

## POPULATION FLUCTUATIONS OF THE CABBAGE WEBWORM *Hellula undalis* FABRICIUS IN CABBAGE AND CAULIFLOWER FIELDS.

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### ABSTRACT

An experiment on the population fluctuations of the cabbage webworm, *Hellula undalis* Fabricius immature stages (eggs and larvae) in cabbage and cauliflower fields was carried out at Auseem village, Giza Governorate during two successive years; 2004 and 2005. Results revealed that this insect was abundant during late summer and the autumn, throughout the two years of study. On the two host plants, two high peaks of the larval population occurred in the 1<sup>st</sup> year during July and October as compared with three ones in the 2<sup>nd</sup> year throughout the period from July to the beginning of November. It was found that August, September and October had the highest abundance of this insect as compared with May, June and December which had the lowest counts. July and November came to the second grade. Therefore, any attempt to control this insect pest, efficiently must be performed during late summer and the autumn.

**Keywords:** cabbage, cauliflower, population fluctuation, cabbage webworm, *Hellula undalis* Fabricius.

### INTRODUCTION

Cruciferous crops are attacked under field conditions by many insect pests in Egypt. Several species of lepidopterous insects represent the most important pest group infesting these crops. Cabbage webworm *Hellula undalis* Fabricius is one of the major insects on cabbage and cauliflower plants in Egypt as well as in many countries in the Middle East. It is of highly economic importance, where it causes considerable damage to crucifers, especially under high densities of its populations which lead to complete defoliation and / or lessens the marketable value of these two Cruciferous crops (Harakly, 1968 and Kamel, 1989). Field experiment was conducted to add some knowledge on the dynamics of this insect pest population under ecosystem conditions of the cabbage and cauliflower fields in Egypt.

### MATERIALS AND METHODS

The present study was conducted along two successive years; 2004 and 2005 at Auseem village, Giza Governorate. In the 2<sup>nd</sup> week of May, about 1¼ feddan was cultivated with both Cabbage and cauliflower seedlings (1/8 feddan for each crop) at 40 and 80cm between hills and rows, respectively.

One month later, another 1/8 feddan for each plant was cultivated adjacent to the first area. All agricultural practices were normally applied. No chemical control was performed.

From the last week of May till the last week of December along both two years, twenty five randomized plants were visually examined in the field at weekly intervals for eggs and larval stages of the cabbage webworm *H.*

*undalis* Fabr. Small pieces of leaves that had any of the two stages were cut and put into paper bags with suitable size and tightly closed then taken to the laboratory. Number of eggs and larvae per plant was calculated. Obtained data were statistically analyzed according to Snedecor, 1980.

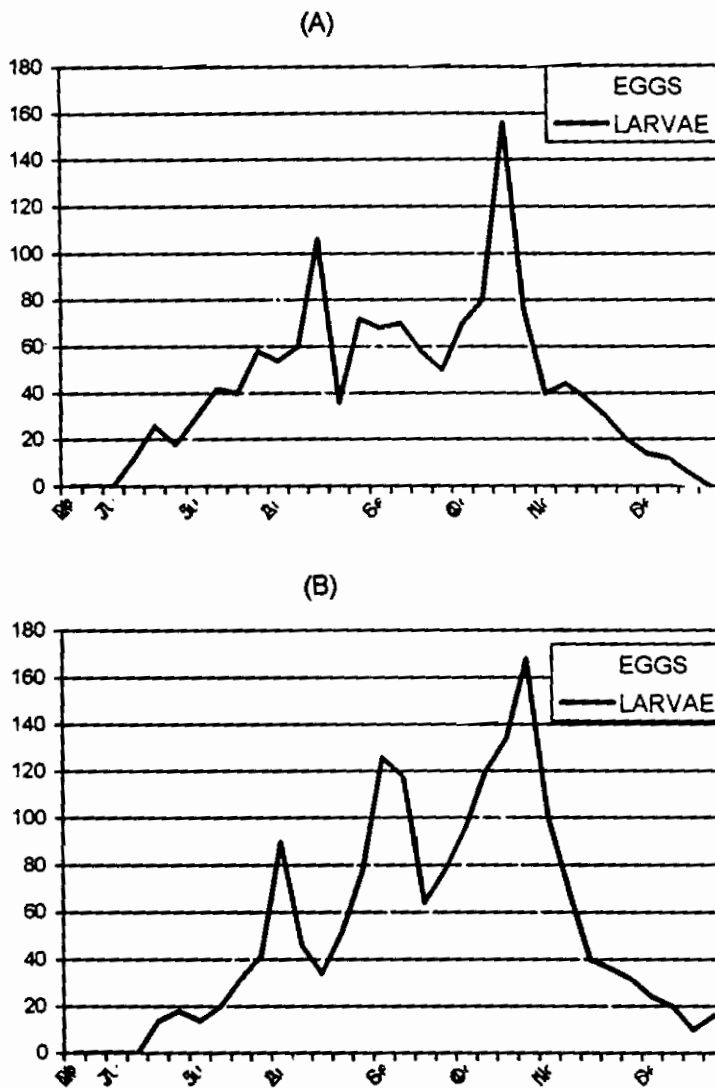
## RESULTS AND DISCUSSION

### 1- Population fluctuations of *Hellula undalis* on cabbage plants:

Data presented in table 1 and figure 1, indicate the population dynamics of *Hellula undalis* eggs and larvae on cabbage plants throughout the two successive years 2004 and 2005.

**Table 1: Number of *Hellula undalis* immatures ( eggs and larvae ) on cabbage and cauliflower plants at Ausem village Giza Governorate throughout 2004 and 2005 seasons.**

Date	Number of immatures per 25 plants							
	2004				2005			
	Cabbage		Cauliflower		Cabbage		Cauliflower	
	eggs	larvae	eggs	larvae	eggs	larvae	eggs	larvae
May24	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0
Jun. 7	5	0	0	0	0	0	0	0
14	8	12	3	0	6	0	0	0
21	14	26	7	10	3	14	2	4
28	12	18	5	22	16	18	18	14
Jul. 5	24	30	14	16	11	14	31	40
12	29	42	21	28	10	20	53	44
19	36	40	25	30	58	32	44	60
26	45	58	32	44	22	42	30	24
Aug. 2	86	54	49	58	27	90	33	28
9	61	60	40	74	25	46	39	34
16	43	106	26	32	39	34	48	42
23	31	36	25	30	59	52	45	60
30	53	72	65	42	92	78	59	56
Sep. 6	64	68	48	54	66	126	94	76
13	48	70	55	52	43	118	66	80
20	69	58	68	70	56	64	40	112
27	55	50	91	66	70	78	32	84
Oct. 4	63	70	73	128	81	96	45	78
11	117	80	51	60	106	120	49	58
18	105	156	43	54	99	134	57	62
25	69	76	14	58	68	168	88	70
Nov.1	35	40	17	30	53	100	52	92
8	22	44	8	20	50	68	31	50
15	23	38	3	28	32	40	14	38
22	11	30	6	8	19	36	9	22
29	6	20	6	14	7	32	5	8
Dec. 6	6	14	4	10	12	24	7	12
13	2	12	0	0	9	20	3	4
20	0	6	0	0	6	10	0	0
27	0	0	0	0	6	16	0	0



**Fig.1 : Population fluctuations of the cabbage web worm *Hellula undalis* Fabricius immatures (eggs and larvae) on cabbage plants at Auseem village, Giza Governorate along 2004 (A) and 2005 (B) seasons.**

From the date of inspection in the last week of May, and through 4 weeks later, the insect population did not exceed 8 eggs, 12 larvae / 25 plants in the 1<sup>st</sup> season and 6 eggs, 0 larvae / 25 plants in the 2<sup>nd</sup> season. In the 1<sup>st</sup> season an obvious increase in its populations occurred reaching the 1<sup>st</sup> peak with count of 86 of eggs and 106 of larvae / 25 plants at August 2, 16, respectively, while the 2<sup>nd</sup> peak recorded to 117 eggs and 156 larvae / 25 plants in October 11 and 18, respectively. In the 2<sup>nd</sup> season, three peaks of

eggs and larval populations take its place at July 19, August 30 and October 11, for eggs with counts of 58, 92 and 106 eggs / 25 plants were recorded, respectively, while three larval peaks; 90, 126 and 186 larvae / 25 plants were found in August 2, September 6 and October 25, respectively. From the beginning of December until the end of investigation period in December 27, eggs and larval populations came to the least count, where no more than 6 eggs and 16 larvae / 25 cabbage plants were observed.

As indicated in table 2, a total of 1174 eggs and 1386 larvae of the cabbage webworm were collected in the first season as compared with 1151 and 1790 of the two respective stages were obtained in the second season. Along the first season, the period from August to October had the greatest portion of the insect population, 864 eggs and 956 larvae, representing 73.6 and 68.9% of the total number collected from the two stages, respectively, as compared with 831 eggs and 1340 larvae which represented 72.2 and 74.9% of the total collected numbers of the two respective stages in the second season. Both July and November altogether ranked the second, where 24.8% of eggs and 24.7% of larvae were collected in the first season and 22.8 and 21.4% of the total collected eggs and larvae, respectively, in the second season. Throughout the two seasons of the study, it is found that May, June and December had the least counts of this insect population.

**Table 2: Seasonal abundance of the cabbage webworm *Hellula undalis* immature stages in cabbage fields at Ausem village, Giza Governorate during 2004 and 2005 seasons.**

Month	Number of immature stages on 25 cabbage plants							
	2004				2005			
	Eggs		Larvae		Eggs		Larvae	
	Total	Weekly Mean	Total	Weekly mean	Total	Weekly Mean	Total	Weekly mean
May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
June	39.0	9.7	56.0	14.0	25.0	6.2	32.0	8.0
July	134.0	33.5	170.0	42.5	101.0	25.2	108.0	27.0
August	274.0	54.8	328.0	65.6	242.0	60.5	300.0	75.0
September	236.0	59.0	246.0	61.5	235.0	58.9	486.0	121.5
October	354.0	88.5	382.0	95.5	354.0	88.5	518.0	129.5
November	97.0	24.2	172.0	34.4	161.0	40.2	276.0	69.0
December	8.0	2.0	32.0	8.0	33.0	8.2	70.0	17.5
Total	1174.0		1386.0		1151.0		1790.0	
G. mean		34.0		43.3		36.0		55.9
LSD 5%		21.49		31.92		27.55		32.30
LSD 1%		29.38		43.63		37.65		44.14

**2- Population fluctuations of *Hellula undalis* on cauliflower plants:**

Data presented in table 1 and illustrated in figure 2, show the population density of *Hellula undalis* eggs and larvae on cauliflower plants throughout the two successive years 2004 and 2005.

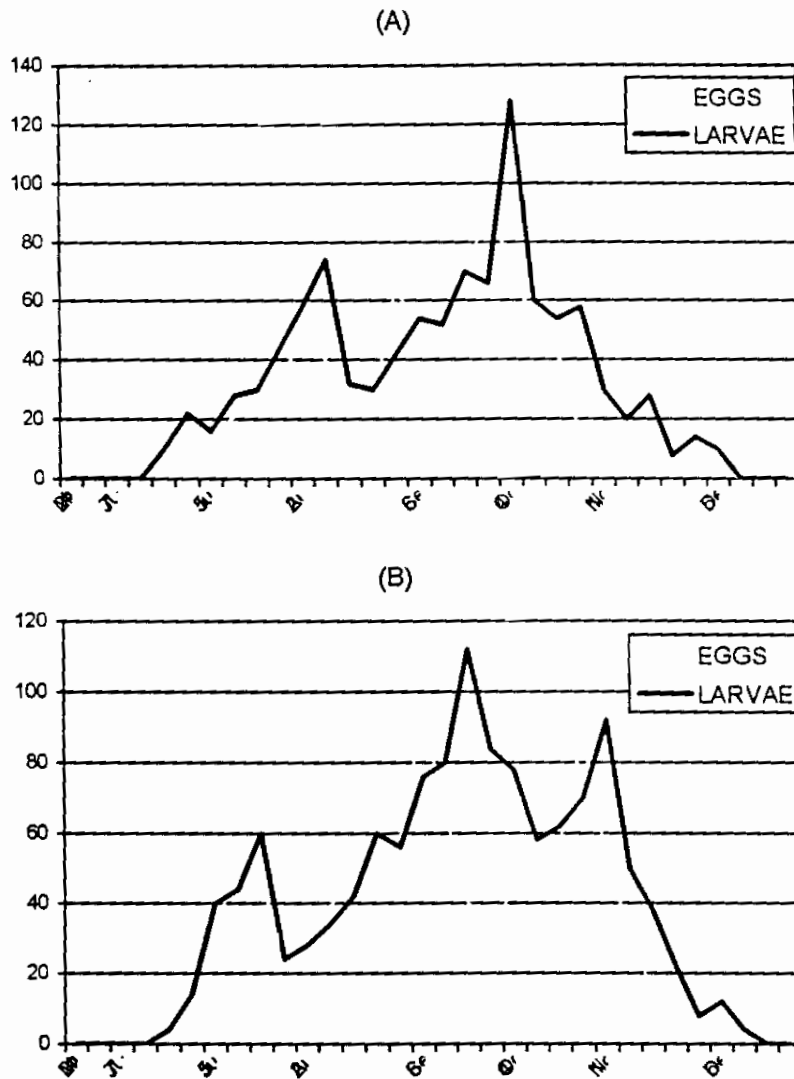


Fig.2 : Population fluctuations of the cabbage web worm *Hellula undalis* Fabricius immatures (eggs and larvae) on cauliflower plants at Auseem village, Giza Governorate along 2004 (A) and 2005 (B) seasons.

Population fluctuations of the two studied stages (eggs and larvae) had a similar trend of that occurred on the cabbage plants. Two high peaks were observed throughout the first season with 49 and 91 eggs /25 plants in August2 and September27, respectively. For larval population, the 1<sup>st</sup> peak (74 individual / 25 plants on) was recorded at August 9, while the 2<sup>nd</sup> and higher peak occurred on October, 4 with 128 larvae/ 25 plants. In the second season, three eggs and larval population peaks occurred in July 12,

September 6, and October 25, respectively, for eggs with respective counts of 53, 94 and 88 eggs / 25 plants. The three larval population peaks reached 60, 112 and 92 larvae / 25 plants on July 19, September 20 and November 1, respectively. After the last peak in the two seasons, eggs and larval populations greatly decreased till it approximately, ceased from the second week of December, where it did not exceed 3 eggs and 4 larvae / 25 plants until the end of the investigation period in December 27.

Data presented in table 3, revealed that a total of 799 eggs and 1038 larvae of the cabbage webworm were collected in the first season on cauliflower plants as compared with 986 and 1192 of the two respective stages were obtained in the second season. The period from August to October had the greatest portion of the insect population (648 eggs, 778 larvae) representing 81.1 and 68.4% of the total collected numbers of the two respective stages for the first season as compared with 687 eggs and 840 larvae in the second season which represented 69.7 and 70.5% of the total collected numbers of the two respective stages. Both July and November altogether ranked the second, where they had 16.5 and 19.2% of both eggs and larvae in the first season. In the second season, 27.3 and 26.7% of the total collected eggs and larvae, respectively, were obtained. May, June and December had the least count of this insect population.

**Table 3: Seasonal abundance of the cabbage webworm *Hellula undalis* immature stages in cauliflower fields at Auseem village, Giza Governorate during 2004 and 2005 seasons.**

Month	Number of immature stages on 25 cauliflower plants							
	2004				2005			
	eggs		larvae		eggs		larvae	
	Total	Weekly mean	Total	Weekly mean	Total	Weekly mean	Total	Weekly mean
May	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
June	15.0	3.7	32.0	8.0	20.0	5.0	18.0	4.5
July	92.0	23.0	118.0	29.5	158.0	39.5	108.0	27.0
August	205.0	41.0	236.0	47.2	224.0	48.8	220.0	44.0
September	262.0	65.5	242.0	60.5	232.0	58.0	352.0	88.0
October	181.0	45.2	300.0	75.0	231.0	57.8	268.0	67.0
November	40.0	8.0	100.0	20.0	111.0	22.2	210.0	42.0
December	4.0	1.0	10.0	2.5	10.0	2.5	16.0	4.0
Total	799.0		1038.0		986.0		1192.0	
G. mean		24.9		32.4		30.8		37.2
LSD 5%		22.12		25.87		24.49		22.92
LSD 1%		30.24		35.36		33.47		31.33

Results of the present study agree with the findings of, Kirby and Slosser, 1984. and Sivapragasam and Abdul Aziz, 1990, who recorded 2-3 peaks a year of the cabbage webworm in cruciferous fields. In addition, Talekar and Lee, 1985, reported that the highest population of this insect occurred during the fall. On the other hand, Vail, et.al, 1991 and Walangululu, and Mushagalusa, 2000, mentioned that the cabbage and cauliflower fields were free from the cabbage webworm through May-June and December.

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### تذبذبات تعداد حفار ساق الكرنب *Hellula undalis* Fabricius في حقول الكرنب والقرنبيط

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أجريت دراسات على ديناميكية تعداد الأطوار غير الكاملة (البيض واليرقات) لحفار ساق الكرنب *Hellula undalis* Fabricius في حقول الكرنب والقرنبيط بمحافظة الجيزة في الموسمين المتتاليين ٢٠٠٤، ٢٠٠٥، وقد أوضحت النتائج تواجد هذه الآفة الحشرية بوفرة في أواخر الصيف وطوال الخريف على كلا المحصولين، فعلى الكرنب سجلت قمتان للتعداد في الموسم الأول ٢٠٠٤ وذلك في الأسبوع الأول من أغسطس والثاني من أكتوبر للبييض، وفي الأسبوع الثالث لكلا الشهرين بالنسبة لليرقات، وفي الموسم الثاني ٢٠٠٥ سجلت ثلاث قمم للتعداد في يوليو (الأسبوع الثالث) وأغسطس (الأسبوع الأخير) وأكتوبر (الأسبوع الثاني) بالنسبة للبييض، وفي الأسبوع الأول لكل من أغسطس وسبتمبر والأسبوع الأخير من أكتوبر بالنسبة لليرقات، وكان للحشرة نفس الاتجاه على نباتات القرنبيط فقد وجد لها قمتان في الموسم الأول وثلاث قمم في الموسم الثاني، حيث سجلت قمم تعداد البيض في الأسبوع الأول من كل من أغسطس وسبتمبر، وفي الأسابيع الثاني والأول والأخير لكل من يوليو وسبتمبر وأكتوبر، للموسمين على التوالي، أما قمم تعداد اليرقات فقد تم تسجيلها في الأسبوع الثاني من أغسطس والأول من أكتوبر للموسم الأول، وفي الأسبوع الثالث من يوليو والثالث من سبتمبر والأول من نوفمبر للموسم الثاني، على التوالي، من ناحية أخرى فقد أظهرت النتائج انخفاض تعداد الحشرة بدءاً من النصف الثاني من نوفمبر، كما أوضحت النتائج سلامة حقول الكرنب والقرنبيط من الإصابة بالحشرة في أشهر مايو ويونيو وديسمبر حيث توقف نشاطها أو تواجدها بأعداد نادرة، وعلى ذلك فالخريف هو أنسب الأوقات لتنفيذ أى برنامج لمكافحة هذه الآفة على النباتات الصليبية نظراً لتواجدها بأعلى كثافة في هذه الفترة.