the second season 2015/16 (Fig.2).

Regarding the weekly counts of aphids insects on both broad bean and pea plants, it's clear that these aphids species were more abundant during 2015/16 than 2014/15season.

It is worth to mention that aphids insects *A. craccivora*, *M. persicae* and *A. pisum* had two peaks of activity on broad bean plants at the fourth week of January and second week of March, respectively. While, the aforementioned aphids insects also had two peaks of activity on pea plants at the fourth week of January and first week of March, respectively. These results agree with the findings of El-Zohairy *et. al.*(1989), Hashem (1997), El -Gindy (2002), Youssef (2006), and Awadalla *et. al.*(2013 and 2014) who mentioned that *A. craccivora* and *M. persicae* had two peaks on winter vegetable plants.

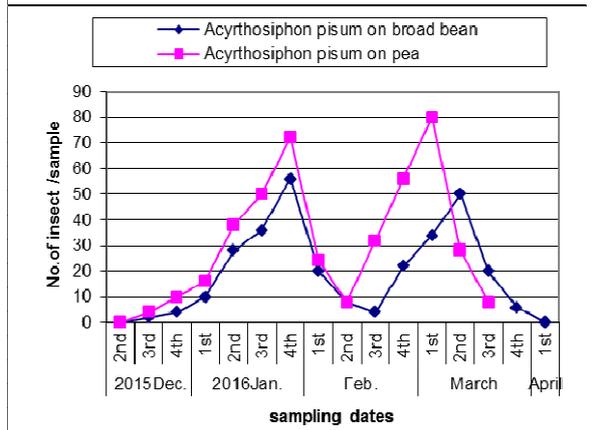
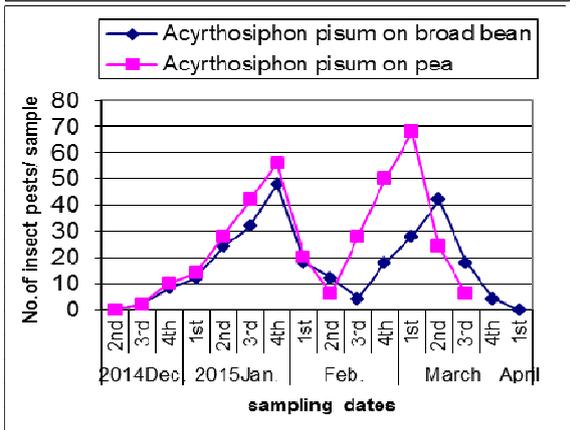
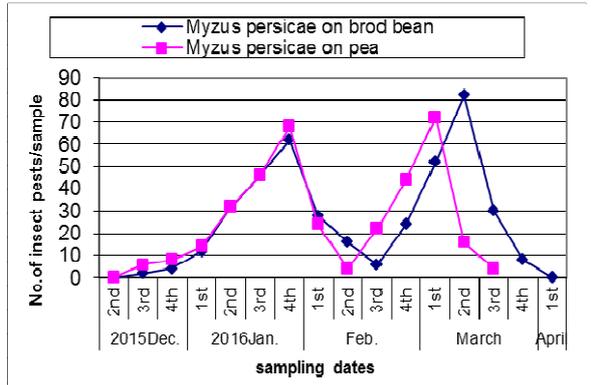
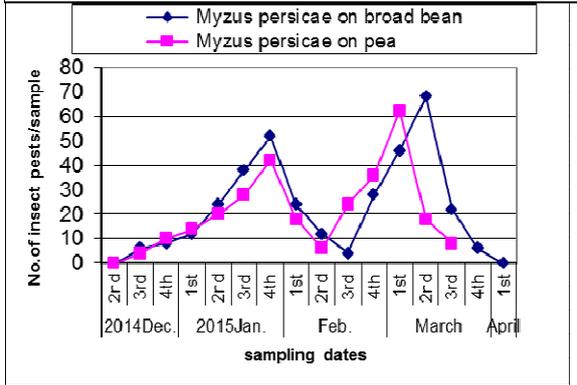
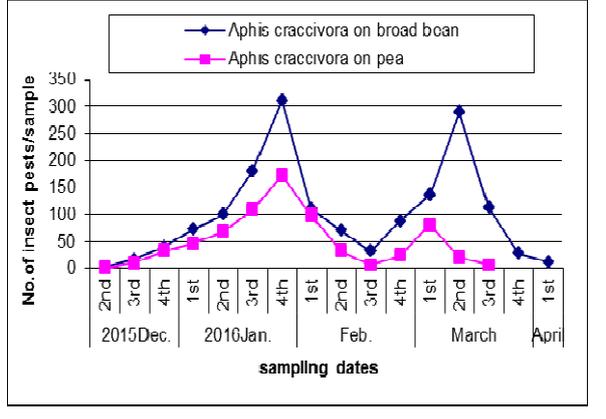
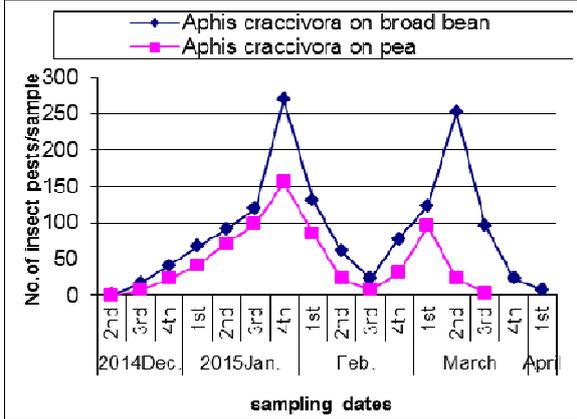
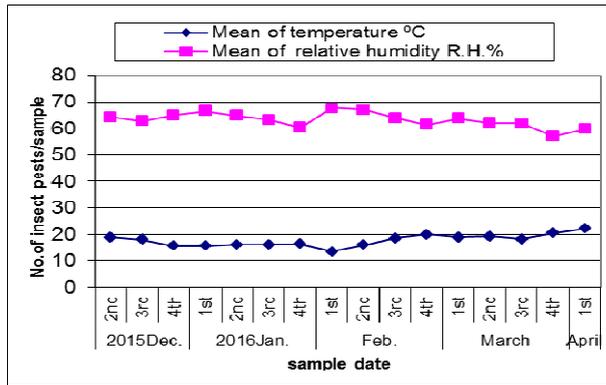
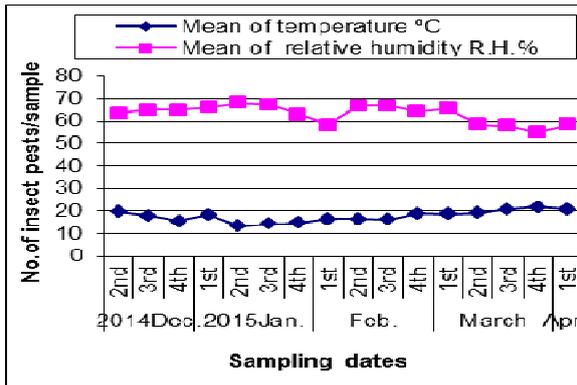


Fig.1. The seasonal abundance of the aphids *A. craccivora*, *M. persicae* and *A. pisum* infesting broad bean and pea plants at Diarb-Nigm district, Sharkia Governorate during 2014/15 season .

Fig.2. The seasonal abundance of the aphids *A. craccivora* , *M. persicae* and *A. pisum* infesting broad bean and pea plants at Diarb-Nigm district, Sharkia Governorate during 2015/16 season.

On cowpea and bean plants:

Date arranged in Fig. (3) indicated that *A. craccivora* during the first season 2014 appeared in the second week of June on cowpea and bean and increased gradually to reach the first peak of abundance in the second week of July with a total number of 224 and 140 aphids/ sample on cowpea and bean plants, respectively. After this peak the aphids number fluctuated until reached the second peak of abundance in the second week of August with a total number of 198 and 158 aphids/ sample on cowpea and bean plants, respectively. After the peak, the individuals of *A. craccivora* on cowpea and bean plants tended to decline until reached its minimum number at the second week of September on cowpea plants with a total number of 6 aphids /sample at 29.9°C and 64.3 % R.H. while, on pea plants the aphids number tended to decline until reached its minimum number at the first week of September with a total number of 14 aphids at 28.0°C and 62.6 % R.H. during 2014 season.

Moreover, *M. persicae* during the first season 2014 also appeared in the second week of June on the two host plant cowpea and bean plants, then increased to reach the first peak of abundance in the second week of July and represented by 78 and 66 aphids/sample at 30.4°C and 65.7% R.H. Fig. (3). After this peak the aphids number fluctuated until reached the second peak of abundance in the second week of August with a total number of 62 and 58 aphids/ sample at 30.2°C and 66.3% R.H. on cowpea and bean, respectively (Fig.3). After this, the aphids number tended to decline until reached its minimum number at the first week of September with a total number of 6 aphids /sample at 28.0°C and 62.6 % R.H. during 2014 season (Fig. 3).

Date presented in Fig. (3) indicated that *A. gossypii* during the first season 2015 appeared in the second week of June on two host plants and increased to reached its first peak of abundance in the second week of July (100 and 110 aphids/ sample) on cowpea and bean plants, respectively. After this peak the aphids number fluctuated until reached the second peak of abundance in the second week of August with a total number of 120 and 124 aphids/ sample at 30.2°C and 66.3% R.H. on cowpea and bean, respectively. After this, the aphids number tended to decline until reached its minimum number at the first week of September with a total number of 6 and 8 aphids /sample on cowpea and bean plants, respectively at 28.0°C and 62.6 % R.H. during 2014 season. Similar results were obtained in the second season, 2015 (Fig.4).

Regarding the weekly counts of aphids insects on both cowpea and bean plants it's clear that these aphids species were more abundant during 2015 than 2014 season.

It is worth to mention that aphids insects *A. craccivora*, *M. persicae* and *A. gossypii* had two peaks of activity on both of cowpea and bean plants during summer plantation at the second week of July and second week of August, respectively. These results disagree with the findings of EL Gindy (2002), Hashem (2005) and Hashem et al. (2011) who reported that *A. craccivora* and *A. gossypii* had one peak on summer vegetable

plants. These differences may be attributed to locality, crop rotation, agricultural practices and environmental conditions prevailing during execution of these experiment.

Effect of different leguminous plant varieties on the seasonal abundance of the aphid insects:-

Date presented in Table (2) showed the influences of certain leguminous varieties on the seasonal occurrence of the aphids insects as broad bean, pea, cowpea and bean plants under the field conditions at Diarb-Nigm distract, Sharkia Governorate were studied during two successive seasons of 2014/15 and 2015/16.

Broad bean varieties:-

As shown in Table (2) the highest average number of *A. craccivora* during the two successive seasons of 2014/15 and 2015/16 occurred on Sakha1(169.37 and 180.12 individuals) followed by Giza 843 variety (142.19 and 165.55 individuals) while, the lowest average were recorded on Giza 3 with an average of 88.25 and 100.00 individuals, respectively.

Also, the same trend was observed with *M. persicae* where the highest average number during the two seasons of investigation were recorded on Sakha 1 and represented by 98.43 and 112.50 individuals. Meanwhile, the lowest average number for *M. persicae* occurred on Giza3 and represented by 21.87 and 25.25 individuals, respectively.

Also, similar results were obtained with *A. pisum* where the highest average number during 2014/15 and 2015/16 seasons were recorded on Sakha 1 and represented by 59.87 and 88.25 individuals. Meanwhile, the lowest average number for *A. pisum* occurred on Giza3 and represented by 16.87 and 18.75 individuals, respectively.

Pea varieties:-

As shown in Table (2) the highest average number of *A. craccivora* during the two successive seasons of 2014/15 and 2015/16 were recorded on Brogres (118.00 and 124.28 individuals) followed by Preifction variety (88.57 and 96.42 individuals) while, the lowest average occurred on Master B with an average of 48.14 and 50.14 individuals, respectively.

Also, the same trend was observed with *M. persicae* where the highest average number during the two seasons of investigation were recorded on Brogres and represented by 90.14 and 98.42 individuals. Meanwhile, the lowest average number for *M. persicae* occurred on Master B and represented by 20.71 and 25.71 individuals, respectively.

Also, similar results were obtained with *A. pisum* where the highest average number during 2014/15 and 2015/16 seasons were recorded on Brogres and represented by 85.14 and 90.50 individuals. Meanwhile, the lowest average number for *A. pisum* occurred on Master B and represented by 25.28 and 31.57 individuals, respectively.

Cowpea varieties: - As shown in Table (2) the highest average number of *A. craccivora* during the two successive seasons of 2014 and 2015 were recorded on Azmerly (140.42 and 148.28 individuals) followed by Dokki 331 variety (110.50 and 115.57 individuals) while

, the lowest average occurred on Cream 7 with an average of 64.71 and 78.57 individuals, respectively. Also, the same trend was observed with *M. persicae* where the highest average number during the two seasons of investigation were recorded on Azmerly and represented by 88.28 and 95.14 individuals. Meanwhile, the lowest average number for *M. persicae* occurred on Cream 7 and represented by 22.00 and 23.14 individuals,

respectively. Also, similar results were obtained with *A. gossypii* where the highest average number during 2014 and 2015 seasons were recorded on Azmerly and represented by 99.42 and 110.14 individuals. Meanwhile, the lowest average number for *A. Gossypii* occurred on Cream 7 and represented by 34.28 and 47.28 individuals, respectively.

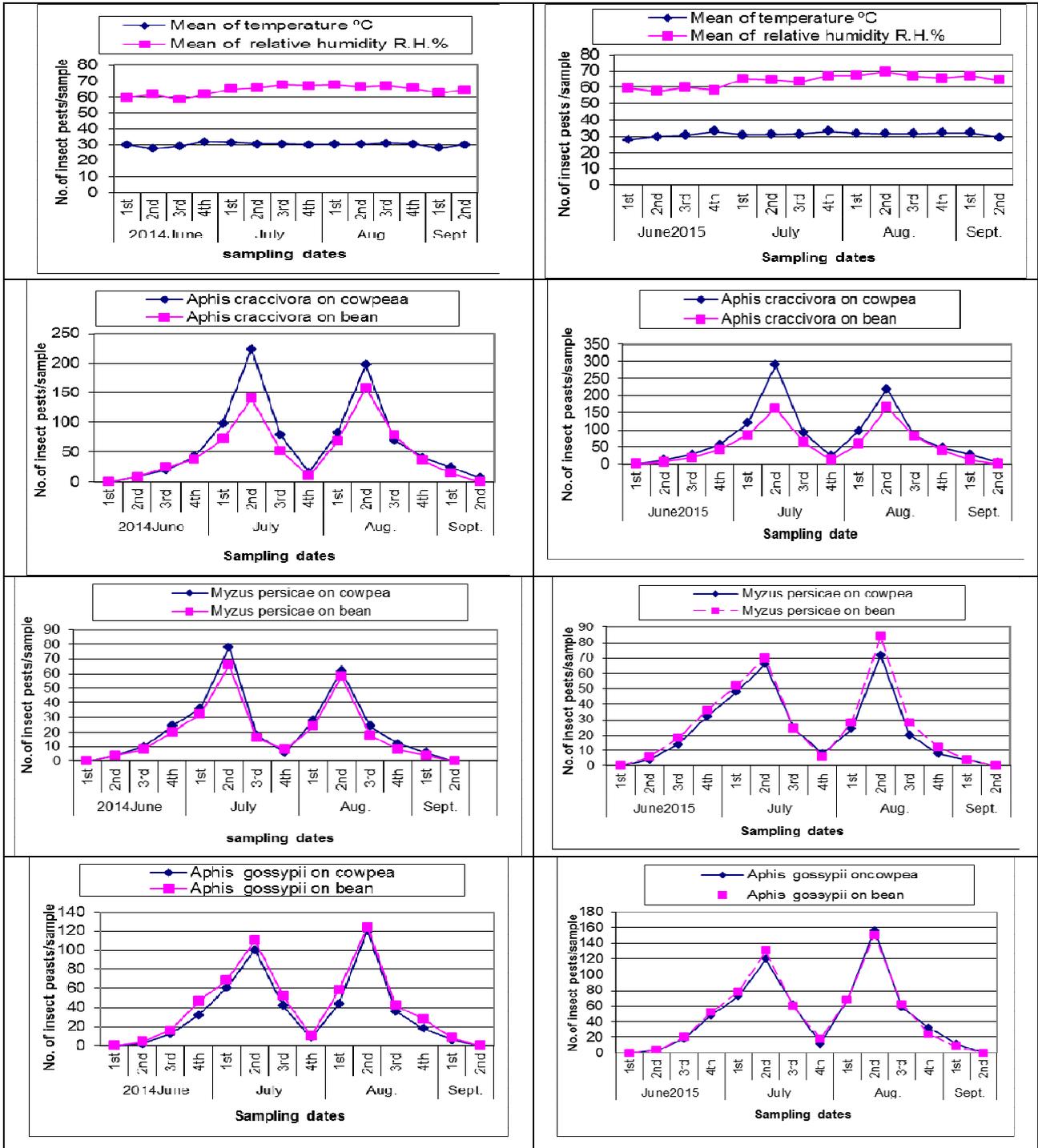


Fig. 3 .The seasonal abundance of the aphids *A. craccivora* ,*M. persicae* and *A.gossypii*infesting cowpea and bean plants at Diarn-Nigmdistrict, Sharkia Governorate during 2014 season .

Fig.4.The seasonal abundance of the main aphid *A. craccivora*, *M. persicae* and *A. gossypii* infesting cowpea and bean plants at Diarb-Nigm district, Sharkia Governorate during 2015 season .

Table 2. Effect of some leguminous plant varieties on the population density of aphid insects at Diarb-Nigm district , Sharkia Governorate ,Egypt during 2014/15 and 2015/16 seasons.

Host plants	varieties	Mean No. of <i>Aphis craccivora</i>		Mean No. of <i>Myzus persicae</i>		Mean No. of <i>Acyrtosiphon pisum</i>		Mean No. of <i>Aphis gossypii</i>	
		2014/15	2015/16	2014/15	2015/16	2014/15	2015/16	2014/15	2015/16
Broad bean	Improved Giza 3	88.25	100.00	21.87	25.25	16.87	18.75	00	00
	Giza714	109.37	117.19	52.31	64.50	28.50	32.18	00	00
	Giza843	142.19	165.55	76.00	89.37	48.50	69.37	00	00
	Sakha 1	169.37	180.12	98.43	112.50	59.57	88.25	00	00
pea	Master B	48.14	50.14	20.71	25.71	25.28	31.57	00	00
	Loncoline	62.50	75.14	40.28	51.28	44.42	48.28	00	00
	Preifction	88.57	96.42	62.28	76.57	68.28	72.14	00	00
	Brogres	118.00	124.28	90.14	98.42	85.14	90.50	00	00
Cowpea	Cream 7	64.71	78.57	22.00	23.14	00	00	34.28	47.28
	Qaha 1	85.00	90.28	48.28	54.42	00	00	56.28	68.42
	Dokki 331	110.50	115.57	65.42	68.28	00	00	78.28	89.42
	Azmerly	140.42	148.28	88.28	95.14	00	00	99.42	110.14
Bean	Bronco	53.69	57.46	20.46	28.30	00	00	43.53	51.84
	Giza 6	69.69	78.46	38.30	51.69	00	00	64.30	75.53
	Giza3	98.15	109.53	56.61	68.61	00	00	86.30	92.16
	Nerina	125.23	132.30	72.46	80.30	00	00	110.46	115.23

Bean varieties:-

As shown in Table (2) the highest average number of *A. craccivora* during the two successive seasons of 2014 and 2015 occurred on Nerina variety (125.23 and 132.30 individuals) followed by Giza3 variety (98.15 and 109.53 individuals) while , the lowest average were recorded on Bronco with an average of 53.69 and 57.46 individuals. respectively.

Also, the same trend was observed with *M. persicae* where the highest average number during the two seasons of investigation occurred on Nerina and represented by 72.46 and 80.30 individuals. Meanwhile, the lowest average number for *M. persicae* were recorded on Bronco and represented by 20.46 and 28.30 individuals, respectively.

Also, similar results were obtained with *A. gossypii* where the highest average number during 2014 and 2015 seasons occurred on Nerina and represented by 110.46 and 115.23 individuals. Meanwhile, the lowest average number for *A. gossypii* were recorded on Bronco and represented by 43.53 and 51.84 individuals, respectively.

As a conclusion, the highest average number of *A. craccivora*, *M. persicae* and *A. pisum* were found on broad bean variety Sakha1 followed by Giza843 variety. While the highest average number for these insect pests

occurred on pea variety Brogres followed by Preifction and the lowest average number were recorded on pea variety Master B, While the highest average number for *A. craccivora*, *M. persicae* and *A. gossypii* insect pests occurred on cowpea variety Azmerly followed by Dokki 331 and the lowest average number were recorded on cowpea Cream7 variety. On the other hand, the highest average number for these aphids insects occurred on bean variety Nerina followed by Giza3 and the lowest average number were recorded on bean Bronco variety. The obtained results agreed with the findings of Ofuya (1988) on cowpea varieties Nosser (1996), El-Gindy (2002), Youssef (2006) and Awadalla et.al. (2011) on beans varieties, Abdel-Samad and Al-Habashy (2013) on cruciferous varieties, Shalaby et.al. (2012) and Awadalla et.al. (2013) on faba bean varieties Hegab (2015) on solanaceous and cruciferous varieties. They mentioned that varieties of hostplants had a great effect on incidence of piercing-sucking insects.

Relationship between certain chemical constituents of different leguminous plant varieties on the population density of the aphids insects.

The chemical contents of broad bean, pea, cowpea and bean plants were chemically analyzed and obtained results are recorded in (Table 3)

Table 3 . Effect of certain chemical constituents of some leguminous plant varieties on the population density of the aphid insects.

Host plants	varieties	Total Protein%	Carbohydrate%	pH	P%	K%	Ca%	Mean No. of aphids	Yield kg. by plot /
Broad bean	Improved Giza 3	18.4	44.6	5.6	0.8	3.1	3.2	126.99	15.8
	Giza714	19.6	47.1	5.3	0.8	3.0	3.1	190.18	13.3
	Giza843	20.9	51.9	5.2	0.7	2.9	3.0	266.69	10.1
	Sakha 1	22.2	54.4	5.0	0.6	2.8	2.8	327.67	9.6
Pea	Master B	20.8	46.2	6.3	0.9	4.2	3.6	94.13	14.7
	Loncolin	22.6	49.8	5.5	0.8	3.4	3.2	147.02	12.6
	Preifction	26.5	53.8	5.0	0.7	2.9	2.9	219.13	10.5
	Brogres	28.2	56.2	4.8	0.7	2.6	2.7	293.23	6.4
Cowpea	Cream 7	21.2	43.2	5.9	1.0	5.6	5.1	120.99	17.5
	Qaha 1	23.6	46.4	5.7	0.9	5.4	4.8	189.56	12.4
	Dokki 331	25.9	48.5	5.5	0.9	5.2	4.1	254.02	9.1
	Azmerly	26.1	53.8	5.2	0.8	4.8	3.9	328.12	7.6
Bean	Bronco	19.8	43.6	6.3	0.9	4.7	3.4	117.68	17
	Giza 6	20.2	47.2	5.4	0.8	3.5	3.0	172.29	15.5
	Giza3	23.8	51.9	4.9	0.8	3.1	2.8	241.06	11.2
	Nerina	27.5	55.2	4.4	0.7	2.9	2.7	308.15	8.5

Data represented in (Table3) suggested that, the average number of the aphid insects affected by the chemical constituents of the leguminous varieties and resulting the yield were influenced .

Broad bean varieties:-

From the obtained results in (Table 3) Improved Giza 3 variety proved to be the lowest total protein and carbohydrate contents and the highest pH value , the least susceptible to aphid insects infestation and the highest yield.

Generally, the results showed a positive relationship between protein & carbohydrate contents and average number of the aphid insects on all broad bean varieties, while a reverse relationship between pH values and insect infestations was also shown.

Pea varieties:-

The results showed a positive relation ship between protein & carbohydrate contents and aphid insects infestation on all pea varieties, while a reverse relationship between pH values and aphid insects infestations was also shown (Table 3).

Cowpea varieties:

From the obtained results Cream 7 and Qaha 1 varieties were the lowest total protein, carbohydrate contents and the highest pH values and the least susceptible to the aforementioned insects average number and the highest yield production (Table 3).

Bean varieties:-

The results showed a positive relationship between protein & carbohydrate contents and aphid insects infestation on all bean varieties, while a reverse relationship between pH values and aphid insects infestations was also shown (Table 3).

It is worth to mention that the aphids infestation was correlated with the chemical constituents of the used leguminous plant varieties and also with quantity of yield .These results agreed with the findings of Hashem (2005), Awadalla *et.al.*(2013) and Hegab (2015) who mentioned that homopterous insects infestations was correlated with the chemical constituents of the host plantvarieties.

REFERENCES

Abdel-Samad, A. A. and A. Z. Al-Habashy (2013): Population dynamics of certain homopterous insects infesting broad bean plants in Sharkia Governorate, Egypt. *Zagazig J. Agric. Res.*, Vol.40(5) :955-962.

Awadalla, S.S.; F.E. Abdallah and Noura R.EL-Mashaly (2013): Influence of some varieties on the main insect pests attacking faba bean plants. *J. Plant Prot. and Path. Mansoura Univ.* 4 (6):581-589.

Awadalla, S.S.; F.E. Abdallah and Noura R.EL-Mashaly (2014): Population density of main insect pests attacking Faba bean plants as influenced by sowing dates. *Glob. J. Agric. food safety Sci.*1 (2):169-177.

Awadalla, S.S; L.M. Shanab; M.E.EL. Naggar and Samia M. Abo-Zeid (2011): Influence of different varieties and planting dates on the main pests infesting kidney beans. *J. Plant Prot.and Path., Mansoura Univ.* 2 (4): 519-531.

El-Defrawy, G. M.; A. K., Emam; I. A., Marzouk and L., Rizkalla (2000): Population dynamics and seasonal distribution of *A. craccivora* Koch and associated natural enemies in relation to virus disease incidence in faba bean fieldsEgyptian., *J. of Agric. Res.* 78: (2) 627-641.

El- Gindy, M. A. (2002): Studies on certain homopterous insect vectors of plant pathogenic diseases (Ph.D Thesis Fac. Agric. Zagazig Univ.).

El-Zohairy, M.M. and Ola,I.M. Hegab (2008): Effect of plant varieties and potassium fertilization on the population densities of certain homopterous insectsinfesting cabbage and cauliflower plant varieties and transmission efficiency of cabbage leaf curl virus and cabbage dwarf mosaic virusEgypt. *J. Appl. Sci.*Vol.16 (4B) 701-727.

El-Zohairy M.M., A.M.Hegab, M.Y.Helaly and H.M.El- Sharkawy(1989): Survey and seasonal abundance of aphid species (Homoptera : Aphididae) infesting certain solanaceous plants in newly reclaimed sandy areas at Sahlia district ,Egypt , *Zagazig J.Agric.Res.*Vol.16 (3)361-371.

Han,W.Z. ; X.L. Wang and R.H. Cao(1991) : Evaluation of resistance *Aphis craccivora* Koch.in *Phaseolus vulgaris* crop. *Genetic.Res.* :32-33

Harris, K.F. and K. Maramorosch (1977): Aphids as virus vectors (Acad. Press New York, San Francisco, London Pp.559).

Harris, K.F. and K. Maramorosch (1980): Vectors of plant pathogens (Acad. Press New York, London, Toronto, San Francisco Pp.467).

Hashem, M.S. (1997): Studies on certain insects infesting somevegetable plants in SharkiaGovernorate M. Sc. Thesis, Fac. Agric. Zagazig Univ.

Hashem, M.S. (2005): Studies on certain piercing-sucking insects infesting some vegetable crops. Ph.D. Thesis, Fac. Agric., Moshtohor, Zagazig Univ.

Hashem, M.S.; A.A. Abdel-Samad and A.A. Abd-Allah (2011): Effect of certain agricultural practices on infesting of broccoli plants with certain homopterous insects at Minia El-Kamh district, Sharkia governorate, Egypt. *ZagazigJ.Agric.Res.*, Vol.38 (1):179-191.

Hegab.A.M. and Ola,I.M.S. Hegab (2009): Suscpetibility of some bean varieties to certain homopterous insects infestation and transmission efficiency of bean leaf roll virus. *Egyp., J. of Appl. Sci.* 23(4B):682-700.

Hegab, M.A.M.(2015): Studies on certain piercing – sucking insects as vectors of phytopathogenic agents in Sharkia Governorate . Ph.D. Thesis, Fac. Agric. Zagazig Univ.

- Hegab, A.M., M.M. El-Maghraby and S.S. Hassanien (1988): Abundance and flight activity of certain aphids infesting maize plants in newly reclaimed sandy area at Salhia district Sharkia Gogernorate (Zagazig J.Agric.Res.,Vol.(1):787-800.
- Little, T.M. and F.J. Hills (1975): Statistical methods in agricultural Research. UCD Book Store University of California, Davis. 242pp.
- Maramorosch, K. (1969): Viruses, vectors and vegetation (Inter Publ. A division of Sohn Wiley New York, London, Toronto Pp.665).
- Nosser, M.A. (1996): Mechanism of resistance in bean and cowpea varieties to certain sucking insects infestation. M.Sc. Thesis. Fac. Agric. Cairo Unvi.
- Ofuya, T.I. (1988) : Antibiosis in some cowpea varieties resistant to the cowpea aphid. *Aphis craccivora* Koch (Homoptera Aphididae). International pest control. 30: 3. 68-69.
- Shalaby, H.H. ;E.M. Mousa and Samia A.EL-Gawwad (2012): Population fluctuations of some insect pests infesting broad bean plantations in relation to certain ecological factors. J. Plant Prot. and Path, Mansoura Univ.3 (9): 935-942
- Soliman, S.A. (1993): Studies on certain pests infesting some cruciferous plants. M.Sc. Thesis, Fac. Agric. Zagazig Univ.
- Youssef, A.A. (2006): Studies on some homopterous insect vectors of plant diseases. Ph.D Thesis, Fac.of Agric Zagazig Univ.

دراسات بيئية على حشرات المن التي تصيب أصناف مختلفة من نباتات الخضر البقولية وتأثيرها على الوفرة الموسمية

هاجر سمير صالح عوض الله^١، حافظ عبد الرحمن القاضي^١، عزت فرج الخياط^٢ و محمود على مرسى حجاب^١
^١ قسم الحشرات الإقتصادية-كلية الزراعة - جامعة دمياط
^٢ قسم وقاية النبات كلية الزراعة-جامعة بنها

أجريت تلك الدراسة البيئية خلال موسمين متتاليين ٢٠١٥/٢٠١٤، ٢٠١٥ / ٢٠١٦ بهدف حصر أنواع حشرات المن ودراسة الوفرة الموسمية للأنواع السائدة التي تصيب بعض النباتات البقولية (القول البلدى، البسلة، اللوبيا و الفاصوليا) وتأثير الأصناف المختلفة على كثافة التعداد للحشرات على النباتات المنزوعة في منطقة ديرب نجم بمحافظة الشرقية باستخدام طريقة العينات النباتية. وقد أوضحت النتائج أن أنواع المن التي تصيب نباتات خضر العائلة البقولية هي:- من البقوليات، من الخوخ الأخضر، من البسلة، من القطن. ودراسة الوفرة الموسمية لتلك الأنواع السائدة على النباتات موضع الدراسة وجد أن لكل من حشرة من البقوليات من الخوخ الأخضر ومن البسلة - لكل منها ذروتى نشاط على نباتات البسلة و الفول البلدى ذروة النشاط الأولى فى الأسبوع الرابع من شهر يناير، والثانية فى الأسبوع الثانى من مارس على الفول البلدى بينما على البسلة فى الأسبوع الاول من مارس بينما على نباتات اللوبيا والفاصوليا فقد وجد لكل من حشرة من البقوليات من الخوخ الأخضر و من القطن - لكل منها ذروتى نشاط على اللوبيا و الفاصوليا الأولى فى الأسبوع الثانى من يوليو و الثانية فى الأسبوع الثانى من أغسطس، وأيضاً تم اختبار حساسية أربعة أصناف من النباتات موضع الدراسة للإصابة بحشرات المن سالف الذكر خلال موسمي الدراسة و تبين من النتائج أن أعلى تعداد من حشرات المن على الفول و اقلهم إنتاجا كان على صنف الفول سخا ١ بينما كان اقلهم تعدادا و أعلى إنتاجا على صنف جيزة ٣ محسن. وكان الصنف مستر بى من البسلة اقلهم إصابة بحشرات المن وأعلى إنتاجا أما الصنف بروجريس فكان أكثرهم إصابة و اقلهم إنتاجا. أما على اللوبيا فكان الصنف كريم ٧ اقلهم إصابة و أعلى إنتاجا بينما كان الصنف أزمرلى اقلهم إنتاجا و أكثرهم إصابة بحشرات المن موضع الدراسة. أما على نباتات الفاصوليا فكان الصنف برونكو أعلى إنتاجا و اقل إصابة بالحشرات موضع الدراسة أما الصنف نارينا تواجد عليه أعلى تعداد من تلك الحشرات خلال موسمي الدراسة و كان اقلهم إنتاجا. و لقد أوضح التحليل الكيميائي لبعض مكونات العصارة النباتية للأصناف المختلفة تحت الدراسة أن هناك علاقة موجبة بين نسبة الإصابة بحشرات المن وكلا من نسبة البروتين الكلى و الكربوهيدرات الكلية. على حين انه توجد علاقة سالبة (عكسية) بين نسبة الإصابة بحشرات المن وقيمة pH للعصارة النباتية وأيضاً علاقة ذلك بكمية المحصول للأصناف المختلفة.