

Natural Enemies of Key pests of Sunflower in Maharashtra, India

G.G. Bilapate, Entomologist
Oilseeds Research Station, Marathwada Agricultural University,
Latur-413 512 (M.S.), India

Summary

The area under sunflower cultivation is rapidly increasing in many states of India. In all 22 pests were observed to feed on sunflower in the country. The cabbage semilooper, *Trichoplusia orichalcea*, head borer *Helicoverpa armigera* and tobacco caterpillar, *Spodoptera litura* were the key pests of sunflower in Maharashtra state of India. The parasitization of *T. ni*, *H. armigera*, *S. litura*, *Spilosoma obliqua*, *Condica illecta*, *Dasychira mendosa*, *Asota ficus* and *Euproctis limbata* was studied in detail. During the period of investigations, 11 larval and pupal parasites including nematode was observed to parasitize the defoliators on sunflower. The *Copidosoma floridanum*, *Charops obtusus* and *Aleiodes percurrens* were identified as key parasites of defoliators. *Dsophrys lutea* was recorded for the first time in India.

Sunflower is one of the most important oilseed crops in Maharashtra state of India. The area under sunflower crop is increasing in Marathwada region of Maharashtra state. Earlier the farmers of this region used to grow sunflower in monsoon season. Now there has been shift of sunflower cultivation from monsoon to winter season. It is also grown in summer under the conditions of limited irrigations. Thus, the cultivation of sunflower round the year has led to increase in the pest fauna of sunflower in the region. *Helicoverpa armigera* is reckoned as important constraint in crop production in Maharashtra state. In recent years, *H. armigera* has become a regular and key pest of sunflower in the region. The natural enemies play important role in regulating the population of pests in nature. In the present article, the population dynamics of parasites of key pests of sunflower has been studied in detail. We Hope information contained in the present article will be highly useful in devising integrated pest management system in sunflower.

Materials and method

Since 1987 roving surveys were made to identify the pest fauna of sunflower in Marathwada region of Maharashtra state. All the pests were identified by Commonwealth Institute of Entomology, London. In all twenty different pests were observed to feed on sunflower. Of the pests recorded, cabbage semilooper, *Trichoplusia orichalcea*, head borer, *Helicoverpa*

armigera and tobacco caterpillar, *Spodoptera litura* were the key pests of sunflower in this region (Bilapate et al. 1994).

The larvae of defoliators were collected at weekly intervals on sunflower round the year from 1991 through 1993. The larvae collected were reared individually in circular plastic boxes (5 x 5 x 5 cm) till pupation. The parasites emerged from larvae and pupae of defoliators were preserved and sent for identification to London. The parasites identified by the International Institute of Entomology (IIE) are listed in Table 1.

Results and discussion

During 1991 to 1993 in all 11 different parasites were observed to parasitize the larvae and pupae of defoliators. Of the parasites recorded *Disophrys lutea* Brulle was reported for the first time in India.

Table 1 : Identified parasites of key pests of sunflower in Maharashtra.

Sr. No.	Name of parasite	Name of host
1.	<i>Aleiodes percurrens</i> Lyle <i>Braconidae/Hymenoptera</i>	Larval parasite of <i>Condica</i> sp.
2.	<i>Homolobus</i> sp. <i>Braconidae/Hymenoptera</i>	Larval parasite of <i>condica</i> sp.
3.	<i>Copidosoma floridanum</i> (Ashmead) <i>Encyritidae/Hymenoptera</i>	Larval parasite of <i>Trichoplusia</i> sp.
4.	* <i>Disophrys lutea</i> Brulle <i>Braconidae/Hymenoptera</i>	Larval parasite of <i>Trichoplusia</i> sp.
5.	<i>Enicospilus</i> sp. <i>Ichneumonidae/Hymenoptera</i>	Larval parasite of <i>Trichoplusia</i> sp.
6.	<i>Metopius</i> sp. <i>Ichneumonidae/Hymenoptera</i>	Pupal parasite of <i>spodoptera</i> sp.
7.	<i>Peribaea</i> sp. <i>Tachinidae/Diptera</i>	Larval parasite of <i>spodoptera</i> sp. and <i>Condica</i> sp.
8.	<i>Charops obtusus</i> Morley <i>Ichneumonidae/Hymenoptera</i>	Larval parasite of <i>Spilosoma</i> sp.
9.	<i>Meteorus dichomeridis</i> wilkinson <i>Braconidae/Hymenoptera</i>	Larval parasite of <i>Spilosoma</i> sp.
10.	<i>Glyptapanteles phytometrae</i> (Wilkinson) <i>Braconidae/Hymenoptera</i>	Larval parasite of <i>Euproctis</i> sp.
11.	<i>Carcelia</i> sp. <i>Tachinidae/Diptera</i>	Larval parasite of <i>Heliothis</i> sp.

* First record in India.

I. *Trichoplusia* sp.

The three year's data presented in table 2 revealed that the larvae of semilooper, *Trichoplusia* ni and *Thysanoplusia orichalcea* were parasitized by *Copidosoma floridanum* (Asmead), *Enicospilus* sp. and *Disophrys lutea* Brulle. The larval parasite, *D. lutea* was reported for the first time in India. The parasitization was 12.93, 14.64 and 18.00 per cent in the month of August, September and October, respectively.

Table 2 : Parasitization of cabbage semilooper on sunflower.

Month	Number of larvae collected	Mean parasitization of larvae (%)
January	399	2.87
February	55	0.56
July	104	6.39
August	1 780	12.93
September	2 591	14.64
October	982	18.00
November	149	1.45
December	154	2.10

II. *Helicoverpa armigera* :

The parasites recorded on *H. armigera* were *Carcelia* sp. and *Campoletis chloridae* Uchida. Both parasites were active through out the year however, the parasitization of larvae remained below 10 per cent during different months. The pupal parasite, *Goniophthalmus halli* Mesnil was merely recorded (table 3). Based on the evidences of earlier publications of author, *C. chloridae* has been identified as key parasite of *Heliothis* Marathwada region (Bilapate 1981, 1984, 1985, 1989, Bilapate et al. 1991, 1979).

Table 3 : Parasitization of *Heliothis armigera* on sunflower.

Month	Number of larvae collected	Mean per cent parasitization of	
		Larvae	Pupae
January	2081	7.34	1.22
February	1305	4.92	1.11
March	309	2.66	0
April	198	2.29	0
July	210	1.98	0
August	1083	7.34	0.50
September	1264	9.37	0.58
October	1091	5.35	0.54
November	703	5.94	0.40
December	1524	8.10	0.27

III. *Spodoptera litura* :

The parasites, *Peribaea* sp. and *Metopius* sp. were recorded to parasitize the larvae and pupae of *S. litura* on sunflower at Latur. The mean parasitization of larvae was 9.97, 11.20 and 11.98 per cent in the month of August, September and October (Table 4). The parasitization of pupae was negligible.

Table 4 : Parasitization of *Spodoptera* sp. on sunflower.

Month	Number of larvae collected	Mean per cent parasitization of	
		Larvae	Pupae
August	292	9.97	2.85
September	227	11.20	1.30
October	84	11.98	0.52
November	227	5.28	1.50

IV. *Spilosoma obliqua* :

Consistently for three years the larvae of *S. obliqua* were parasitized in the month of October and the mean parasitization was 23.96 per cent (table 5). Among the parasite recorded, *Charops obtusus* Morley was identified as key parasite while *Meteorus dichomeridis* Wilkinson was merely recorded.

Table 5 : Parasitization of *S. obliqua* on sunflower.

Month	Number of larvae collected	Mean per cent parasitization of	
		Larvae	Pupae
February	65	2.56	1.67
March	433	6.16	4.28
April	1000	3.50	3.72
May	200	0	2.78
July	380	0	5.07
August	1147	0	2.62
October	695	23.96	12.78
November	60	0	0
December	607	8.09	7.06

V. *Condica illecta* :

The data on parasitization of safflower caterpillar, *C. illecta* from Marathwada are presented in Table 6. Three larval parasites viz., *Peribaea* sp. *Homolobus* sp. and *Aleiodes percurrens* Lyle were recorded on safflower caterpillar. One nematode

was very predominant and it was observed to parasitize the larvae by *A. percurrens* was high in the month of July (17.49%), August (21.29%) and September (23.35%). The parasitization by nematode alone was 25-64 per cent in the month of August. *A. percurrens* and nematode were the key parasitoids of *C. illecta* in the region. These parasites were able to reduce the population of pest during crop growth.

Table 6 : Parasitization of *Condica illecta* on sunflower

Month	Number of larvae collected	Mean parasitization of larvae (%)
January	30	5.26
February	37	0.43
July	189	17.49
August	1582	21.29 25.64 alone by nematode
September	256	23.35
October	210	2.08
November	170	2.78
December	44	4.39

VI. *Dasychira mendosa* :

During the period of study the larval and pupal parasitization of tea caterpillar, *D. mendosa* did not exceed more than 5.09 and 7.36 per cent (Table-7). The identification of parasites of *D. mendosa* was awaited.

Table 7 : Parasitization of *Dasychira mendosa* on sunflower.

Month	Number of larvae collected	Mean per cent parasitization of	
		larvae	Pupae
January	256	1.46	5.04
February	71	0.98	2.08
August	32	0	0.85
October	97	5.09	7.36
November	204	2.66	6.80
December	293	1.34	3.29

VII. *Asota ficus* :

The data on parasitization of fig semilooper, *A. ficus* are presented in table 8. The mean larval parasitization was higher in the month of December (12.50%) followed by November (8.07%). The identification of parasites of fig semilooper was

Table 8 : Parasitization of *Asota ficus* on sunflower.

Month	Number of larvae collected	Mean parasitization of larvae (%)
January	17	1.59
February	11	0
August	20	2.08
September	59	2.58
October	146	3.11
November	37	8.07
December	19	12.50

VIII. *Euproctis limbata*

The parasitization of hairy caterpillar, *E. limbata* by *Glyptapan- teles phytometrae* (Wilkinson) was 13.38 per cent and 11.97 per cent in the month of October and November (Table 9).

Table 9 : Parasitization of *Euproctis limbata* on sun flower.

Month	Number of larvae collected	Mean parasitization of larvae (%)
January	45	6.18
February	36	1.33
March	14	2.38
April	19	3.33
August	20	0
October	919	13.38
November	204	11.97
December	142	3.76

The parasites viz., *Carcelia illota* and *Exorists xanthaspis* parasitized the larvae of *Helicoverpa* to the extent of 24.54 % in Gujarat state, (Patel and Talati 1987). *Charops* sp. parasitized *S. obliqua* larvae to the extent of 38.95 per cent while 15.12 per cent parasitization was due to *Apanteles obliqua* and *A. ruidus* (Shetgar et al. 1990). The mean daily predation rate by an adult bug of *Canthaconidea* was seven *Spilisoma* larvae. One generation of predator could control two successive over lapping generations of pest (Gope 1981).

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