

Comparative Study of Cereal Aphids Species and their Associated Predators and Parasitoids in Two Different Wheat Regions in Egypt

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ABSTRACT

Wheat is one of the main crops in cereal group. Many pests attack wheat plants from planting up to harvest, the main insect pests are aphids. Susceptibility of the wheat cultivars Sids 1, Sakha 8, 61 and 69 and Giza 164 and 167 to aphids' infestation was studied at two different governorates: Beni-suef, middle Egypt (Sids Agricultural Research Station) and Kafr El-Sheikh, Delta, north Egypt (Sakha Agricultural Research Station) during the two successive seasons of 1997/98 and 1998/99. Three main species of aphids were recorded infesting wheat plants: *Rhopalosiphum padi*, *Schizaphis graminum* Rondani and *Rhopalosiphum maidis* Fitsh, in both regions. The population densities of aphids in both regions occurred in high numbers during the months; February and March. The results showed that the wheat cultivars could be arranged ascendingly according to the infestation levels by aphids as follows: Sids 1 (12.9%), Giza 164 (13.6%), Sakha 8 (15.4%), Sakha 61 (17.3%), Giza 167 (19.7%) and Sakha 69 (21.1%). Survey of the predators associated with wheat aphids revealed the presence of *Coccinella undecimpunctata* Reiche (36.1% at Sakha and 35% at Sids), *Paederus alfieri* Koch (19.8% at Sakha and 18% at Sids), *Chrysoperla carnea* Steph. (16.4% at Sakha and 16% at Sids), *Syrphus* spp. (9.4% at Sakha and 10% at Sids), *Orius* spp. (7% at Sakha and 8% at Sids), *Scymnus* spp. (3.2% at Sakha and 4% at Sids) and true spiders (8.1% in Sakha and 9% at Sids). The present study showed also five parasitoid species attacking wheat aphids namely; *Aphidius matricariae* Haliday, *Aphidius colemani* Viereck, *Diaeretiella rapae* M'Intosh, *Ephedrus* sp. and *Praon* sp. Rate of parasitism reached 6% at Sakha and 9.62% at Sids in February, 14.1% at Sakha and 11.9% at Sids in March, and lower in the other months of the growing season.

Key Words: Wheat cultivars, Aphids, Susceptibility, Predators, Parasitoids, Egypt.

INTRODUCTION

The Egyptian agricultural policy aims to increase wheat production to reduce the "Food Gap" between the consumption and production. Many pests attack wheat plants from planting up to harvest. The main insect pests are aphids (EL-Heneidy *et al.*, 1991; Alsuhaibani, 1996; Abou-Elhagag and Abdel-Hafez, 1998 and Milne and Delves, 1999), which sometimes cause severe losses in the yield. These losses were estimated by 7-23% of total production. (Wheat Report 2000). The injurious of aphids comes through either direct feeding and / or transmission of viral diseases.

Chemical insecticides used to be recommended against aphids in wheat fields. Since wheat is addable food for human and its livestock and to avoid chemical residues in the seeds as well as their deleterious effect in polluting the environment, all wheat producing countries have planned to minimize using insecticides in wheat fields (Picard, 1987).

Recently, entomologists suggested using the Integrated Pest Management (IPM) which means controlling insects pests when their population reaches the economic threshold injury level, using all other control methods with emphasize on biological control (Havlickova, 1997; Dent, 1999 and Schuler *et al.*, 1999).

The present study aimed to throw a light on:-

Susceptibility of some wheat cultivars to aphids' infestation in two different governorates: Beni-Suef, middle Egypt and Kafr-El-Sheikh, north Egypt.

Studying the role of parasitoids and predators in suppressing the population densities of cereal aphid species attacking wheat plants.

MATERIALS AND METHODS

Survey and population density of wheat aphids:

Survey and population densities of wheat aphids and their associated natural enemies, especially predators and parasitoids on the wheat plants were studied from December to April in two different governorates; Beni-Suef (Sids Agricultural Research Station) and Kafer EL-Sheikh (Sakha Agricultural Research Station) during the two successive seasons 1997/98 and 1998/99.

Wheat cultivars i.e. Sakha 8, Sakha 61, Sakha 69, Sids 1, Giza 164 and Giza 167 were chosen in both governorates to compare their susceptibility to aphids' infestation. Seeds of each wheat cultivar were sown in experimental plot sized 4.2 X 30 m at Sids and 1.8 X 35 m at Sakha during the same month (17th and 25th of November at Sids and Sakha, respectively) in the two successive seasons. Experimental plots received all regular cultural practices throughout the two growing seasons. No chemical application was used to evaluate the role of natural enemies without any disruption by insecticides.

Samples of twenty five plants of the six wheat cultivars were weekly examined by means of the cross – side method under field conditions at each location throughout different growth stages of wheat plants, starting from late December (mostly during early tillering stage) to the end of April (mostly ripening stage). Number of aphids per plant cultivar was counted directly in the field. Infested samples of wheat plants were collected and transferred to the laboratory for identifying aphid species and determining the ratios of their occurrence.

Survey and population density of natural enemies

Predators

Weekly direct count of predatory species associated with wheat aphids on wheat plant (in the field) were estimated on 25 wheat plants/location throughout the growing seasons.

Parasitoids

Samples of highly infested wheat plants with aphids were collected weekly and transferred in paper bags to the laboratory for:

- 1- Estimating the rate of parasitism by dissecting 100 randomized living aphids/location/week.
- 2- Identifying emerged parasitoid species by confining infested aphids in glass jars until emergence of adult parasitoids. Emerged parasitoids were collected, identified (by Dr. Petr Stary, Academy of Sciences, Institute of Entomology, Czech Rep.).

RESULTS AND DISCUSSION

1- Aphid species

Three main species of cereal aphids were found infesting wheat plants, *Rhopalosiphum padi* L. (represented by 90.2% at Sakha and 94.6% at Sids regions), *Schizaphis graminum* Rondani (represented by 6.5% at Sakha and 2.8% at Sids) and *Rhopalosiphum maidis* Fitsh (represented by 3.3% at Sakha and 2.6% at Sids). This record coincides with those of EL-Heneidy and Attia (1988), EL-Heneidy *et al* (1991), Ibrahim and Affi (1991), Alsuhaibani (1996), Abou-Elhagag and Abdel-Hafez (1998) and Milne and Delves (1999).

2- Population density of aphids

2-1- Sakha region (Kafr EL-Sheik governorate)

2-1-1- Infestation level of aphids

In the two successive seasons of 1997/98 and 1998/99, *R. padi* began to occur on the wheat plants in December (second week) but with low numbers and general means of 0.48 ± 0.34 , 1.05 ± 0.27 , 0.64 ± 0.14 , 0.48 ± 0.38 , 0.78 ± 0.51 and 0.76 ± 0.65 aphids/plant on the wheat cultivars; Sids 1, Giza 167, Giza 164, Sakha 8, Sakha 61 and Sakha 69, respectively. In January, the infestation level started to increase slightly to reaching the averages of 1.78 ± 0.59 , 2.7 ± 1.09 , 1.69 ± 0.61 , 1.75 ± 0.54 , 2.16 ± 0.85 and 2.75 ± 0.89 aphids/plant for respective cultivars.

As shown in table (1), obtained data proved that the highest periods of infestation with aphids were recorded during the months of February and March, when the number of aphids/plant reached its maximum level throughout the whole season. In February the averages were 5.87 ± 2.20 , 9.71 ± 2.03 , 6.25 ± 1.64 , 6.53 ± 1.73 , 8.4 ± 2.06 and 9.75 ± 2.67 aphids per plant while they were 7.77 ± 3.54 , 9.47 ± 3.91 , 6.29 ± 2.71 , 6.52 ± 2.67 , 7.92 ± 2.91 and 10.62 ± 3 aphids/plant on the cultivars Sids 1, Giza 167, Giza 164, Sakha 8, Sakha 61 and Sakha 69, respectively in March.

In April, the number of aphids decreased obviously, probably due to the beginning of ripening stage of the wheat plants. Therefore, the mean number of aphids averaged 1.51 ± 10.55 , 2.14 ± 1.10 , 1.24 ± 0.54 , 1.17 ± 0.66 , 1.87 ± 1.29 and 2.62 ± 0.87 aphids per plant on the cultivars Sids 1, Giza 167, Giza 164, Sakha 8, Sakha 61 and Sakha 69, respectively.

Table (1): Monthly mean numbers $\pm$ S.D. of aphids / plant on wheat cultivars at Sakha (Kafr EL-Sheik) during 1997/98 and 1998/99 seasons

Month	Wheat cultivars																	
	Sids 1			Giza 167			Giza 164			Sakha 8			Sakha 61			Sakha 69		
	A	B	mean	A	B	mean	A	B	mean	A	B	mean	A	B	mean	A	B	mean
Dec.	0.58 ± 0.14	0.4 ± 0.5	0.5 ± 0.3	1.26 ± 0.25	0.8 ± 0.3	1.1 ± 0.3	0.74 ± 0.2	0.5 ± 0.1	0.6 ± 0.1	0.7 ± 0.4	0.3 ± 0.4	0.5 ± 0.4	1.2 ± 0.5	0.4 ± 0.5	0.8 ± 0.5	1.0 ± 0.6	0.5 ± 0.7	0.8 ± 0.7
F value	(97/98= 1.071) (98/99=0.355) (mean=0.526)																	
Jan.	1.58 ± 0.52	2.0 ± 0.7	1.8 ± 0.6	3.0 ± 1.1	2.4 ± 1.0	2.7 ± 1.1	1.8 ± 0.8	1.6 ± 0.5	1.7 ± 0.6	1.8 ± 0.7	1.7 ± 0.7	1.8 ± 0.5	2.6 ± 1.1	1.7 ± 0.7	2.2 ± 0.9	4.1 ± 1.0	2.4 ± 0.3	3.1 ± 0.9
F value	(97/98= 2.375) (98/99=1.238) (mean=2.210)																	
Feb.	6.8 ± 2.9	4.9 ± 1.5	5.9 ± 2.2	12.0 ± 2.5	7.4 ± 1.7	9.7 ± 2.0	6.8 ± 2.1	5.7 ± 1.2	6.3 ± 1.6	7.3 ± 2.1	5.8 ± 1.4	6.5 ± 1.7	9.9 ± 2.3	6.9 ± 1.7	8.4 ± 2.1	12.2 ± 3.3	7.3 ± 2.2	9.7 ± 2.7
F value	(97/98= 3.883*) (98/99=2.971*) (mean=2.871*)																	
L. S. D	(97/98= 3.839) (98/99=1.571) (mean=2.161)																	
Mar.	7.7 ± 4.8	7.8 ± 3.2	7.8 ± 3.5	10.7 ± 4.8	8.3 ± 3.0	9.4 ± 3.9	6.6 ± 4.0	6.0 ± 1.5	6.3 ± 2.8	6.3 ± 3.4	6.7 ± 2.0	6.5 ± 2.7	8.3 ± 2.8	7.6 ± 2.8	7.9 ± 2.9	10.6 ± 3.6	10.6 ± 2.8	10.6 ± 3.0
F value L. S. D	(97/98= 2.901*) (98/99=2.757*) (mean=2.719*) (97/98= 2.875) (98/99=2.201) (mean=1.901)																	
Apr.	1.5 ± 0.7	1.5 ± 0.5	1.5 ± 0.6	19 ± 1.0	2.9 ± 1.7	2.1 ± 1.1	0.7 ± 0.3	1.8 ± 0.8	1.2 ± 0.5	1.2 ± 0.4	1.1 ± 1.0	1.2 ± 0.7	2.7 ± 1.3	1.0 ± 1.3	1.9 ± 1.3	3.1 ± 1.2	2.1 ± 0.5	6 ± 0.9
F alue	(97/98= 2.509) (98/99=1.708) (mean=1.615)																	

A= season 1997/98

B= season 1998/99

2-1-2- Comparative infestation levels on different wheat cultivars

Generally, different wheat cultivars didn't show significant differences of aphid infestations among each other during the growing seasons. Infestation levels with aphids were low during the months of December, January and April, when F values were 0.526, 2.210 and 1.615, respectively. The differences among the wheat cultivars occurred when the infestation level of aphids increased during February and March. In February, ($F = 2.871$, L.S.D. = 2.161) Sids 1 showed the lowest infested cultivar (12.6%), while Giza 167 showed the highest one (21%). In March, the infestation with aphids reached its maximal level ($F = 2.719$ and L.S.D. = 1.901), where Giza 164 comprised the lowest infested cultivar (12.9%) while Sakha 69 recorded the highest rate of infestation (21.8%).

It is clear that the months of February and March in both seasons were considered the highest periods of infestation by aphids. The mean averages of both months showed virtual significant differences ($F = 3.644$ and L.S.D. = 2.462) among different wheat cultivars. It could be easily divided the experimented cultivars depending on the rate of infestation into two groups, the first included Giza 164 (13.2%), Sakha 8 (13.7%) and Sids 1 (14.3%) and the second comprised Giza 167 (20.2%) and Sakha 69 (21.4%). The cultivar Sakha 61 (17.2%) located in between.

2-2- Sids region (Beni Suef governorate)

2-2-1- Infestation level of aphids

The infestation level of aphids at Sids region, through the two successive seasons (1997/98 and 1998/99) of wheat cultivation, was also low during the months of December, January and April (Table 2) as at Sakha region. Average mean numbers of aphids per plant in December were 0.98 ± 0.54 , 0.75 ± 0.49 , 0.68 ± 0.48 , 1.0 ± 0.48 , 0.86 ± 0.64 and 1.0 ± 0.31 aphids per plant on the cultivars Sids 1, Giza 167, Giza 164, Sakha 8, Sakha 61 and Sakha 69, respectively. In January, numbers of aphids per plant were slightly increased on the different wheat cultivars to reach the averages of 3.51 ± 1.32 for Sids 1, 3.88 ± 1.48 for Giza 167, 2.61 ± 1.20 for Giza 164, 3.08 ± 1.39 for Sakha 8, 3.22 ± 1.66 for Sakha 61 and 3.97 ± 2.16 for Sakha 69. In April, the trend of aphid population/plant felt down to reach the averages of 1.24 ± 0.78 , 2.24 ± 0.84 , 1.19 ± 0.41 , 1.82 ± 0.48 , 1.88 ± 0.71 and 2.74 ± 1.35 aphids on the cultivars Sids 1, Giza 167, Giza 164, Sakha 8, Sakha 61 and Sakha 69, respectively.

Table (2): Monthly mean numbers $\pm$ S.D. of aphids / plant on wheat cultivars at Sids (Beni Suef) during 1997/98 and 1998/99 seasons

Month	Wheat cultivars																	
	Sids 1			Giza 167			Giza 164			Sakha 8			Sakha 61			Sakha 69		
	A	B	mean	A	B	mean	A	B	mean	A	B	mean	A	B	mean	A	B	mean
Dec.	1.1 ± 0.6	0.8 ± 0.5	1.0 ± 0.5	1.2 ± 0.6	0.3 ± 0.4	0.8 ± 0.5	1.0 ± 0.5	0.7 ± 0.5	0.7 ± 0.5	1.0 ± 0.6	1.0 ± 0.3	1.0 ± 0.5	1.0 ± 0.7	0.4 ± 0.3	0.9 ± 0.6	1.2 ± 0.2	0.8 ± 0.4	1.0 ± 0.3
F value	(97/98= 0.083) (98/99=0.595) (mean=0.08)																	
Jan.	3.5 ± 1.9	2.8 ± 0.7	3.5 ± 1.3	5.1 ± 2.1	2.6 ± 1.0	3.9 ± 1.5	3.3 ± 2.2	1.9 ± 0.3	2.6 ± 1.2	3.5 ± 1.7	2.7 ± 1.1	3.1 ± 1.4	3.9 ± 2.0	2.6 ± 1.4	3.2 ± 1.7	4.4 ± 2.4	3.6 ± 1.9	4.0 ± 2.2
F value	(97/98= 0.449) (98/99=0.837) (mean=0.433)																	
Feb.	10.4 ± 1.9	7.4 ± 1.7	8.9 ± 1.7	16.1 ± 2.6	8.1 ± 1.8	12.1 ± 2.2	12.6 ± 2.7	6.7 ± 1.6	9.7 ± 2.1	13.4 ± 3.0	10.0 ± 2.2	11.7 ± 2.6	15.0 ± 3.4	8.6 ± 1.1	11.8 ± 2.2	16.8 ± 2.4	9.6 ± 1.5	13.2 ± 1.8
F value	(97/98= 3.102*) (98/99=2.958*) (mean=3.091*)																	
L. S. D	(97/98= 3.030) (98/99=2.180) (mean=2.892)																	
Mar.	7.1 ± 3.2	4.5 ± 1.9	5.8 ± 2.5	13.1 ± 5.8	10.6 ± 2.8	11.9 ± 4.2	7.8 ± 4.4	7.9 ± 2.1	7.9 ± 2.9	10.0 ± 4.5	8.0 ± 3.0	9.0 ± 3.7	11.7 ± 4.9	8.3 ± 1.8	10.0 ± 3.3	14.3 ± 5.0	10.6 ± 3.1	12.5 ± 4.0
F value	(97/98=3.011*) (98/99=4.117**) (mean=2.896*)																	
L. S. D	(97/98= 4.620) (98/99=2.680) (mean=3.697)																	
Apr.	1.2 ± 0.6	1.3 ± 1.0	1.2 ± 0.8	2.5 ± 0.8	2.0 ± 1.1	0.2 ± 0.8	1.3 ± 0.4	1.1 ± 0.5	1.2 ± 0.4	2.1 ± 0.5	1.6 ± 0.5	1.8 ± 0.5	2.4 ± 0.8	1.4 ± 0.4	1.9 ± 0.7	3.1 ± 1.6	2.4 ± 2.2	2.7 ± 1.4
F value	(97/98= 2.171) (98/99=1.721) (mean=1.939)																	

A = season 1997/98

B = season 1998/99

As previously mentioned at Sakha, the highest infestation level with aphids at Sids was also recorded during the months of February and March. In February, the population reached its maximum with the

averages of 8.87 ± 1.7 , 12.11 ± 2.2 , 9.65 ± 2.14 , 11.68 ± 2.6 , 11.8 ± 2.18 and 13.21 ± 1.83 aphids per plant on the cultivars Sids 1, Giza 167, Giza 164, Sakha 8, Sakha 61 and Sakha 69, respectively while in March they reached 5.81 ± 2.49 , 11.87 ± 4.2 , 7.86 ± 2.93 , 8.99 ± 3.67 , 9.98 ± 3.28 and 12.46 ± 3.99 aphids per plant on the respective cultivars.

2-2-2- Comparative infestation levels on different wheat cultivars:

Statistically, no difference was found among the wheat cultivars during the season months of low infestation levels with aphids where F values were 0.080 for December, 0.433 for January and 1.939 for April.

Significant differences were actually found during only the months of February and March (highest infestation level), where in February ($F = 3.091$ and $L.S.D. = 2.892$), the cultivar Sids 1 (13.2%) showed minimal infestation level while Sakha 69 (19.6%) considered the highest cultivar in infestation with aphids. During March ($F = 2.896$ and $L.S.D. = 3.697$), Sids 1 (10.2%) was also recorded as the minimal cultivar, while Sakha 69 (21.9%) had the highest level of infestation with aphids.

The mean averages of both months February and March showed significant differences among cultivars ($F = 4.423$ and $L.S.D. = 2.806$). Cultivars could be arranged ascendingly according to the rate of infestation as follow: Sids 1 (11.8%), Giza 164 (14.1%), Sakha 8 (16.6%), Sakha 61 (17.5%), Giza 167 (19.3%) and Sakha 69 (20.7%).

In February ($F = 3.057$ and $L.S.D. = 1.962$) the cultivars could be arranged ascendingly according to the level of infestation as follows: Sids 1 (12.9%), Giza 164 (13.9%), Sakha 8 (16%), Sakha 61 (17.7%), Giza 167 (19.1%) and Sakha 69 (20.2%). In March ($F = 2.903$ and $L.S.D. = 2.551$) the arrangement was Sids 1 (12.8%), Giza 164 (13.4%), Sakha 8 (14.9%), Sakha 61 (16.9%), Giza 167 (20.2%) and Sakha 69 (21.8%).

The average mean of each cultivar in the two months February and March together showed significant differences among the cultivars ($F = 4.102$, $L.S.D. = 2.241$). The cultivars could be arranged ascendingly according to the infestation levels with aphids as follow: Sids 1 (12.9%), Giza 164 (13.6%), Sakha 8 (15.4%), Sakha 61 (17.3%), Giza 167 (19.7%) and Sakha 69 (21.1%).

Obtained results coincided with those of Kuo-Sell *et al.*, (1987), Ibrahim and Afifi (1991 a), Hussein (1993) and Tsadik (1997). Signsgaard (1997) found that the highest densities of *R. padi* on wheat plants reached 6 aphids per shoot. Also, Milne and Delves (1999) stated that aphids were first found on the crops, 4 week after sowing when numbers were generally low, and the maximum percentage of infested stems ranged from 14-34%.

3- Population density of predators

Catches of predatory species revealed the following species: *Coccinella undecimpunctata*, *Paederus alfieri*, *Chrysoperla carnea*, *Syrphus* sp., *Orius* sp., *Scymnus* sp., and true spiders.

The trend of the population density of the predators on wheat plants depends mainly on the 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), Table (3).

Table (3): Monthly means $\pm$ S.D. of population density of predators on wheat plants at Sakha (Kafr EL- Sheik) and Sids (Beni-Suef) during 1997 /98 and 1998 /99 seasons

Month	Sakha			Sids		
	1997/98	1998/99	Mean	1997/98	1998/99	Mean
Dec.	0.25	0	0.25	2.0 ± 2.0	1.0 ± 1.0	1.5 ± 1.5
Jan.	4.0 ± 3.7	4.75 ± 2.5	4.38 ± 2.9	4.75 ± 1.09	6.75 ± 6.83	6.5 ± 4.85
Feb.	27 ± 6.1	12.5 ± 3.35	19.75 ± 4.4	19 ± 5.2	43.5 ± 7.1	31.2 ± 6.1
Mar.	35.6 ± 18.2	28.2 ± 3.9	31.9 ± 8.4	27.4 ± 7.3	45.2 ± 21.2	36.3 ± 12.7
Apr.	13.2 ± 6.3	9.5 ± 5.1	11.4 ± 5.7	5.2 ± 3.6	10.75 ± 5.3	8.0 ± 4.2

Analysis of variances among the predatory species showed highly significant differences among each other either at Sakha or Sids regions where F values were 17.6 at Sakha and 15.8 at Sids. On the other hand, no significant differences (t value) were found between either each predator species or the total number of predators in the two successive seasons at the same region.

The trend of occurrence of the predatory species in both regions (Sakha and Sids) was recorded. It could be descendently arranged as follow:

C. undecimpunctata (36.1% at Sakha and 35% at Sids.), the most common species.

P. alferii: 19.8 and 18% for Sakha and Sids, respectively.

C. carnea: 16.4% and 16% at Sakha and Sids, respectively.

Syrphus sp.: 9.4% at Sakha and 10% at Sids.

Orius sp.: 7% at Sakha and 8% at Sids.

Scymnus sp.: was the lowest predator, 3.2 and 4% at Sakha and Sids regions, respectively.

True spiders represented an average of 8.1% and 9% at Sakha and Sids regions, respectively.

Generally, no significant difference was found between the total number of predators either within the two regions in the two seasons of 1997/98 and 1998/99 ($t = 1.253$ at Sakha and 1.755 at Sids) or between the mean numbers of the two regions regardless to the season where $t = 0.678$.

The present results coincided with those of Ghanim and EL-Adl (1983, & 1991), EL-Heneidy and Attia (1988), Kiran (1994), Alhag *et al.*, (1996), Abou-Elhagag and Abdel-Hafez (1998) who stated that the most important predators attacking wheat aphids were coccinellids, chrysopids and staphylinids.

4- Rate of parasitism on wheat aphids

Five parasitoids species were identified attacking wheat aphids in the working sites. They were *Aphidius matricariae* Haliday, *Aphidius colemani* Vierech, *Diaeretiella rapae* McIntosh, *Ephedrus* sp. and *Praon* sp. Rate of parasitism was summarized in Table (4). Data showed that the parasitoids started to attack the wheat aphids during the second week of January but in low percentage of parasitism due to the low density of aphids presented in both regions (Sakha and Sids) when % parasitism reached the averages of 0.87 and 1.87% at Sakha and Sids, respectively. As the population densities of the aphids built up, the percentage of parasitism began to increase to reach an average of 6 % at Sakha and 9.62% at Sids in February. The maximum percentages of parasitism 14.1 and 11.9% were found during March, at Sakha and Sids, respectively. By the end of the season (in April) the parasitism percentage declined to 4.37% at Sakha and 3% at Sids due to the downtrend of the number of aphids on the plants.

No significant difference was found either between the two successive seasons of 1997/98 and 1998/99 within region ($t = 0.191$ at Sakha and 0.737 at Sids) or between the two regions regardless to the season where $t = 0.056$.

Table (4): Monthly rate of parasitism on cereal aphids on wheat plants at the two regions (Sakha and Sids) during 1997/98 and 1998/99 seasons different

Sakha				Sids			
Month	Parasitism %			Month	Parasitism %		
	97/98	98/99	Mean		97/98	98/99	Mean
Dec.				Dec.			
Mean $\pm$ S.D.	0	0	0	Mean $\pm$ S.D.	0	0	0
Jan.				Jan.			
Mean $\pm$ S.D.	0.25	1.5	0.87	Mean $\pm$ S.D.	2.5	1.25	1.87
Feb.				Feb.			
Mean $\pm$ S.D.	5.25 $\pm$ 2.6	6.75 $\pm$ 1.09	6 $\pm$ 1.8	Mean $\pm$ S.D.	8.25 $\pm$ 2.28	11 $\pm$ 1.7	9.62 $\pm$ 0.96
Mar.				Mar.			
Mean $\pm$ S.D.	15 $\pm$ 3.17	13.2 $\pm$ 1.47	14.1 $\pm$ 1.96	Mean $\pm$ S.D.	9.8 $\pm$ 2.71	14 $\pm$ 5.21	11.9 $\pm$ 3.89
Apr.				Apr.			
Mean $\pm$ S.D.	3.75 $\pm$ 2.04	5 $\pm$ 3.67	4.37 $\pm$ 2.77	Mean $\pm$ S.D.	3.25 $\pm$ 2.38	2.75 $\pm$ 2.94	3 $\pm$ 2.54

The present results coincided with those of EL-Heneidy (1994) and Abou-Elhagag and Abdel-Hafez (1998) who showed that the peak of parasitoids occurred during March.

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دراسة مقارنة لأنواع من القمح والمفترسات والطفيليات المصاحبة له في منطقتين مختلفتين لزراعة القمح في مصر

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درست حساسية ستة اصناف من القمح هي سدس ١ وسخا ٨ وسخا ٦١ وسخا ٦٩ وجيزة ١٦٤ وجيزة ١٦٧ للإصابة بالمن في منطقتين الاولى في مصر الوسطى ممثلة في محافظة بنى سويف (محطة بحوث سدس) والثانية في منطقة الدلتا ممثلة في محافظة كفر الشيخ (محطة بحوث سخا) خلال موسمي ١٩٩٨/٩٧-١٩٩٩/٩٨. سجلت ثلاث انواع من المن تصيب نبات القمح هي *Rhopalosiphum padi* L., *Schizaphis graminum* R., *Rhopalosiphum maidis* F. تزداد نسبة الإصابة بالمن في المنطقتين خلال شهرى فبراير ومارس، بينما ضعفت الإصابة في باقى الأشهر، اظهرت الدراسة وجود اختلافات معنوية بين سلالات القمح المختلفة حيث امكن ترتيبها تصاعديا حسب نسبة الإصابة الى سدس ١ (١٢,٩%) جيزة ١٦٤ (١٣,٦%) - سخا ٨ (١٥,٤%) - سخا ٦١ (١٧,٣%) - جيزة ١٦٧ (١٩,٧%) - سخا ٦٩ (٢١,١%). سجلت أثناء الدراسة المفترسات التالية مصاحبة للمن وهي ابو العيد ذو الاحدى عشر نقطة ٣٦,١% (سخا) - ٣٥% (سدس) والحشرة الرواغه ١٩,٨% (سخا) و ١٨% (سدس) واسد المن ١٦,٤% (سخا) - ١٦% (سدس) وذبابة السيرفس ٩,٤% (سخا) - ١٠% (سدس) والاوريس ٧% (سخا) - ٨% (سدس) و الاسكمنس ٣,٢% (سخا) - ٤% (سدس) بالإضافة الى العناكب الحقيقية ٨,١% (سخا) - ٩% (سدس). كذلك وجود ٥ انواع من الطفيليات الداخلية على حشرة من القمح هي *Aphidius matricariae* H., *Aphidius colemani* V., *Diaeretiella rapae* M. *Praon* sp. *Ephedrus* sp. تتواكب معدلات التطفل مع اعداد المن حيث كانت متوسطة خلال شهر فبراير ٦% (سخا) - ٩,٦٢% (سدس) وتصل الى اعلى معدلاتها خلال شهر مارس حيث تصل الى ١٤,١% (سخا) - ١١,٩% (سدس ١).