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CEREAL APHIDS ON WHEAT AND THEIR ASSOCIATED APHIDOPHAGOUS INSECT PREDATORS

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ABSTRACT: Studies on cereal aphids infesting wheat plants and their aphidophagous insect predators were conducted in Meet-Elezz village, Fakous district, Sharkia Governorate during 1997-98 and 1998-99 growing seasons. The obtained data are summarized as follow:

1. ***Shizaphis graminum*** (Rondani), ***Macrosiphum avenae*** (Fabricius), ***Rhopalosiphum maidis*** (Fitch) and ***Rhopalosiphum padi*** (Linnaeus) were found infesting wheat plants.

2. Five insect predators belonging to three orders and four families were recorded. Coleopterous species were represented by the highest percent, followed by the neuropterous and latter the dipterous predaceous species. In general, coccinellids predatory insects were the most dominant, constituting in respective 49.27 and 42.58% of the total number of predators during 1997-98 and 1998-99 seasons. Among all recorded predaceous species, *Coccinella undecimpunctata* L. was the most dominant species, comprised 39.13 and 37.36% of the total count of the predators during the two respective seasons.

3. Cereal aphids infest wheat plants from the first week of February till the first week of April. The highest populations of aphids were recorded in the first week of March with counts of 187 and 285 individuals/ sample in the first and second seasons, respectively. The highest total monthly count of aphids occurred during March in the first season and during February in the second one.

4. *Coccinella undecimpunctata* showed the maximum total monthly counts during March in both seasons. *Chryosperla carnea* (Steph.) indicated the highest total monthly counts during March in both

seasons. The highest total monthly number of *Metasyrphus corollae* (Fabr.) was during March in the first season and during April in the second one. The means of predator: prey ratio for *C. undecimpunctata, C. carnea* and *M. corollae* were 1:30.77 , 1:41.55 and 1:83.10 in the first season, and 1:37.35, 1:48.84 and 1:55.22 in the second one , respectively. The total recorded predators showed means of 1:12.04 and 1:13.95 predator: prey ratio in the first and second seasons, respectively.

Key words: Wheat, cereal aphids, insect predators

INTRODUCTION

Wheat is the most important cereal crop in Egypt. It is using for human food, as well as in animal and poultry feeding. The Egyptian agricultural policy aims to increase wheat production to reduce the gap between the consumption and production. The grown wheat area in Sharkia Governorate is about 308489 feddans with an average production of about 2.869 tons/ feddan (Anonymous, 2003).

Many pests attack wheat plants from sowing till harvest. The main insect pests are cereal aphids (Hassan, 1957; Ghanim, 1984; El-Heneidy and Attia, 1988-1989; Ismail *et al.*, 1993; Alhag *et al.*, 1996 ; Abou –Elhagag and Abdel – Hafez, 1998; El-Serafy, 1999; Mannaa, 2000; El-Aish-Hana *et al.*, 2004; El-Heneidy *et al.*, 2004 and Youssef, 2006) which sometimes cause severe losses in yield. These losses were estimated by 7.5 – 18.7% of the total wheat production in middle and upper Egypt (Tantawi, 1985). The injurious of aphids comes through either direct feeding or/and transmission of viral diseases (Mahlooji and Makoui, 1990).

Chemical insecticides induced major well known problems such as health hazards to human and animals, destruction of biological control agents and increased resistance of insects to insecticides. All wheat producing countries have planned to minimize using insecticides in wheat fields (Picard, 1987).

Recently, entomologists suggested Integrated Pest Management (IPM), using all other control methods which emphaize an biological control (Havlickova and Holubec 1999; Dent, 1999 and Schüler *et al.*, 1999). Since, the aphidophagous especially predatory insects have important role in suppression aphid populations. The present work was conducted to study the following points :

1. Surveying the cereal aphids and their associated aphidophagous insect predators on wheat plants.
2. Seasonal abundance of cereal aphids and their associated aphidophagous insect predators on wheat plants.

MATERIALS AND METHODS

The present investigation was carried out at Meet-Elezz village, Fakous district, Sharkia Governorate, Egypt during two successive wheat growing seasons, 1997-98 and 1998-99.

The experimental area was about half feddan, cultivated with wheat, *Triticum aestivum* L., variety Sakha 69 and was sown during the first week of November in each 1997 and 1998 years. The normal agricultural practices were adapted in the due time without any insecticidal application.

To study the population fluctuations of aphids and aphidophagous insect predators, ten tillers of wheat infested with aphids were weekly selected at random, picked up, placed in paper bag and transferred into laboratory, where carefully examined by the aid of stereoscopic microscope. The number of winged and wingless aphids were directly counted. Predators in most cases were directly counted and in some few cases laboratory rearing was necessary for the immature stages till the emergence of the adults.

Daily records of temperatures and relative humidities during the period of investigation were obtained from Agrometeorological station at Zagazig region.

RESULTS AND DISCUSSION

Survey of Aphid Species and Their Aphidophagous Insect Predators.

Survey of aphid species

Four aphid species beloning to Homoptera, Aphididae were found infesting wheat plants, *i. e. Schizaphis graminum* (Rondani), *Macrosiphum (= Sitobion) avenae* (Fabricius), *Rhopalosiphum maidis* (Fitch) and *Rhopalosiphum padi* (Linnaeus).

The obtained results are in agreement with those of different investigators: Ghanim (1984), El-Heneidy and Attia (1988-1989), Abou-Elhagag and Abdel-Hafez (1998), El-Serafy (1999), Tawfik and El-Husseini (2002), El-Bouhssini *et al.*(2003), El-Heneidy *et al.* (2004) and Youssef (2006) in different regions of Egypt. Also, in certain countries of the world.

Tawfik and El-Husseini (2002) mentioned that wheat is attacked by a few numbers of pests. The most injurious are aphids, *S. graminum, S. avenae, R. maidis, R. padi* and *Diuraphis noxia* Mord.

Survey of aphidophagous insect predators

Five insect predators beloning to three orders and four families were recorded (Table 1). They were *Coccinella undecimpunctata* L., *C. septempunctata* L. (Coleoptera : Coccinellidae), *Paederus alfierii* (Koch.) (Coleoptera : Staphylinidae), *Chrysoperla carnea* (Stepth.) (Neuroptera : Chrysopidae) and *Metasyrphus (= Syrphus) corollae* (Fabr.) (Diptera :Syrphidae).

Coleopterous species were represented by the highest percent followed by the neuropterous and latter the dipterous predaceous species. The respective percents were 56.53, 28.98 and 14.94% in the first season and 46.15, 28.57 and 25.28% in the second one.

In general, among the predaceous aphidophagous, coccinellids were the most dominant constituting in respective 49.27 and 42.58% of the total number of predators during 1997-1998 and 1998-1999 seasons. *C. undecimpunctata* was the most dominant species, comprised 39.13 and 37.36% of the total number of predators in the first and second seasons, respectively. *C. carnea* ranked the second category, showing 28.98 and 28.57% during the two respective seasons.

C. undecimpunctata as a predator of cereal aphids was recorded by several workers such as Ghanim (1984), El-Heneidy and Attia (1988), El-Heneidy (1991) in Egypt, El-Hag (1992) in Saudi Arabia, Saghy and Kondorosy (1998) in Hungary, Mohamed *et al.* (2000) in USA and El-Aish-Hana *et al.* (2004) in Libya. *C. septempunctata* was reported by Shukla and Pathak (1987) in India, Brueggen and Sengonca (1989) in Germany, Ferran *et al.* (1989) in France, El-Heneidy (1991), Freier *et al.* (1996) in Germany, Yu *et al.* (1998) in China, Triltsch (2000) in Germany, Tawfik and El-Husseini (2000) and El-Aish-Hana *et al.* (2004). *C. carnea* was recorded by Ghanim (1984), Bruggen and Sengonca (1989), El-Heneidy (1991), Mohamed *et al.* (2000), Tawfik and El-Husseini (2000) and El-Aish-Hana *et al.* (2004). *M. corollae* was mentioned by several workers such as Adams *et al.* (1987) in UK, El-Heneidy (1991), Du and Chen (1993) in China, Abou-Elhagag and Abdel-Hafez (1998), Kannan (1999) in Sudan and Mannaa (2000) in Egypt. *P. alfierii* was recorded by El-Heneidy and Attia (1988-1989) in Egypt.

Table 1. Total number and percentages of aphidophagous insect predators associated with aphids infesting wheat plants during 1997-1998 and 1998-1999

Aphidophagous insect predators	Season					
	1997-1998			1998-1999		
	No. of predator	% order	% sp.	No. of predator	% order	% sp.
Coleoptera	39	56.53		42	46.15	
Coccinellidae	34			39		
Coccinella undecimpunctatal L.	27		39.13	34		37.36
Coccinella septempunctata L.	7		10.14	5		5.50
Staphylinidae	5			3		
Paederus alfierii (Koch.)	5		7.25	3		3.29
Neuroptera	20	28.98		26	28.57	
Chrysopidae	10			26		
Chrysoperla carnea (Steph.)	20		28.98	26		28.57
Diptera	10	14.49		23	25.28	
Syrphidae	10			23		
Metasyrphus (=*Syrphus*) *corollae* (Fabr.)	10		14.49	23		25.28
Total	69	100	100	91	100	100

Seasonal Abundance of Aphids Infesting Wheat Plants and Their Associated Aphidophagous Insect Predators

Seasonal abundance of aphids

It is worth to be mentioned that the different species of aphids infesting wheat plants were not taken into consideration during the course of this study. So, aphids well be referred to the counting of different aphid species infesting wheat plants.

Data presented in Table 2 illustrate the fluctuations in the population of aphid complex on wheat plants under the prevailing climatic conditions through the two successive seasons of 1997-98 and 1998-99.

For the first season of study, as shown in Table 2, aphids started to appear in the first week of February 1998 at which the average temperature and relative humidity reached 13.5°C and 68.0% RH, respectively, with count of 13 aphids /10 tillers. Then, the population of aphids increased gradually recording its peak of 187 individuals /10 tillers in the first week of March at means of 16.5°C and 60.5% RH. The monthly total numbers of aphids during February, March and April recorded 375, 454 and two individuals, respectively.

In the second season, data recorded in Table 2 indicate that the aphids infestation began during the first week of February 1999 at means of 16.3°C and 66.0% RH, with a number of 64 aphids/10 tillers. Then, a sharp increase of aphids population occurred forming a higher peak of 202 aphids/sample by the second week of February at means of 18.0°C and 57.2% RH. Thereafter, the population fluctuated till the first week of March, recording the second highest peak, 285 aphids/sample, whereas the means of temperature and relative humidity were 16.6°C and 59.2% RH, respectively. A gradual decrease of population occurred from this time, reaching its minimal value during April. The total monthly count of aphids recording 707, 550 and 13 individuals during February, March and April, respectively.

The aphids population in the second season was relatively higher as compared with that in the first one, with counts of 1270 and 831 individuals, respectively.

The obtained results are in agreement with those of different investigators. Ali and Darwish (1990) in Assiut, Egypt who indicated that the population density of aphids reached 10% of the maximum population density

Table 2. Seasonal abundance of aphids infesting wheat plants during 1997-1998 and 1998-1999 growing seasons

Weekly date of sample		No. of aphids/ sample (10 tillers)		Corresponding means of			
		1997-1998	1998-1999	Temp. °C		RH%	
				1997-1998	1998-1999	1997-1998	1998-1999
Feb.,	1st	13	64	13.5	16.3	68.0	66.0
	2nd	62	202	14.1	18.0	66.3	57.2
	3rd	120	169	13.5	18.0	67.1	55.8
	4th	180	272	15.1	15.5	65.4	58.4
Total		375	707				
Mar.,	1st	187	285	16.5	16.6	60.5	59.2
	2nd	147	147	17.4	18.7	49.7	57.2
	3rd	69	72	18.4	19.1	58.7	58.7
	4th	37	46	16.8	20.5	60.3	52.3
	5th	14	-	17.1	19.7	61.1	50.3
Total		454	505				
Apr.,	1st	2	11	18.0	21.9	59.8	53.5
	2nd	-	2	18.7	19.5	58.9	50.5
Total		2	13				
General total		831	1270				

in mid March. Ali *et al.* (1991) in Egypt, revealed that numbers of *S. graminum* and *R. padi* peaked in late February and in the first half of March during two respective seasons. Neil *et al.* (1997) in Canada mentioned that *R. padi* was the more common aphid species during the heading out in winter wheat. Abdel-Rahman *et al.* (2000) in Assiut, Egypt revealed that *R. padi* and *S. graminum* infested wheat plants from December to the end of March, with peak abundance at the end of February. Sattar *et al.* (2001) in Pakistan, indicated that the infestation by *S. avenae* on wheat started during the second week of February. The population reached a peak during the second week of March and disappeared towards the end of April. El-Heneidy *et al.* (2004) reported that the population densities of cereal aphids on wheat plants in Sakha and Sids region occurred in high numbers during February and March. Rana (2005) indicated that *S. avenae* population was the highest during the second week of March and started declining gradually and disappeared in the second week of April.

Seasonal abundance of aphidophagous insect predators

It is worth to be mentioned that during the course of this study, no aphidophagous insect predators are detected associated with the aphids infesting roots of wheat plants during the two seasons of study.

The seasonal abundance of aphidophagous insect predators are presented in Tables 3 and 4.

***Coccinella undecimpunctata* L.**

During the first season (Table 3), the first occurrence of this predator was detected in the fourth week of February 1998 associated with 180 aphid individuals at means of 15.1°C and 65.4% RH. It must be noted that, the aphid started to appear three weeks before. Afterwards, the number of the ladybird beetle was fluctuated between three and five individuals, reaching its peak of occurrence, six individuals, in the fourth week of March associated with 37 aphids at means of 16.8°C and 60.3% RH. The maximum total monthly count of the predator, 21 individuals, was recorded during March. The lowest value, one individual, was obtained during February. The mean of predator: prey ratio during the season was 1 : 30.77.

In the second season, data presented in Table 4 revealed that the first appearance of this predator was in the first week of February 1999 at the same time of aphid occurrence with two individuals of predator/64 aphids at means of 16.3°C and 66.0% RH. Then, the number of the predator

increased from one to two and nine individuals, reaching its maximal number, 10 individuals, during the fourth week of March associated with 46 aphids at means of 20.5°C and 52.3% RH. The maximum monthly total count was as in the first season during April. The mean of predator : prey ratio in the season was 1 : 37.35.

It could be noticed that the early occurrence of the ladybird beetle in the second season may be attributed to the differences in climatic factors, especially temperature whereas its mean was 16.3°C instead of 13.5°C, respectively.

Azab *et al.* (1965) in Egypt, mentioned that *C. undecimpunctata* larvae were found all round the year. In spring, the predator was abundant on duranta, rationing okra and Brussels sprouts. Its highest activity took place in association with *Aphis punicae* infesting duranta in March, represented by monthly number of 10 individuals /596.46 aphids at 16.5°C and 62.0% RH. El-Heneidy (1991) reported that the highest number of aphidophagous insect predators was observed during April, and coccinellids were the most abundant species. Subhash and Chander (1996) in India, found that coccinellid adults were associated with aphids on wheat crop and their distribution was regular and random.

***Chrysoperla carnea* (Steph.)**

In the first season, data given in Table 3 indicate clearly that *C. carnea* was presented with a few numbers on wheat tillers infested with cereal aphids. This predator began to appear three weeks later after the infestation of aphids in the fourth week of February 1998 with count of two predators/180 aphids at means of 15.1°C and 65.4% RH. The highest number of the predator, five individuals, was recorded during the second week of March associated with 147 aphids at means of 17.4°C and 49.7% RH. The number of the green lacewing decreased gradually till disappeared completely at the end of the season. The highly total monthly count, 18 individuals, was obtained during March. The mean ratio of predator : prey during the season was 1 : 41.55.

Data obtained in Table 4 show that in the second season, this predator started to appear at the same time of aphid infestation, in the first week of February 1999, and three weeks early comparing to that recorded in the first season. This appearance with count of three predators in association with 64 aphids at means of 16.3°C and 66.0% RH. Thereafter, the total

number of the predator was similar during the following weeks, three individuals each, with exception of the second and third weeks of March, whereas four individuals were recorded associated with 147 and 72 aphids at means of 18.7 & 19.1°C and 57.2 & 58.7% RH, respectively. The maximum total monthly count, 14 individuals, was observed during March. The mean of predator : prey ratio during the season was 1 : 48.84.

Azab *et al.* (1965) reported that *C. carnea* was active in March and August. During March, the predator peak represented its highest abundance on duranta at 16.5°C and 62.0% RH. The predator peak was associated with the peak of aphid.

Many investigators mentioned the important role of *C.carnea* in suppressing aphids population on wheat and maintaining them under the economic injury level. Cividans *et al.* (1987) in Brazil, stated that the most common predatory insects collected from wheat fields included *Chrysopa* sp. Kannan (1999) revealed that *Chrysoperla pudica* and *C. zastrowi* were recorded early in the season and played a substantial role in suppressing aphid populations and maintaining them below the economic injury level. Abou-Elhagag and Abdel-Hafez (1998) indicated that the peak of insect predators of cereal aphids on wheat including *C. carnea* occurred in the beginning of April and late March during the two respective seasons.

El-Aish-Hana (2004) recorded *C. carnea* as main predator of cereal aphid on wheat and barley plants. El-Heneidy *et al.* (2004) stated that the trend of the population density of the predators depends mainly on densities of aphids. The mean number of predators fluctuated during December and January, and increased gradually to reach its maximum during February and March, then decreased towards the end of the season, in April.

***Metasyrphus (= Syrphus) corollae* (Fabr.)**

As shown from data obtained in Table 3 in the first season, the number of this predator was fewer and began to appear three weeks after the occurrence of the aphids, with two predators/180 aphids at means of 15.1°C and 65.4% RH in the fourth week of February 1998. The peak of activity was recorded in the first week of March, with four predators/187 aphids at means of 16.5°C and 60.5% RH. The predator count was two individuals during the second and third weeks of March. Then, disappeared completely. The mean

Table 3. Seasonal abundance of aphidophagous insect predators on wheat plants during 1997-1998 growing season

Weekly date of sample		No. of aphids/ sample	Number of aphidophagous insect predators / sample						Corresponding means of	
			C. undecimpunctata	*C. septempunctata*	*P. alfierii*	*C. carnea*	*M. corollae*	Total	Temp. °C	RH%
Feb.,	1st	13	0	0	0	0	0	0	13.5	68.0
	2nd	62	0	0	0	0	0	0	14.1	66.3
	3rd	120	0	0	0	0	0	0	13.5	67.1
	4th	180	1	0	0	2	2	5	15.1	65.4
Total		375	1	0	0	2	2	5		
Mar.,	1st	187	3	0	0	4	4	11	16.5	60.5
	2nd	147	3	1	0	5	2	11	17.4	49.7
	3rd	69	5	2	0	4	2	13	18.4	58.7
	4th	37	6	2	2	3	0	13	16.8	60.3
	5th	14	4	0	1	2	0	7	17.1	61.1
Total		454	21	5	3	18	8	55		
Apr.,	1st	2	5	2	2	0	0	9	18.0	59.8
Total		2	5	2	2	0	0	9		
General total		831	27	7	5	20	10	69		
Mean of predator: prey ratio			1:30.77	1:118.71	1:166.20	1:41.55	1:83.1	1:12.04		

Table 4. Seasonal abundance of aphidophagous insect predators on wheat plants during 1998-1999 growing season

Weekly date of sample		No. of aphids/ sample	Number of aphidophagous insect predators / sample						Corresponding means of	
			C. undecimpunctata	*C. septempunctata*	*P. alfierii*	*C. carnea*	*M. corollae*	Total	Temp. °C	RH%
Feb.,	1st	64	2	0	0	3	2	7	16.3	66.0
	2nd	202	2	0	0	3	4	9	18.0	57.2
	3rd	169	1	0	0	3	5	9	18.0	55.8
	4th	272	2	1	0	3	4	10	15.5	58.4
Total		707	7	1	0	12	15	35		
Mar.,	1st	285	1	0	0	3	1	5	16.6	59.2
	2nd	147	2	1	0	4	3	10	18.7	57.2
	3rd	72	9	1	0	4	4	18	19.1	58.7
	4th	46	10	2	2	3	0	17	20.5	52.3
Total		550	22	4	2	14	8	50		
Apr.,	1st	11	3	0	1	0	0	4	21.9	53.5
	2nd	2	2	0	0	0	0	2	19.5	50.5
Total		13	5	0	1	0	0	6		
General total		1270	34	5	3	26	23	91		
Mean of predator: prey ratio			1:37.35	1:254.00	1:423.33	1:48.84	1:55.22	1:13.95		

ratio of predator: prey during the whole season was 1 : 83.1.

In the second season, data given in Table 4 reveal that the first occurrence of the larval stage of this aphidophagous was detected in the first week of February 1999, with count of two individuals and it was synchronized with the first appearance of aphids, 64 individuals, at means of 16.3°C and 66.0% RH. The predator number increased gradually, reaching its peak of activity, five individuals, in the third week of February associated with169 aphids at means of 18.0°C and 55.8% RH. The second peak, four individuals, took place at the third week of March in association with 72 aphids at means of 19.1°C and 58.7% RH. The total monthly count of *M. corollae* was 15 and eight individuals during February and March, respectively. The mean of predator : prey ratio during the season was 1 : 55.22.

Azab *et al.* (1965) reported that syrphids species were found associated with the aphids on rationing okra at the beginning of spring, February. El-Heneidy (1991) recorded six groups of common aphidophagous insect predators in wheat fields including syrphids, and mentioned that the highest number of predators were recorded during April.Greoger (1993) reported that syrphids, *Ebisyrphus balteatus* and *S. corollae* being the most frequent predators of cereal aphids on winter wheat and winter hosts at two different places in Germany. In years, when aphids and syrphids are synchronized, aphid infestation remained slight. Mateeva *et al.* (2001) in Bulgaria, indicated that the development of syrphid larvae in relation to aphid density showed that relatively high numbers of these predators could survive and complete their development even with limited food supply.

Total number of aphidophagous insect predators in relation with aphid infestation

Data of the first season (Table 3), indicate that the initial aphids infestation was recorded in the first week of February1998, while the first record of the aphidophagous insect predators, five individuals, was in the fourth week of February, three weeks later, at means of 15.1°C and 65.4% RH. The highest count of the predators was detected during the third and fourth week of March with maximum value of 13 predators, synchronized with 69 and 37 aphids at means of 18.4 & 16.8°C and 58.7 & 60.3% RH, respectively. The maximum monthly total number, 55 predators, was recorded during March. The mean ratio of

predators : prey during the season was 1 : 12.04.

As shown in the second season (Table 4), the aphidophagous insect predators started to appear in the first week of February 1999 with count of seven predators synchronized with the first aphids infestation, 64 aphdis, at means of 16.3°C and 66.0% RH. Their number increased gradually reaching its first peak of activity during the fourth week of February corresponding with 272 aphids at means of 15.5°C and 58.4% RH. The second peak with value of 18 individuals/72 aphids took place in the third week of March at means of 19.1°C and 58.7% RH. The maximum total monthly count, 50 predators, was observed during March. The mean ratio of predators : prey during the whole season was 1 : 13.95.

Ghanim (1984) mentioned that the comparative close predator-prey relationship in winter wheat throughout the study period prevent aphid outbreaks. Henze and Sengonca (1992) in Germany, reported that the most aboundant predators in all wheat crop rotations were coccinellids, especially *C. septempunctata*, followed by syrphids and chrysopids. The obtained results are in agreement with those of Abou-Elhagag and Abdel-Hafez (1998) who revealed that the peak of insect predators of cereal aphids on wheat plants in late March and beginning of April. Also, the obtained results are in accordance with the findings of El-Heneidy *et al.* (2004) who stated that the population density of the predators depended on the densities of aphids and reached its maximum value during February and March, then decreased at the end of the season.

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من النجيليات على القمح ومقتاتاته الحشرية المفترسة

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أجريت تلك الدراسة خلال موسمى ١٩٩٧ / ١٩٩٨ و ١٩٩٨ / ١٩٩٩ بقرية ميت العز بمنطقة فاقوس – محافظة الشرقية بهدف حصر أنواع من النجيليات التى تصيب نباتات القمح والمفترسات الحشرية المصاحبة لها ودراسة الوفرة الموسمية للمن ومقتاتاته الحشرية المفترسة . وقد خلصت النتائج إلى مايأتى :

١- يصيب القمح أربعة أنواع من المن هى (Rondani) *Shizaphis graminum* ، (Fabricius) *Macrosiphum avenae* ، (Fitch) *Rhopalosiphum maidis* ، (Linnaeus) *Rhopalosiphum padi* .

٢- سجلت خمسة أنواع حشرية تتبع أربعة رتب وثلاثة عائلات كمفترسات للمن . مثلت المفترسات التابعة لرتبة غمدية الأجنحة أعلى نسبة ، تلاها نوع تابع لشبكية الأجنحة وأخيراً نوع تابع لذات الجناحين . بوجة عام ، وجد أن الأنواع التابعة لعائلة أبى العيد هى الأكثر سيادة ممثلة ٤٩,٢٧ و ٤٢,٥٨% من العدد الكلى للمفترسات خلال موسمى الدراسة الاول والثانى على التوالى . كان أبو العيد ذو الإحدى عشر نقطة هو الأكثر سيادة من بين كل المفترسات المسجلة ممثلاً ٣٩,١٣ و ٣٧,٣٦ % من الأعداد الكلية للمفترسات خلال موسمى الدراسة الأول والثانى على التوالى .

٣- من النجيليات يصيب القمح من الأسبوع الأول من فبراير حتى الأسبوع الأول من أبريل . سجلت أعلى تعدادات للمن فى الأسبوع الأول من مارس وبأعداد ١٨٧ و ٢٨٥ فرد / عينة فى الموسمين الأول والثانى على التوالى . وجد أعلى تعداد كلى شهرى للمن خلال مارس فى الموسم الأول وخلال فبراير فى الموسم الثانى .

٤- سجل أعلى تعداد كلى شهرى للمفترسين *Coccinella undecimpunctata* L. و *Chrysoperla carnea*(Steph.) خلال مارس فى موسمى الدراسة . أظهر المفترس *Metasyrphus corollae* (Fabr.) أعلى تعداد شهرى كلى خلال مارس فى الموسم الأول وخلال أبريل فى الموسم الثانى . كانت متوسطات نسب المفترس : الضحية للمفترسات *C. undecimpunctata* ، *C. carnea* ، *M. corollae* ١ : ٣٠,٧٧ ، ١: ٤١,٥٥ ، ١: ٨٣,١٠ فى الموسم الأول و ١: ٣٧,٣٥ ، ١: ٤٨,٨٤ ، ١: ٥٥,٢٢ فى الموسم الثانى على التوالى . وجد أن متوسطات نسب المفترس : الضحية لجميع المفترسات المسجلة هى ١: ١٢,٠٤ و ١: ١٣,٩٥ خلال الموسمين الأول والثانى على التوالى .