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SEASONAL ABUNDANCE OF THE MAIN PIERCING-SUCKING INSECTS INFESTING MAIZE AND SUGAR BEET PLANTS IN SHARKIA GOVERNORATE, EGYPT

Ola I.M. Hegab[1*], A.A. Abd-Elsamad[2] and M.A.M. Hegab[1]

1. Plant Prot. Dept., Fac. Agric., Zagazic Univ., Egypt

2. Plant Prot. Res. Inst., Agric. Res. Cent., Dokki, Giza, Egypt

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ABSTRACT: The present work was conducted during the two successive seasons of 2015/2016 and 2016/2017 in order to study the seasonal abundance of aphids, leafhoppers and planthopper insects infesting maize and sugar beet plants in Diarb-Nigm District, Sharkia Governorate, Egypt. On maize plants the following aphid species were occurred: *Rhopalosiphum padi* (Linnaeus), *R. maidis* (Fitch). and *Aphis gossypii* (Glover).While, the leafhopper and planthopper insects included *Empoasca decipiens* (Paoli), *E. decedens* (Paoli), *Cicadulina chinai* (Ghauri), *Segatella vibix* (Haupt) and *S. furcifera* (Horv). On the other hand, sugar beet plants were infested with one species of aphid *i.e. Myzus persicae* (Sulzer) and three species of Leafhoppers *i.e. Circulifera tenellus* (Baker), *E. decipiens* (Paoli), and *E. decedens* (Paoli). The aforementioned insect pests were collected by three different methods from maize and sugar beet plants using plant sample, sweeping net and yellow sticky board trap. This research aims to utilize the obtained results in developing the integrated pest management (IPM) programs against the aforesaid insect pests through the effect of atmospheric temperature and relative humidity on the population of these insects.

Key words: Maize, sugar beet, population dynamic, aphids, leafhoppers, planthoppers, temperature, relative humidity.

INTRODUCTION

Aphids, leafhoppers and planthoppers are considered serious insect pests infesting maize and sugar beet plants. Several investigators recorded the role of homopterous insect species in transmitting pathogens of plants diseases **(Nielson, 1968**). The faunae of these insects on most field crops were studied in Egypt by some authors (**Herakly, 1970; Helal *et al*., 1996 and 1997; Al-Moaalem *et al.*, 2005; Malik *et al*., 2010**) who reported considerable data on the aphid, leafhopper and planthopper insects infesting maize plants. The aim of the present work was to determine the population density of aphid, leafhopper and planthopper insects on maize and sugar beet plants using three different sampling techniques, as well as to indicate the population dynamics of these species during 2015/2016 and 2016/2017 seasons in Diarb-Nigm District, Sharkia Governorate, Egypt.

MATERIALS AND METHODS

These experiments were carried out in Diarb-Nigm District, Sharkia Governorate, during two growing seasons of maize (2015 and 2016) and sugar beet plants (2015/2016 and 2016/2017). An area about half faddan was divided into three replicates. Three different sampling techniques for collecting the tested insect pests infesting maize plants and sugar beet plants were conducted and started when the age of plants reached about 28 days and continued at weekly intervals throughout the growing seasons of maize plants (until the 4th week of September) and sugar beet plants (until the 4th week of March). The following three procedures of sampling were as follows:

* **Corresponding author: Tel. :** +201126679636
E-mail address: drolahegab@gmail.com

Plant Sample

Weekly sample of 10 leaves and 5 tiller tissues of maize plant and 20 leaves of sugar beet plant were taken randomly from each replicate. These leaves were kept in paper bags and transferred to the laboratory for inspection. The number of individuals of aphids were counted using a hand lens, recorded and identified according to **Hegab *et al.* (1987)**.

Sweeping Net

A sweeping net, (35 cm diameter and 60 cm deep) was used and each sample consisted of 50 double strokes taken randomly from the field. In case of maize plants spaces of 1 m were left between plots for applying the sweeping net technique. Catched leafhopper and planthopper insects were transferred to plastic sacs containing pieces of cotton saturated with ether for anesthetizing collected insects. The plastic sacs were tied by rubber bands and taken to the laboratory for inspection and identification according to **Nielson (1968)** and **Hegab *et al.* (1989).**

Yellow Sticky Board Trap

A board (20 × 20 cm) coated with sticky material was hung on wood rod. The height between trap and the plants was 15 - 20 cm and varied according to the height of plants through the period of sampling. Counts of captured leafhoppers, planthoppers and winged aphids were recorded.

For clarifying the effect of certain weather factors such as maximum temperature, minimum temperature and relative humidity on the population density of the studied insect pests, daily means of the three factors were provided by the Meteorological Central Laboratory of Agricultural Climate, Agricultural Research Center during the studying seasons. To indicate the effect of each factor on the population density of these insects, the values of simple correlation coefficient (r), partial regression coefficient (b) and total explained variance (EV%) were calculated using computer program (**COSTAT**, **2005**).

RESULTS AND DISCUSSION

The results in Table 1, illustrate the total numbers of some homopterous insect species estimated by using three different sampling techniques on maize and sugar beet plants at Diarb-Nigm District during the two successive growing seasons of 2015 / 2016 and 2016/ 2017.

Aphid Insects Species

From the data given in Table 1, it is very obvious that plant sample proved to be the best method for the determination of aphids population density showing on maize plants the highest total numbers of aphid insects 9299, 8613 and 3933 in 2015 season for *R. maidis*, *R. padi* and *A. gossypii*, respectively. While, 12310, 10902 and4869 individuals were collected in 2016 season, for the same species respectively. On the other hand, the total numbers of *M. persicae* on sugar beet plants recorded, were 3776 and 4842 insects during 2015/2016 and 2016/2017 seasons, respectively.

Leafhopper Insects Species

Results in Table 1 show that, six leafhopper species belonging to family Cicadellidae were found on maize plants. The collected leafhopper species were arranged descendingly according to their abundance as follows: *E. decipiens*, *E. decedens*, *C. chinae*, *Balclutha hortensis* (Lindb.), *Cicadulina bipunctella* Zea and *Nephotettis apicalis* (Matsch). The obtained results pointed out that *E. decipiens* (763 and 992 insects), *E. decedens* (681 and 799 insects), *C. chinai* (601 and 826 insects) were the most dominant leafhopper species on maize plants during the two successive seasons of study, respectively. While, *E. decipiens*, *E. decedens* and *C. tenellus* occurred on sugar beet plants with a total number of 805, 965 ; 394 , 538 ; 1241 and 1505 insects during the two seasons, respectively.

Planthopper insects *S. vibix* and *S. furcifera* were attracted with high numbers on maize plants (426 and 505 insects), (325 and 493 insects) in 2015, 2016 seasons, respectively, than those numbers occurred on sugar beet plants (85 and 41 insects)and (27 and 23 insects) for 2015/2016, 2016/2017 seasons, respectively as indicated in Table 1.

Generally, it is clearly shown that both leafhopper and planthopper insects were collected with high numbers by using sweeping net technique as compared to the other two tested techniques, especially in the second season than in the first one.

Table 1. Total numbers of some homopterous insect species collected from maize and sugar beet plants by using three different methods; plant sample, sweeping net and yellow sticky board trap at Diarb-Nigm District, Sharkia Governorate during 2015/2016 and 2016/2017 seasons

Insect species		Plant	Plant sample	Sweeping net	Yellow sticky board trap	Plant Sample	Sweeping Net	Yellow sticky board trap
				2015			2016	
R. maidis	**Aphid species**	**Maize**	9299	165	281	12310	180	348
R. padi			8613	278	335	10902	302	227
A. gossypii			3933	12	190	4869	31	241
E. decipiens	**Leafhopper species**		0	763	162	0	992	112
E.decedens			0	681	76	0	799	83
C. chinai			0	601	87	0	826	90
B. hortensis			0	51	4	0	46	28
C. bipunctella			0	44	4	0	32	4
N. apicales			0	53	9	0	47	11
S. vibix	**Planthopper species**		0	426	104	0	505	94
S. furcifera			0	325	61	0	493	87
				2015/2016			2016/2017	
M. persicae	**Aphid species**	**Sugar beet**	3776	30	83	4842	9	126
C. tenellus	**Leafhopper species**		0	1241	100	0	1505	120
E. decipiens			0	805	93	0	965	104
E. decedens			0	394	60	0	538	66
S. vibix	**Planthopper species**		0	85	12	0	41	24
S. furcifera			0	27	8	0	23	12

Seasonal Abundance of the Dominant Insect Species

Aphid insects species

On maize plants

Rhopaosiphum maidis and *R. padi*

Samples were taken weekly from maize plants during 2015 and 2016 seasons. The seasonal fluctuations of *R. maidis* and *R. padi* on maize plants are shown in Figs. 1 and 2. One peak was recorded for both *R. maidis* and *R. padi*. The peak occurred on the second week of August with a total numbers of 3140 and 3611 individual insects for *R. maidis* as well as 2283 and 2907 individual insects for *R. padi* at means of maximum and minimum temperatures 36.86ºC, 34.63ºC and 27.0ºC, 25.75ºC with 46.57% and 60.0% RH for the two seasons, respectively.

Aphis gossypii

The population density of *A. gossypii* on maize plants in 2015 and 2016 are illustrated in Figs. 1 and 2. One peak was obtained on the fourth week of August with a total number of 984 and 1245 individual insects at means of maximum and minimum temperature 34.2ºC, 32.13ºC and 25.0ºC, 23.75ºC with 57% and 58.0% RH for the two seasons, respectively.

These results are in agreement with the findings of **Hegab (2001)**, **Akhtar and Shahida-Parveen (2002)**, **Abdel-Samed (2006)** and **Nassab *et al.* (2013)** who mentioned that *R. maidis, R. padi* and *A. gossypii* population density had one peak on maize plants.

Leafhopper insects

The leafhopper species; *E. decipiens*, *E. decedens* and *C. chinai* were the most abundant species on maize plants. Two peaks of

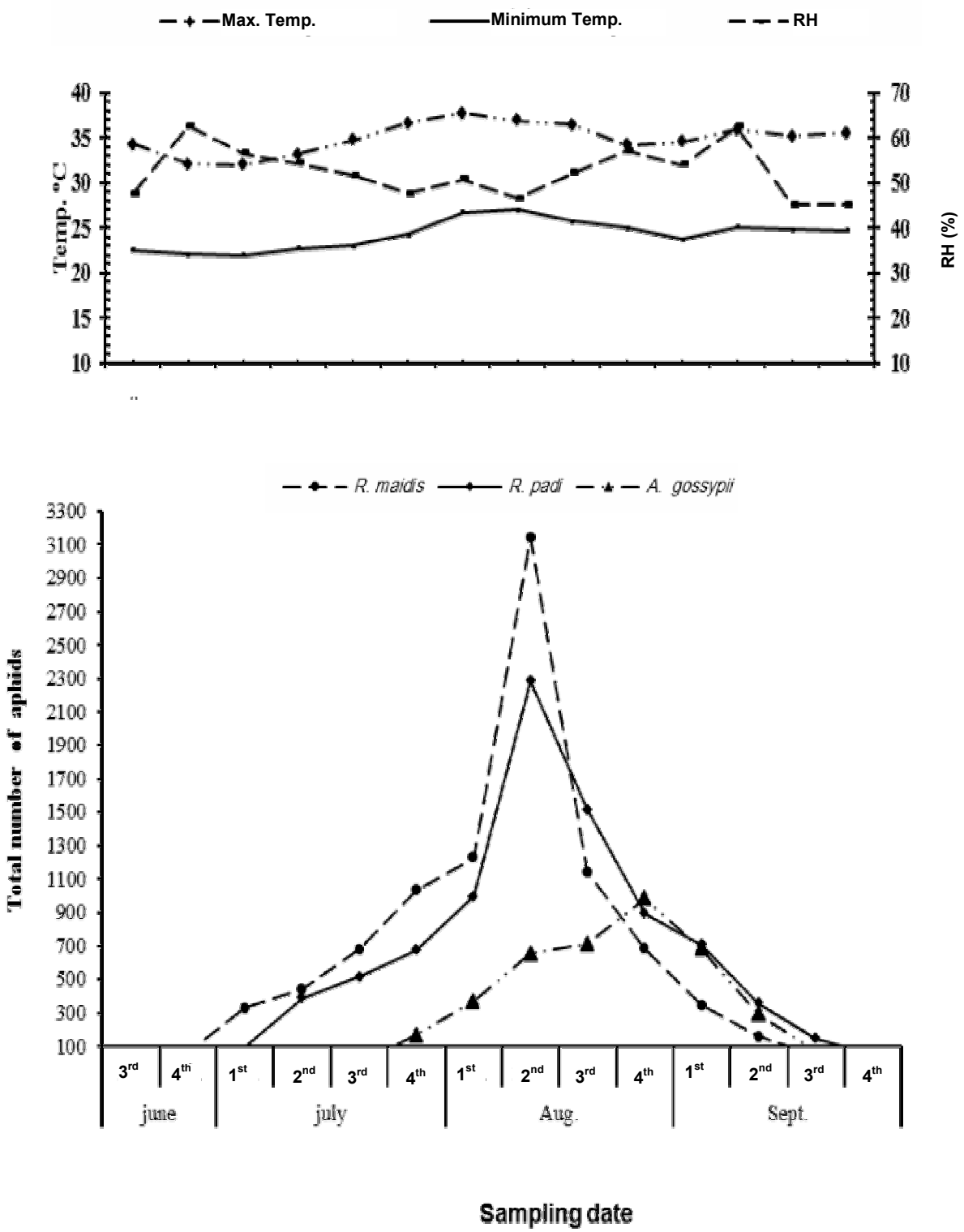

Fig. 1. Seasonal abundance of the different aphid insects; *R. padi*, *R. maidis* and *A. gossypii* infesting maize plants in Diarb-Nigm District, Sharkia Governorate during 2015 season

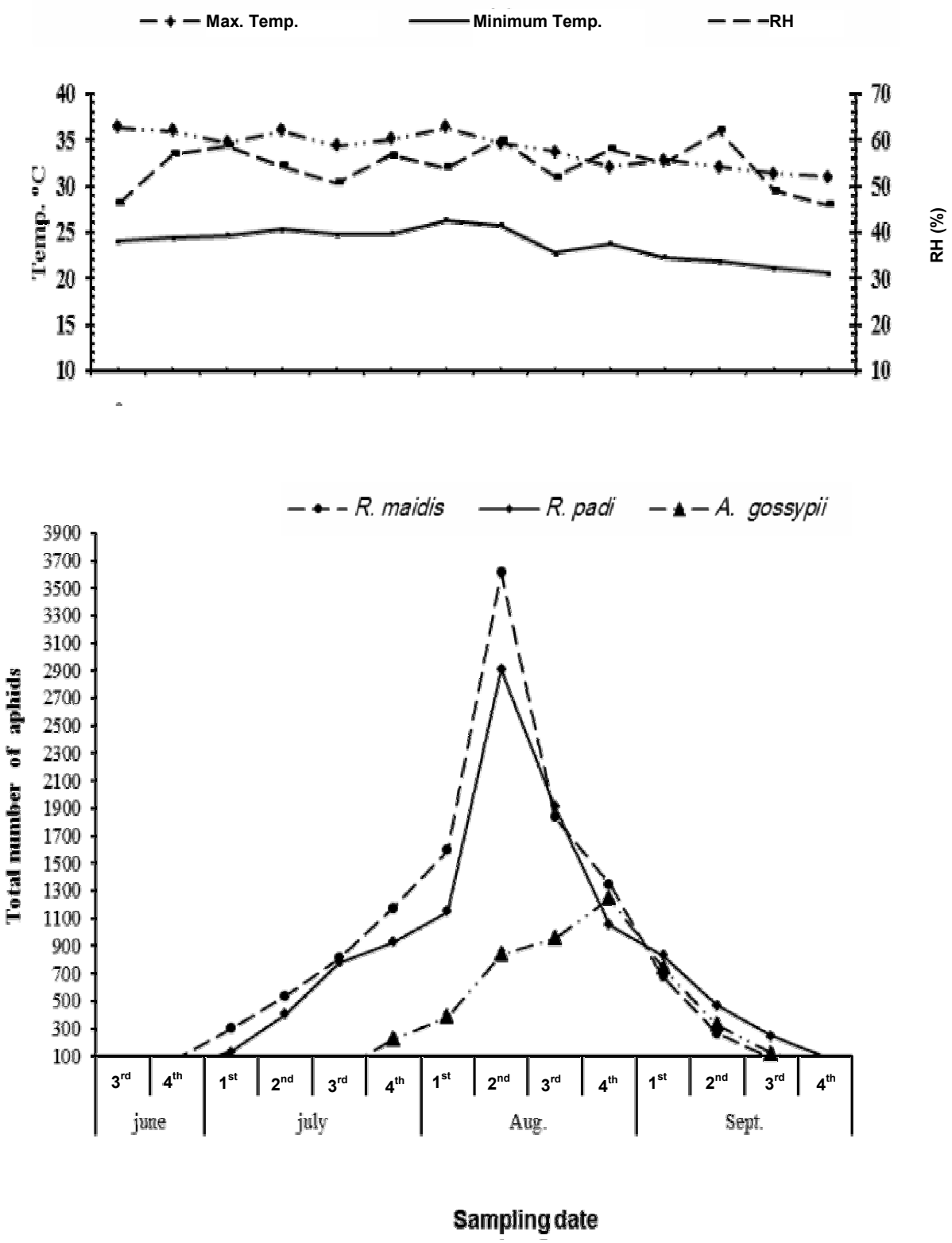

Fig. 2. Seasonal abundance of the different aphid insects; *R. padi*, *R. maidis* and *A. gossypii* infesting maize plants in Diarb-Nigm District, Sharkia Governorate during 2016 season

population density were recorded for *E. decipiens*, *E. decedens* and *C. chinai* on maize plants. The first peak occurred on the third week of July at means of maximum and minimum temperature 34.71ºC, 34.38ºC and 23.0ºC, 24.75ºC with 51.71% and 50.71% RH for the two seasons, respectively with a total number of 118 and 138 insects (for *E. decipiens*) 86 and 104 insects (for *E. decdens*) 68 and 107 insects (for *C. chinae*) for the two seasons, respectively. The second peak was recorded on the first week of September with a total number of 99 and 112 insects (for *E. decipiens*), 59 and 79 insects (for *E. decedens*) as well as 80 and 91 insects (for *C. chinae*) at means of maximum and minimum temperature 34.57ºC, 32.86ºC and 23.71ºC, 22.25ºC with 54.0% and 55.0% RH during the two seasons (Figs. 3 and 4).

Planthopper insects

The total weekly numbers of planthopper insects collected from maize plants during 2015 and 2016 seasons were illustrated in Figs. 5 and 6. Only one peak was recorded for *S. vibix* and *S. furcifera* during 2015 and 2016 seasons on maize plants. The peak occurred on the 4th week of August with a total number of 75, 94 and 69, 83 insects for *S. vibix* and *S. furcifera* at means of maximum and minimum temperature 34.2ºC, 32.13ºC and 25.0ºC, 23.75ºC with 57% and 58.0% RH for the two seasons, respectively.

These results partially agree with the findings of **Hegab (2001), Akhtar and Shahida-Parveen (2002), Abdel-Samed (2006)** and **Malik *et al.* (2010)** who mentioned that leafhopper; *E. decipiens*, *E. decedens* and *C. chinai* had two peaks, while *S. vibix* and *S. furcifera* had one peak on maize plants.

Generally, it could be noticed that total numbers of aforementioned tested insects were higher in the second season that in the first one.

On sugar beet plants

Aphid insects

The results illustrated in Fig. 7 show the seasonal flactuation of *M. persicae* infesting sugar beet plants during 2015/2016 and 2016/ 2017 seasons. One peak of the population density for *M. persicae* was recorded on sugar beet plants. The peak was happened on the 1st week of February with a total number of 942 and 1186 individual insects at means of maximum and minimum temperature 20.29ºC, 20.4ºC and 10.57ºC, 12ºC with 59.71% and 74.0% RH for the two seasons, respectively.

These results are in agreement with the findings of **Ali *et al.* (1993), Irbab and Laanen (2005)** and **Muska (2007)**. They mentioned that *M. persicae* had one peak on sugar beet plants.

The leafhopper insects

On Sugar beet plants (Figs. 8 and 9) two peaks of the dominant leafhopper insects, *E. decipiens*, *E. decedens* were observed on sugar beet plants during 2015/2016 and 2016/2017. The first peak occurred on the second week of November at means of maximum and minimum temperature 25.0ºC, 27.5ºC and 15.75ºC, 16.0ºC with 65.29% and 64.0% RH for the two seasons, respectively with a total number of 55 and 67 insects (for *E. decipiens*) and 39 and 44 insects (for *E. decedens*) and 75 and 90 (for *C. tenellus*) for the two seasons, respectively. The second one was observed on the second week of February with a total number of 70 and 85 insects (for *E. decipiens*) and 51 and 69 insects (for *E. decedens*) and 93 and 115 insects (for *C. tenellus*) at means of maximum and minimum temperature 20.89ºC, 21.0ºC and 16.43ºC, 12.5ºC with 50.43% and 65% RH for the two seasons, respectively.

These results agree with the findings of **Ghorbani *et al.* (2010)** and **Talebi *et al.* (2010)** who mentioned that *E. decipiens* and *E. decedens* had two peaks on sugar beet plants.

Effect of Maximum Temperature, Minmum Temperature and Mean Relative Humidity on the Population Density of Some Dominant Homopterous Insects Infesting Maize and Sugar Beet Plants

Maize

The obtained results in Table 2 appear that, in 2015 the correlation coefficient between population density of *R. maidis* and maximum and minimum temperature was positively significant (r_1= 0.552* and $r_{2=}$ 0 .650*). Also, there was positively significant correlation coefficient between *R. padi* population and maximum temperature (r_1=0.608*) and negative highly significant with minimum temperature (r_2= -0.739**), while the correlation coefficients

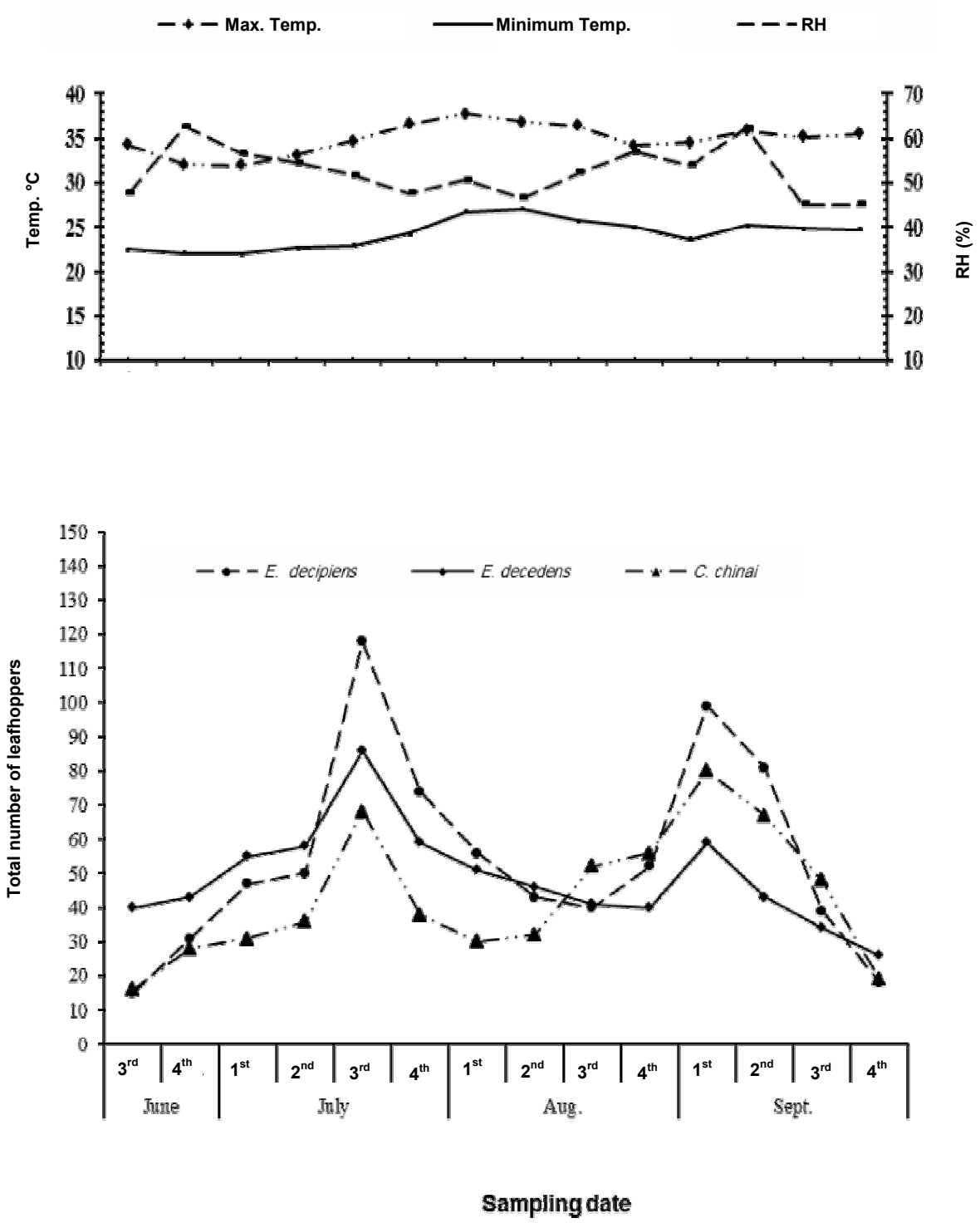

Fig. 3. Seasonal abundance of the different leafhopper insects; *E. decipiens*, *E. decedens* and *C. chinai* infesting maize plants in Diarb-Nigm District, Sharkia Governorate during 2015 season

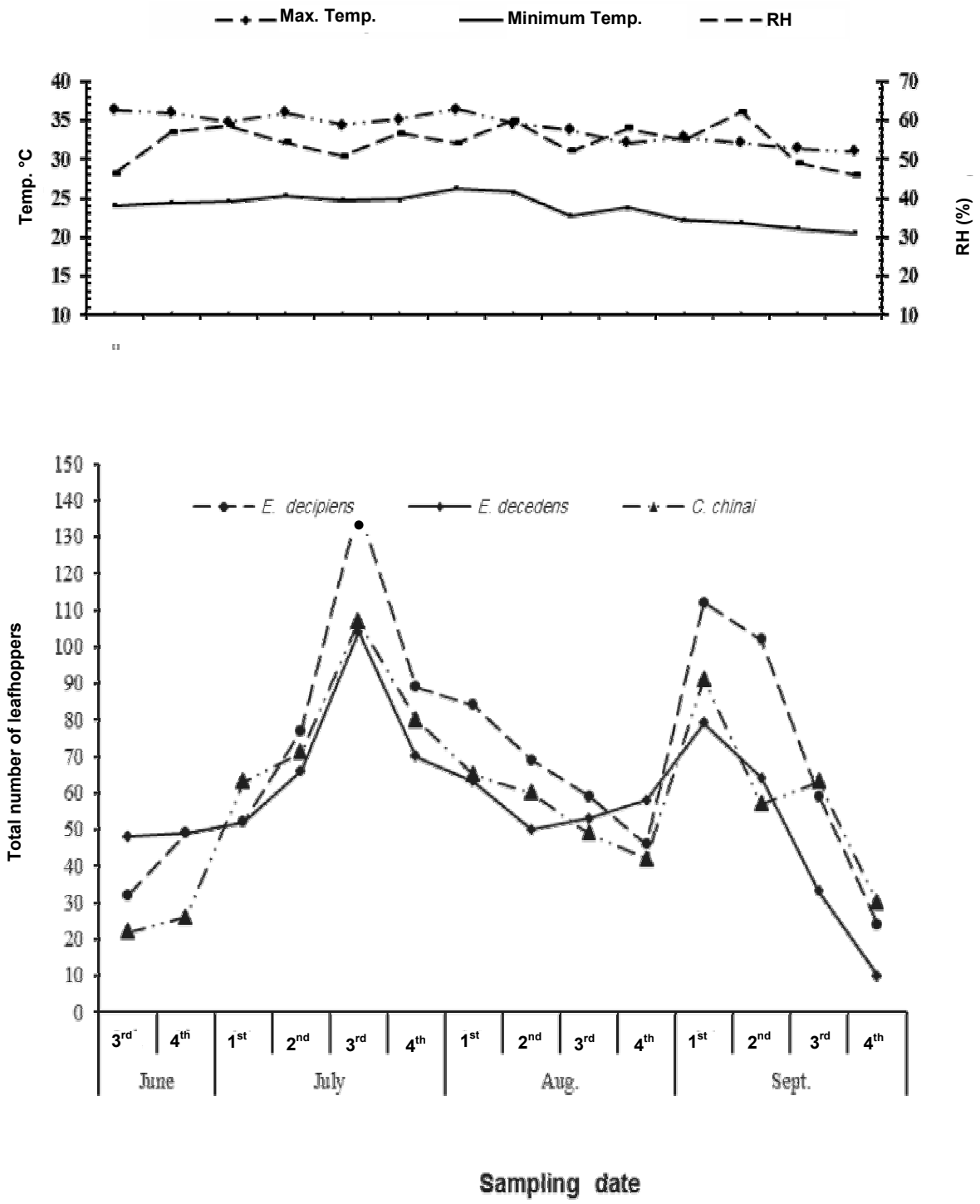

Fig. 4. Seasonal abundance of the different leafhopper insects; *E. decipiens*, *E. decedens* and *C. chinai* infesting maize plants in Diarb-Nigm District, Sharkia Governorate during 2016 season

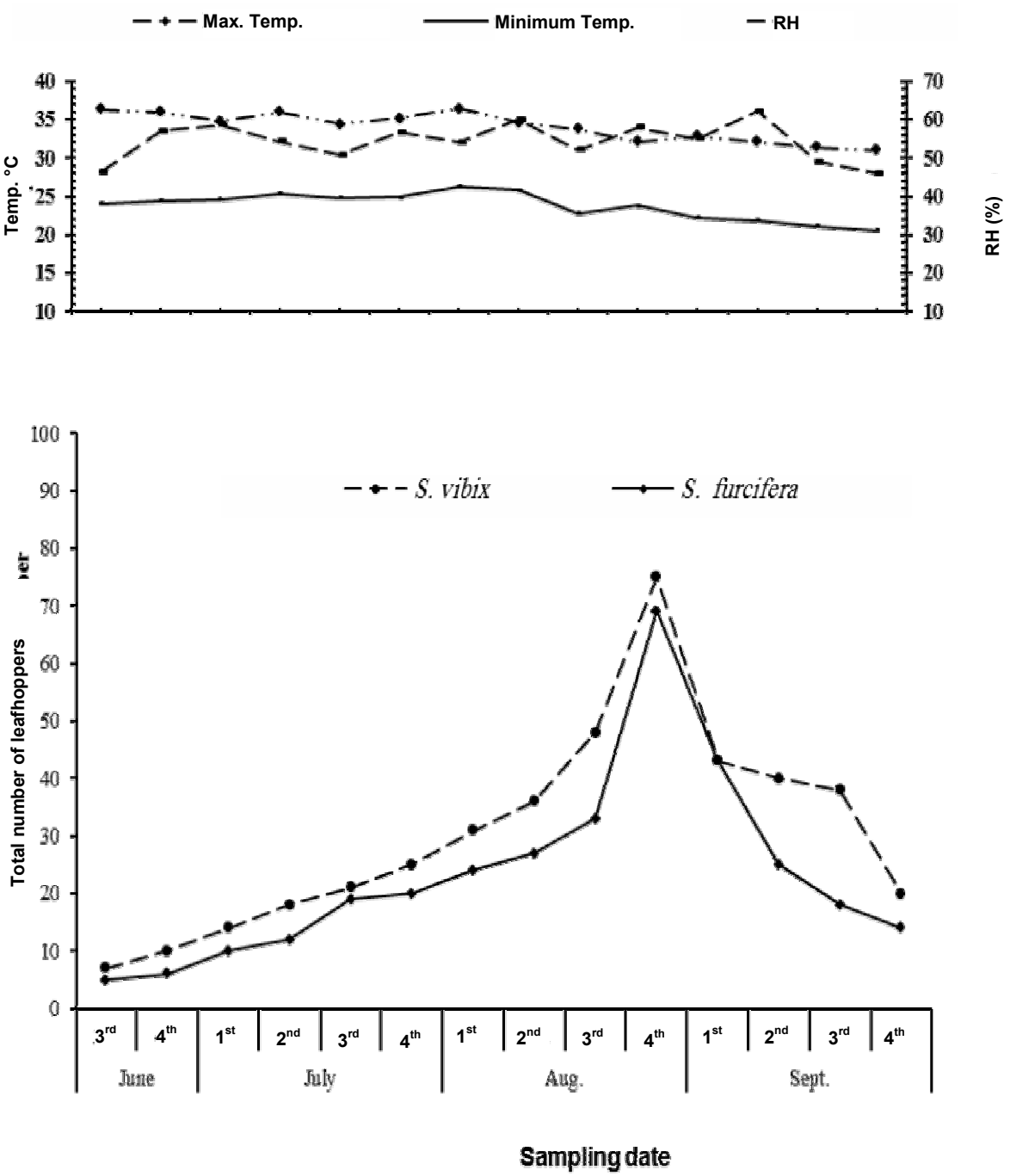

Fig. 5. Seasonal abundance of planthopper insects; *S. vibix* and *S. furcifera* infesting maize plants in Diarb-Nigm District, Sharkia Governorate during 2015 season

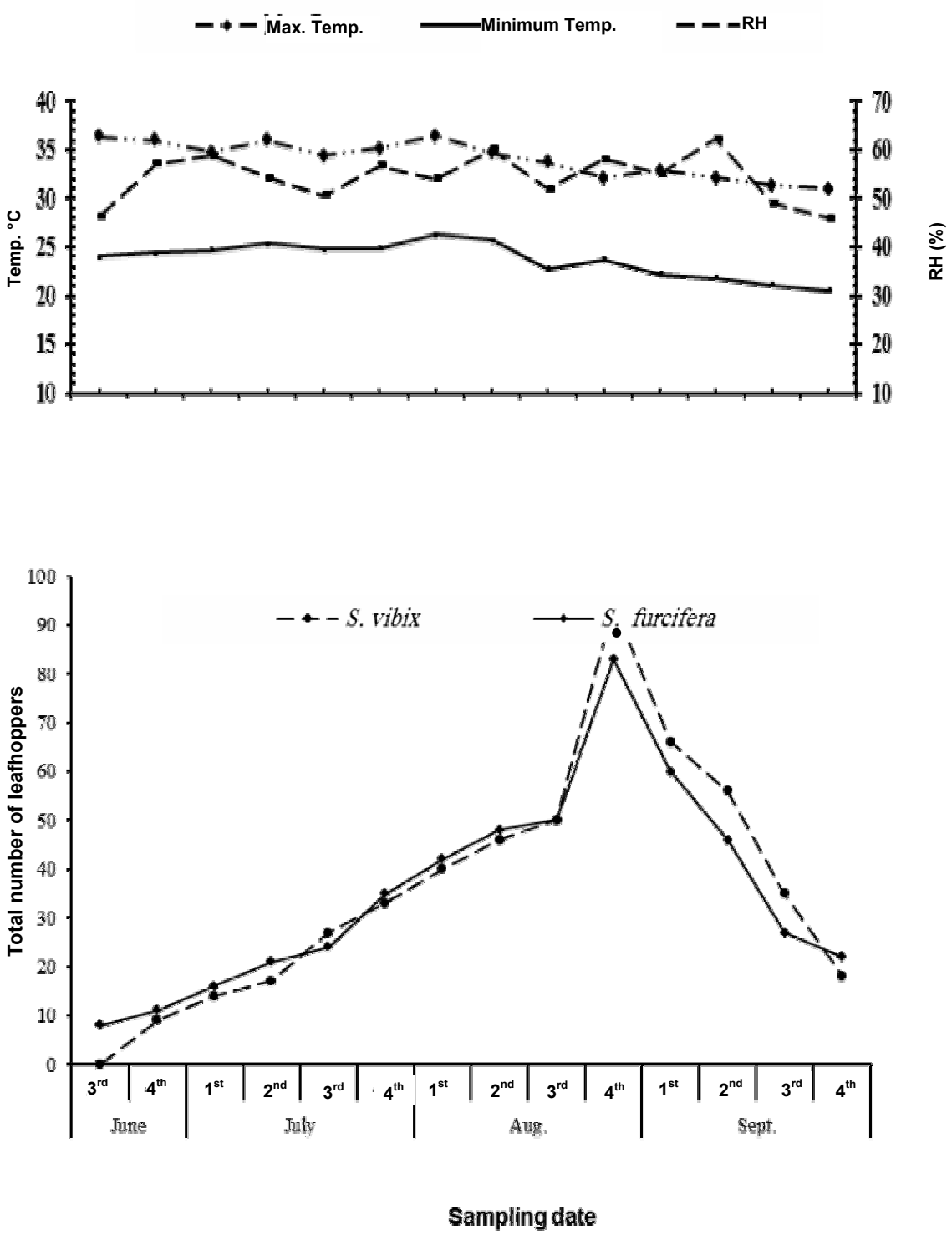

Fig. 6. Seasonal abundance of the planthopper insects; *S. vibix* and *S. furcifera* infesting maize plants in Diarb-Nigm District, Sharkia Governorate during 2016 season

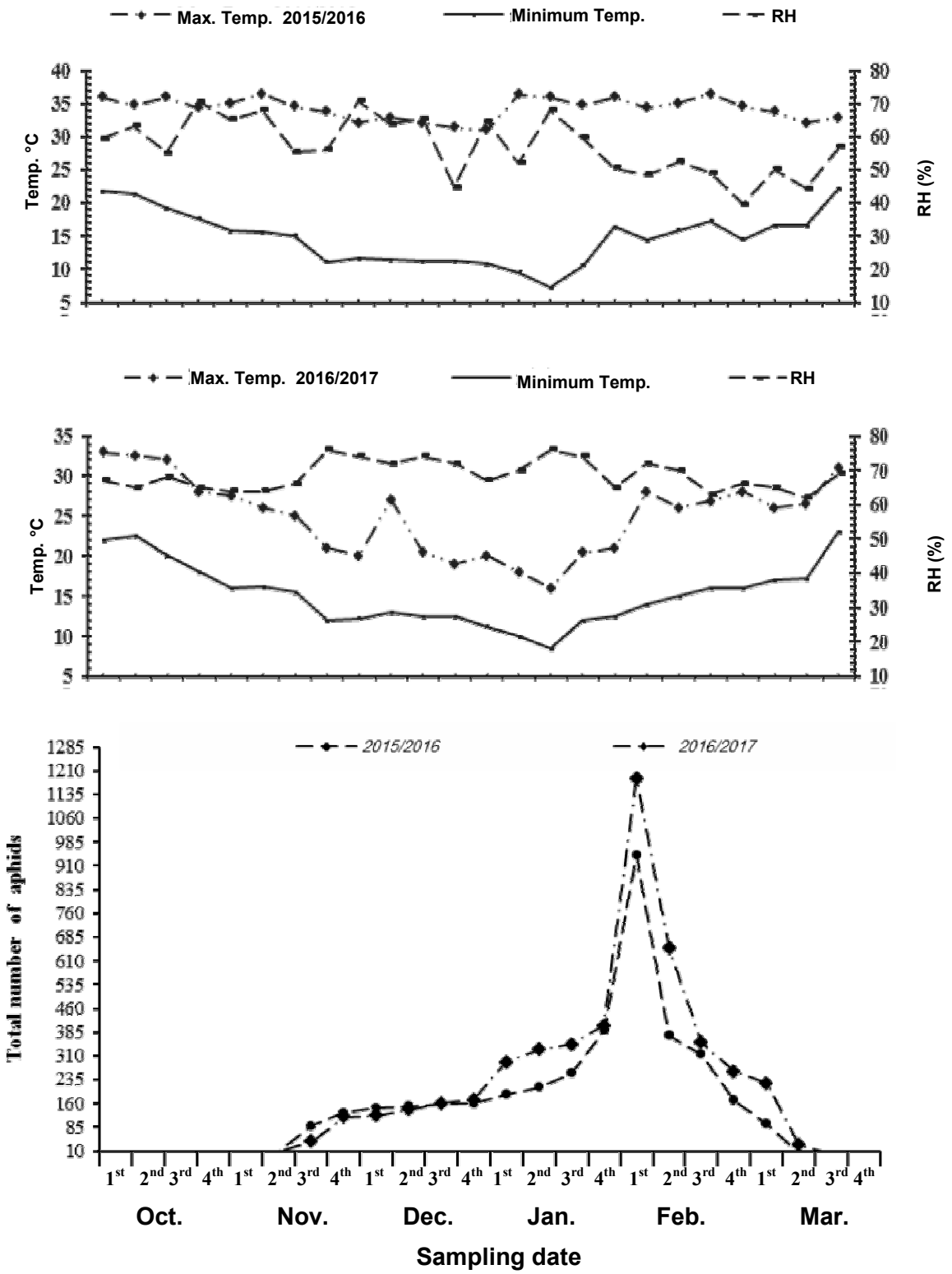

Fig. 7. Seasonal abundance of the aphid insect; *M. persicae* infesting sugar beet plant in Diarb-Nigm District, Sharkia Governorate during 2015/2016 and 2016/2017 seasons

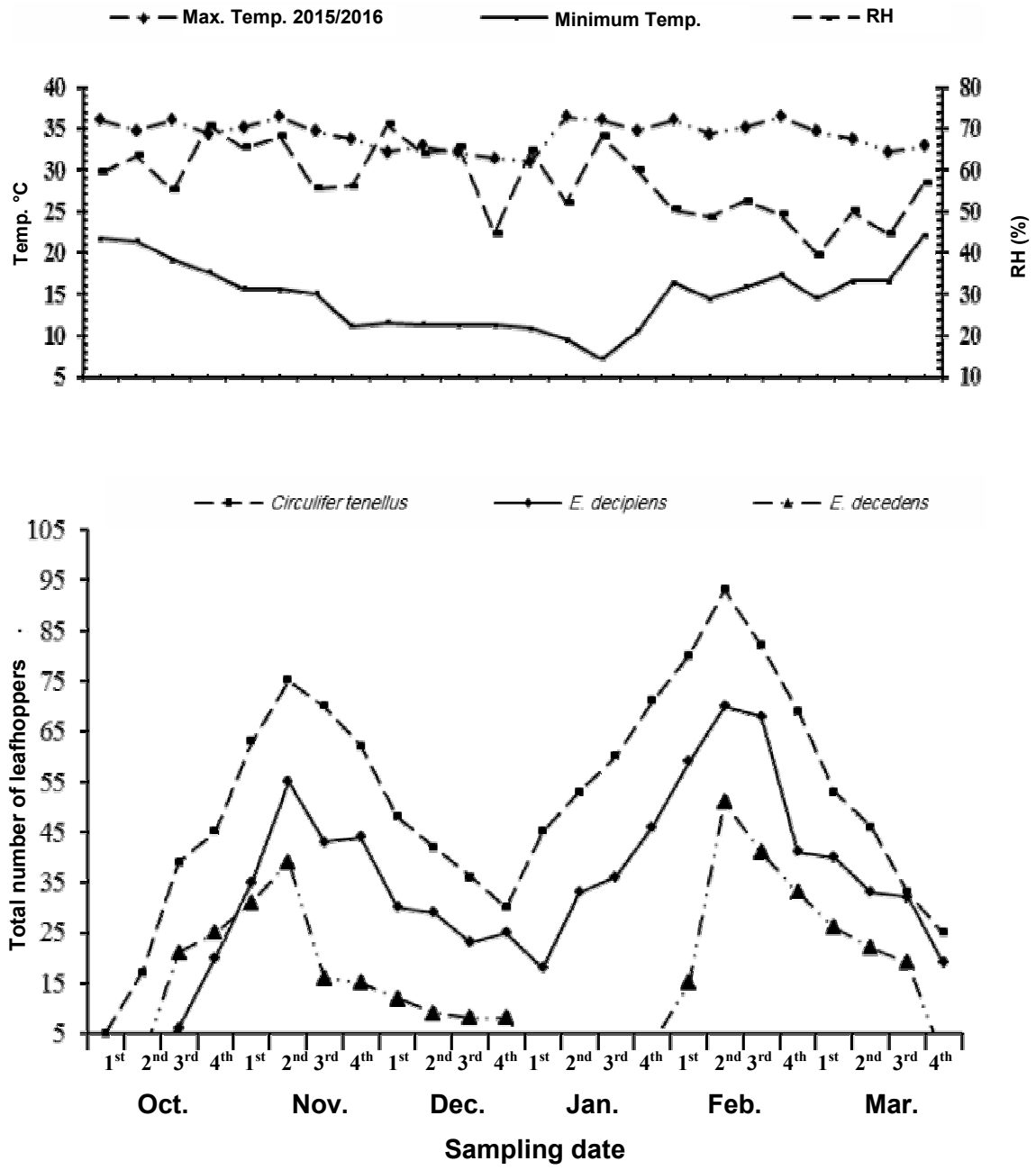

Fig. 8. Seasonal abundance of the leafhopper insects; *E. decipiens* and *E. decedens* infesting sugar beet plants in Diarb-Nigm District, Sharkia Governorate during 2015/2016 season

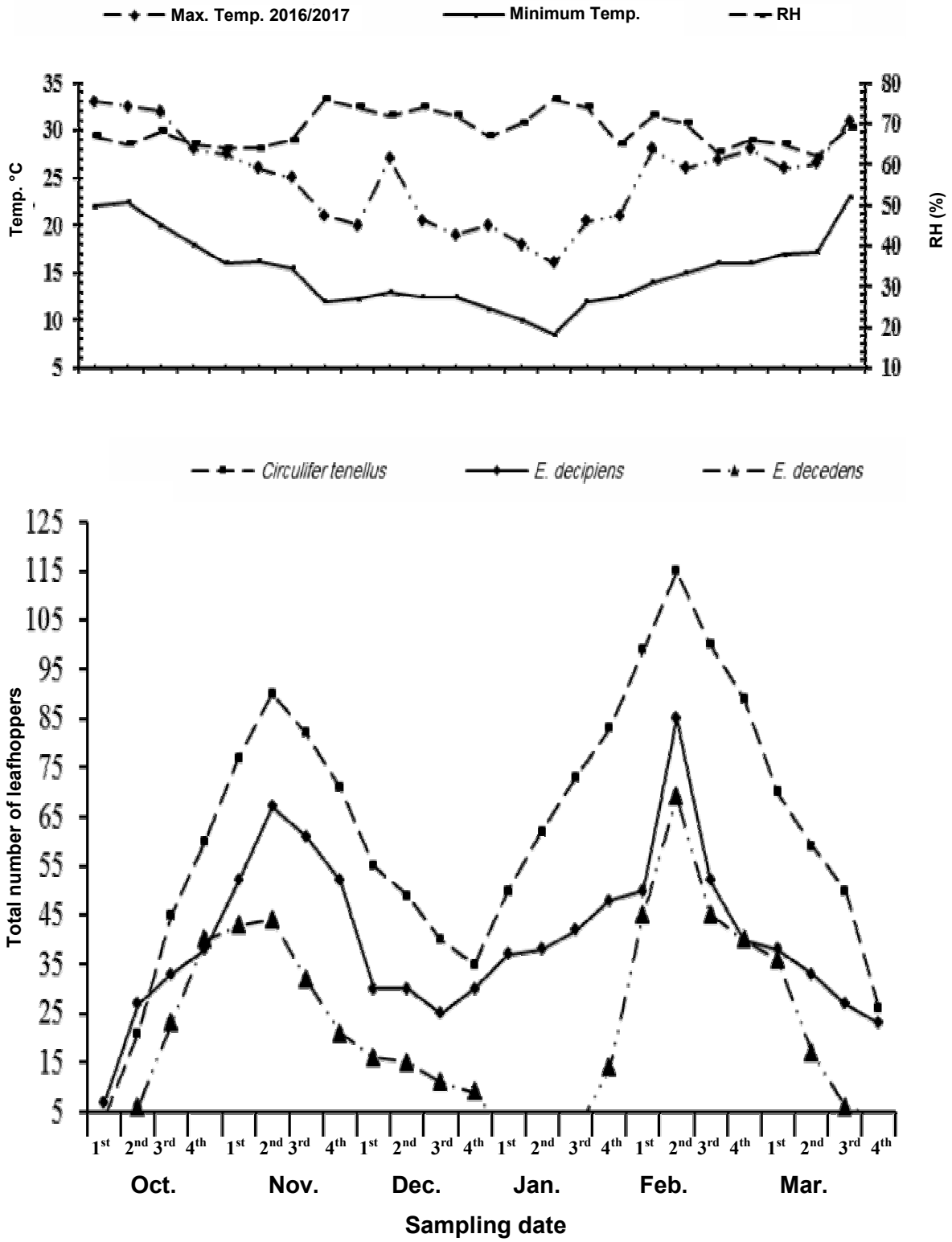

Fig. 9. Seasonal abundance of the leafhopper insects; *E. decipiens* and *E. decedens* infesting sugar beet plants in Diarb-Nigm District, Sharkia Governorate during 2016/2017 season

Table 2. Simple correlation coefficient (r) between each of maximum temperature, minimum temperature as well mean relative humidity and the population density of some homopterous insects infesting maize and sugar beet plants in Diarb-Nigm District, Sharkia Governorate during 2015/2016 and 2016/2017 seasons

Insect	Plant	Simple correlation coefficient					
		r1	r_2	r_3	r_1	r_2	r_3
		2015			2016		
R. maidis	**Maize**	0.552*	0.650*	-0.292	0.157	0.487	0.384
R. padi		0.608*	-0.739**	-0.211	0.046	0.346	0.347
A. gossypii		0.381	0.61*	0.1	-0.297	-0.014	-0.364
E. decipiens		0.129	-0.029	0.245	0.065	0.216	0.300
E. decedens		-0.107	-0.322	0.146	0.343	0.476	0.323
C. chinai		0.081	0.088	0.342	0.009	0.228	0.187
S. vibix		0.349	0.594*	0.108	-0.511	-0.165	0.432
S. furcifera		0.247	0.46	0.152	-0.427	-0.083	0.427
	Sugar beet	2015/2016			2016/2017		
M. persicae		-0.549**	-0.568**	0.011	-0.567**	-0.578**	-0.408*
E. decipiens		-0.401	0.412**	-0.103	-0.247	-0.332	-0.197
E. decedens		0.2560	0.2740	-0.207	0.149	0.009	-0.196
C. tenellus		-0.373	-0.371	-0.024	-0.349	-0.481*	0.005

r_1 = Simple correlation coefficient for maximum temperature, r_2 for minimum temperature and r_3 for mean relative humidity.

r * with star indicates that the correlation coefficient is significant at 0.05 level of probability and with 2 stars (r^{**}) indicates highly significant correlation at 0.01% level of probability.

between *A. gossypii*, *S. vibix* and minimum temperature were positive and significant (0.610*, 0.594*), respectively. The correlation coefficients were not significant in the second season.

Sugar beet

M. persicae showed negative and highly significant correlation between the population and maximum temperature and minimum temperature (r_1 =-0.549**, r_2=-0.568**), (r_1 = -0.567** r_2= -0.578**) for the two seasons, respectively while there was negative and significant correlation between *M. persicae* population density and relative humidity in the second season (r_3=- 0.408*).

The correlation coefficient between population density of *E. decipiens* and minimum temperature was positive and highly significant (r_2 = 0.412**) in the first season, while it was negative and significant (r_2= - 0.481*) between population density of *C. tenellus* and minimum temperature in the second season.

The values of partial regression coefficients between the population of insects and maximum temperature, minimum and relative humidity in the two seasons were recorded in Table 2.

Results in Table 3 show the R^2 values and explained variance by the three aforementioned meteorological factors indicating that the considered factors have played a conspicuous role in detecting the activity of these insect pests during the a aforementioned investigated seasons. **Parh (1986)** and **Raupach *et al*. (2002)** explained that the temperature and humidity had effects on the insects population density under study on maize and sugar beet plants.

Table 3. Partial regression coefficient (b) and explained variance (EV%) between each of maximum temperature, minimum temperature as well mean relative humidity and the population density of some homopterous insects infesting maize and sugar beet plants in Diarb-Nigm District, Sharkia Governorate during 2015/2016 and 2016/2017 seasons

Insect	Plant	Partial regression coefficient						Explained variance (%)	
		2015/2016			2016/2017			2015/2016	2016/2017
		b_1	b_2	b_3	b_1	b_2	b_3	R^2	R^2
R. maidis	**Maize**	0.041	0.012	0.311	0.87	0.077	0.175	0.433	0.477
R. padi		0.021	0.003	0.469	0.877	0.225	0.225	0.554	0.345
A. gossypii		0.179	0.020	0.734	0.302	0.963	0.201	0.523	0.325
E. decipiens		0.661	0.920	0.398	0.826	0.459	0.297	0.308	0.122
E. decedens		0.716	0.262	0.918	0.230	0.085	0.259	0.293	0.257
C. chinai		0.784	0.764	0.231	0.974	0.432	0.521	0.211	0.178
S. vibix		0.221	0.025	0.713	0.128	0.779	0.128	0.523	0.460
S. furcifera		0.395	0.098	0.604	0.062	0.573	0.116	0.363	0.510
M. persicae	**Sugar beet**	0.005	0.004	0.779	0.004	0.003	0.048	0.327	0.351
E. decipiens		0.052	0.046	0.834	0.245	0.113	0.357	0.185	0.338
E. decedens		0.227	0.196	0.582	0.488	0.966	0.358	0.082	0.173
C. tenellus		0.073	0.075	0.785	0.111	0.017	0.980	0.144	0.402

b_1 = Partial regression for maximum temperature, b_2 = for minimum temperature and b_3 = for mean relative humidity.

REFERENCES

Abdel-Samed, A.A. (2006). Studies on some homopterous insect vectors of plant diseases. Ph.D. Thesis, Fac. Agric., Zagazig Univ., Egypt.

Akhtar, M.S. and Shahida-Parveen (2002). Studies on population of wheat aphids on wheat crop in New Campus area, Lahore. Punja Univ. J. Zool., 17: 14-22.

Ali, F.A., M.A. Samy, F.E. El-Adl and S.M. Ibrahim (1993). Effect of planting dates on the infestation ration of the main insect in sugar-beet fields. J. Agric. Sci., Mansoura Univ., 18 (6): 1805- 1812.

Al-Moaalem, R.C., I.D. Borgemeister and H.M. Poehling (2005). The influence of different host plants on the green leafhopper *Empoasca decipiens* Paoli (Homoptera: Cicadellidae) and its parasitoid *Anagrus atomus* Halliday (Hymenoptera: Mymaridae). Mitt. Biol. Bund Land-Forst, 396: 103-105.

COSTAT (2005). Version 6.311, copy right ©, cohort software, 798 lighthouse Ave. pMB320, Monterey, CA, 93940 ,USA.

Ghorbani, R., S.K. Mousavi, S. Nazari and B. Hatami (2010). Study of the effect of irrigation and nitrogen fertilizer on sugar beet growth and population dynamism of *Empoasca decipiens* (Hom.: Cicadellidae) and *Thrips tabaci* (Thys.: Thripidae). Appl. Entomol. and Phytopathol., 78 (1): 61-80.

Hegab, A.M., I.M. Kelany and M.M. EI-Maghraby (1987). Survey of leafhoppers and

planthoppers infesting maize plants by using three sampling techniques in newly reclaimed sandy areas at Salhia District, Egypt. Minia J. Agric. Res., 9 (2): 945-953.

Hegab, A.M., M.M. El-Zohairy, M.M. Helaly and H.M. El-Sharkawy (1989). Survey and seasonal abundance of leafhoppers infesting certain solanaceous vegetable plants in newly reclaimed sandy areas at Salhia District, Egypt. Zagazig J. Agric. Res., 16 (2): 175-187.

Hegab, O.I.M.S. (2001). Studies on certain insect vectors of plant pathogenic agents. Ph.D. Thesis. Fac. Agric., Zagazig Univ., Egypt.

Helal, A.H., R.M. Salem, A.S. El-Khouly, M.M. Metwally and A.B. El-Mezaien (1996). Population dynamic of *A. craccivora* Koch and *Empoasca* spp. on faba bean in relation to associated predators and some climatic factors. Egypt. J. Agric. Res., 75 (2): 461-471.

Helal, H.A., E.L. Khouly, A.S. Khalafalla, E.M.E. Metwally and A.B. El-Mezaien (1997). Preliminary studies on the population of legume aphid, *Aphis craccivora* Koch and jassids, *Empoasca* spp. on different faba bean varieties and breeding lines under the field conditions of Kafr El-Sheikh Governorate, Egypt. Egypt. J. Agric. Res., 75 (4): 951-959.

Herakly, F.A. (1970). Studies on certain jassids infesting vegetables in Egypt. M.Sc. Thesis, Fac. Agric., Ain Shams Univ., Egypt.

Irbab, M.T. and A. Laanen (2005). Identification of the principal aphids of sugar beet. Betteravier-Bruxelles, 39 (417): 7-8.

Malik, L., J. Emmanuelle and C.D. Armelle (2010). Assessment of aphid diversity (Hemiptera: Aphididae) in Algeria: a fourteen-year investigation. Entomologiefaunistique–Faunistic Entomol., 62 (2): 73-87.

Muska, F. (2007). Damaging presence of aphids on sugar beet and beet in Czech Republic historical summary until 2005. Listy-Cukrovarnicke-a-Reparske, 123 (9/10): 284-287.

Nassab, A.D.M., R.A. Mardfar and Y. Raei (2013). Effects of wheat-oilseed rape intercropping and fertilizers on the population density of *Sitobion avenae* and its natural enemies. Int. J. Biosci., 3 (5):43 – 50.

Nielson, M.W. (1968). The leafhopper Vectors of Phytopathogenic Viruses (Homoptera, Cicadellidae): Taxonomy, Biology and Virus Transmission. US. Agric. Res. Ser., Tech. Bull., 1382: 1-386.

Parh, I.A. (1986). The reaction of the cowpea leafhopper *E. dolichi* (Paoli), to temperature and humidity, Indian J. Entomol., 48 (3): 346-353.

Raupach, K., C. Borgemeister, M. Hommes, H.M. Poehling and M. Sétamou (2002). Effect of temperature and host plants on the bionomics of *Empoasca decipiens* (Homoptera: Cicadellidae). Crop Prot., 21: 113–119.

Talebi, A.A., A. Izadpanah, S. Moharramipour, Y. Fathipour and B. Naseri (2010). Demographic study of the green leafhopper, *Empoasca decipiens* (Hemiptera: Cicadellidae) on four sugar beet cultivars. Appl. Entomo. and Phytopatho., 77 (2): 1-13.

الوفرة الموسمية لأهم الحشرات الثاقبة الماصة التي تصيب نباتات الذرة وبنجر السكر في محافظة الشرقية - مصر

علا إبراهيم محمد حجاب[١] - عبدالله علي عبد الصمد[٢]- محمد علي مرسي حجاب[١]

١- قسم وقاية النبات - كلية الزراعة - جامعة الزقازيق- مصر

٢- معهد بحوث وقاية النباتات - مركز البحوث الزراعية – الدقي- الجيزة - مصر

أُجريت الدراسة في خلال موسمين متتاليين ٢٠١٥/٢٠١٦ و ٢٠١٦/٢٠١٧ بهدف دراسة الوفرة الموسمية في تعداد بعض أنواع المَنَّ ونطاطات الأوراق ونطاطات النباتات السائدة التي تصيب نباتات الذرة وبنجر السكر المزروعة في مركز ديرب نجم - محافظة الشرقية، وقد أوضحت النتائج أن أنواع حشرات المَنّ التي تصيب نباتات الذرة هي *Rhopalosiphum maidis* and *R. padi* بينما نوع المن الذي يصيب بنجر السكر هو مَنَّ الخوخ *Myzus persicae* and *Aphis gossypii* بينما أنواع نطاطات الأوراق التي تصيب نباتـــات الـذرة هي *Empoasca decedens*, *E. decipiens* and *Cicadulina chinai* وكذلك تم دراسة تواجد أنواع من نطاطات النباتات *Sogatella vibix* and *S. furcifera* بينما تواجد انواع من نطاطات الأوراق *Empoasca decedens, E. decipiens* and *Circulifer tenellus* على نباتات بنجر السكر، تم أستخدام ثلاث طرق لأخذ العينات وهي العينة النباتية وشبكة جمع الحشرات والمصيدة اللاصقة الصفراء، ووجد أن هناك تأثير لكل من الحرارة والرطوبة على تعداد الحشرات، لذلك يهدف هذا البحث إلى استخدام النتائج المتحصل عليها والاستفادة منها عند وضع برامج المكافحة المتكاملة لهذه الآفات الحشرية سابقة الذكر من خلال تفعيل تأثير بعض العوامل البيئية الرئيسية (الحرارة و الرطوبة) على تعداد الحشرات.

المحكمون :

١- أ.د. سمير صالح إبراهيم عوض الله أستاذ الحشرات الاقتصادية المتفرغ – كلية الزراعة – جامعة المنصورة.

٢- أ.د. علـي عبدالحميد علـي شاهين أستاذ الحشرات الاقتصادية المتفرغ – كلية الزراعة – جامعة الزقازيق.