

## **HOST PLANTS, DISTRIBUTION, PARASITIDS AND POPULATION DYNAMICS OF WHITEFLY, *ALEUROLOBUS MARLATTI* (HOMOPTERA: ALEYRODIDAE) IN EGYPT, WITH WORLD REVIEW OF ITS HOST PLANTS**

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### **Abstract**

*Aleurolobus marlatti* (Quaintance) (Homoptera: Aleyrodidae), is an important pest on woody dicotyledonous plants. This work includes a survey of host plants, distribution, parasitoids as well as the population dynamics of this whitefly. During 2003-2005, the whitefly, *A. marlatti* was recorded on 10 plant species (7 genera) belonging to 5 families in 12 localities of 9 governorates in Egypt. World review of host plants of *A. marlatti* is provided. *Encarsia elegans* Masi, *Encarsia lutea* (Masi) and *Eretmocerus* sp. were found attack this whitefly. The seasonal abundance of *A. marlatti* was conducted for two successive years from June 2003 to May 2005 on the nabkk trees, *Ziziphus spinachristi* in Giza Governorate. The obtained results showed that *A. marlatti* occurred all year round on *Z. spinachristi*; the insect population (eggs, larvae and adults stages) reached its maximum in Nov, 15<sup>th</sup>, 2003 (first year) and Aug, 15<sup>th</sup>, 2004 (second year). Three parasitoid species, the abundance of these parasitoids was also conducted for two successive years from June, 2003 to May 2005 on *Z. spinachristi* in Assiut and Giza. *E. elegans* was the most effective with maximum parasitism rates 42.1% in Assiut during Aug. 2004.

### **INTRODUCTION**

*Aleurolobus marlatti* (Quaintance) (Homoptera: Aleyrodidae) (formerly *Aleurolobus niloticus* Priesner & Hosny) is one of the most important pests that affect drastically woody dicotyledonous plants in different parts of the world. These species attacks 24 host plant families in the world while in Egypt, it attacks 5 families (Abd-Rabou, 2001). Mound and Halsey (1978) recorded 5 parasitoid species associated with this species, three of them were recorded in Egypt by Abd-Rabou, 1997. No work was available on the dynamics of this species; in Egypt. The present work deals with a survey on host plants, distribution, parasitoids and dynamics of this whitefly species in Egypt.

## MATERIALS AND METHODS

### 1. Survey of Host Plants, Distribution and Parasitoids Of The Whitefly, *Aleurolobus marlatti* In Egypt.

A survey was carried out all over Egypt governorates during 2003-2005. Infested host plants with the whitefly, *A. marlatti* were examined in the field, using a pocket lens. Leaves from different host plants were collected and placed separately in paper bags for further examination in the laboratory. Identification of *A. marlatti* was made by examining its pupal case and mounted adult in Canada balsam, according to Bink-Moenen (1983). Specimens were also kept in a well-ventilated container until the emergence of any parasitoids. Identification of parasitoids was made by examining their mounted adults in Hoyer's medium (Noyes, 1982).

### 2. Seasonal Abundance Of The Whitefly, *Aleurolobus marlatti* In Egypt:

Seasonal abundance of *A. marlatti* was carried out on nabkk trees *Z. spinachristi* in Giza Governorate during June 2003 to May 2005. The plant area selected for these investigations received no chemical control measures for several years. About 10 trees of *Z. spinachristi*, almost similar in age, shape, size and growth condition were randomly chosen for sampling two times a month at biweekly intervals. On each sampling, 60 leaves were chosen at random, early in the morning, and examined immediately in the field for counting the number of adults. Thereafter, the leaves were kept in a closed paper bags and transferred to the laboratory to estimate the total number of immature stages under a binocular microscope where the number of eggs, larvae and pupae of *A. marlatti* were counted per one leaf. Accordingly, the total number of each stage was calculated for each tested host plant.

Records of the meteorological factors, mainly the daily mean of minimum (D.Min.T.), maximum (D. Max.T.) temperatures and relative humidity (D.M.R.H.), were obtained from the Meteorological Department. The daily records of these factors were recalculated to get the daily averages within two weeks prior to sampling date.

Simple correlation value was calculated to obtain information about the relationships between the three tested weather factors and the population of *A. marlatti* (egg, larvae, pupae case and adults stages).

### 3. Seasonal Abundance Of The Whitefly, *Aleurolobus marlatti* Parasitoids In Egypt:

Second, third larval and pupal stages of *A. marlatti* were sampled from *Z. spinachristi* at Assuit and Giza governorates. Eighty leaves of *Z. spinachrist* were collected monthly during June 2003 until May 2005 (80 leave per sample) and transferred to the laboratory. *A. marlatti* eggs and first larval stages were eliminated,

as well as any other insect species. The second, third larval and pupal stages of *A. marlatti* were recorded per leaf. Each leaf was stored in well-ventilated emergence glass tubes and monitored daily for parasitoids emergency. Percentages of parasitism were calculated according to Abd-Rabou, 1997.

## RESULTS AND DISCUSSION

### 1. Host Plants , Distribution and Parasitoids Of The Whitefly, *Aleurolobus marlatti* In Egypt.

As shown in Table (1) the whitefly, *A. marlatti* is recorded on 10 plant species (7 genera) belonging to 5 families. The results indicate that *A. marlatti* attacking some economic plants in Egypt *e.g.*, Sycamore fig and nabkk trees. The present work indicates that *A. marlatti* was recorded in 12 localities covering 9 governorates in Egypt. This whitefly species recorded here associated with 3 parasitoid species (Table, 1). They are: *Encarsia elegans* Masi, *Encarsia lutea* ( Masi) and *Eretmocerus* sp. (Aphelinidae: Hymenoptera). Host plants of this species were recorded previously by Mound and Halsey, 1978. They recorded 35 plant families in the world. In 1983, Bink-Moenen added 4 families as a host plant of *A. marlatti*. Recently in Egypt Abd-Rabou (2001) recorded 5 families as a host plants (Table, 8).

### 2. Seasonal Abundance Of The Whitefly, *Aleurolobus marlatti* In Egypt:

The seasonal abundance of *A.marlatti* was observed for two successive years from June 2003 to May 2005 on *Z. spinachristi* in Giza Governorate. The obtained data in Tables (2 and 3) showed that *A. marlatti* occurred all year round on *Z. spinachristi* , the insect population (eggs, larvae and adults stages) per 60 leaves of *Z. spinachristi* plants was low during January. At the beginning of February the population increased gradually forming two peaks of abundance, during mid August and mid November in both years. The highest peak was in mid November in the first year (9997), whereas in the 2<sup>nd</sup> year it was during mid August (6418). These results confirms with the previous findings of Abd-Rabou(2001).

The simple correlation values indicated the relationship between the seasonal abundance of *A.marlatti* population and average of daily maximum temperature. The simple correlation (*r*) was positive and highly significant at 0.01 probabilities (0.735 and 0.6455). This suggested that, the average daily maximum temperature during Nov. (32.5-36.7 °C) and Aug. (34.0-34.2°C) were quite close to the factors optimum for the abundance of *A. marlatti*. The simple correlation (*r*) between the seasonal abundance of *A. marlatti* population and average of daily minimum temperature, were positive and highly significant at 0.01 probabilities (0.834 and 0.830).

The results did not clarify the relation between this factor and the seasonal activity of *A. marlatti*.

### 3. Seasonal Abundance Of The Whitefly, *Aleurolobus marlatti* Parasitoids In Egypt:

Three species of parasitic Hymenoptera were reared from samples of *A. marlatti* on *Z. spinachristi*. These are listed below in alphabetical order:

*Encarsia elegans* Masi, *Encarsia lutea* ( Masi), *Eretmocerus* sp.

19.9 and 26.7% during the first and second years, respectively. Peak parasitism of 38.4 and 42.1% occurred in Assuit during Aug., 2003 and 2004, respectively and the lowest parasitism occurred was 5.9 and 7.7 % during Feb., 2004 and 2005 in the first and second years, respectively, Tables (4 &5) .

In Giza, the average parasitisms were 4.2 and 2.7% by *Encarsia lutea* and 2.5 and 1.5 % by *Eretmocerus* sp. during the first and second years, respectively. Total rate parasitism in Giza reached a maximum of 11.3 and 9.2 % by *E.lutea* during Oct., 2003 and 2004, respectively and 7.5 and 5.3 % by *Eretmocerus* sp. during Nov. 2003 and 2004, respectively Tables (6&7).

Abd-Rabou (1997) recorded five parasitoids attacking *A. marlatti* (previously *A. niloticus*) these are *E. elegans* , *E.lutea*, *Eretmocerus* nr. *haldemani* , *Eretmocerus* sp. and *Euderomphale* sp. He observed *E.elegans* is the dominant parasitoids attacking this pest in Assuit, these findings agree with the result of the present work.

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Table 1. The host plants, distribution, parasitoids and date of collection of *Aleurolobus marlatti* in Egypt

Host Plants	Distribution	Parasitoids	Date of Collection
Family	Species	Governorate	Locations
Lythraceae	<i>Lawsonia alba</i> *	Qena*	Dishna* <i>Encarsia elegans</i> Masi Sep., 2003 <i>Encarsia lutea</i> ( Masi) Nov., 2004
		Aswan	Kom Ombo <i>E. elegans</i>
	<i>Lawsonia inermis</i>	Qena	Armant* March, 2005
	Moraceae	<i>Ficus sycamorus</i>	Assiut
Giza*			Dokki* <i>E. elegans</i> <i>Eretmocerus</i> sp. Jan., 2005 <i>Encarsia lutea</i> ( Masi) March, 2005
<i>Morus alba</i> *		Assiut	Assiut <i>E. elegans</i> July, 2004
		El-Minya	El-Minya <i>E. elegans</i> Aug. , 2003 June, 2004
Rhamnaceae	<i>Ziziphus</i> sp.	Assiut	Assiut <i>E. elegans</i> July, 2004
		El-Minya	El-Minya <i>E. elegans</i> Aug. , 2003 June, 2004
	<i>Ziziphus jujube</i>	Assiut	Assiut <i>E. elegans</i> June,2004
	<i>Z.spinachrist</i> *	Dakhla Oasis	El-Gedida <i>E. elegans</i> Aug., 2003
		Sharqyia*	Zagazig* <i>E.lutea</i> Oct. 2004
Lythraceae	<i>Dodonaea viscosa</i>	Sinai	El-Tour - Nov. 2004
		Qena	Dishna <i>E. elegans</i>
		Eastern Desert	Gabal Elba - June,2004
Zygophyllaceae	<i>Balanites</i> sp.	Aswan	Abou-Simbil <i>E. elegans</i> Sep.,2003
		Aswan	Ibrim <i>E. elegans</i> Nov.,2004

\* new record of host plants and locations

Table 2. Half monthly mean numbers of *Aleurolobus marlatti* on *Ziziphus spinachristi* in Giza Governorate during June, 2003- May, 2004.

Date	Egg	Larvae	Adult	Total	Max.	Min.	RH %
June 1 <sup>st</sup> , 2003	1536	1132	550	3218	32.5	18.2	44
15 <sup>th</sup>	1751	1334	584	3669	38.0	21.0	40
July 1 <sup>st</sup>	2366	1550	612	4528	37.0	21.9	55
15 <sup>th</sup>	2368	1987	648	5003	33.3	19.0	57
Aug. 1 <sup>st</sup>	3969	2101	742	6812	34.2	23.3	51
15 <sup>th</sup>	4226	2796	750	7772	34.0	20.8	50
Sep. 1 <sup>st</sup>	3450	3254	810	7514	35.0	23.0	58
15 <sup>th</sup>	3156	1987	615	5758	31.0	21.9	58
Oct. 1 <sup>st</sup>	2987	1735	523	5245	30.8	15.9	58
15 <sup>th</sup>	3354	1145	453	4952	17.5	16.8	59
Nov. 1 <sup>st</sup>	4654	2856	390	7900	36.7	13.2	48
15 <sup>th</sup>	5543	3742	712	9997	23.3	13.2	60
Dec. 1 <sup>st</sup>	2984	2160	857	6001	27.5	11.6	55
15 <sup>th</sup>	2765	2009	910	5684	24.9	12.9	53
Jan. 1 <sup>st</sup> , 2004	1112	1450	720	3282	21.5	11.6	50
15 <sup>th</sup>	965	890	515	2370	22.9	10.9	53
Feb. 1 <sup>st</sup>	90	24	12	126	22.5	12.0	49
15 <sup>th</sup>	110	65	15	190	27.8	14.5	53
March 1 <sup>st</sup>	130	75	24	229	31.0	16.2	55
15 <sup>th</sup>	220	114	60	394	19.9	10.0	51
April 1 <sup>st</sup>	438	198	84	720	35.6	17.8	50
15 <sup>th</sup>	758	332	169	1259	28.1	16.8	53
May 1 <sup>st</sup>	1221	645	288	2154	32.9	18.9	53
15 <sup>th</sup>	1324	954	458	2736	30.0	16.9	50

Table 3. Half monthly mean numbers of *Aleurolobus marlatti* on *Ziziphus spinachristi* in Giza Governorate during June, 2004- May, 2005.

Date	Egg	Larvae	Adult	Total	Max.	Min.	RH %
June 1 <sup>st</sup> , 2004	1250	836	428	2514	29.0	18.9	50
15 <sup>th</sup>	1570	910	466	2946	34.9	18.0	48
July 1 <sup>st</sup>	2090	968	547	3605	35.0	19.6	50
15 <sup>th</sup>	2144	1132	580	3856	34.2	21.9	53
Aug. 1 <sup>st</sup>	3426	1641	612	5679	34.0	23.0	58
15 <sup>th</sup>	3989	1760	732	6418	36.1	22.0	50
Sep. 1 <sup>st</sup>	2110	1980	786	4876	33.2	21.9	56
15 <sup>th</sup>	1530	1126	836	3492	30.7	20.5	54
Oct. 1 <sup>st</sup>	1352	869	976	3197	36.3	21.1	49
15 <sup>th</sup>	2148	750	463	3361	30.2	18.0	51
Nov. 1 <sup>st</sup>	2845	1055	395	4295	32.5	13.5	48
15 <sup>th</sup>	3009	1567	591	5167	23.3	11.2	60
Dec. 1 <sup>st</sup>	1759	1735	732	4226	25.5	11.6	55
15 <sup>th</sup>	1587	987	956	3530	23.9	12.9	53
Jan. 1 <sup>st</sup> , 2005	776	665	496	1937	20.5	11.6	50
15 <sup>th</sup>	534	450	386	1370	20.9	10.0	52
Feb. 1 <sup>st</sup>	60	15	11	86	21.5	11.5	50
15 <sup>th</sup>	95	43	17	155	26.5	13.5	50
March 1 <sup>st</sup>	115	55	19	189	30.0	15.2	54
15 <sup>th</sup>	198	97	33	328	20.9	11.0	50
April 1 <sup>st</sup>	410	112	54	576	34.6	14.5	49
15 <sup>th</sup>	670	268	60	998	24.1	16.5	51
May	1065	356	124	1545	33.9	17.9	50
15 <sup>th</sup>	1145	754	177	2076	31.0	15.9	51

Table 4. Percent parasitism of *Aleurolobus marlatti* on *Ziziphus spinachristi* by aphelinid Parasitoid *Encarsia elegans* in Assiut governorate, in relation to the weather Factors during May, 2003- April, 2004.

Date	Immature stages of whitefly	Percent parasitism	Temperature		RH%
			Max.	Min.	
June, 2003	987	25.6	35.5	17.0	42
July	1320	29.5	38.0	22.0	48
Aug.	1670	38.4	37	20	46
Sep.	1365	30.5	37	21.5	49
Oct.	1185	24.0	33	16	49
Nov.	787	21.7	33.5	12.5	49
Dec.	254	10.1	31.6	10.0	47
Jan. 2004	30	8.0	30.5	10.0	48
Feb.	70	5.9	33.9	12.9	49
March	165	11.8	34	11	49
April	452	13.0	34	19	53
May	745	20.7	30	13.5	50

Table 5: Percent parasitism of *Aleurolobus marlatti* on *Ziziphus spinachristi* by aphelinid parasitoid *Encarsia elegans* in Assiut governorate, in relation to the weather factors during May, 2004- April, 2005

Date	Immature stages of whitefly	Percent parasitism	Temperature		RH%
			Max.	Min.	
June, 2004	823	33.2	35	21	51
July	1146	37.3	38.5	21.5	53
Aug.	1920	42.1	39.0	25	55
Sep.	1770	39.5	30.0	16.0	56
Oct.	1565	28.9	44.0	20.0	48
Nov.	1385	28.0	40.5	17.0	50
Dec.	987	19.2	39.0	15.5	48
Jan. 2005	454	16.0	35	14.0	48
Feb.	45	7.7	36	12.5	47
March	85	18.8	36	13	48
April	197	20.0	35	18	52
May	534	29.1	31	14.	50



Table 6. Percent parasitism of *Aleurolobus marlatti* on *Ziziphus spinachristi* by different aphelinid parasitoids in Giza governorate, in relation to the weather factors during May, 2003 – April, 2004

Date	Immature stages of whitefly	Percent parasitism		Temperature		RH%
		<i>Encarsia lutea</i>	<i>Eretmocerus</i> sp.	Max.	Min.	
June,2003	1346	1.8	1.3	32.5	18.2	44
July	2111	2.5	1.3	37.0	21.9	55
Aug.	1987	4.6	2.7	34.2	23.3	51
Sep.	1673	5.7	3.8	35.0	23.0	58
Oct.	1499	11.3	5.7	30.8	15.9	58
Nov.	1120	8.4	7.5	36.7	13.2	48
Dec.	654	6.5	4.1	25.5	11.6	55
Jan. 2004	65	4.5	2.4	21.5	11.6	50
Feb.	120	3.2	0.0	22.5	12.0	49
March	210	0.0	0.0	31.0	16.2	55
April	654	0.5	0.1	35.6	17.8	50
May	933	1.4	0.8	32.9	18.9	53

Table 7: Percent parasitism of *Aleurolobus marlatti* on *Ziziphus spinachristi* by different aphelinid parasitoids in Giza governorate, in relation to the weather factors during May, 2004 – April, 2005

Date	Immature stages of whitefly	Percent parasitism		Temperature		RH%
		<i>Encarsia lutea</i>	<i>Eretmocerus</i> sp.	Max	Min.	
June,2004	639	1.0	0.9	29.0	18.9	50
July	965	1.4	1.1	32.0	20.0	56
Aug.	1324	4.0	1.9	34.0	23.0	58
Sep.	968	5.0	2.1	33.2	21.9	56
Oct.	868	9.2	3.5	36.3	21.1	49
Nov.	685	6.3	5.3	32.5	13.5	48
Dec.	374	3.1	2.2	25.5	11.6	55
Jan. 2005	181	1.1	1.1	20.5	11.6	50
Feb.	96	0.0	0.0	21.5	11.5	50
March	76	0.0	0.0	30.0	15.2	52
April	101	0.2	0.0	33.2	17.8	51
May	335	1.0	0.3	31.9	16.8	50

Table 8: World review of host plants of *Aleurolobus marlatti*

Families	Species	References
Anacardiaceae	<i>Sclerocarya birrea</i>	Bink-Moenen,1983
Annonaceae	<i>Hexalibus monopetalus</i>	Bink-Moenen,1983
Araceae	<i>Colocasia</i> sp.	Mound & Halsely,1978
Araliaceae	<i>Hedera nepalensis</i>	Mound & Halsely,1978
Apocynaceae	<i>Nerium indicum</i>	Mound & Halsely,1978
	<i>Saba senegalensis</i>	Bink-Moenen,1983
Asclepiadaceae	<i>Leptadenia hastate</i>	Mound & Halsely,1978
Biganoniaceae	<i>Stereospermum</i>	Mound & Halsely,1978
Bombacaceae	<i>Bombax malabaricum</i>	Mound & Halsely,1978
Boraginaceae	<i>Ehertia aspersa</i>	Mound & Halsely,1978
	<i>Cordia Africana</i>	Bink-Moenen,1983
Caesalpniaceae	<i>Cassia sieberiana</i>	Bink-Moenen,1983
	<i>Detarium microcarpum</i>	Bink-Moenen,1983
	<i>Tamarindus indica</i>	Bink-Moenen,1983
Capparaceae	<i>Boscia senegalensis</i>	Mound & Halsely,1978
	<i>Capparis corymbosa</i>	Mound & Halsely,1978
Capparidaceae	<i>Capparis corymbosa</i>	Bink-Moenen,1983
Celastraceae	<i>Maytens senegalensis</i>	Bink-Moenen,1983
Daphniphyllaceae	<i>Daphniphyllum</i>	Mound & Halsely,1978
Ebenaceae	<i>Diospyros mespiliiformis</i>	Bink-Moenen,1983
Euphorbiaceae	<i>Antidesma venosum</i>	Bink-Moenen,1983
	<i>Bridelia ferruyinea</i>	Bink-Moenen,1983
	<i>Hymenocardia acida</i>	Bink-Moenen,1983
	<i>Mallotus philippinensis</i>	Mound & Halsely,1978
Leguminosae	<i>Dalbergia sisoo</i>	Mound & Halsely,1978
Lythraceae	<i>Lawsonia alba</i>	Mound & Halsely,1978
	<i>Lawsonia inermis</i>	Abd-Rabou,2001
		Bink-Moenen,1983
Mimosaceae	<i>Parkia clappertoniana</i>	Bink-Moenen,1983
Moraceae	<i>Ficus</i> sp.	Mound & Halsely,1978
		Bink-Moenen,1983
	<i>Ficus sycamorus</i>	Mound & Halsely,1978
		Bink-Moenen,1983
		Abd-Rabou,2001

	<i>Morus alba</i>	Mound & Halsey,1978
Myrtaceae	<i>Syzygium guineense</i>	Bink-Moenen,1983
Oleaceae	<i>Olea cupidata</i>	Mound & Halsey,1978
Rhamnaceae	<i>Ziziphus</i> sp.	Abd-Rabou,2001
	<i>Ziziphus hysudrica</i>	Mound & Halsey,1978
	<i>Ziziphus jujube</i>	Abd-Rabou,2001
	<i>Ziziphus mauritiana</i>	Bink-Moenen,1983
		Mound & Halsey,1978
	<i>Z. spinachristi</i>	Bink-Moenen,1983
		Mound & Halsey,1978
Rosaceae	<i>Rosa indica</i>	Mound & Halsey,1978
Rutaceae	<i>Citrus</i> sp.	Mound & Halsey,1978
	<i>Murraya exotica</i>	Mound & Halsey,1978
	<i>M. koenigii</i>	Mound & Halsey,1978
Ulmaceae	<i>Aphananthe aspera</i>	Mound & Halsey,1978
Salvadoraceae	<i>Salvadora</i> sp.	Mound & Halsey,1978
		Abd-Rabou,2001
	<i>Salvadora persica</i>	Abd-Rabou,2001
	<i>Dodonaea viscosa</i>	Abd-Rabou,2001
Sapindaceae	<i>Paullinia pinnata</i>	Bink-Moenen,1983
Smilacaceae	<i>Smilax</i> sp.	Mound & Halsey,1978
Verbenaceae	<i>Duranta</i> sp.	Mound & Halsey,1978
	<i>Vitex doniana</i>	Bink-Moenen,1983
Zygophyllaceae	<i>Balanites</i> sp.	Abd-Rabou,2001
	<i>Balanites aegyptiaca</i>	Abd-Rabou,2001
		Bink-Moenen,1983
		Mound & Halsey,1978

العوائل النباتية و التوزيع الموسمي والجغرافي والطفيليات لحشرة أليرولوبس  
مارلاتي في مصر مع مراجعة للعوائل النباتية لهذا النوع في العالم

شعبان عبد ربه ، نها أحمد

معهد بحوث وقاية النباتات - مركز البحوث الزراعية - جيزة - مصر

تضمن هذا العمل حصر للعوائل النباتية والتوزيع الموسمي والجغرافي والطفيليات لحشرة أليرولوبس مارلاتي في مصر اثناء الفترة من ٢٠٠٣-٢٠٠٥. تم تسجيل حشرة أليرولوبس مارلاتي تصيب ١٠ عائل نباتي تابعة ل ٧ أجناس تنتمي إلى ٥ فصائل متواجدة في ١٢ منطقة في ٩

محافظات و أن هذه الآفة تهاجم ب٣ طفيليات هي إنكارسيا إيجانس و إنكارسيا ليوتى و إريتموسيروس. للتوزيع الموسمي لحشرة أليرولوبس مارلاتي تم إجراءه لموسمين متتاليين في محافظة الجيزة أثناء الفترة من مايو ٢٠٠٣ إلى إبريل ٢٠٠٥ وقد أظهرت النتائج أن أعلى تعداد لهذه الآفة كان في النصف الثاني من نوفمبر السنة الأول وأغسطس في السنة الثانية. أما بالنسبة للطفيليات فقد تم دراستها في نفس الفترة ولكن في محافظتى اسيوط و الجيزة وقد أتضح من النتائج أن طفيل إنكارسيا إيجانس من الطفيليات المؤثرة في مكافحة هذه الآفة و قد وصلت أعلى نسبة تطفل إلى ٤٢,١ % في محافظة اسيوط خلال شهر أغسطس ٢٠٠٤.