Eleven species of Homopteran pests were collected from two study-sites — Bamankhali and Chemaguri in the Sagar Island, Sunderbans, India. *Nilaparvata lugens* was dominant during pre- and post-monsoon at Chemaguri, *Nephotettix virescens* prevailed throughout the seasons at both the study sites and *Recilia dorsalis* occurred during pre-monsoon at Chemaguri and Bamankhali. *Sogatella furcifera* was dominant during pre-monsoon at Bamankhali and in monsoon at Chemaguri. It seems that the seasonal environment factors play an important role to determine the presence of the homopteran insects in these specific ecozones.

SEASONAL ABUNDANCE OF LEAFHOPPERS AND PLANTHOPPERS (HOMOPTERA) IN THE SAGAR ISLAND

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Key words : *Leafhoppers, Planthoppers, Relative abundance*

Introduction

Rice is basically a tropical crop, but it is grown over a broad geographical area ranging from 49° N in the Czech Republic to 35°S in Australia as reported by Wilson and Claridge[1]. However, Asian countries have over 90% of the world's rice-growing land area and produce about 90% of the world production as reported by De Datta[2]. This vast area also invites the incidence of various insect pests which are the major causes of yield loss. Among the insect pests, sap sucking leafhoppers and planthoppers (Homoptera : Auchenorrhyncha) stand out as important pests, either by direct feeding or through transmitting virus or virus-like pathogens causing tungro disease, rice grassy stunt and orange leaf disease as reported by Ou[3] and

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Hibino[4]. They were formerly regarded as of minor significance but are now considered as major pests because of the menace they pose in the paddy fields. The present investigation emphasises the role of agro-meteorological factors, *viz*, air temperature, rainfall and relative humidity in influencing the relative abundance (RA) of eleven representative of leafhoppers (Cicadellidae) and planthoppers (Fulgoridae) at the different study sites.

The Hooghly–Matla estuarine complex has an intricate network of several riverine systems like Hooghly, Mooriganga, Matla, etc. Owing to the presence of so many rivers, the entire area gets crisscrossed into a number of islands. Sagar Island, the largest of this group, is situated in the western sector of the Sunderbans. Two study sites were identified for the present investigation, namely Chemaguri and Bamankhali. The latter is situated in the northern part of the island and covers wide stretches of paddy fields. Chemaguri, on the other hand, lies in the southern sector and has a close proximity to the river Mooriganga.

Material and Methods

Insects were collected from the rice fields of the above sites at night by light-trap method using an electrically operated unit fitted with a suction device to maximise insect catches and to minimise errors in sampling as reported by Perfect[5]. The collected samples were t segregated up to species level and their numb recorded season-wise. The agro-meteorolog parameters like air temperature, rainfall a relative humidity were recorded, using a dig thermo-hygrometer during the entire study pe (March, 2000 – February, 2001).

The pooled data were used to calculate season-wise relative abundance of differ species. The values were put on the Brockma Jerosch scale by Tamura[6] to categorise domin subdominant and rare species. Correlat between the environmental variables a population of the different species were calcula using the KyPlat software package.

Results

Eleven species of homopteran group we recorded during the study period, *viz*, *Nephotet virescens* (green leafhopper), *Nephotet nigropictus, Recilia dorsalis* (zig-zag leafhoppe *Cofana spectra, Recilia distinct Emproascanara indica, Exitianus indicu Exitianus nanus, Nilaparvata lugens* (brow leafhopper), *Sogatella furcifera* (white-back planthopper) and *Nisia nervosa*. Of these, t first eight belong to Cicadellidae (leafhopper and the rest three belong to Fulgorida (planthoppers). The seasonal fluctuation in the population numbers is illustrated in table 1. O of these 11 species, *Nephotettix virescens*

Nephotettix nigropictus, Recilia dorsalis, Nilaparvata lugens and Sogatella furcifera are considered to be the major pests, being the vectors of different rice viral diseases.

The homopteran insect population in the two stations in the Sagar Island display a conspicuous seasonal variation in their faunistic structure as well as in relative abundance (Table 2). A close study reveals that *Nephotettix virescens* dominated during the pre-monsoon, monsoon and post-monsoon periods at both the stations. *Nephotettix nigropictus* dominated during monsoon at Chemaguri, *Recilia dorsalis* at Bamankhali and Chemaguri during pre-monsoon period while *Nilaparvata lugens* dominated during pre- and post-monsoon at Bamankhali and monsoon and post-monsoon at Chemaguri. *Sogatella furcifera*, another major pest, prevailed only during the pre-monsoon season in Bamankhali. The rest of the listed species appear to be minor pests and have no dominant role as rice pests. The environmental parameters recorded during the study period were characteristic of the respective seasons they represented (Table 3). Correlation coefficient values show a direct and negative relation between *N. lugens* and temperature. The same was also observed with relative humidity. Significant positive relation existed for *S. furcifera* with rainfall. The rest did not any significant relationship as clarified by values (Table 4).

Discussion

It is a wellknown fact that the densi abundance of any organism is goverr various ecological factors. The succ development and maintenance of a pop depends upon ecological balance be environmental conditions and tolera organisms to variation in one or more conditions studied by Reid[7].

The present study on the basis of r abundance revealed that *N. virescens*, a of rice tungro virus (John and Ling)[8] dominant in all seasons of the year at b stations. It appears that the environmental prevailing during those particular p accelerated and geared up the proc efficiency of the above-mentioned specie

Simple correlation between insect pop and agro-meteorological values of mentioned major dominant pests p significant for some of the species. Suc are significant in terms of effective mana of paddy pests.

Table 1 : Season-wise Population of Different Homopteran Insects at two Study Sites.

Species	Bamankhali			Chemaguri		
	Pre monsoon	Monsoon	Post monsoon	Pre monsoon	Monsoon	Post Monsoon
Nephotettix virescens	168	5332	160	65	1069	656
Nephotettix nigropictus	12	229	0	9	350	16
Recilia dorsalis	128	139	0	128	53	32
Cofana spectra	79	6	0	12	2	0
Exitianus indicus	170	25	0	62	58	1
Nilaparvata lugens	329	311	1060	10	94	4064
Sogatella furcifera	100	116	0	13	116	76
Exitianus nanus	19	35	0	2	49	0
Recilia distincta	9	304	0	7	32	4
Empoascanara indica	45	6	0	4	12	0
Nisia nervosa	0	64	80	0	32	48

Table 1 : Relative Abundance of Different Homopteran Species in Different Seasons at two Stations.

Species	Bamankhali			Chemaguri		
	Pre monsoon	Monsoon	Post monsoon	Pre monsoon	Monsoon	Post Monsoon
Nephotettix virescens	15.86*	81.19*	12.30*	20.83*	57.25*	13.39*
Nephotettix nigropictus	1.13***	3.48**	0	2.88**	18.74*	0.32***
Recilia dorsalis	12.08*	2.11**	0	41.02*	2.83**	0.65***
Cofana spectra	7.45*	0.09***	0	3.84**	0.10***	0
Exitianus indicus	16.05*	0.38***	0	19.87*	3.10**	0.02***
Nilaparvata lugens	31.06*	4.73***	81.53*	3.20**	5.03*	82.98*
Sogatella furcifera	9.44*	1.76***	0	4.16**	6.21*	1.55***
Exitianus nanus	1.79***	0.53***	0	0.64***	2.62**	0
Recilia distincta	0.84***	4.62**	0	2.24**	1.71***	0.08***
Empoascanara indica	4.24**	0.09***	0	1.28***	0.64***	0
Nisia nervosa	0	0.97***	6.15*	0	1.71***	0.98***

* = **Dominant**; ** = **Subdominant** and *** = **rare**
(according to Brockmann–Jerosch scale : RA > 5% = *; 2% <RA <5% = ** and RA < 2% = ***)

Table 3 : Seasonal Values of agro-meteorological parameters at two selected stations

Season	Bamankhali			Chemaguri		
	Temperature (°C)	Rrainfall (mm)	Relative Humidity (%)	Temperature (°C)	Rainfall (mm)	Relative Humidity(%)
Premonsoon	27.45	6.77	87.0	27.68	6.67	85.12
Monsoon	28.26	12.65	89.87	28.1	12.65	87.0
Postmonsoon	20.03	1.16	71.37	18.58	1.16	68.6

Table 3 : Results of Simple Correlation Coefficients of Major Dominant Homopteran Pest and agro-meteorological Parameters

Species	Bamankhali			Chemaguri		
	Temperature (°C)	Rrainfall (mm)	Humidity (%)	Temperature (°C)	Rainfall (mm)	Humidity (%)
Nephotettix virescens	0.612	0.894	0.655	0.661	0.939	0.700
Nephotettix nigropictus	0.806	0.983	0.837	0.638	0.928	0.678
Recilia dorsalis	0.563	0.150	0.517	0.508	0.034	0.461
Nilaparvata lugens	– 0.968	– 0.981	– 0.980	– 0.998*	– 0.849	– 0.994**
Sogatella furcifera	0.573	0.162	0.527	0.912	0.997*	0.933

* Significant at p = 0.05 ** Significant at p = 0.01

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