



Parasitoids and predators of rice insect pests of Jorhat districts of Assam

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ABSTRACT: Parasitoids and predators of rice ecosystem recorded during 1999-2000 at three locations of Jorhat district of Assam are listed. Altogether 30 species of parasitoids and 26 species of predators were recorded along with their hosts, period of activity and relative abundance.

KEY WORDS: Insect pests, parasitoids, predators, rice

INTRODUCTION

In Assam, the total area under rice cultivation is 2489.8 thousand hectares, which contributes to a total production of 3382.9 thousand tones grains and an average productivity of 1359 kg/ha (Anon., 2000). One of the major reasons for the low production of rice is the pest problems associated with the crop. More than hundred insect pests have been known to attack rice crop during its growth stages, out of which about twenty have major significance (Basit and Bhattacharya, 2001). However, the rice fields of Assam have a teeming rich community of parasitoids and predators. These natural biological control agents are the friends of farmers and are responsible in managing the population build-up of rice insect pests. These natural enemies play a dominant role in suppressing pest population in the crop ecosystem, whenever suitable conditions prevail for their survival, development, conservation and multiplication. Furthermore, it is of paramount importance to have

correct identification of natural enemies and understanding of their role in order to optimize the strategies for the management of insect pests. Hence, in view of the importance of conservation biological control, an attempt was made to find out the potential parasitoids and predators of rice insect pests in Assam.

MATERIALS AND METHODS

The experiment was conducted during 1999-2000 at three locations of Jorhat district *viz.* Instructional-Cum-Research Farm of Assam Agricultural University (AAU), Jorhat, Regional Agricultural Research Station (RARS), Titabar (20 Km from AAU, Jorhat), Kakajan village (25 Km from AAU) by weekly monitoring of population build-up of natural enemies of rice insect pests. From each location, one 20-cent plot (variety: Ranjit) was identified for taking observations and the farmers of that locality were requested not to apply insecticides. The samples of insect pests, predators

and parasitoids were collected at weekly interval with 5 double sweeps in four sub-plots each (4 sq. m area) from the last week of August to 1st week of November at all the locations. Parasitoids and predators collected were sent to the Division of Entomology, IARI, New Delhi and Zoological Survey of India, Calcutta for identification and a new check list of parasitoids and predators was prepared.

RESULTS AND DISCUSSION

The mean number of insect pests, predators and parasitoids at the three locations of Jorhat district and their per cent population is summarized in Table 1. The maximum per cent of phytophagous insects (64.07 %) was recorded at RARS, Titabar, followed by ICR Farm, AAU (61.99%) and Kakajan (53.89 %). The phytophagous insects included mostly grasshoppers, green leafhoppers, rice skippers, gundhi bugs, whorl maggots, and moths of yellow stem borer, leaf folder and case worm. However, very negligible population of foraging insects (less than 1 %) was observed in all the locations. The maximum mean per cent predators

and parasitoids (30.76 % and 10.84 %, respectively) were recorded at Kakajan, which is one of the most predominant rice monocrop belts of Jorhat district of Assam. The RARS, Titabar and ICR Farm of AAU recorded 27.67 & 8.26 and 30.03 & 7.98 per cent of predators and parasitoids, respectively.

Perusal of Table 2 & 2a shows that hymenopteran parasitoids were highly dominant over dipteran parasitoids. During the survey, 29 species of parasitoids belonging to 10 families of Hymenoptera *viz.* Braconidae, Ichneumonidae, Scelionidae, Trichogrammatidae, Bethyridae, Eulophidae, Chalcididae, Pteromalidae, Ceraphronidae and Vespidae were identified. However, only one species of dipteran parasitoid belonging to the family Tachinidae was recorded.

Likewise, 26 species of predators were recorded with their target prey species, predatory stage, period of activity and relative abundance (Table 3 & 3a). Spiders and coccinellid beetles (7 species each) were found to be more abundant over other groups of predators. The present findings on parasitoids and predators of rice insect pests of

Table 1. Mean number of insect pests, predators and parasitoids at three locations of Jorhat district during 1999-2000

Period	RARS, Titabar			Kakajan			ICR Farm		
	Insect pest	Predator	Parasitoid	Insect pest	Predator	Parasitoid	Insect pest	Predator	Parasitoid
August 4 th week	17.33	8.00	0.00	15.00	4.33	0.67	23.67	11.33	0.00
September 1 st ..	25.00	9.33	1.67	17.00	8.00	3.00	29.00	16.33	3.00
September 2 nd ..	28.00	15.00	3.00	25.33	13.00	5.00	34.33	23.00	8.00
September 3 rd ..	45.67	20.67	7.33	37.00	23.67	8.00	40.33	29.00	10.33
September 4 th ..	67.00	27.67	11.67	54.33	30.67	10.33	59.67	32.00	7.00
October 1 st ..	55.67	35.00	8.00	59.33	34.33	11.67	54.00	38.00	11.00
October 2 nd ..	58.67	28.67	6.00	52.67	28.00	12.00	47.33	30.00	6.67
October 3 rd ..	39.33	11.00	6.33	47.33	24.00	8.67	43.33	25.33	5.00
October 4 th ..	34.33	9.67	4.67	32.67	17.67	6.67	33.00	12.00	6.33
October 1 st ..	27.33	7.00	2.67	25.67	9.33	2.00	24.67	10.00	3.00

Data based on 5 double sweeps in 3 subplots

Table 2. Checklist of parasitoids of rice insect pests of Jorhat district of Assam

Sl. no.	Parasitoid	Host species	Host stage	Period of activity	Relative abundance
A. Hymenoptera					
1.	<i>Aulosaphes</i> sp. (Braconidae)	<i>Cnaphalocrosis medinalis</i>	Larva	Sept./Oct.	++
2.	<i>Bracon</i> sp. (Braconidae)	<i>C. medinalis</i>	Larva	Sept./Oct.	++
3.	<i>Cardiochilis philippensis</i> Ashmead (Braconidae)	<i>C. medinalis</i>	Larva	Aug./Oct.	+++
4.	<i>Cotesia flavipes</i> (Cameron) (Braconidae)	<i>Scirpophaga incertulus</i>	Larva	Sept./Oct.	+++
5.	<i>Scutibracon hispae</i> (Viereck) (Braconidae)	<i>Dicladispa armigera</i>	Larva	May/June/ Aug./Sept.	++
6.	<i>Tropobracon</i> sp. (Braconidae)	<i>S. incertulus</i>	Larva	Sept./Oct.	+
7.	<i>Macrocentrus</i> sp. (Braconidae)	Not known	-	Aug./Sept.	++
8.	<i>Myosoma chinensis</i> (Szepligeti) (Braconidae)	<i>S. incertulus</i>	Larva	Sept./Oct.	++
9.	<i>Amauromorpha accepta</i> (Fabr.) (Ichneumonidae)	<i>S. incertulus</i> & <i>S. innotata</i>	Larva	June/July /Sept.	++
10.	<i>Isotima javensis</i> (Rohwer) (Ichneumonidae)	<i>S. incertulus</i>	Larva	Sept./Oct.	++
11.	<i>Ischnojoppa luteator</i> (Fabr.) (Ichneumonidae)	<i>S. incertulus</i>	Larva	Sept./Oct.	+++
12.	<i>Temelucha</i> sp. (Ichneumonidae)	<i>C. medinalis</i>	Larva	Aug./Sept.	++
13.	<i>Xanthopimpla flavolineata</i> Cameron (Ichneumonidae)	<i>C. medinalis</i>	Larva	June/July/ Sept.	++
14.	<i>Gryon</i> sp. (Scelionidae)	<i>Leptocorisa acuta</i>	Egg	June/July & Sept.	++

Assam corroborate and update the findings of Rahman (1983), Anonymous (1992) and Bhuyan and Basit (1995).

This study strongly suggests the presence of a wide array of natural enemies of rice insect pests, which may be of great value in the biological control. Therefore, greater emphasis is required for the conservation and augmentation of the rich natural enemy fauna in rice ecosystem of Assam. However, the seasonal incidence, relative

abundance of the pests/natural enemies and predator/parasitoid-prey relationship has to be worked out under different agro-climatic zones to know the real impact of these naturally occurring biocontrol agents.

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Table 2a. Checklist of parasitoids of rice insect pests of Jorhat district of Assam

Sl. no.	Parasitoid	Host species	Host stage	Period of activity	Relative abundance
15.	<i>Telenomus</i> sp. (Scelionidae)	<i>S. incertulus</i>	Egg	March/April	++
16.	<i>Telenomus cyrus</i> Nixon (Scelionidae)	<i>Nezara viridula</i>	Egg	May/June	++
17.	<i>Telenomus dignus</i> (Gahan) (Scelionidae)	<i>S. incertulus</i>	Egg	June/Sept./Oct	++
18.	<i>Telenomus remus</i> (Nixon) (Scelionidae)	<i>S. incertulus</i>	Egg	Sept./Oct.	++
19.	<i>Telenomus rowani</i> (Gahan) (Scelionidae)	<i>S. incertulus</i>	Egg	Sept./Oct.	++
20.	<i>Trichogramma japonicum</i> (Trichogrammatidae)	<i>S. incertulus</i>	Egg	March/April/Sept./Oct.	++
21.	<i>T. chilonis</i> Ishii (Trichogrammatidae)	<i>S. incertulus</i> & <i>C. medinalis</i>	Egg	March/April/Sept./Oct.	++
22.	<i>Goniozus</i> sp. (Bethyidae)	<i>C. medinalis</i>	Larva	Oct./Nov.	++
23.	<i>Chrysonotomyia</i> sp. (Eulophidae)	<i>D. armigera</i>	Egg/larva	May/June/Aug./Sept.	++
24.	<i>Tetrastichus schoenobii</i> Ferriere (Eulophidae)	<i>S. incertulus</i>	Egg	Sept./Oct.	++
25.	<i>Elasmus</i> sp. (Eulophidae)	<i>C. medinalis</i>	Larva	Aug./Sept.	+
26.	<i>Brachymeria excarinata</i> Gahan (Chalcididae)	<i>C. medinalis</i>	Larva	June/July	+
27.	<i>Trichomalopsis apanteloctena</i> (Crawford) (Pteromalidae)	<i>Pelopidas mathias</i> (Fabr.)	Larva	Sept./Oct.	++++
28.	<i>Aphanogmus manilae</i> Ahmead (Ceraphronidae)	-	-	Sept/Oct.	+
29.	<i>Icaria ferruginea</i> (Fabr.) (Vespidae)	-	-	Sept/Oct.	+
B. Diptera: Tachinidae					
30.	<i>Halidaya luteicornis</i> (Walker)	<i>P. mathias</i>	Larva	Sept./Oct.	+

Relative abundance: +: Less common, ++: Common, +++: Abundant, ++++: Probably hyperparasite

Table 3. Checklist of predators of rice insect pests of Jorhat district of Assam

Sl. no.	Predator	Prey species	Predatory stage	Period of activities	Relative abundance
A. Spiders :					
1.	<i>Lycosa pseudoannulata</i> (Boesenberg & Strand) (Lycosidae: Araneae)	<i>N. nigropictus</i> (Stål.) <i>N. lugens</i> (Stål.)	Both spiderlings and spiders	Throughout the kharif season	+++
2.	<i>Oxyopes javanus</i> Thorell (Oxyopidae: Araneae)	Moths of <i>S. incertulus</i> , <i>C. medinalis</i> & nymphs of <i>Leptocorisa acuta</i>	-do-	Throughout the kharif season	+++
3.	<i>O. lineatipes</i> (Koch) (Oxyopidae: Araneae)	-do-	-do-	-do-	+++
4.	<i>Argiope catenulata</i> Doleschall (Araneidae: Araneae)	<i>N. nigropictus</i> (Stål.), <i>N. lugens</i> (Stål.) & <i>Hieroglyphus banion</i> Fabr.	Mainly adults	Sept./Oct.	+
5.	<i>Neoscona theisi</i> (Walck.) (Araneidae: Araneae)	-do-	-do-	-do-	+
6.	<i>N. mukerjei</i> (Araneidae: Araneae)	-do-	-do-	-do-	+
7.	<i>Tetragnatha</i> sp. (Tetragnathidae: Araneae)	-do-	-do-	Throughout the kharif season	+++
B. Coleoptera:					
(i) Coccinellidae					
8.	<i>Micraspis discolor</i> (Fabr.) Warplex	Nymphs and adults <i>N. nigropictus</i> & <i>Thrips oryzae</i> Williams	Both grubs and adults	Aug./Oct.	+++
9.	<i>Micraspis inops</i> (Fabr.)			Sept.	+
10.	<i>Harmonia octomaculata</i> (Fabr.)			Aug./Oct.	++
11.	<i>Cheilomenes sexmaculata</i> (Fabr.)			Aug./Sept.	+++
12.	<i>Coccinella transversalis</i> Fabr.			Aug./Oct.	+++
13.	<i>Coccinella septempunctata</i> (Fabr.)			Aug./Oct.	+++
14.	<i>Propylea nr. japonica</i> (Thunberg)			Sept.	+

Table 3a. Checklist of predators of rice insect pests of Jorhat district of Assam

(ii) Carabidae					
15.	<i>Ophionea nigrofasciata</i> (Schmidt-Goebel)	Larva of <i>C. medinalis</i>	Adult	Aug./Sept.	+++
16.	<i>Casnoidea ishii ishii</i> Habu	-do-	Not known	Aug./Sept	+
17.	<i>Anoplogenus microgonus</i> (Chaudoir)	Not Known	Not known	Aug.	+
(iii) Staphylinidae					
18.	<i>Paederus fuscipes</i> Curtis	<i>N. nigropictus</i>	Adults	Aug./Oct.	++
C. Odonata:					
(i) Libellulidae					
19.	<i>Crocothemis servilia</i> (Drury)	Moths of <i>S. incertulus</i> , <i>C. medinalis</i> & Nymphs and adults of <i>N. nigropictus</i>	Adults	Aug./Oct.	++
20.	<i>Orthetrum abina</i> (Drury)				
21.	<i>Neurothermis tullia tullia</i> (Drury)				++
(ii) Coenagrionidae					
22.	<i>Agriocnemis pygmaea</i> (Rambur)	-do-	Adults	Aug./Oct.	+++
23.	<i>A. famina famina</i> (Brauer)			-do-	+++
D. Orthoptera:					
(i) Tettigoniidae					
24.	<i>Conocephalus longipennis</i> (de Hann)	Nymphs of <i>N. nigropictus</i> , eggs of <i>S. incertulus</i>	Both nymphs and adults	Aug./Sept.	+
(ii) Gryllidae					
25.	<i>Metioche vittaticollis</i> (Stål)	Eggs of <i>S. incertulus</i> & <i>C. medinalis</i> , Nymphs of <i>N. nigropictus</i>	Adults	Aug./Sept.	+
E. Hemiptera: Miridae					
26.	<i>Cyrtorhinus lividipennis</i> Reuter	Nymphs of <i>N. nigropictus</i>	Adults	Aug./Sept.	+

Relative abundance: + : Less common

++ : Common

+++ : Abundant

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