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Natural Enemies of Cotton Bollworms in Saurashtra Region of Gujarat

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The bollworms, *Earias vittella* F. and *Helicoverpa armigera* Hub. cause losses of cotton production and quality too in cotton growing areas of Gujarat State. Bioagents and their potentiality of bollworms have been studied in middle Gujarat (Yadav *et al.*, 1982), but preliminary information on natural enemies of cotton bollworms from Saurashtra region of the State being scanty has prompted to conduct the present investigation.

Periodical collections of bolls infested with larvae and pupae of *E. vittela* and *H. armigera* were made from cotton fields grown at University Centres, Junagadh during 1993-94 and Targhadia during 1991-94. They were reared in laboratory till their complete development. *E. vittella* larvae were reared individually in glass tube (3 x 20 cm) containing okra fruits as their food and *H. armigera* larvae on cotton bolls or tomato. Number of parasitoid adults emerged out from each collection was recorded according to bioagent type and preserved. Subsequently they were indentified from International Institute of Entomology, London. Percentage parasitism was calculated on the basis of total healthy and parasitized host larvae.

Result showed that both the bollworms were found to be parasitized by the hymenopterous and dipterous larval parasitoids. A chalcidid, *Brachycoriphos nersi* Gahan was only recorded as a pupal parasitoid of *E. vittella.*

A. Parasitism of *E. vittella*

Three braconids, *Rogas aligarhensis* Quadri, *Apanteles* sp. and *Agathis fabise* (Nixon) and a tachnid, *Peribaeda sp. were found parasitizing E. vittella* larvae. Amongst, *R. aligarhensis* and *Peribaea* sp. were important, causing 6.7 to 36.2 per cent with an average of 24.9 per cent parasitism in the season (Table 1). Parasitism by *Peribaea* sp. was 15.1 per cent with the maximum (20.0-23.3%) during October-November while *R. aligarhensis* was active during November to February (11.1 to 13.5%). Thus *Peribaea* sp. preponderated to *R. aligarhensis* throughout the season. Under North Saurashtra condition, both were active, causing 12.6 to 40.1 per cent parasitism during September to November.

b. Parasitism of *H. armigera*

H. armigera was found to be regulated by a parasitoid complex and predators, *Chrysoperla carnea (Stephens) and Mallada*

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TABLe 2

Parasitism of cotton bollworms by different larval parasitoids.

Month		Parasitism (%) / host							
		E. vittella				*H. armigera*			
		No. of larvae observed	*R.aligar-hensis*	*Peribaea*	*Total*	*No. of larvae observed*	*C. chloridеae*	*E. illota*	*Total*
August	1993	40	00.00	14.3	14.3	50	4.4	10.0	14.4
September	1993	48	00.5	18.0	18.5	130	8.80	9.9	18.7
October	1993	45	2.8	20.0	22.8	140	10.1	16.2	26.3
November	1993	84	12.9	23.3	36.2	146	12.3	18.2	30.5
December	1993	96	11.1	18.8	29.9	138	14.3	22.9	37.2
January	1994	128	13.5	13.3	26.8	170	16.4	20.0	36.4
February	1994	48	11.5	8.5	20.0	80	8.5	14.2	22.7
March	1994	30	2.4	4.3	6.7	38	4.2	3.4	7.6
Mean		—	6.8	15.1	24.9	—	9.9	14.3	24.2

boninensis (Okamato) (both chrysopids), an insectivorus bird, Babbler and a microbioagent, nuclear polyhedrosis virus (NPV). A parasitoid complex consisted of six tachnids, *Carcelia (Senometapia) illota* curron, *Eucarcellia illota* Curron, *Drino imberbis* Weidemen, *Exorista xanthospis* Muesebeck, *Stroblimia angateli* Villenrieue and *Eriborus* sp., three braconids, *Microchelonus heliope* Gupta, *Apanteles angaleti* Muesebeck and *Bracon greeni* Ashm, and an ichneumonid, *Compoletis chlorideae* Uchida.

Of them, *E. illota* and *C. chlorideae* were important and percentage parasitism ranged from 3.4 to 22.9 and 4.2 to 16.4 averaging 14.3 and 9.9, respectively (Table 1). Thus *E. illota* proved dominant to *C. chlorideae*. The cold months, December and January favoured high activity of both the parasitoid (36.4 — 37.2%), while humid months i.e. August and September (14.4 — 18.7%) and hot months i.e. February and March (7.6 — 22.7%) suppressed their development.

The study concluded that the larval parasitoids of *E. vittella* and *H. armigera* in cotton field should be protected and encouraged by providing congenial environment during October-February.

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