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PARASITES AND PREDATORS ASSOCIATED WITH SUGARCANE BORERS

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Abstract

Field survey and systemic studies were conducted to explore the parasite and predator fauna associated with sugarcane borers, three parasite species viz, *Trichogramma chilonis* (Ishii) , *Telenomus spp.* And *Cotesia* (*Apanteles*) *flavipes* (Cam) were recorded from the eggs and larvae of sugarcane borers. Red ants, black ants and hovering fly were found predating the larvae of sugarcane borers . Mean percent parasitism of *T. chilonis* and *C.flavipes* was positively correlated with the population of borers and larval infestation respectively .

Key Words: Sugarcane borers, Parasites, Predators.

Introduction

Sugarcane , *Saccharum officinarum* Lin. is one of the major cash crops in Pakistan. It is a tropical crop, therefore flourishes well in humid and mild climate. In Sindh province the climate conditions for the cultivation of sugarcane are more favourable but the yield per hectare is very low as compared to other cane growing countries of the world (Khoso,1992). Among other factors, the ravages of insect pests are of unique importance. Due to continuous cultivation, many pests have perpetuated from one crop to the next .

About a dozen of important insect pests have been mentioned from Pakistan (Chaudhry and Ansari ,1988)as well as from the Sindh (Naqvi, 1975). Among them the borers and leaf hoppers are major devastators, which consequently reduce the quality and quantity of cane and cane sugar (Irshad et al ,1981,Khuhro and Ansari 1993). Ruinard (1988) recorded cane damge by Top borer, *Scirpophaga nivella* F. (15-20%) and Gurdasper borer, *Acigona steniellus* Hompson (15-20%) which in severe case was upto 60%.

To control these pests, a comprehensive approach of integrated pest management system should be adopted to utilize associated suitable techniques and methods of control based on biological control (Irshad et al. 1982, Mohyuddin *et al.* 1982). The present studies were conducted to make an extensive survey to determine the parasites and predators associated with sugarcane borers under field conditions around Tando Jam area.

Materials and Methods

During study, a survey of the sugarcane fields around TandoJam was made. The egg masses of sugarcane borers were collected from the field and brought to the laboratory. These egg samples were kept inside Petri dishes and the parasites emerged were identified. The larvae collected from the field were kept in the cane cuttings to provide food to the larvae. After definite time intervals these cane cuttings were checked for presence of parasitoid cocoons. These cocoons were kept in glass vials plugged with moistened cotton and the adult parasites on emergence were identified.

Predator sampling was made by visiting sugarcane field at regular intervals and the predators on sugarcane borers were collected and preserved for identification. Percent infestation of different sugarcane

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borer species were also observed at monthly intervals to establish the correlation of borers and parasitoids in relation to crop phenology. The data thus obtained was subjected to analysis of variance.

Results And Discussion

1. *Trichogramma chilonis* (Ishii).

The parasitism of the eggs of different sugarcane borers was recorded as an aggregate of the individual egg masses collected. The results on mean percent parasitism of *T.chilonis* in the eggs of sugarcane borers (Table-1) revealed that parasitism varied significantly with the plant phenology and sugarcane season. The mean percent parasitism was significantly highest. (16.35%) during September. The parasitism was 4.92% during early vegetative growth stage in March. It increased gradually during April (6.82%)to May (13.07%). Thereafter an abrupt decline in parasitism was recorded in June (3.48) and it remained constant during July (3.92%).This may be attributed to higher temperature during these months. As the climatic conditions became favourable during August, the parasitism increased again (8.45%) After September the parasitism declined towards the maturity of the sugarcane crop ,because the borer larvae started entering hibernation as the season approached to the winter months.

The correlation coefficient of parasitism percentage with the egg masses collected indicated that parasitism had positive and significant correlation with the oviposition by female moths (Mohyuddin *et al.*,1981, Sithanathan *et al.*, 1982, Misra *et al.*, 1987).

2. *Cotesia (Apanteles) flavipes* (Cam).

This important gregarious larval parasitoid was recorded from the larvae of sugarcane stem borer *Chilo infuscatallus* Sn. The results (Table-2) revealed that parasitism percentage varied significantly with the crop and insect pest (host) phenology. In May the parasitism was significantly less (0.15%), it increased during June (0.58%) and again declined in July (0.27%). Thereafter it gradually increased during August (2.67%). The parasitism further increased during September (3.37%), October (4.52%), November (4.68%) and December (4.83%) months.

The data indicates that parasitism by *C. flavipes* was significantly lower in summer months, as compared to winter months. This indicated that *C. flavipes* was a temperature sensitive parasitoid.

These results are in close conformity to that reported by Mohyuddin (1978). *Mohyuddin et al.* (1981 & 1982) also reported similar parasitism pattern of *C. flavipes* in the larvae of *C. infuscatellus* in N.W.F.P. province of Pakistan. This also reflects that cool and dry weather favoured the survival and establishment of *C. flavipes* in sugarcane field.

3. *Telenomus spp.*

This parasitoid was also recovered from the eggs of sugarcane borers during the months of April only once a year hence the data has not been tabulated. However ,this parasitoid was recovered from the eggs of top borer of sugarcane and this may be the most active parasitoid during March – April. Further more Sexena (1977) also recovered it from the eggs of sugarcane top borer (Liu *et al.* 1987).

4. *Brumoides suturalis.*

This predatory beetle is famous for predating soft bodied insects. However, in sugarcane field this beetle was found predating upon the eggs of sugarcane borers. The incidence of this beetle as a

predator of eggs was not tabulated. It was recorded during March and then in October- November.

5. Ants.

Two ant species were found associated with the predators of sugarcane borers at TandoJam. Red ants were recorded during August and September and Black ants were found predating on the larvae during March –April . The prevalence of these two predators was not consistent, hence the data was not sufficient for presentation in tabulated form .

6. Syrphid flies.

The hovering flies were not recorded at regular intervals in sugarcane field. These flies were found associated with the predation of moths. Some of the maggots were also recovered feeding on the neonate larvae of the sugarcane borers during March –April.

Table –1. Mean percent parasitism of *Trichogramma chilonis* (Ishii) in the eggs of sugarcane borers.

Months	Mean egg masses collected	Mean parasitised egg masses	Percent parasitism
March	27.6	1.36	4.92 e
April	36.9	2.52	6.82 d
May	40.6	5.31	13.07 b
June	42.2	1.47	3.48 e
July	46.5	1.82	3.92 e
August	51.6	4.36	8.45 c
September	69.5	11.36	16.35 a
October	12.6	0.14	1.15 f

Cd 1 = 1.158
Cd 2 = 1. 576

Mean values in third column with similar Superscrits are statistically non-significant (P + 0.05)

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Table –2. Mean percent parasitism of *Cotosia (Apanteles) flavipes* (Cam) in the larvae of sugarcane stem borers.

Months	Mean No of larvae collected	Mean No.of larvae parasitised	Mean Percent parasitism
March	175.6	0.26	0.1 5 e
April	142.2	0.96	0.58 d
May	192.6	0.52	0.27 e
June	180.5	4.82	2.67 e
July	211.6	7.13	3.37 b
August	190.8	8.62	4.52 a
September	245.6	11.49	4.68 a
October	261.7	12.64	4.83

Cd 1 = 0.36
Cd 2 = 0.49

Mean values sharing similar alphabets are statistically non-significant (P + 0.05)

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Table – 3. Mean percent larval infestation of different sugarcane borers species during 1996.

Months	Top borers	Stem borer	Root borer
March	2.45 e	2.95 h	--
April	5.98 b	4.70 g	--
May	8.83 a	9.25 f	--
June	4.75 c	16.58 d	0.85 f
July	4.78 c	19.68 c	2.80 e
August	4.60 c	23.27 b	4.17 d
September	3.33 d	29.75 a	5.78 c
October	--	10.57 e	8.10 b
November	--	8.72 f	8.57 a
December	--	5.40 g	8.87 a
Cd 1 =	0.329	1.248	0.329
Cd 2 =	0.447	1.698	0.447

Mean values with similar superscripts are statistically non-significant (P + 0.05)

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References

Chaudhry, N.A and M.A.Ansari. 1988. insect pests of sugarcane in Pakistan .Progressive Farming 8(4).10-18.

Irshad, M., A. S. K. Ghouri, and I.Khanzada.1981. sugarcane borers in the sprayed and unsprayed areas of northern Pakistan. ISST Entomol., newsletters., 11.14 -15.

Irshad, M., S. Mirza, and A.Rahatullah. 1982.Control of the sugarane borers, *Chilo infuscatellus* and *Tryporyza nivella* by bactospeine a microbial Pesticide. Pakistan Agriculture5 (2). 263-264.

Khoso, A.W., 1992. Crops of sindh 5th Edition. Deptt. Agronomy, S.A.U. Tandojam ,p.190-191.

Khuhro, G.A and A.H.Ansari. 1993. influence of stem borer, *Chilo infuscatellus* (Snell) on juice quality of sugarcane, *Saccharam officinarum* (Linn) Modern Agric. 8: 22 - 29.

Liu,W.H.,M.F.Gou.,S.C.Han.,H.W.Wuann d, and L. Y. Li. 1987 Inundative releases aT.nuilale (Ertle and Davis) to control sugarcane borers on large scale. Chinese J.Biol. Cont., 3 (4) : 149 - 151.

Misra, M. P., A. D. Pawar, and U.L.Sirivastava., 1987. Biocontrol of Sugarcane Moth Borers by releasing *Trichogramma* parasites. Indian J. Plant PROT., 14 : 89 - 91.

Mohyuddin , A. I. 1978. The scope of biological control of sugarcane borers in Pakistan. Proc. Pak Soc Sug. Tech. Seminar plant protec. Lahore, 29-39.

Mohyuddin A. I., C. Inayatullah, and E.G.King. 1981. Host selection and strains occurrence in *Apanteles flavipes* (Cam.) and its bearing on biological control of graminaceous stem borers. Bull. Ent. Res., 71 : 575 - 781.

Mohyuddin, A. I., A. Rahim, and M. Irshad., 1982. Studies on population dynamics of *Pyrilla prepusilla* (Wlk.), its natural enemies in Pakistan and possibilities of its control PSST,18: 157- 171.

Naqvi, K.M., 1975. Important insect pests of sugarcane in Sindh. Sugarcane crop Seminar. Representation and Recommendations by Ciba Geigy.,67-70 pp.

Ruinard, J., 1988 Investigation into bionomics, economic importance and possibilities of control of sugarcane stalk borers in Java (In Butch). Wagenin Proefschar Land Bouwhogesch, pp 222.

Sexena, A. P., 1977. Role of egg parasites in the control of sugarcane borers. Z. Ange Entomol., 84: 299 - 305.

Sithanathan, S.A., A.R. Solayappan, and T. Sankeran., 1982. The role of *Trichogrammatids* in biological control of sugarcane borers in India. Res. Agron., 239 - 249 pp.