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ECOLOGICAL STUDIES ON THE IMMATURE STAGES OF THE COTTON LEAFWORM *SPODOPTERA LITTARALIS* (BOISD.) IN SHARKIA GOVERNORATE

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Abstract

The present work was carried out to study the population density of the imature stages of the cotton leafworm *Spodoptera littoralis* Boisd. in Berseem fields . Samples of egg-masses taken from 15 locations over 4 years had shown that the pest had 3 generations. The first started in the third week of May, the second in the third week of June and the third in the first week of August . The second generation was the largest as indicated by the number of egg-masses collected. The second generation came next followed by the first . No significant differences were found between the immature stages collected from the several localities. The least number of immatures occurred during March, and the highest during May.

INTRODUCTION

The present study is an attempt to get more information about the size and distribution of the immature stages of the cotton leafworm *Spodoptera littoralis* Boisduval in Sharkia governorate. Several attempts were formerly carried out in this regard (Bishara, 1934 and 1936; Nasr, 1961; Nasr *et al.*, 1980; Abul-Nasr and Naguib , 1966; Abul-Nasr *et al.*, 1966 a and b ; Isshak and Abdel -Megeed, 1975; Wissa, 1978).

MATERIALS AND METHODS

Population density of egg-masses of *S.littoralis*

Three differnt zones were chosen for this study. The north zone represented by the five districts El-Huseniya, Faquos, Awlad -Sukr, Kafr-Sukr and Abu-Kebir. The second (middel zone) was represented by the four districts Hihya, Ibrahimiya, Diyarb-Negm and Abu-Hammad. The third one(Southern zone) was represented by the five districts Zagazig, El-Qenayate, Bilbes, Minia El-Qamh, and Mashtol. Egg-masses on cotton at each of the four mentioned localities were counted daily starting from approximately the second week of May until mid August.

Population density of larvae and pupae of *S. littoralis* in berseem fields

This experiment was carried out in Sharkia Governorate during the 4 successive years 1984, 85, 86 and 1987.

Ten localities were chosen for estimating the population density of the immature stages of the cotton leafworm. Soil samples 50x50x10 cm depth were examined and number of larvae and pupae were counted monthly in berseem before cotton plantation.

Samples were taken during the period from March 6th until May 18th through the four successive years.

RESULTS AND DISCUSSION

The northern zone (El-Huseinya, Faquous, Awlad-Sukr, Kafr-Sukr and Abu-Kebir.

The number of egg-masses collected during the four successive cotton seasons indicated that the cotton leafworm moths began depositing their eggs on cotton starting from the last week of May until the beginning of August.

The first generation

As shown in Table 1 and Figs. 2-5 , the first generation during the years 1984, 85, 86 and 1987 had few number of egg-masses.

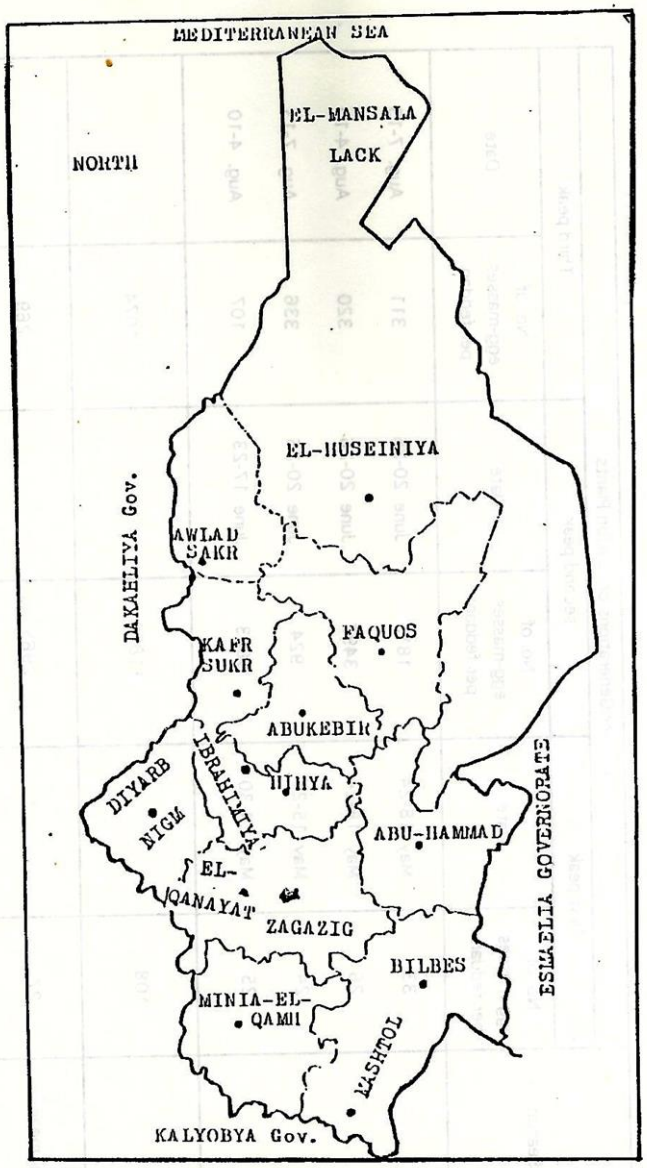

Fig 1. Zones under investigation

Table 1. Trend of *S. littoralis* egg-masses per feddan during the peaks of the three generations on cotton in the Northern zone (1984-1987)

Season	Summer Generations on Cotton Plants					
	First peak		second peak		Third peak	
	No. of egg-masses per feddan	Date	No. of egg-masses per feddan	Date	No. of egg-masses per feddan	Date
1984	33	May 18-24	1815	June 20-26	311	Aug. 7-13
1985	26	May 18-24	3497	June 20-26	320	Aug. 4-10
1986	24	May 15-21	924	June 20-26	336	Aug. 7-13
1987	25	May 24-30	5623	June 17-23	107	Aug. 4-10
Total	108		11859		1074	
General mean	27		2965		269	

Table 2. Trend of *S. littoralis* egg-masses per feddan during the peaks of the three generations on cotton in the Middle zone (1984-1987)

Season	Summer Generations on Cotton Plants					
	First peak		second peak		Third peak	
	No. of egg-masses per feddan	Date	No. of egg-masses per feddan	Date	No. of egg-masses per feddan	Date
1984	31	May 18-24	1908	June 20-26	193	Aug. 1-7
1985	160	May 21-27	2262	June 17-23	129	Aug. 1-7
1986	92	May 21-27	1418	June 20-26	322	Aug. 7-13
1987	151	May 27-2 Jun.	6275	June 17-23	345	Aug. 4-10
Total	434		11863		989	
General mean	109		2966		247	

Table 3. Trend of *S. littoralis* egg-masses per feddan during the peaks of the three generations on cotton in the third zone (1984-1987).

Season	Summer Generations on Cotton Plants					
	First peak		second peak		Third peak	
	No. of egg-masses per feddan	Date	No. of egg-masses per feddan	Date	No. of egg-masses per feddan	Date
1984	32	May 20-26	2063	June 20-26	221	Aug. 1-7
1985	231	May 24-30	4150	June 20-26	378	Aug. 7-13
1986	48	May 18-24	947	June 23-29	323	Aug. 1-7
1987	97	May 27-2 Jun.	10448	June 23-29	239	Aug. 4-10
Total	408		17608		1161	
General mean	102				290	

Table 4. Number of larvae and pupae of *S. littoralis* in 20 soil samples (5 m^2 x 10 cm depth) in Berseem fields at 10 localities in Sharkia Province during March, April, and May (1984-1987 seasons).

Localities	Summer Generations on Cotton Plants															
	March				April				May				Total			
	1984	85	86	87	1984	85	86	87	1984	85	86	87	1984	85	86	87
Diyarb-Nigm	25	5	6	11	17	17	8	16	13	29	32	57	32	51	46	84
Manshia-Qasem	13	3	3	5	4	13	13	17	11	41	21	29	16	57	37	51
Ibrahimiya	50	0	3	6	4	10	5	10	10	18	22	42	19	28	30	58
Sharkiat-Mebasher	34	4	4	6	8	12	5	10	22	12	25	35	33	28	34	51
Hihya	23	3	2	4	13	15	8	10	11	18	12	15	26	36	22	29
Sobiah	82	2	5	8	3	10	7	14	15	11	16	27	26	23	28	49
Zankaloon	35	5	3	6	4	10	7	14	11	16	24	43	18	31	34	63
Elmesalmya	13	3	1	3	4	6	6	8	24	27	21	26	29	36	28	37
Fequos	33	3	4	6	4	5	9	13	10	9	15	26	17	17	28	45
Ellnamroot	35	5	1	4	7	11	7	11	14	16	9	19	24	32	17	34
Total	31	33	32	59	68	109	75	125	141	197	197	319	240	339	304	501
Average	3.1	3.3	3.2	5.9	6.8	10.9	7.5	12.3	14.1	19.7	19.7	31.9	24.0	33.9	30.4	50.1

Table 5. Total numbers of larvae and pupae of *S. littoralis* (in 5 m^2 x 10 cm depth) of Berseem fields at 10 localities during four successive seasons (84, 85, 86, and 1987).

Localities	March	April	May	Total	$\bar{X}$
Diyarb-Nigm	24	58	131	213	71.00
Manshia-Qasem	12	47	102	161	53.67
Ibrahimiya	14	29	92	135	45.00
Sharkiat-Mebasher	17	35	94	146	48.67
Hihya	11	46	56	113	37.67
Sobiah	23	34	69	126	42.00
Zankaloon	17	35	94	146	48.67
Elmesalmya	8	24	98	130	43.33
Fequos	16	31	60	107	35.67
Ellnamroot	13	36	58	107	35.67
Total	155	375	854	1384	
$\bar{X}$	15.5	37.5	85.4		

F value = 9.373** between date of inspections.
F value = 0.140 between localities.

The second generation

The peak of the second generation occurred almost at the same date observed for the years 1984, 1985 and 1986 seasons (26th of June). In 1987 season, the peak of the second generation was three days earlier. The egg-masses of the second generation in 1987 was larger in its number than in the former three years.

The third generation

Peak of the third generation occurred in the first week of August in all seasons of 1984-1987. The number of egg-masses of this generation was higher in 1986 than the corresponding generations of the years 84, 85 and 1987.

The middle zone (Hihya, Ibrahimiya , Diyarb-Negm and Abu-Hammad)

According to the data tabulated in Table 2 and illsutrated in Figs. 2-5 the trend of the three summer generations was as follows

The first generation

The first generation in cotton fields was very weak giving a small number of egg-masses.

The second generation

It appeared on the 26th of June in 1984 and 1986 seasons, but in 1985 and 1987 the peak was three days earlier. The second generation in 1987 had the higher number of egg-masses compared with the former years.

The third generation

The peak of this generation occurred in the second week of August in 1986 and 1987, but in 1984 and 1985 the peak was in the first week of August. Also this generation was higher in the number of egg-masses during the season of 1987 than the previous seasons of 1986, 1984 and 1985.

Table 6. Differences between the mean number of *S. littoralis* larvae and pupae per month during three months (Sharkia Province during March, April and May for the years 1984, 85, 86 and 1987).

Month	Mean $\overline{X}$	Differences		
		$\overline{X}$-15.5	$\overline{X}$-37.4	$\overline{X}$-85.4
May	85.4**	69.9**	48**	---
April	37.5**	22.0**	---	---
March	15.5**	---	---	---

The south zone (Zagazig, El-Qanayat, Bilbis, Minia-El-Qamh and Mashtol)

The first generation

The data listed in Table 3 and Fig. 2 show that there was an overlapping between the first and second generations . The first generation was very weak and there was a few number of egg-masses during the last week of May.

The second generation

High numbers of egg-masses were collected on the 26th of June in 1984 and 1985 seasons. But in 1986 and 1987 seasons, the peak was three days earlier.

The second generation on cotton plants during the last week of June, 1987 occurred in great number of egg-masses as the average egg-masses per feddan was 10448. On the other hand, the average number of egg-masses (Fig2,3,4,5), in 1984, 85 and was 2063. 4150 and egg-masses, respectively.

The third generation

The peak of the third generation of the year 1987 occurred on the second week of August and was the most dangerous generation as shown by the number of its egg-masses.

As a general conclusion , the data collected during the four seasons, show that there was an overlapping between the first and the second generations during the four years. The first generation was always small in the number of deposited egg-masses during the successive seasons. Also, the first generation lasted for a short period and female moths deposited few number of egg-masses.

The second generation was the most important and lasted for more than five weeks with a large number of egg-masses.

Population density of larvae and pupae in berseem fields

Data obtained in Table 4 showed that there were large differences in the number of immature stages in the different localities and seasons. Number of immature stages of *S. littoralis* in Diyarb-Negm locality was higher than those recorded in the other localities under investigation. The total number of larvae and pupae were 213

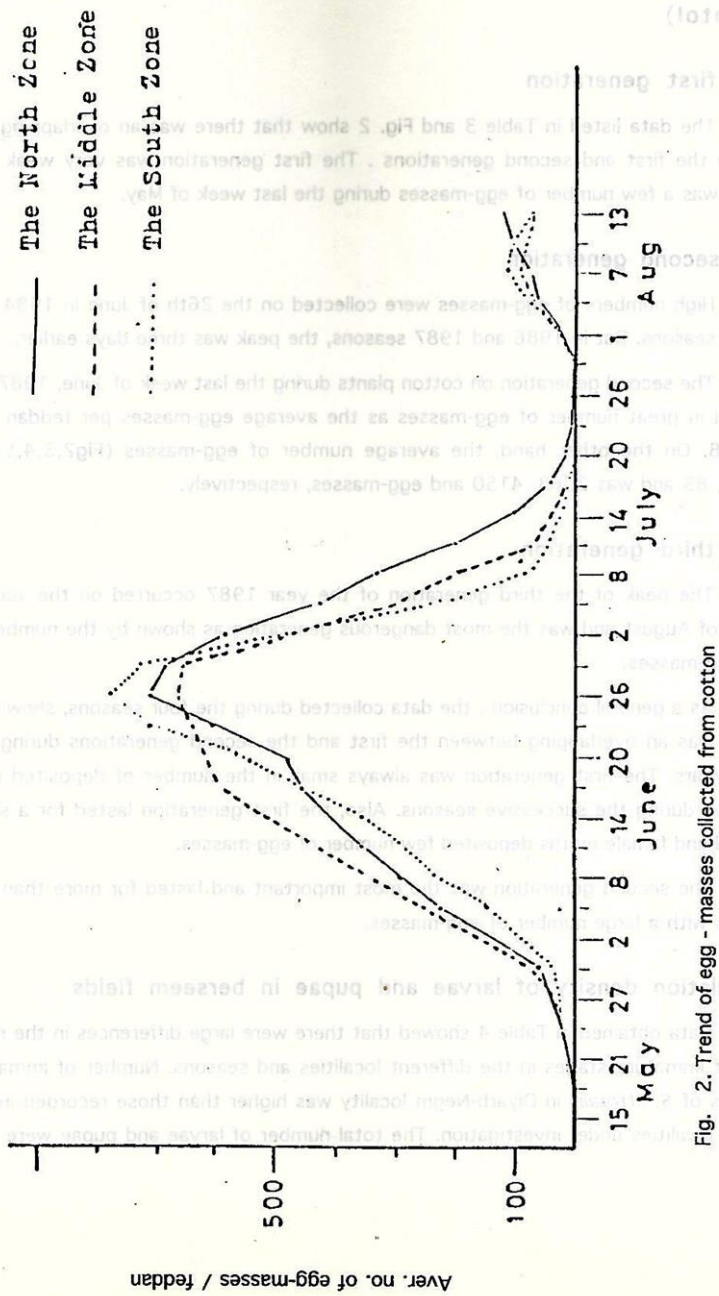

Fig. 2. Trend of egg - masses collected from cotton plants in different zones, 1984.

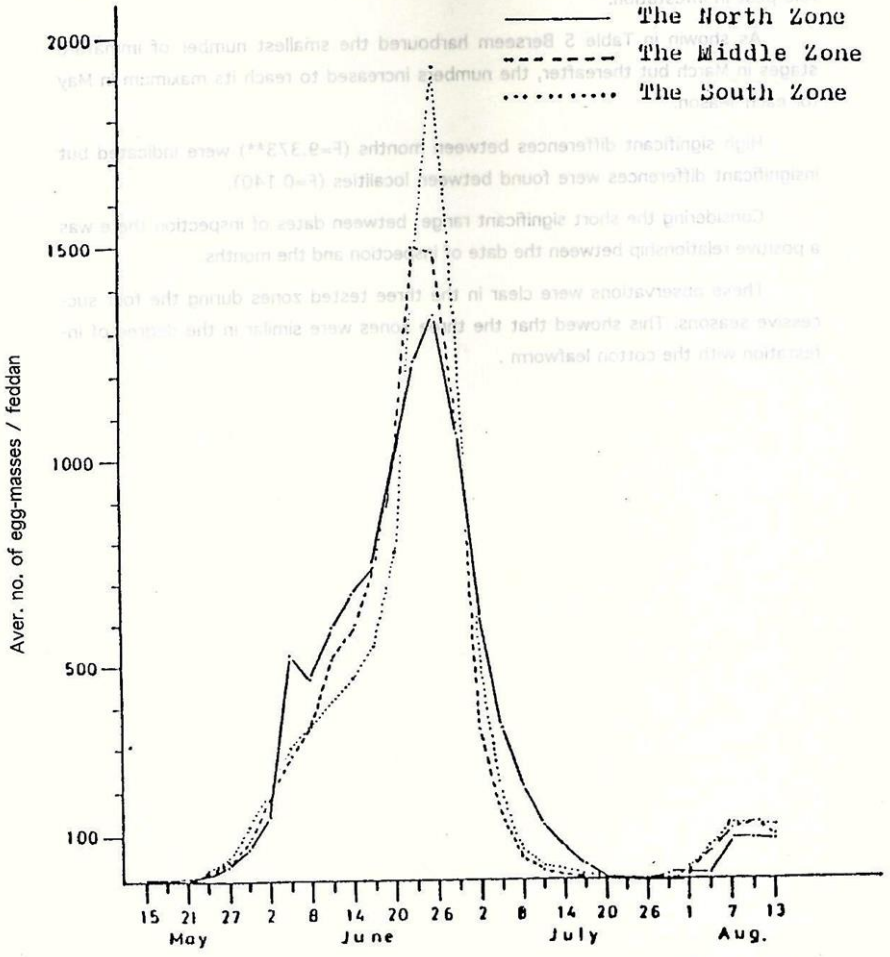

Fig. 3. Trend of egg - masses collected from cotton plants in different zones, 1985.

during the four seasons . On the other hand, Faqous and El-Namroot localities harboured the smallest number of immature stages being 107 and 107 larvae and pupae, successively in the same period (Table 5).

The environmental factors and the wide range of host plants play an important role pest in infestation.

As showin in Table 5 Berseem harboured the smallest number of immature stages in March but thereafter, the numbers increased to reach its maximum in May for each season.

High significant differences between months (F=9.373**) were indicated but insignificant differences were found between localities (F=0.140).

Considering the short significant range between dates of inspection there was a positive relationship between the date of inspection and the months.

These observations were clear in the three tested zones during the four successive seasons. This showed that the three zones were similar in the degree of infestation with the cotton leafworm .

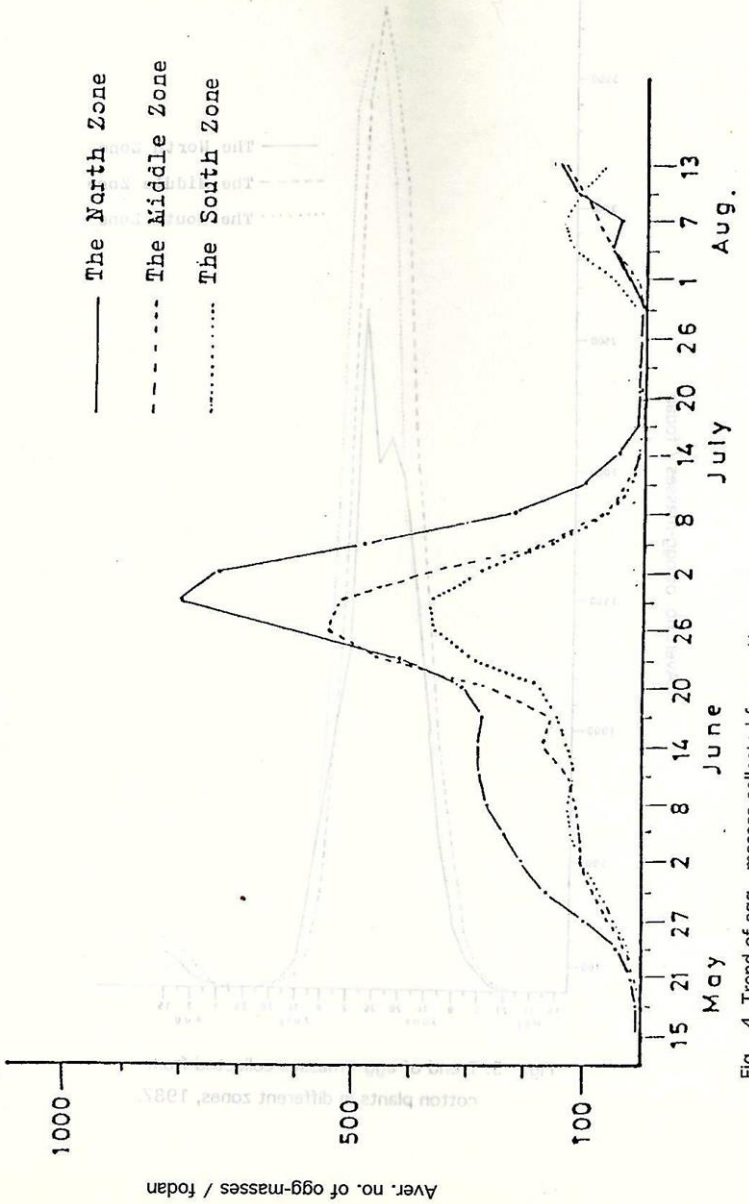

Fig. 4. Trend of egg - masses collected from cotton plants in different zones, 1986.

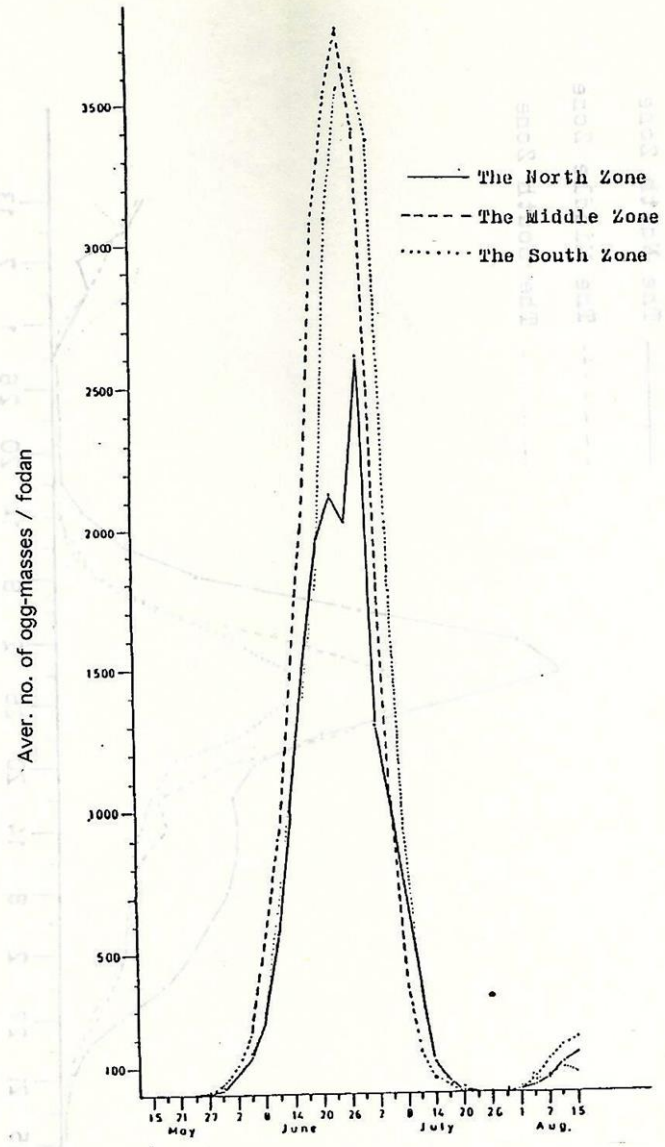

Fig. 5. Trend of egg - masses collected from cotton plants in different zones, 1987.

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دراسات بيئية على الأعمار غير الكاملة لدودة ورق القطن فى محافظة الشرقية

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كان الهدف من الدراسة معرفة الكثافة العددية للأطوار غير الكاملة لدودة ورق القطن والتى أوضحت من خلال العينات التى تم أخذها من ١٥ منطقة بمحافظة الشرقية لمدة أربع سنوات متتالية وجود ثلاث أجيال قوية على القطن - الجيل الأول يبدأ من الاسبوع الثالث من مايو والجيل الثانى يبدأ من الاسبوع الثانى من يونيو ويبدأ الجيل الثالث خلال الاسبوع الاول من اغسطس ، كما اتضح أن الجيل الثانى هو أقوى الاجيال الثلاثة وذلك بالنظر الى تعداد اللطع المتحصل عليها خلال الاربعة مواسم المتتالية ويتبعها فى ذلك الجيل الثالث .

كما لوحظ من خلال الفحص فى حقول البرسيم أنه لا يوجد اختلاف معنوى بين المناطق الخمسة عشرة تحت الدراسة ، ووجد أن أقل تعداد من الاطوار غير الكاملة لشهور التجربة كان خلال شهر مارس بينما أعلى تعداد كان خلال مايو .