Ass. Univ. Bull. Environ. Res. Vol. 15 No. 1 March 2012

AUCES

PARASITISM ON CABBAGE APHID, *BREVICORYNE BRASSICAE* (LINNAEUS) (HOMOPTERA: APHIDIDAE) ASSOCIATED WITH CANOLA PLANTS IN ASSIUT

M. Z. Embarak; Aiman K. Abou El-Saad and A. A. A. Salem

Plant Protection Res. Institute, Agricultural Research Center, Giza, Egypt

ABSTRACT:

Thirteen cultivars of canola were subjected to evaluate the percentage of parasitism on cabbage aphid, *Brevicoryne brassicae* L. infesting canola plants in the field and laboratory during 2011 season in Assiut Governorate. The rate of parasitism in the field was (7.13%) for all cultivars. The rate of parasitism of the aphid collected from the field and reared in the laboratory was 2.67% times higher than the rate of parasitism in the field at the end of season regardless the canola cultivars. The highest rates of parasitism were recorded with the early ripening cultivars, while the lowest ones were realized with the late ripening cultivars. In the field, the rate of parasitism increased progressively during the third week of February to a peak level (parasitism 43.15%) in the second week of March. Whereas in the laboratory, the highest rate of parasitism (53.06%) was achieved during the last week of February and then the parasitism started to decrease gradually during March. Two primary parasitoids species (*Diaeretiella rapae* McIntosh and *Praon necans* Mackauer, Aphidiidae) and two hyperparasitoids species (*Alloxysta* sp., Cynipidae and *Chalcids* sp., Chalcididae) were associated with cabbage aphids in canola fields. *D. rapae* consider the most important primary parasitoids on *B. brassicae* which represented about 93.93% of the total primary parasitoids in canola field. While, *Alloxysta* sp. was the most hyperparasioid represent 81.67% of the total of the secondary parasitoid. However, the primary parasitoids recorded the most percentage (71.94%) comparison with the percentage of secondary parasitoids (28.06%) from the total parasitoids for primary and secondary parasitoids.

INTRODUCTION:

Canola (*Brassica napus* L.) is one of the main oil crops in many countries especially in Canada, European Union and USA. Cultivation of canola in Egypt may provide an opportunity to overcome some of the local deficit of vegetable edible oil production, particularly it could be successfully grown during winter season in newly reclaimed land outside the old one of Nile valley to get-around the competition with other crops occupied the old cultivated area. (Sharaan, 1986; Ghallab and Sharaan 2002 and Sharaan *et al.*, 2002).

Canola crop is attacked by a number of pests; among these aphids are more serious. Three species of aphids, i.e., cabbage aphid (*Brevicoryne brassicae* L.), turnip aphid (*Lipaphis erysimi* Kalt.) and green peach aphid (*Myzus persicae* Sulz.) are more abundant and widely distributed (Rehman *et al.*, 1987; Lamb,

1989; Boyed, 1994; Buntin and Raymer 1994). Of these, cabbage aphid is the most destructive to the members of Brassicaceae. It forms large colonies on leaves, stems and inflorescence, causes severe distortion of leaves and thus heavy losses to the crops. Aphid infested plants show slow growth, which results in seed yield loss of 9-77%. Aphids also cause an 11% reduction in seed oil content (Kelm and Gadomski, 1995).

Parasitoids species associated with aphids have been previously reported by many investigators. Parasitoids species contribute to aphid suppression factor in two ways: direct mortality cause by the wasp parasitism, and also parasitized aphids have reduce reproductive rate (Hafez, 1961; Knuston *et al*, 1993; Dively and Palton, 1996). On the other hand, Stary (1976) reported that aphid parasitoids are one of the groups of which utilization in biological control has given significant results in many countries.

Therefore, the present study was under taken to determine the percentage of parasitism on cabbage aphid, *B. brassicae* at both field and laboratory. Also, seasonal occurrence of aphid parasitoid species associated with cabbage aphid on canola plants and their hyperparasitoids at laboratory.

MATERIALS AND METHODS:

The experiment of this investigation was conducted at Abnoub district located 25 Km northeast of Assiut city, during 2011 season. An area about half Feddan was chosen and divided into 39 plots. Thirteen canola cultivars viz., Gorczauski, Trebiska, Juno, Hanna, Wesreo, H1 Sakha1, Dichotome, L.L. 84, Pactol, Warszawski, Serw 4, Semundo AX 83 and Laha10 were distributed in a complete randomized blocks with three replicates each. Normal agriculture practices were carried out and no chemical pest control was done. This study included field and laboratory investigations.

In the field, the number of aphids was directly counted each week on five randomly plants from each replicate. At the same time number of parasitized aphids (mummies) was also recorded.

Field parasitism was calculated according to Feng *et al.*, (1992):

$$\text{Field parasitism \%} = A/B+A$$

Where:
A = Total number of mummies.
B = Total number of aphids.

In the laboratory, the experiment was conducted to evaluate the percentage of cabbage aphid parasitized by the primary parasitoids in canola field. Samples of live individuals of *B. brassicae* were collected from canola cultivars (the number of aphids was collected according to the total number of aphids present in the field). The specimens were kept in paper bags and transferred to the laboratory. The numbers of collected aphids were divided into three replicates and caged on canola seedling in plastic pots (7.5 cm in diameter). Aphids were then reared under laboratory conditions and observed daily for more than two weeks to

record the development of mummies. Any observed mummies were removed and individually placed in small vials and stopped with sterile cotton and observed until the adult emergence. Emerging adult parasitoids were examined for species identification according to Pike *et al.*, (1997).

The number of mummies was expressed as percentage of total aphids collected each week in order to simplify comparison between field and laboratory parasitism. Percentage of parasitism in each sampling date was estimated according to Salem (2007), as follows:

$$\text{Laboratory parasitism \%} = A/B \times 100$$

where:
A = Total number of developed mummies.
B = Total number of aphids.

The relationship between the rates of parasitism in the field and those in the laboratory for each cultivar was estimated as:

$$\text{Ratio} = L/F$$

Where:
L = Parasitism in the laboratory.
F = Parasitism in the field.

RESULTS AND DISCUSSION:

1-Parasitism:

A-In the field:

Data in (Table 1) show the percentage of parasitism on cabbage aphid infesting thirteen cultivars of canola in the field. Parasitism started to fluctuate from the last week of January until the middle of March for all canola cultivars, except for the three cultivars, Gorczauski, Trebiska and Laha10 show up gradually during the same period. Regardless canola cultivars, parasitism fluctuated during the first four weeks with insignificant differences, whereas parasitism increased progressively during the next four weeks from (parasitism 1.26%) in the third week of February to a peak level (parasitism 43.15%) in the second week of March with significant difference than the other weeks. The highest percentage of parasitism (13.39%) was recorded for Dichotome cultivar followed by Gorczauski (10.33%), Wesreo (9.78%), Laha10 ((9.66%), Trebiska (8.82%), Serw4 (8.39%), Hanna (7.54%), Pactol (7.52%), H1 Sakha1 (5.68%) and Semundo AX83 (5.07%) with insignificant differences. While, the lowest percentages (1.91%) was obtained with Juno followed by Warszawski (1.93%) and L.L.84 (2.64%) with insignificant differences. The general mean percentage of parasitism in the field was (7.13%) for all cultivars. In harmony with these results, Farsi *et al.* (2010) investigated the population fluctuation of canola aphids and their natural enemies, and reported that the highest percent of the parasitism was 32% in late March, early April and the average percent of parasitism was 13%. Previous studies, in Egypt, have shown different levels of cereal aphid parasitism due to the endemic parasitoids, Ibrahim and Afifi, 1991 (11.3%); Abdel-Rahman *et al*, 2000 (53.75%) and Abdel-Samad and Gomaa, 2004 (12.5% and 16.7% with an average of 14.6%). El Mandarawy *et al.* (2006) mentioned that the rate of parasitism in canola field was highest during March.

B-In the laboratory:

Data in (Table 1) also indicate the percentage of mummies developed in the laboratory from live aphids collected from thirteen canola cultivars. The results clearly confirmed what previously detected in the field. The percentage of parasitism fluctuated from the last week of January until the middle of March for all canola cultivars. Regardless canola cultivars, the percentage of parasitism increased from 1.41% to reach maximum level of 53.06% during the last week of February with significant differences than other weeks, and then the parasitism started to decrease gradually during March. Parallel results were obtained by Feng *et al.* (1992) who found that parasitism was often<10% before the population of aphid approached the peak, but dramatically increased as the aphid population decreased. Gabrys *et al.* (1998) reported that the percentage of parasitism was the minimum at seedling stage, increasing to a peak as the aphid population declined later in the season.

As for canola cultivars, the maximum parasitism attained with Gorczauski (24.44%) cultivar followed by Juno (24.0%), Serw4 (23.53%), Dichotome (22.54%) and L.L.84 (21.96%), Wesreo (21.37%), Semundo AX83 (20.95%), Trebiska (19.51%) with insignificant differences. The minimum parasitism was recorded with Pactol (9.48%) and Hanna (10.17%) with insignificant difference, while the differences between these two cultivars and all previous cultivars were significant. Also, the results indicate that the early ripening cultivars viz., Juno, Wesreo, Dichotome, L.L.84, Semundo AX83 and Laha10 recorded the highest percentage of parasitism (73.33, 86.67, 83.33, 74.44, 66.67 and 41.67%, consecutively) in the first week of March, except for Dichotome cultivar in the fourth week of February. Whereas, the late ripening cultivars viz., Gorczauski, Trebiska, Hanna, H1 Sakha1, Pactol, Serw4 and Warszawski acquired the highest percentage of parasitism (60.0, 57.85, 68.05, 55.51, 24.18, 62.47, 75.0 and 50.0%) in the fourth week of February, except for Pactol cultivar in the second week of February.

As shown in (Table 1), regardless canola cultivars, it is clear that the percentage of parasitism in the field for any given date was always low as compared with that recorded from the aphid collected from the field and reared in the laboratory, except for the last week of investigation in the field was higher than in the laboratory, which may be result from the maximum level of parasitism coincided with the collapse of aphids population in the field. Regarding canola cultivars, the data indicate that the percentage of parasitism in the field was lower than in the laboratory for all cultivars. The two cultivars Juno and L.L.84 recorded the highest rates of parasitism of reared aphids, being 12.57 and 8.32% times higher than the rates of parasitism in the field. Whereas, the lowest rates of parasitism of reared aphids were 1.26 and 1.35% times higher than the rates of parasitism in the field for the two cultivars Pactol and Hanna. As a result of

this, the highest rates of parasitism were recorded with the early ripening cultivars, while the lowest ones were realized with the late ripening cultivars. In general, the rate of parasitism of reared aphids was 2.67% times higher than the rate of parasitism in the field at the end of season regardless the canola cultivars.

2-Parasitoids of cabbage aphid, *B. brassicae:*

The experiment was carried out under laboratory conditions to survey hymenopterous parasitoid species, study the population fluctuation of parasitoids and estimate the rate of parasitism on cabbage aphids, *B. brassicae* infesting canola cultivars during 2011 season.

A-Survey of parasitoids:

The survey revealed the presence of two primary parasitoids species belonging to one family (*Diaeretiella rapae* McIntosh and *Praon necans* Mackauer, Aphidiidae) and two hyperparasitoids species pertaining to two families (*Alloxysta* sp., Cynipidae and *Chalcids* sp., Chalcididae) associated with cabbage aphids in canola fields. El Mandarawy *et al.* (2006) identified *D. rapae* and *Ephedrues* sp. as primary parasitoids for cabbage aphids, *B. brassicae* infesting canola plants, and the hyperparasitoid species, *Alloxysta* sp. occurred associated with the primary parasitoids.

B-Population fluctuation of parasitoids:

Data in (Table 2) indicate that a positive correlation was observed between the percentage of aphids' parasitism and the emergence percentage of parasitoids. The primary parasitoid, *D. rapae* was appeared during the fourth week of January at low level (7 individuals /12 mummies), then the number increased gradually until reach the maximum (245 individuals/324 mummies) represented 85.07% parasitism, then decreased until the end of the season (10 individuals/75 mummies) represented about 16.95% parasitism. All aphid samples were free from the primary parasitoid, *P. necans* until the third week of February, then appeared in the fourth week of February and increasing gradually towards the end of season. On the other hand, the secondary parasitoids were appeared during the third week of February at low level (14.93% parasitism), then increased progressively until the end of the season (72.88%). From the aforementioned results, *D. rapae* consider the most important primary parasitoids on *B. brassicae* which represented about 93.93%, while *P. necans* represented 6.07% of the total primary parasitoids in canola field. However, *Alloxysta* sp. was the most hyperparasioid which represented 81.67% and *Chalcids* sp. represented 18.33% of the total of the secondary parasitoid. Also, the numbers of the secondary parasitoids were increasing comparison with the numbers of the primary parasitoids throughout the end of the season.

Table 1: Parasitism percentages on cabbage aphids infesting some canola varieties under field and laboratory conditions, as well as the rate of parasitism, Arab – Alawamer, Assiut, during 2011 season

Sampling date		Parasitism (%)													Mean
		Gorczauski	Trebiska	Juno	Hanna	Wesreo	H1 Sakha1	Dichotome	L.L. 84	Pactol	Serw 4	Warszawski	Semundo AX 83	Laha 10	
Field	24/01/2011	0.00	0.00	0.00	4.77	0.03	0.00	0.07	0.03	4.77	0.00	0.00	0.00	0.00	0.74 B
	31/01/2011	0.00	0.00	0.57	11.10	0.00	0.00	0.00	2.18	0.00	0.00	0.00	0.60	0.00	1.11 B
	07/02/2011	0.00	0.00	0.00	0.00	0.03	1.60	0.00	0.00	0.00	4.77	0.00	0.00	0.00	0.49 B
	14/02/2011	1.67	0.33	0.03	2.43	0.03	1.37	0.00	0.00	2.57	0.95	2.10	0.10	0.07	0.90 B
	21/02/2011	1.60	3.40	1.20	1.13	0.33	1.27	0.17	0.40	0.53	4.30	1.07	0.90	0.13	1.26 B
	28/02/2011	1.70	3.07	1.43	16.47	2.27	0.97	1.97	1.63	2.73	2.73	2.13	1.00	1.27	3.03 B
	07/03/2011	2.63	3.70	9.43	9.17	14.33	2.53	4.90	3.57	6.70	4.80	9.0	3.47	8.00	6.32 B
	14/03/2011	75.03	60.03	2.63	15.27	61.17	37.70	100.00	13.33	42.87	49.53	1.10	34.50	67.80	43.15 A
	Mean	10.33AB	8.82AB	1.91B	7.54AB	9.78AB	5.68AB	13.39A	2.64B	7.52AB	8.39AB	1.93B	5.07AB	9.66AB	7.13
Laboratory	24/01/2011	0.00	0.00	0.00	0.00	4.14	0.00	0.00	0.48	0.00	0.00	0.00	8.33	5.33	1.41 f
	31/01/2011	0.00	16.67	25.92	0.00	7.02	0.00	9.62	4.52	1.59	9.72	0.00	0.00	8.52	6.43 e
	07/02/2011	8.11	6.41	0.00	0.00	0.00	10.30	9.40	6.31	7.25	11.11	0.00	2.22	9.43	5.43 e
	14/02/2011	4.64	0.97	0.00	0.00	3.59	8.57	2.96	4.00	24.18	0.00	0.00	0.15	4.89	4.15 ef
	21/02/2011	53.33	15.83	16.67	13.33	5.33	13.33	38.33	24.89	10.83	0.00	27.50	37.78	30.00	22.09 c
	28/02/2011	60.00	57.85	43.33	68.05	64.23	55.51	83.33	43.33	12.89	75.00	50.00	36.19	40.00	53.06 a
	07/03/2011	44.44	38.33	73.33	0.00	86.67	24.66	36.67	74.44	2.67	66.67	29.44	66.67	41.67	45.05 b
	14/03/2011	25.00	20.00	32.78	0.00	0.00	20.02	0.00	17.73	16.43	25.75	19.76	16.22	0.00	14.90 d
	Mean	24.44a	19.51abcd	24.00a	10.17e	21.37abc	16.55cd	22.54ab	21.96ab	9.48e	23.53a	15.84d	20.94abc	17.48bcd	19.06
Ratio*		2.37	2.21	12.57	1.35	2.19	2.91	1.68	8.32	1.26	2.81	8.21	4.13	1.81	2.67

Means followed by the same capital letter(s), in the same row, do not significantly different at 0.05 level of probability.
Means followed by the same small letter(s), in the same row, do not significantly different at 0.05 level of probability.
* Parasitism in the laboratory / parasitism in the field.

Table 2 : Number of developed mummies and percentages of primary parasitism on *B. brassicae* reared in the laboratory and hyperparasitoids, Arab–Alawamer, Assiut, during 2011 season

Sampling date	Number of individuals / week																% Parasitism
					Parasitoid species												
					Primary parasitoids						Hyper parasitoids						
					D. rapae		*P. necans*		Total		*Alloxysta* sp.		*Chalcids* sp.		Total		
	No. alive aphids	No. mummies	No. parasitoids	% emergence	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
24/01/2011	621	12	7	58.33	7	100	00.00	00.00	7	100.00	00.00	00.00	00.00	00.00	00.00	00.00	1.86
31/01/2011	621	45	38	84.44	38	100	00.00	00.00	38	100.00	00.00	00.00	00.00	00.00	00.00	00.00	7.24
07/02/2011	1095	83	64	77.11	64	100	00.00	00.00	64	100.00	00.00	00.00	00.00	00.00	00.00	00.00	7.58
14/02/2011	1424	81	63	77.78	63	100	00.00	00.00	63	100.00	00.00	00.00	00.00	00.00	00.00	00.00	5.68
21/02/2011	1358	324	288	88.89	245	85.07	00.00	00.00	245	85.07	27	9.38	16	5.55	43	14.93	23.85
28/02/2011	1102	592	479	80.91	377	78.70	17	3.56	394	82.25	62	12.94	23	4.80	85	17.75	53.73
07/03/2011	907	382	285	74.61	63	22.10	33	11.58	96	33.68	168	58.95	21	7.37	189	66.32	42.12
14/03/2011	497	75	59	78.67	10	16.95	6	10.17	16	27.12	37	62.71	6	10.17	43	72.88	15.09
Grand total	7625	1594	1283	80.49	867	67.58	56	4.36	923	71.94	294	22.92	66	5.14	360	28.06	19.64

In concurrence, according to Zuniga-Salinas (1982) *D. rapae* prefers aphids from Brassica plants, although they have been observed in wheat. Souza and Bueno (1992) was described *D. rapae* as the main primary parasitoid of cabbage aphid, *B. brassicae*. Rosilda and Wedson, (2002) recorded that *D. rapae* was the most common parasitoid during the aphids colonies installation period. It was found that *D. rapae* is an important primary parasitoid of a wide range of aphid species such as cabbage aphid, *B. brassicae* and bird cherry oat aphid, *Rhopalosiphum padi* (Zhang and Hassan, 2003 and Saleh, 2004). Moreover, data in (Table 2) also showed that from a total of 1283 parasitoids developed from 7625 live aphids, there were 923 and 360 individuals represented 71.94% and 28.06% of the total parasitoids for primary and secondary parasitoids. Abou-Attia *et al.* (2003) recorded adverse relation between the total percentage of parasitism by primary parasitoids and the secondary parasitoids.

The results of the present study lead to conclusion that, parasitoids play a role in natural regulating of *B. brassicae* populations in canola fields. Also, live field-collected aphids reared in the laboratory is the more accurate method to assess the intensity of parasitoids attack cabbage aphids. There is sort of synchronization between the growth of mummies population in the field and those developed in the laboratory. The percentage of parasitism was shown later and higher on the early ripening canola cultivars than late ripening canola cultivars.

REFERENCES:

Abdel-Rahman, M.A.A.; M.A.K. Nasser and A.M. Ali (2000): Incidence of hymenopterous parasitoids attacking cereal aphids in wheat fields in Upper Egypt. Assiut J. Agric. Sci., 31 (2): 317-328.

Abdel-Samad, S. S. M. and A. A. Gomaa (2004): Seasonal abundance of cereal aphids and their endoparasitoids on wheat plants at El-Fayoum Governorate. Ann. Agric. Sci., Ain Shams Univ., Cairo, 49(2): 793-803.

Abou-Attia, F. A.; H. A. Boraei; F. M. Agamy and A. K. S. Fathia (2003): Survey and population fluctuation of primary and secondary parasitoids of some aphid species on four crops and parasitoid of *Coccinella undecimpunctata* at Kafer El-Sheikh. The first Int. Egyptian-Romanian Conf., Zagazig, Egypt, (Dec., 6-8), 61-75.

Boyed, M. L. (1994): Seasonal incidence of aphids and aphid parasitoid, *Diaeretiella rapae* (M'Intosh) (Hymenoptera: Aphidiidae) on rapeseed in Tennessee. Environ. Entomol., 23 (2): 349-353.

Buntin, G. D. and P. L. Raymer (1994): Pest status of aphid and other insects in winter canola in Georgia. J. Econ. Entomol., 87 (4): 1097-1104.

Dively, G. and T. Palton (1996): Integrated pest management report. University of Maryland, Pest Management Program, 5: 1-6.

El Mandarawy, M. B. R.; M. A. Z. El-Naggar and M. M. Khewa (2006): Infestation of

the oilseed crop, canola with aphids and their associated parasitoids in northern Egypt. Egyptian German Soc. Zool., VOL. 49; PART E, pages 1-12.

Farsi, A.; F. Kocheyli; E. Soleymannezhadian and Y. A. Khajehzadeh (2010): Population dynamics of canola aphids and their dominant natural enemies in Ahvaz. Plant Protection (Sci. J. Agric.) 32 (2): 55-65.

Feng, M. G.; J. B. Johnson and S. E. Halbert (1992): Parasitoids (Hymenoptera: Aphididae) populations in irrigated grain in Southwestern Idaho. Environ. Entomol., 21 (6): 1433-1440.

Gabrys, B.; H. Gadomski; G. Sobota; A. halarewicz-Pacon; V. H. Paul (ed.); K. kohn (ed.); J. Thomas (ed.) and P. D. Dapprich (1998): Reduction of the cabbage aphid, *Brevicoryne brassicae* (L.), population by *Diaeretiella rapae* (McIntosh) on oilseed rape, white mustard, and brassica vegetables. Bulletin, OILB-SROP Bull., 21: 197-223.

Ghallab, K.H. and A.N. Sharaan (2002): Selection in canola (*Brassica napus* L.) germplasm under conditions of newly reclaimed land. II. Salt tolerant selections. Egypt. J. Plant Breed. 6(2): 15-30.

Hafez, M. (1961): Seasonal fluctuation of population density of the cabbage aphid, *Brevicoryne brassicae* L. in the Netherlands, and the role of its parasite, *Aphidius* (*Diaeretiella*) *rapae* (CURTIS). T. PI. Ziekt, 67: 1-104.

Ibrahim, A. M. and A. I. Afifi (1991): Seasonal fluctuation of English grain aphid, *Sitobion avenae* (Feb.) (Hom.: Aphididae) on wheat and its primary parasitoids hyperparasitoids in Giza Governorate, Egypt. Bull. Fac. Agric., Univ. Cairo, 42: 167-182.

Kelm, M. and H. Gadomski (1995): Occurrence and harmfulness of the cabbage aphid (*Brevicoryne brassicae* L.) on winter rape. Materially Sesji Instytutu Ochrony roslin. 35: 101–3.

Knuston, A.; E. P. Boring; G. J. Michaels and F. Gilstrap (1993): Biological control of insect pests in wheat. Texas Agric. Ext. Service Publication B-5044, p. 8.

Lamb, R.J. (1989): Entomology of oilseed crops. Ann. Rev. Entomol.. 34: 211-233.

Pike, K. S.; P. Stary and T. Allison (1997): Small-grain aphid parasitoids (Hymenoptera: Aphelinidae and Aphidiidae) of Washington: Distribution, relative abundance, seasonal occurrence, and key to known North American species. Environ. Entomol., 26: 1299-1311.

Rehman, K.A.; M. Munir and A. Yousaf (1987): Rape and mustard in Pakistan. p. 101 PARC Islamabad.

Rosilda, M. M. and De. F. Wedson (2002): Occurrence of *Diaretiella rapae* (Mc´Intosh, 1855) (Hymenoptera: Aphidiidae) Parasitising *Lipaphis erysimi* (Kaltenbach,1843) and *Brevicoryne brassicae* (L. 1758) (Homoptera:

Aphididae) in *Brassica napus* in Mato Grosso do Sul. Brazilian Archives of Biology and Technology. 45 (1):41- 46 pp.

Saleh, Al A. (2004): Mass production and field application of some aphid natural enemies. Ph. D. Thesis, Fac. Agric., Mansoura Univ., p. 161.

Salem, A. A. A. (2007): Population dynamics and seasonal distribution of cereal aphids and their parasitoids in wheat fields in Upper Egypt. Ph. D. Thesis, Fac. Agric., Assiut Univ., p. 150.

Sharaan, A. N. (1986): Variation in character expression in rapeseed (*Brassica napus* L.) cultivars in relation to environmental changes. Bull. Fac. Agric., Univ. Cairo. 37 (1): 35-48.

Sharaan, A. N.; K. H. Ghallab and K. M. Yousif (2002): Performance and water relations of some rapeseed genotypes grown in sandy loam soils under irrigation regimes. Ann. Agric. Sci., Moshtohor, 40(2): 751-767.

Souza, B. M. De. and V. H. P. Bueno (1992): Parasitóide e hiperparasitóide de múmias de *Brevicoryne brassicae* (Linnaeus, 1758) (Hemiptera-Homoptera: Aphidiidae). *Revista de Agricultura*, 67 (1): 55-62.

Stary, P. (1976): Parasite spectrum and relative abundance of parasites of cereal aphids in Czehoslovakia (Hymenoptera: Aphidiidae; Homoptera: Aphidoidae) Acta Entomol. Bohemoslav., 73: 216-223.

Zhang, W. Q. and S. A. Hassan (2003): Use of the parasitoid, *Diaeretiella rapae* (McIntosh) to control the cabbage aphid, *Brevicoryne brassicae* (L.). Chin. J. Appl. Entomol., 127: 522-526.

Zuniga-Salinas, E. (1982): Controle biológico dos afídeos do trigo (Homoptera: Aphididae) por meio de parasitóides no planalto médio do Rio Grande do Sul, Ph.D. Thesis, Brasil. UFPR-Curitiba, p. 319.

Ass. Univ. Bull. Environ. Res. Vol. 15 No. 1 March 2012

التطفل في حشرة من الكرنب *Brevicoryne brassicae* (Linnaeus) المتواجد على نباتات الكانولا في أسيوط

ماجد زاهي إمبارك، أيمن كامل أبو السعد، علاء الدين عبد القادر أحمد سالم

معهد بحوث وقاية النباتات- مركز البحوث الزراعية- الجيزة- جمهورية مصر العربية

أجريت هذه الدراسة على ثلاثة عشر صنف من الكانولا لتعيين نسبة التطفل على من الكرنب *Brevicoryne brassicae* الذي يصيب نباتات الكانولا في الحقل والمعمل خلال موسم ٢٠١١ في محافظة أسيوط .

أوضحت النتائج المتحصل عليها أن معدل التطفل في الحقل بلغ (٧,١٣٪) بغض النظر عن أصناف الكانولا. في حين أن المن الذي تم جمعه من الحقل من الأصناف محل الدراسة، وتم تربيته في المعمل، بلغت نسبة التطفل عليه (٢,٦٧٪) مرة أعلى من معدل التطفل الحادث في الحقل بغض النظر عن أصناف الكانولا.

أيضا أظهرت النتائج أن أعلى معدل للتطفل كان على الأصناف المبكرة النضج بينما معدلات التطفل الأقل سجلت على الأصناف متأخرة النضج. أيضاً اتضح أن معدل التطفل في الحقل بدأ يزداد بداية من الأسبوع الثالث من فبراير ليصل إلى أعلى معدل (٤٣,١٥٪) في الأسبوع الثاني من مارس. بينما في المعمل وجد أن أعلى معدل للتطفل (٥٣,٠٦٪)، قد حدث في الأسبوع الأخير من فبراير ثم بدأ بعد ذلك يقل تدريجياً خلال شهر مارس.

من خلال حصر أنواع الطفيليات المتواجدة على الكرنب المتواجد في حقول الكانولا ، وجد نوعان من الطفيليات الأولية هما: *Diaeretiella rapae* & *Praon necans*، ونوعان من الطفيليات الثانوية هما: *Alloxysta* sp. & *Chalcids* sp.. أيضاً أوضحت النتائج أن *D. rapae* ، ويعتبر الطفيل الأول الأكثر أهمية حيث مثل (٩٣,٩٣٪) من المجموع الكلي للطفيليات الأولية في الحقل. بينما الطفيل *Alloxysta* sp. كان الأكثر سيادة بالنسبة للطفيليات الثانوية حيث شكل (٨١,٦٧٪) من المجموع الكلي للطفيليات الثانوية. ومع ذلك وجد أن الطفيليات الأولية شكلت النسبة الأعلى (٧١,٩٤٪) مقارنة بالطفيليات الثانوية التي شكلت (٢٨,٠٦٪) من المجموع الكلي للطفيليات الأولية والثانوية.