

**THE PARASITISM OF THE COTTON LEAFWORM,
SPODOPTERA LITTORALIS BOISD., ON JEW'S MALLOW,
CORCHORUS OLITORIUS IN EGYPT**

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Abstract

Weekly samples of *Spodoptera littoralis* Boisd. larvae were collected from Jew's Mallow (*Mulūkhīyah*), *Corchorus olitorius* fields, from five Governorates, during May-November, in successive growing seasons 1982-1987. Percentage of parasitism of each of the secured parasitic species was estimated.

The following five parasitic species were recorded on *S. littoralis* larvae in Jew's Mallow fields: *Microplitis rufiventris* Kok., *Meteorus gyrator* Th., *Zelex chlorophthalma* Nees., *Chelonus inanitus* L. (Hym.: Braconidae), and *Periboaea orbata* Wied. (Diptera : Tachinidae). *M. rufiventris* was the most abundant species followed by *P. orbata*.

The highest percentage of parasitism was recorded during the period June-October except August. The highest monthly average of parasitism was 8.2% in June. Total average of parasitism for the six seasons reached 3.5%.

INTRODUCTION

The cotton leafworm, *Spodoptera littoralis* Boisd. is still the key pest in many agricultural crops in Egypt because of its polyphagous feeding behaviour. Since most of the previous studies concerning biological control agents of the pest were restricted to cotton fields (Kamal 1951, Hafez *et al.* 1976, Kolaib 1983), a series of ecological studies was started by Hassanein *et al.* (1985) and Hassanein and el-Heneidy (1985) to evaluate the role of parasitoids in controlling the pest population in highly infested vegetable crops, e.g. Jew's Mallow (common name : *Mulūkhīyah*).

The present study might help in developing control measures *S. littoralis* in vegetable fields.

MATERIALS AND METHODS

Weekly samples of *S. littoralis* larvae were collected from different infested Jew's Mallow fields in Menoufia and Qalubia (lower Egypt), Giza, Fayoum, and Beni-Suef (middle Egypt) Governorates during the six successive growing seasons 1982-1987. The larvae were counted and reared in glass jars on the semi-synthetic diet of Shorey and Hale (1965) and kept under laboratory conditions ($25 \pm 2^\circ\text{C}$ and 50-60% RH) till emergence of parasitic wasps, which were identified and counted. Parasitism percentage by each parasitoid species was estimated.

RESULTS AND DISCUSSION

The growing season of the Jew's Mallow (Mulûkhiyah) usually lasts from May to November therefore, most of the larvae of *S. littoralis* were collected during this period.

As shown in Table 1 number of collected larvae varied from one season to another according to the intensity of infestation. Total number of collected larvae reached 6635 (represented by 102 samples) during the whole period of study. The seasons 1984, 1985, and 1987 presented the highest collections of *Sopodoptera* larvae, as they reached 1794, 2222, and 1225, respectively, while 1982 season presented the least (185 larvae).

Highest infestation of *S. littoralis* to Jew's Mallow fields was mainly observed during the period from June to October, but the highest population of larvae was found during July and August. However, one sample of 150 *S. littoralis* larvae was collected in November 1985 from Menoufia Governorate. Most of the highly infested samples were collected from Fayoum and Beni-Suef Governorates.

Five species of parasitoids were recorded during the six seasons parasitizing *S. littoralis* larvae, these were:

- (1) *Microplitis rufiventris* Kok. (Hymenoptera : Braconidae)
- (2) *Meteorus gyrator* Th. (Hymenoptera : Braconidae)
- (3) *Zele chlorophthalma* Nees. (Hymenoptera : Braconidae)
- (4) *Chelonus inanitus* L. (Hymenoptera : Braconidae)
- (5) *Periboea orbata* Wied. (Diptera : Tachinidae)

According to their rates of parasitism, the five parasitic species could be arranged as follow: *M. rufiventris* ranked first (represented by 41.6%), followed by *P. orbata* (34.8%), *M. gyrator* (13.3%), *Z. chlorophthalma* (9.0%), and *C. inanitus* (1.3%) ranked last.

Highest rates of parasitism were recorded during 1985 season (87 times) and *M. rufiventris* occupied about 50%. *M. rufiventris* and *P. orbata* were yearly recorded through-

Table 1. Monthly average of total parasitised larvae of the cotton leafworm, *S. littoralis*, collected from Jew's Mallow fields during the successive seasons 1982-1987.

Months	1982		1983		1984		1985		1986		1987		Total	
	Total larvae	Parasitized larvae	Total larvae	Parasitized larvae	Total larvae	Parasitized larvae	Total larvae	Parasitized larvae	Total larvae	Parasitized larvae	Total larvae	Parasitized larvae	Total larvae	Parasitized larvae
May	0	0	0	0	57	1 (1.8%)	0	0	0	0	63	0	120	1 (0.8%)
June	8	0	117	7 (6.0%)	75	0	138	25 (18.1%)	0	0	78	2 (2.6%)	416	34 (8.2%)
July	8	0	174	0	778	2 (0.3%)	450	33 (7.3%)	96	10 (10.4%)	390	16 (4.1%)	1896	61 (3.2%)
August	0	0	157	9 (5.7%)	447	2 (0.4%)	869	7 (0.8%)	407	13 (3.2%)	260	3 (1.2%)	2140	34 (1.6%)
September	94	9 (9.6%)	91	4 (4.4%)	226	16 (7.1%)	166	7 (4.2%)	147	15 (10.2%)	341	1 (0.3%)	1065	52 (4.9%)
October	75	14 (18.7%)	0	0	211	21 (9.9%)	449	7 (1.6%)	20	0	93	1 (1.1%)	848	43 (5.1%)
November	0	0	0	0	0	0	150	8 (5.3%)	0	0	0	0	150	8 (5.3%)
Total	185	23 (12.4%)	539	20 (3.7%)	1794	42 (2.3%)	2222	87 (3.9%)	670	38 (5.7%)	1225	23 (1.9%)	6635	233 (3.5%)

hout the six seasons of study. *M. gyrator* and *Z. chlorophthalma* were observed in the 4th and 5th seasons, respectively, while *C. inanitus* was found only once in 1984 season.

M. rufiventris was observed parasitizing *S. littoralis* larvae in Jew's Mallow fields during June, July, September, and October. Its percentage of parasitism ranged between 1.3 and 38.9% in September and June, respectively.

P. orbata was found parasitizing *S. littoralis* larvae in Jew's Mallow fields during a period that lasted from June to September. Parasitism percentage ranged between 0.7 and 12.4% in October and June, respectively.

M. gyrator was recorded on *S. littoralis* larvae in Jew's Mallow fields during June, July, September, and November. Parasitism ranged between 0.7 and 14.0% in November and July, respectively.

Z. chlorophthalma parasitized *S. littoralis* larvae during July, September, and October. Parasitism ranged between 1.0 and 11.5% in July and October, respectively.

C. inanitus was recorded only once on *S. littoralis* larvae with 6.0% parasitism in September 1984.

Total yearly percentages of parasitism ranged between 1.9 and 12.4% in 1987 and 1982 seasons, respectively. The total average of parasitism of the six seasons reached 3.5% (Table 1). Total monthly percentages of parasitism oscillated during the period from May to August then gradually increased from September to November (Table 1). Monthly average of parasitism percentage ranged between 0.0 and 18.7%. The highest averages were recorded in October 1982 (18.7%) and in June 1985 (18.1%). May and August represented the least percentages of parasitism (0.8 and 1.6%, respectively).

The aforementioned results indicated, therefore, that five solitary larval parasitic species (4 hymenopterous and braconids, and 1 dipterous) were secured from *S. littoralis* larvae infesting Jew's Mallow fields during the six seasons of study (1982-1987). The same parasitoid species were recorded on the pest in cabbage fields (Hassanein and el-Heneidy 1985).

In general, *M. rufiventris* was the most abundant parasitic species on *S. littoralis* larvae attacking Jew's Mallow (41.6%), followed by *P. orbata* (34.8%). The highest percentages of parasitism by the two parasitoids were observed during the period June-October except for August. The same findings were reported on parasitoids associated with lepidopterous larvae in vegetable fields (Hassanein *et al.* 1985, Hassanein and el-Heneidy *in press*).

Total monthly percentages of parasitism on *S. littoralis* larvae in Jew's Mallow fields ranged between 0.8 and 8.2% in May and June, respectively. Yearly percentage of parasitism ranged between 1.9 and 12.4% in 1987 and 1982 seasons, respectively, with an

average of 3.5% for the whole period of investigation.

Hafez *et al.* (1976) estimated an average of 3.6% parasitism on *S. littoralis* in vegetable fields during the period from 1968 to 1972.

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التطفل على دودة ورق القطن *Spodoptera littoralis* Boisd. التي تصيب الملوخية

فوزية على حسنين أحمد حسين الهنيدي

معهد بحوث وقاية النباتات ، مركز البحوث الزراعية ، الدقي .

جمعت اسبوعيا عينات من يرقات دودة ورق القطن من حقول الملوخية ، من خمس محافظات خلال أشهر (مايو - نوفمبر) لمدة ستة مواسم متتالية (١٩٨٢ - ١٩٨٧) . وقدرت النسب المئوية للتطفل لكل طفيل على حدة .

وسجلت أنواع الطفيليات الخمس التالية على يرقات دودة ورق القطن في حقول الملوخية :
Zele chlorophthalma, *Chelonus inanitus*, *Microplitis rufiventris*, *Meteorus gyrator*
(غشائية الأجنحة)
Periboea orbata, (ذات الجناحين : *Tachinidae*) وكان النوع *M. rufiventris*
أكثر الأنواع توافرا ، يليه الطفيل *P. orbata* .

وسجلت أكبر نسب للتطفل أثناء الدراسة خلال الفترة من يونيو إلى أكتوبر عدا شهر أغسطس . وكان أكبر متوسط للتطفل ٨,٢ ٪ في شهر يونيو . وبلغ المتوسط الكلي للتطفل خلال المواسم الستة التي تمت فيها الدراسة ٣,٥ ٪ .