

SURVEY AND SEASONAL ABUNDANCE OF LEAFHOPPERS INFESTING SOME LEGUMINOUS CROPS

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ABSTRACT: The present work was conducted during two successive seasons in the period from 2001 to 2003 seasons to survey some leafhoppers insects infesting certain leguminous plants (cowpea, bean, broad bean and pea plants) in Diarb – Nigm district, Sharkia Governorate Egypt .The aforementioned insect pests were collected by different methods from leguminous plants. The sweeping net, sticky board and yellow pan traps were used. Studies showed that the sweeping net proved to be the best method to collect all the leafhopper species. The sticky board traps had a remarkable selectivity for attracting certain leafhoppers. The yellow sticky board trap seemed to be the most attractive to leafhoppers. The yellow pan traps were also selective for collecting leafhoppers. The leafhoppers, *Empoasca decedens* (Paoli), *Empoasca decipiens* (Paoli), *Cicadulina chinai* (Ghau) and *Balclutha hortensis* (Lindb) were collected from the aforementioned leguminous plants representing high population density for *E. decipiens* occurred on broad bean plants and pea plants at the end of February .On bean and cowpea plants two peaks were recorded at second week of both July and August. On the other hand, *E. decedens* (Paoli) had one peak of abundance occurred on the second week of March on pea and broad bean plants, In cowpea and bean plants two peaks for *E. decedens* were recorded at the end of July and third week of August.

Key words: Leguminous plants, seasonal abundance, leafhopper .

INTRODUCTION

Leafhoppers are serious insect pests investing leguminous plants. Several investigators recorded the role of some leafhopper species in transmitting the pathogens of plants diseases Nielson, 1968 and Hegab, 1983. The fauna of these insects on most field and leguminous crops and fruit trees were studied in Egypt (Herakly, 1970, Ammar and Farrag, 1976 EL-Nahal *et al.*, 1977 Aboul Ata 1983, Hegab *et al.*, 1987, 1988, Helal, *et al.*, 1996 and Singh, *et al* 1998) reported considerable data on the leafhoppers infesting leguminous plants. The aim of the present work is to survey the leafhoppers on certain leguminous plants (cowpea, bean, broad bean and pea plants) as well as to clear the seasonal abundance of the dominant species during 2001/ 2002and 2002/ 2003 seasons in Diarb-Nigm, Sharkia Governorate.

MATERIALS AND METHODS

Sampling started when the age of the leguminous crops reached about 21 –28 days and continued at weekly intervals throughout cowpea, bean, broad bean and pea plants. The following three procedures of sampling were used:

- (1) Sweeping net, 35 cm diameter and 60 cm deep and each sample consisted of 200 single strokes taken from both diagonal directions of the field.
- (2) The yellow plastic boards 20×20-cm coated with sticky material hung on wood rods in the field at the height of the plants throughout the period of samples.
- (3) The use of yellow pan traps 30-cm diameter and 10 cm deep using water as a trapping liquid. These traps were also hung on wood rods in the field. Counts of captured leafhoppers were done for each trap according to Hegab *et al.* (1987 & 1988), the collected specimens were killed by cyanide, sorted into species and identified in the plant protection Department by A. Hegab.

RESULTS AND DISCUSSIONS

Survey of leafhopper species infesting cowpea, bean, broad bean and pea plants .The date presented in Table 1 show the incidence of leafhoppers belonging to Family Cicadellidae on cowpea, bean,

Table 1: Total number of leafhoppers species collected from certain leguminous plants by using sweeping nets, sticky board traps and yellow pan traps in Dirab-Nigm district Sharkia Governorate during 2001/2002 and 2002/2003 seasons

Leafhopper species	Host plant	2001/2002			2002/2003		
		S.N.	S.B.T.	Y.P.T.	S.N.	S.B.T.	Y.P.T.
<i>Empoasca decipiens</i>	Cowpea	372	145	75	353	178	93
	Bean	271	159	66	222	165	64
	Broad bean	459	210	45	488	196	75
	Pea	215	136	62	187	102	61
<i>Empoasca decedens</i>	Cowpea	198	98	49	171	114	42
	Bean	201	82	63	195	69	52
	Broad bean	272	145	52	222	129	33
	Pea	142	96	35	98	55	41
<i>Cicadulina chinai</i>	Cowpea	43	6	0	36	10	0
	Bean	21	9	0	32	6	0
	Broad bean	0	0	0	0	0	0
	Pea	0	0	0	0	0	0
<i>Balclutha hortensis</i>	Cowpea	0	0	0	0	0	0
	Bean	0	0	0	0	0	0
	Broad bean	22	0	0	31	9	0
	Pea	14	4	0	22	7	0
Total		2230	1090	447	2057	1040	461

S.N. sweeping nets

S.B.T. sticky board traps

Y.p.t. yellow pan traps

broad bean and pea plants in Diarb- Nigm district, Sharkia Governorate

a) On cowpea plants

The collected leafhopper species arranged descendingly according to their abundance on cowpea plants are as follows: *Empoasca decedens* (Paoli), *Empoasca decipiens* (Paoli) and *Cicadulina chinai* (Ghaur). The seasonal abundance of leafhoppers, *Empoasca decedens* (Paoli) and *Empoasca decipiens* (Paoli) were recorded on cowpea plants during 2001/2002 and 2002/2003 seasons.

b) On bean plants

Date obtained revealed that the leafhopper species found on bean plants were *Empoasca decedens* (Paoli), *Empoasca decipiens* (Paoli) and *Cicadulina chinai* (Ghaur). The most abundant species were *Empoasca decedens* (Paoli) and *Empoasca decipiens* (Paoli) during the first and second seasons.

c) On broad bean plants

The species *Empoasca decedens* (Paoli), *Empoasca decipiens* (Paoli) and *B. hortensis* were recorded on broad bean plants during 2001/2002 and 2002/

2003 seasons while *Empoasca decedens* (Paoli) and *Empoasca decipiens* (Paoli) were the most abundant leafhoppers infesting broad bean plants

d) On pea plants

The following species of the leafhoppers *Empoasca decipiens* (Paoli), *Empoasca decedens* (Paoli) and *B. hortensis* attacked pea plants. *Empoasca decedens* (Paoli) and *Empoasca decipiens* (Paoli) were apparently the most abundant species, whereas, the other species were observed in low numbers on pea plants during the first and second seasons.

All the aforementioned leafhopper species were collected from the leguminous crops by the sweeping net. Concerning the efficiency of the three methods of surveying, it appears that the use of sweeping nets was the most efficient method. The total numbers of all species collected by each of the mentioned methods were 2230, 1090, 447 and 2057, 1040 and 461 individuals in 2001/2002 and 2002/2003 seasons respectively (Table 1) These results agree with the findings of Hegab et al., 1987 and 1988, who showed that sticky board and

yellow pan trap have a remarkable selectivity for attracting certain leafhoppers species from different field crops, vegetable crops and fruit orchards. Results obtained by Hemeida 1981, who mentioned that, only *E. decipiens* was found infesting solanaceous vegetable plants at Giza region.

Seasonal Abundance of the Dominant Homopterous Leafhopper Insects (Fam: Cicadellidae) Infesting Some Leguminous Crops

a) Cowpea Plants

i) *E. decipiens* (Paoli)

This species represented the most abundant one cowpea plants during 2002 and 2003 seasons. The total numbers of *Empoasca decipiens* (Paoli) individuals collected through weekly samples from cowpea plants in 2002 and 2003 seasons are graphically illustrated in Figure 1. The obtained results show that *Empoasca decipiens* (Paoli) insects were present on cowpea plants under field conditions through 2002 and 2003 seasons. Two peaks of *E. decipiens* (Paoli) during 2002 and 2003 seasons were recorded on cowpea plants. The first one occurred at second of July with a

total number of 68 and 55 individuals/200 strokes at 28.45 C, 27.84 C with 60.43.68%, 57.71% R.H. for the two seasons respectively. The second peak was recorded in second of August with a total number of 59 and 63 individuals/200 strokes in 2002 and 2003 seasons at 28.69 C, 28.84 C with 61.71%, 61.86% R.H. for the two seasons, respectively.

ii) *Empoasca decedens* (Paoli)

Samples (200 strokes) were taken weekly using sweeping net from cowpea plants during 2002 and 2003 seasons. The total number of *E. decedens* (Paoli) individuals infesting cowpea plants are recorded and graphically represented in Figure 2.

The obtained results further indicated two peaks of *E. decedens* (Paoli) during 2002 and 2003 seasons on cowpea plants. The first one occurred at the end of July with a total number of 29 and 23 individuals/200 strokes at 29.1 C, 29.01 C with 60.0%, 61.5% R.H. for the two seasons respectively. The second peak was recorded in third of August, with a total number of 32 and 29 individuals/200 strokes in 2002 and 2003 seasons at 27.55 C, 28.17C with 61.0%, 59.43% R.H. for the two seasons, respectively.

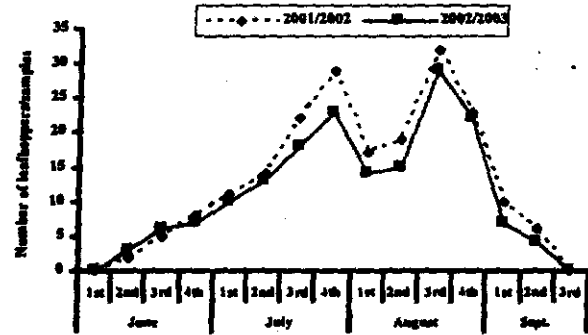
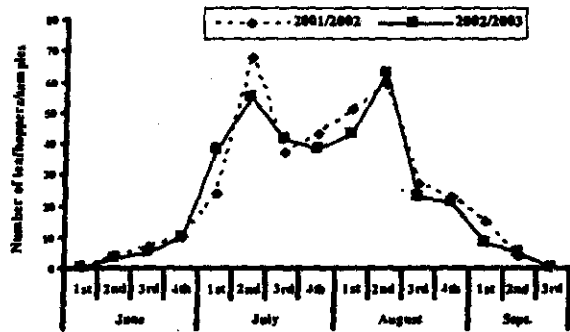
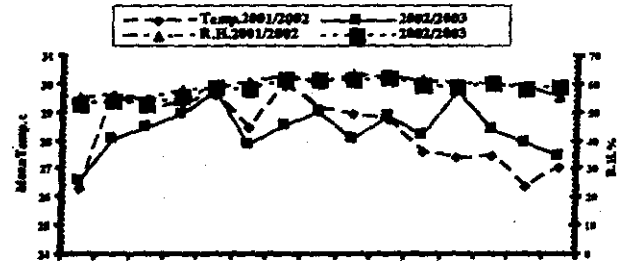
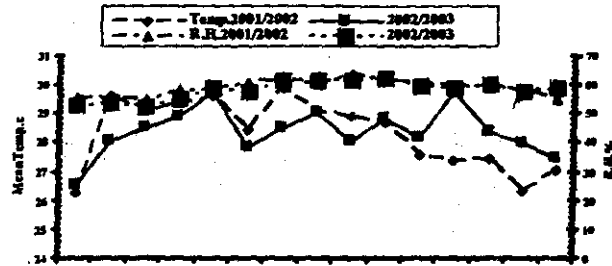


Fig. 1: Seasonal abundance of leafhoppers *Empoasca decipiens* (Paoli) infesting cowpea plants collected by sweeping net at Diarb - Nigm district, Sharkia Governorate during 2001/2002 and 2002/2003 seasons

Fig. 2: Seasonal abundance of leafhoppers *Empoasca decedens* (Paoli) infesting cowpea plants collected by sweeping net at Diarb - Nigm district, Sharkia Governorate during 2001/2002 and 2002/2003 seasons

b) Bean Plants

i) *E. decipiens* (Paoli)

This species represented the most abundant species on tested bean plants during 2002 and 2003 seasons. The total numbers of *Empoasca decipiens* (Paoli) individuals collected through weekly samples from bean plants in 2002 and 2003 seasons are graphically illustrated in Figure 3. The obtained results show that *Empoasca decipiens* (Paoli) insects were present on bean plant under field conditions through 2002 and 2003 seasons. Two peaks of *E. decipiens* (Paoli) were recorded during 2002 and 2003 seasons on bean plants. The first one occurred at the second of July with a total number of 41 and 35 individuals/200 strokes at 28.45 C, 27.84 C with 60.43.68%, 57.71% R.H. for the two seasons respectively. The second peak was recorded in the second of August with a total number of 51 and 46 individuals/200 strokes in 2002 and 2003 seasons at 28.69 C, 28.84 C with 61.71%, 61.86% R.H. for the two seasons, respectively.

ii) *Empoasca decedens* (Paoli)

Samples (200 strokes) were taken weekly using sweeping net

from bean plants during 2002 and 2003 seasons. The total number of *E. decedens* (Paoli) individuals infesting cowpea plants are graphically recorded and represented in Figure 4.

The obtained results further indicated two peaks of *E. decedens* (Paoli) during 2002 and 2003 seasons on bean plants. The first one occurred at the end of July with a total number of 34 and 29 individuals/200 strokes at 29.1 C, 29.01 C with 60.0%, 61.5% R.H. for the two seasons respectively. The second peak was recorded in the third of August, with a total number of 42 and 36 individuals/200 strokes in 2002 and 2003 seasons at 27.55 C, 28.17C with 61.0%, 59.43% R.H. for the two seasons, respectively.

c) Broad Bean Plants

i) *Empoasca decipiens* (Paoli)

Samples (200 strokes) were taken weekly by using sweeping net from broad bean plants during 2001/2002 and 2002/2003 seasons. The total number of *Empoasca decipiens* (Paoli) individuals infesting broad bean plants are graphically illustrated in Figure 5.

Figure 5 show the total number of *Empoasca decipiens* (Paoli). One peak was noticed for

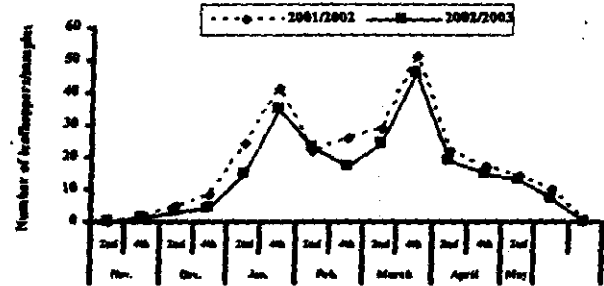
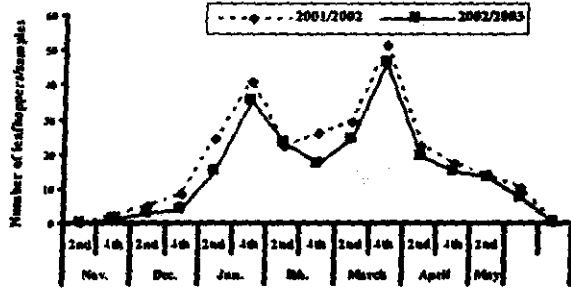
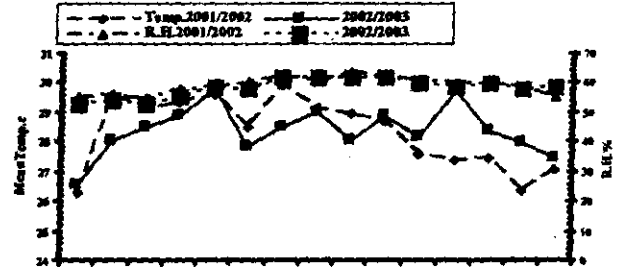
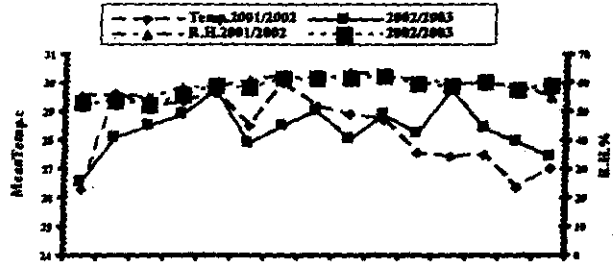


Fig. 3: Seasonal abundance of leafhoppers, *Empoasca decipiens* (Paoli) infesting bean plants collected by sweeping net at Diarb - Nigm district, Sharkia Governorate during 2001/2002 and 2002/2003 seasons

Fig. 4: Seasonal abundance of leafhoppers *Empoasca decedens* (Paoli) infesting bean plants collected by sweeping net at Diarb - Nigm district, Sharkia Governorate during 2001/2002 and 2002/ 2003 seasons

Empoasca decipiens (Paoli) on broad bean plants, the peak occurred at the end of February with total numbers of 104 and 115 individuals/200 strokes at 16.12C, 13.17C with 57.35%, 56.86% R.H. for the two seasons, respectively.

ii) *Empoasca decedens* (Paoli)

The total numbers of leafhopper individuals *Empoasca decedens* (Paoli) collected through weekly samples from broad bean plants using sweeping net, during 2001/2002 and 2002/2003 seasons are graphically illustrated in Figure 6.

In case of *Empoasca decedens* (Paoli) one peak was recorded during 2001/2002 and 2002/2003 seasons. The first one occurred at mid-March with a total number of 64 and 52 individuals/200 strokes at 19.5C, 16.57C with 62.57%, 57.78% R.H. for the two seasons, respectively.

d) Pea Plants

i) *Empoasca decipiens* (Paoli)

Samples (200 strokes) were taken weekly by using sweeping net from pea plants during 2001/2002 and 2002/2003 seasons. The total numbers of *Empoasca decipiens* (Paoli) individuals

infesting pea plants are graphically recorded in Figure 7.

Figure 7 illustrate the total numbers of *Empoasca decipiens* (Paoli). One peak was noticed for *Empoasca decipiens* (Paoli) on pea plants, occurred at the end of February with total numbers of 49 and 41 individuals/200 strokes at 16.12C, 13.17C with 57.35%, 56.86% R.H. for the two seasons, respectively.

ii) *Empoasca decedens* (Paoli)

The total numbers of *Empoasca decedens* (Paoli) leafhopper individuals collected through weekly samples from broad bean plants using sweeping net, during 2001/2002 and 2002/2003 seasons are graphically shown in Figure 8.

The results show one peak recorded during 2001/2002 and 2002/2003 seasons. It occurred at the mid-March with a total number of 45 and 28 individuals/200 strokes at 19.5C, 16.57C with 62.57%, 57.78% R.H. for the two seasons, respectively.

It is worthy to mention that both of *E. decipiens* and *E. decedens* had two generations on cowpea and bean plants while on broad bean and pea plants it has

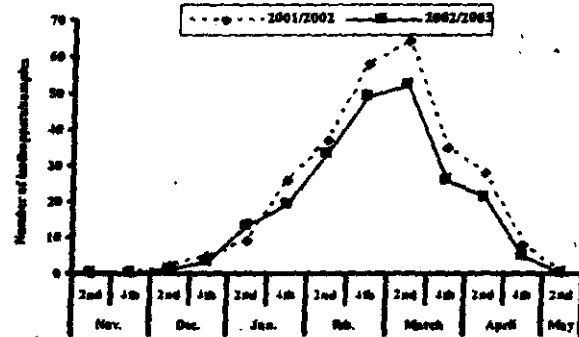
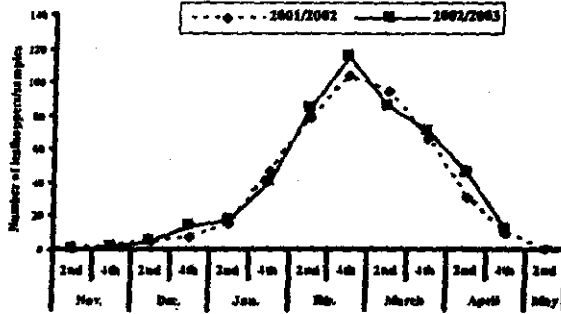
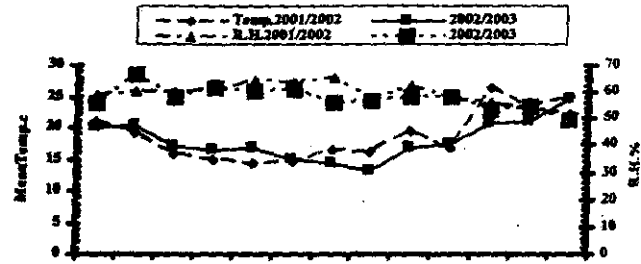
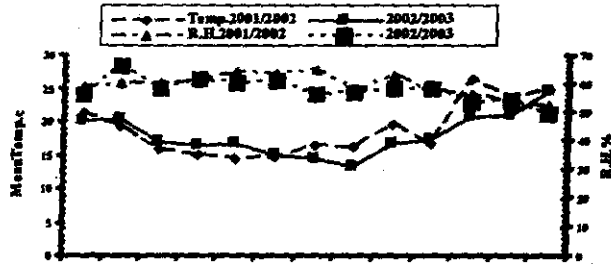


Fig. 5: Seasonal abundance of leafhoppers *Empoasca decipiens* (Paoli) infesting broad bean plants collected by sweeping net at Diarb - Nigm district, Sharkia Governorate during 2001/2002 and 2002/2003 seasons

Fig. 6: Seasonal abundance of leafhoppers *Empoasca decedens* (Paoli) infesting broad bean plants collected by sweeping net at Diarb -Nigm district, Sharkia Governorate during 2001/2002 and 2002/2003 seasons

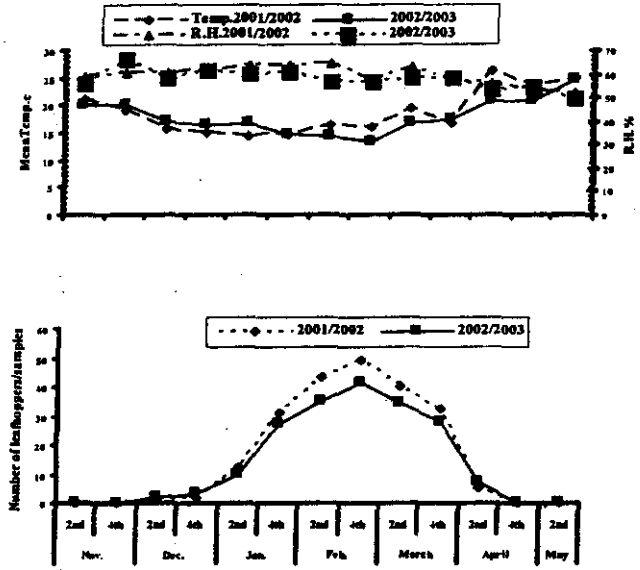


Fig. 7: Seasonal abundance of leafhoppers *Empoasca decipiens* (Paoli) infesting pea plants collected by sweeping net at Diarb - Nigm district, Sharkia Governorate during 2001/2002 and 2002/2003 seasons

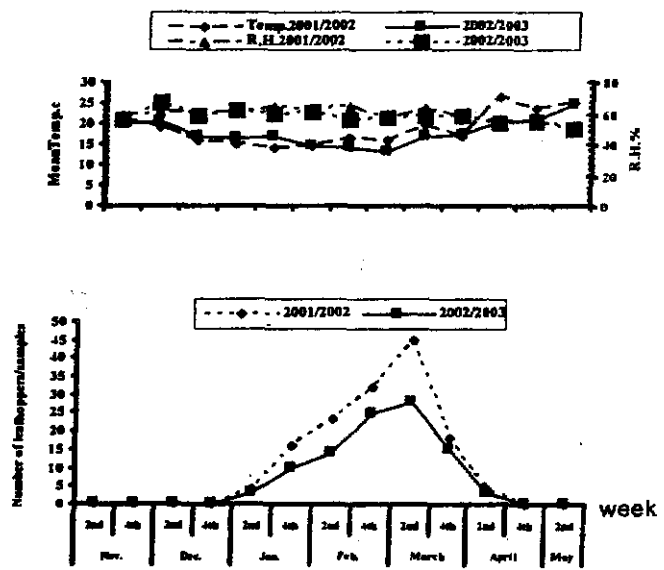


Fig. 8: Seasonal abundance of leafhoppers *Empoasca decedens* (Paoli) infesting pea plants collected by sweeping net at Diarb - Nigm district, Sharkia Governorate during 2001/ 2002 and 2002/2003 seasons

only one generation. These results agree with the findings of Hegab *et al.*, 1989 and Hashem 1997, EL Gindy 1997, 2002 and disagree with the results obtained by Herakly 1980 and Hemeida 1981 who mentioned that *E. decipiens* has five peaks of population density on some solanaceous vegetable plants in summer plantation. These difference may be attributed to locality, crops rotation, agricultural practices and environmental conditions prevailing during execution of these experiments.

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حصر و دراسة الوفرة الموسمية لنشاطات الأوراق التي تصيب بعض

النباتات البقولية

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أجريت الدراسة في خلال موسمين متتاليين ٢٠٠٢/٢٠٠١ و ٢٠٠٣/٢٠٠٢ بهدف حصر أنواع نشاطات الأوراق وكذلك دراسة الوفرة الموسمية للأنواع السائدة التي تصيب بعض النباتات البقولية (اللوبياء، الفاصوليا، البسلة، الفول البلدي) المنزرعة في منطقة ديرب نجم محافظة الشرقية وذلك باستخدام ثلاث طرق مختلفة لاخذ العينات وهي المصيدة الشبكية، المصيدة اللونية الصفراء، المصيدة المائية الصفراء. وقد أوضحت النتائج أن أنواع نشاطات الأوراق التي تصيب نباتات اللوبياء و الفاصوليا هي *Empoasca decedens* (Paoli); *Empoasca decipiens* (Paoli) and *Cicadulina chinai* Ghouri.

بينما أنواع نشاطات الأوراق التي تصيب نباتات البسلة و الفول البلدي هي *Empoasca decedens* (Paoli); *Empoasca decipiens* (Paoli) and *Balclutha hortensis* (Lindb.) بدراسة الوفرة الموسمية للأنواع السائدة على النباتات موضع الدراسة وجد ان النوع *Empoasca decipiens* (Paoli) له قمتين نشاط على نباتات اللوبياء و الفاصوليا خلال موسمي الدراسة في الأسبوع الثاني من شهر يوليو وأغسطس اما على نباتات البسلة و الفول البلدي فكانت له قمة نشاط واحدة فقط في الأسبوع الأخير من شهر فبراير بينما نشاط الأوراق *Empoasca decedens* (Paoli) كانت له قمتين نشاط على نباتات اللوبياء و الفاصوليا خلال الأسبوع الرابع من يوليو والأسبوع الثالث من شهر أغسطس أما على نباتات البسلة و الفول البلدي فكانت لها قمة نشاط واحدة فقط في الأسبوع الثاني من شهر مارس.