ABUNDANCE AND DIVERSITY OF INSECT FAUNA IN FOUR SPOTS OF CHITTAGONG UNIVERSITY CAMPUS

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Abstract

Abundance and diversity of insect fauna were studied in four different spots in Chittagong University campus, Chittagong from January to December in 2012. Number of species belonging to different taxonomic orders collected from the spots was as follows: 10 Odonata; 7 Orthoptera; 1 Dictyoptera; 19 Lepidoptera; 4 Diptera; 8 Coleoptera and 12 Hymenoptera. Percentage of monthly collection of insects was as follows: January (8.74%), February (8.35%), March (7.60%), April (6.67%), May (7.76%), June (8.03%), July (8.35%), August (8.30%), September (8.52%), October (8.79%), November (9.38%) and December (9.49%). Insect abundance was highest in Spot 2 (34.50%), followed by Spot 1 (28.32%), Spot 4 (19.10%) and Spot 3 (18.07%). Coleoptera (23.58%) was the most abundant order followed by Lepidoptera (23.00%), Hymenoptera (22.51%), Diptera (10.91%), Odonata (9.39%), Orthoptera (9.39%) and Dictyoptera (1.41%). All collection-spots were enriched with leidopteran and hymenopteran insects except Spot 4 where the most dominating orders were Coleoptera and Hymenoptera. Species richness (SR) was highest in Spot 3 (4.17 ± 0.06) and lowest in Spot 2 (3.49 ± 0.04), Species diversity (H´) was highest in Spot 2 (2.53 ± 0.03) and lowest in Spot 4 (2.34 ± 0.08) and Species evenness (J´) was highest in Spot 2 (0.89 ± 0.01) and lowest in Spot 4 (0.76 ± 0.03). In the Spot 1, the highest species richness was observed in April; and highest species diversity and species evenness in January. In Spot 2, the highest species richness was observed in May; and highest species diversity and species evenness in April. In Spot 3, the highest species richness was observed in April; and highest species diversity and species evenness in March and June. In the Spot 4, the highest species richness value was observed in February; and highest species diversity and species evenness in December. Abundance, diversity and species composition suggest that the insect fauna of Chittagong University campus occurs in two main communities; one occurring in the area surrounding the forests and gardens with a high abundance and the another one at the plain lands and road sides with a comparatively low abundance of insects.

Key words**:** Insect biodiversity**,** abundance, species richness, species diversity, species evenness.

INTRODUCTION

Insects constitute a species group attributed mainly due to their small size, which enable them to occupy all types of niches. Biodiversity entails all forms of biological entities inhabiting the earth. Insect biodiversity plays a great role in every sector of the biosphere. Insect biodiversity accounts for a large proportion of biodiversity in the world. One of the major features of insects is their extraordinary diversity in terms of number, and morphological form climatic variations and the different habitats. Bangladesh is enriched with different types of entomofauna having representatives of all the insect orders where the climatic condition and bright photoperiodism and thermoperiodism are favourable to insect growth and regulation.

Report on the entomofaunal diversity of Bangladesh is available scantly. The research survey by James (2011) in Rajshahi University campus explored its entomofaunal diversity. He listed 12 orders of insects of which Diptera was the most dominant order. El Moursy *et al*. (2001) studied insect diversity and abundance in Zaranik Protectorate, Egypt. They reported on local communities of insects including 187 species and subspecies belonging to 49 families representing15 orders. Ahmed *et al.* (2004) studied the biodiversity of insects

associated with sugarcane crop in Faisalabad, Pakistan and the data were analyzed statistically. Khadijah *et al.* (2013) made a work on the diversity and abundance of insect species at Kota Damansara community forest reserve, Selangor, whereby highest insect diversity was observed in Diptera and highest insect abundance was observed in Blattoidea. Kyermaten *et al.* (2014) studied the insect diversity of Muni-Pomadze Ramsar site, Ghana and on the whole this site showed a high diversity of insect species.

The objectives of the present investigation were to explore the abundance of the insect species of four different sampling sites of Chittagong University campus for a period of 12 months.

MATERIAL AND METHODS

Monthly samplings were made from January to December 2012 in four different spots (viz. 1-Shahid minar to Biological faculty; 2-Ladies halls to botanical garden; 3-Social science faculty to warehouse; 4-Shahid minar to gate no. 1) of Chittagong University campus. Specimens were collected in the morning hours of the day with a duration of one hour at each spot. Sampling was done by using sweep net and hand collection. Visual observation and counts were made for those insects that were missed from the net-practices. All the captured insects were chloroformed, killed, sorted, mounted, labeled and preserved by following general entomological procedures (Borror *et al.* 1981). Identification of insects were done by comparison with previously identified specimens available in the entomological museum at the Department of Zoology, Chittagong University and also with reference to the taxonomic keys and characters following Bingham (1907), Kirby (1914), Maulick (1919), Fraser (1936), Van Emden (1965), Talbot (1975), Richards and Davies (1977), Borror *et al.* (1981) and internet sources.

For the abundance study, the total number of insects recorded per month/ per spot/ per order was calculated by counting into percentage for determining the abundance of insects for each month or spot or order.

The investigation was conducted to study the variation in abundance of the insects month wise, spot wise and order wise. The study was based on the basis of diversity indices i.e. species richness (SR), species diversity (H′) and species evenness (J′).

Species Richness (SR)-Species Richness (SR) represents the number of species occurring per sampling spot followed by the formula of Gleason (1922), Franz (1976) as:

$$SR = S\text{-}1/\log N$$

Where, S= Total number of species in a sample, N= Natural log of total number of individuals of all species

Shannon-Wiener's species diversity index (H or H')-In the present study Shannon-Wiener diversity index has been used. It incorporates both species richness and equitability. The formula of Shannon-Wiener (1949) diversity index is:

$$H \text{ or } H' = \sum_{i=1}^{s} (pi \log 2\ pi)$$

Where, *H′* = Species diversity, *S* = Total number of species in the sample, *N* = Total number of individuals of all species, *ni* = The number of individuals of each species

Species Evenness (J')-This is a measure of equitability, a measure how evenly the individuals are distributed among the different species. Species Evenness (J′) equitability was calculated using the formula of Pielou (1966) which is as follows:

$$J' = H`/\ln S$$

Where, J′= Species Evenness, H′= Species diversity, S= Number of the species

RESULTS AND DISCUSSION

Insect species collection in the study period

A total of 1843 insect specimens was collected during the study period. However, members of the same species escaping during capture or could not be caught were counted as well. The collected specimens were primarily sorted into seven orders as follows- Odonata, Orthoptera, Dictyoptera Lepidoptera, Diptera, Hymenoptera and Coleoptera. Two families under Odonata, two families under Orthoptera, one family under Dictyoptera, six families under Lepidoptera, three families under Diptera, five families under Hymenoptera and five families under Coleoptera were identified. The collection included 61 species in the study (Table 1).

Table 1. List of the insects collected from Chittagong University Campus during the study period from January to December 2012.

Order	***Family***	***Scientific name***	***Common name***
Odonata	Libellulidae	*Orthetrum sabina (*Drury 1770*)*	Green marsh hawk
		Neurothemis fulvia (Drury 1773)	Fulvous forest skimmer
		Neurothemis tullia tullia (Drury 1773)	Pied-paddy skimmer
		Rhyothemis variegata (Linnaeus 1763)	Common picture wing
		Acisoma panorpoides (Rambur1842)	Grizzled paintail
		Rhodothemis rufa (Rambur 1842)	Common redbolt
		Crocothemis servilia (Drury 1770)	Oriental scarlet
	Coenagrionidae	*Trithemis annulata* (Palisot de Beauvoid 1807)	Violet drop wing
		Ischnura elegans (Vander Lindon 1820)	Common bluetail
		Coenagrion sp. (Linnaeus 1763)	Azure damselfly
Orthoptera	Acrididae	*Hieroglyphus bettoni* (Kirby 1914)	
		Attractomorpha sp. (Saussure 1862)	Vegetable grasshopper
		Oxya chinensis (Thunberg 1825)	Short horned grasshopper
		Oxya velox (Fabricius 1787)	Paddy field grasshopper
		Paratettix sp. (Bolivar 1887)	Creek pygmy grasshopper
		Systeloderus sp.	
	Tettigonidae	*Neoconcephalus* sp. (Karny 1907)	Red cone head katydid
Dictyoptera	Mantidae	*Mantis* sp. (Burmeister 1838)	Ground mantis
Lepidoptera	Nymphalidae	*Junonia hierta* (Fabricius 1798)	Yellow pansy
		Junonia almana (Linnaeus 1758)	Peacock pansy
		Junonia atlites (Linnaeus 1763)	Grey pansy
		Junonia lemonias (Linnaeus 1758)	Lemon pansy
		Neptis hylas (Moore 1877)	Common sailer
		Labadea martha (Fabricius 1787)	Knight
	Pieridae	*Eurema hecabe* (Moore 1877)	Common grass yellow
		Catopsilia pomona (Fabricius 1775)	Lemon emigrant

		Leptosia nina (Fabricius 1793*)*	Psyche
		Pieris rapae (Linnaeus 1758)	Cabbage white
		Delias descombesi (Boisduval 1836)	Red-spot jezebel
	Satyridae	*Melanitis leda* (Linnaeus 1758)	Common evening brown
	Riodinidae	*Zemeros flegyas indicus* (Fruhstorfer 1898)	Punchinello
	Papillionidae	*Papilio demoleus* (Linnaeus 1758)	Lime butterfly
		Papilio polystes (Cramer 1775)	Common mormon
		Pachliopta hector (Linnaeus 1758)	Crimson rose
	Danaidae	*Danaus chrysippus* (Linnaeus 1758)	Plain tiger
		Danaus genutia (Cramer 1779)	Striped tiger
		Parantica aglea (Moore 1877)	Glassy tiger
Diptera	Tabanidae	*Tabanus* sp. (Linnaeus 1758)	Horse fly
	Muscidae	*Musca domestica* (Linnaeus 1758)	House fly
	Culicidae	*Anopheles* sp. (Meigen 1818)	Common mosquito
	Calliphoridae	*Calliphora* sp. (Linnaeus 1758)	Blow flies
Coleoptera	Crysomellidae	*Aulacophora* sp. (Dejean 1836)	Pumpkin beetle
		Aspidomorpha cancticrus (Fabricius 1775)	Tortoise beetle
		Podontia quartrodecimputa (grondal 1808)	Leaf-miner bettle
	Cerambycidae	*Goes tigrinus* (De Geer 1775)	White oak borer
	Coccinellidae	*Menochilus sexmaculatus* (Fabricius 1775)	Lady bird beetle
	Melloidae	*Mylabris* sp.	Blister beetles
	Scarabeidae	*Rhynocerus oryctes* (Linnaeus 1758)	Sawit
		Euchlora sp. (Fabricius 1773)	Ground beetle
Hymenoptera	Vespidae	*Vespa assamensis* (Meade-waldo 1913)	Asian Giant hornet
		Vespa tropica (Linnaeus 1758)	Greater banded hornet
		Eumens conica (Blanch)	
		Polistes sp. (Fabricius 1775)	Paper nest wasp
	Sphecidae	*Sphex lobatus* (Fabricius 1775)	Digger wasp
	Eulophidae	*Sceliphron violaceum* (Fabricius 1775)	Fassorial wasp
	Apidae	*Apis dorsata* (Fabricius 1793)	Giant honey bee
		Apis mellifera (Linnaeus 1758)	Western honey bee
		Xylocopa aestuans (Latreille 1802)	Large carpenter bee
	Formicidae	*Formica familiaris* (Smith 1860)	Wood ant
		Camponotus sp.(Fabricius 1775)	Carpenter ant
		Solenopsis sp.(Smith 1860)	Red fire ant

Abundance of insects in the four study areas during the study period

During the collection period, a total of 1843 insects was collected (Table 2) of which 160 (8.74%) in January, 152 (8.35%) in February, 140 (7.60%) in March, 123 (6.67%) in April, 143 (7.76%) in May, 149 (8.03%) in June, 154 (8.35%) in July, 153 (8.30%) in August, 157 (8.52%) in September, 162 (8.79%) in October, 173 (9.38%) in November and 177 (9.49%) in December were collected. Among these months, November and December were the most dominant months during which 173 (9.38%) and 177 (9.94%) insects were collected respectively where lepidopteran, hymenopteran and coleopteran insects were mostly available. In January and October, 160 (8.74%) and 162 (8.79%) insects were collected respectively. Abundance of the insects in the month was dominant also. In February, June, July, August and September, 154 (8.35%), 149 (8.03%), 154 (8.35%), 153 (8.30%) and 157 (8.79%) were collected respectively and the abundance was medium in these months. In the month of March 140 (7.60%), April 123 (6.67%) and May 143 (7.76%) insects were collected and abundance of the insects was lower in these months.

Table 2. Number of insects collected per order and per month and their % composition of Chittagong University Campus during Jan-Dec, 2012.

Order	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total (of a Order)	% (Order)
Odonata	19	14	21	20	11	16	12	13	09	14	12	12	173	9.39
Orthoptera	14	16	12	16	15	18	16	15	15	12	11	14	174	9.39
Dictyoptera	00	02	01	03	00	02	00	04	04	06	00	04	26	1.41
Lepidoptera	39	38	27	18	31	30	41	37	37	38	44	45	425	23.00
Diptera	17	16	17	21	16	17	11	14	16	17	21	19	202	10.91
Coleoptera	38	30	32	23	33	33	42	37	41	38	43	39	429	23.58
Hymenoptera	33	36	30	22	37	33	32	33	35	37	42	44	414	22.51
Monthly total	160	152	140	123	143	149	154	153	157	162	173	177		
Monthly percentage %	8.74	8.35	7.60	6.67	7.76	8.03	8.35	8.30	8.52	8.79	9.38	9.49		

From 12 months observation (Table 3), a total of 1843 insects of which 522 (28.32%) from Spot 1, 636 (34.50%) from Spot 2, 333 (18.07%) from Spot 3 and 352 (19.10%) from Spot 4 were collected. In the present observation, the highest abundance of insects was found in Spot 2, medium abundance of insects was found at Spot 1 and Spot 4 and lowest abundance of insects was found in Spot 3.

Table 3. Number of insects collected per order from the four spots and their % composition of Chittagong University Campus during Jan-Dec, 2012.

Order	Spot 1	Spot 2	Spot 3	Spot 4	Total (Order)	% (Spot)
Odonata	65	74	18	16	173	9.39
Orthoptera	83	59	22	40	174	9.44
Dictyoptera	6	12	3	5	26	1.41
Lepidoptera	130	147	96	52	425	23.06
Diptera	70	67	40	25	202	10.96
Hymenoptera	103	146	94	71	414	22.46
Coleoptera	95	131	60	143	429	23.27
Total (all insects)	522	636	333	352	1843	
% (monthly)	28.32	34.50	18.07	19.10	-	-

Table 3 shows the order wise distribution of the collected insects in the four study spots during the study period. Beetles (Coleoptera) were the most abundant group in Spot 4 (143), Spot 2 (131), Spot 1 (95) and Spot 3 (60). In these four spots the second dominant order was Lepidoptera (butterflies), of which 147 from Spot 2, 130 from Spot 1, 96 from Spot 3 and 52 from Spot 4 were collected. The next dominating order was Hymenoptera which was most abundant in Spot 2 (146) followed by Spot 1 (103), Spot 3 (94) and Spot 4 (71). Dipteran insects were most common in all collection spots except Spot 4 (25), where their abundance was lowest. Besides this spot, 70, 67and 40 dipteran flies were collected from Spot 1, Spot 2 and Spot 3 respectively. Grasshoppers (Orthoptera) were most abundant in Spot 2 (59) and Spot 1 (53) whereas the Spot 3 (22) and Spot 4 (40) represented lower abundance. The abundance of dragonflies and damselflies (Odonata) in Spot 2 (74) and Spot 1 (65) were comparatively higher in comparison to Spot 3 (18) and Spot 4 (16). The

lowest insect abundance order was Dictyoptera which was found very few in number in different study spots, such as 6 from Spot 1, 12 from Spot 2, 3 from Spot 3 and 5 from Spot 4.

Amongst the 1843 adult insects studied under seven orders, and 25 families, a total of 429 coleopterans, 425 lepidopterans, 414 hymenopterans, 202 dipterans, 173 odonates, 174 orthopterans and 26 dictyopterans were collected during the study period. Members of insects of orders Coleoptera, Lepidoptera and Hymenoptera were highly abundant. They were seen throughout the whole year. On the other hand, dipteran flies and odonates were greatly found in monsoon season. Members of orders Dictyoptera and Orthoptera were found scattered the whole year. Maximum numbers of insects were collected in October (162), November (173) and December (177) when temperature and weather condition were suitable and minimum numbers were collected in the months of March (140), April (123) and May (143) due to monsoon season. However, according to El-Moursy *et al.* (2001), there is little doubt that abiotic conditions (relative humidity, soil moisture, temperature etc.) may affect insect distribution.

Again of the total 1843 insects collected, 522 specimens were collected from Spot 1, 636 specimens from Spot 2, 333 specimens from Spot 3 and 352 specimens from Spot 4. The most abundant species richness spot was Spot 2. This spot was relatively open and sunny area full of forest and different flowering plants. As most of the insects are sun-loving and love to stay in densely forest area and also feed on flower nectar, their abundance in this spot was high. The second insect abundance spot was Spot 1 where a lake garden was present and also a forest area located in front of the New Biological faculty. Odonate, orthopteran and coleopteran species were mostly found in this spot. Spot 4, the kata pahar forest area was relatively open with many tall plants where coleopteran, hymenopteran and large sized butterflies were found. Spot 3 consisted of several medium sized garden and light forest area where butterflies, bees and wasps and some beetles were found at comparatively low rate.

Of the total collected insects, maximum numbers of insects were collected from Spot 2 and minimum numbers from Spot 3. These differences could be the result of habitat and microhabitat differences among the sites. This spot consisted of several flower garden, grass land and also rich in small to big sized plants which were the natural breeding ground and food source of butterflies, bees, wasps and beetles which may explain the highest total number of species captured at this site. From the study it was seen that lepidopteran, coleopteran and hymenopteran species were most abundant in Spot 2. Large numbers of coleopteran and orthopteran insects were collected from Spot 4 which was rich in densely forest areas. Dragonflies and damselflies were mostly collected from Spot 1 because of a lake garden area being situated in this place. The large sized butterflies and other large sized insects were the inhabitants of forest and hilly areas and medium to small sized insects were the inhabitants of plain lands and flower gardens. Abundance of dictyopteran species was very low in all spots and also in all the study months.

Amongst the orders coleopteran species was the most abundant insect order in almost all the months except January, February, March, November and December. Lepidoptera was the second dominant order which was found on average in large number almost in all of the months and also all in study spots. Hymenopteran species were the third abundant group which was found in all months and all study spots. Diptera was the fourth insect abundant order which was dominant in all most of the months. Odonata and Orthoptera were the fifth

abundant insect orders which were found almost in all months but highly found in the month of March, April and May. Orthoptera is the lowest abundant insect order which were found in very low number except the months of January, May, July and November. Except Orthoptera, insects of all orders were found more or less in almost all the months.

James (2011) while studying the diversity and abundance of insect fauna in Rajshahi University campus illustrated that the highest number of insects was found in November 2008 followed by February 2009 and the lowest population of insect was found in January 2009. There were 12 distinct orders found in this study where the most abundant insect order was Diptera followed by the Coleoptera. Minimum abundance was recorded for Mantoidea followed by Psocoptera. His research revealed that highest population was observed in November when the temperature and relative humidity were 22.98°C and 78.63%, respectively.

The numbers of individuals collected per species suggest a pattern, that is, some species are found in great numbers and others are rare (Resh and Carde 2003). In the present study, it was seen that some species were collected regularly, while others were rare. These findings are consistent with many community studies, which show that a small number of species dominates the community, whilst the majority of species are relatively rare (El-Moursy *et al*. 2001).

Monthly fluctuation in species richness (SR), species diversity (H') and species evenness (J′) of the collected insects in four study areas

Species richness (SR), species diversity (H') and species evenness (J') values in the twelve months study period in the four study areas are given in Table 4.

Table 4. Average (± SE) monthly fluctuation in Species richness (SR), Species diversity (H′) and Species evenness (J′) of the collected insects in four study spots of Chittagong University Campus during Jan-Dec, 2012.

	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Species Richness (SR)	Average	3.81 ± 0.18	4.01 ± 0.37	3.95 ±0.17	4.15 ±0.25	3.88 ±0.11	3.87 ±0.14	3.85 ±0.15	3.86 ±0.17	3.82 ±0.16	3.79 ±0.17	3.84 ±0.21	3.69 ±0.11
Species diversity (H′)	Average	2.40 ±0.25	2.25 ±0.24	2.93 ±0.13	2.45 ±0.15	2.15 ±0.12	2.51 ±0.42	2.26 ±0.11	2.18 ±0.16	2.36 ±0.11	2.37 ±0.77	2.32 ±0.41	2.46 ±0.54
Species evenness (J′)	Average	0.86 ± 0.87	0.79 ± 0.88	0.85 ± 0.46	0.87 ± 0.51	0.76 ± 0.83	0.89 ± 0.15	0.81 ± 0.36	0.77 ± 0.59	0.84 ± 0.41	0.84 ± 0.27	0.83 ± 0.13	0.86 ± 0.20

The average highest species richness value was observed in the month of April (4.15±0.25) and lowest value in December (3.69±0.11). Species richness value fluctuated in between 3.79 (±0.17) and 4.01 (±0.37) in the rest of the months. The average highest species diversity value was observed in June (2.51±0.42) and lowest value in May (2.15±0.12). Species diversity value fluctuated in between 2.18 (±0.16) and 2.46 (±0.54) in the rest of the months. The average highest species evenness value was observed in June (0.89±0.15) and lowest value in May (0.76±0.83). Species evenness value fluctuated in between 0.77 (±0.59) and 0.87 (±0.51) in the rest of the months.

Spot wise fluctuation in species richness (SR), species diversity (H΄) and species evenness (J΄) values of the collected insects in 12 months (Jan-Dec, 2012)

The spot wise fluctuation of the species richness (SR), species diversity (H′) and species evenness (J′) values during the twelve month study period is given in Fig. 1. During the entire study period, the highest species richness value was observed in Spot 3 (4.17 ± 0.06) and lowest in Spot 2 (3.49 ± 0.04). The other average species richness values were Spot 1 (3.67 ±0.03) and Spot 4 (4.16 ± 0.09). The highest species diversity value was observed in Spot 2 (2.53 ± 0.03) and lowest in Spot 4 (2.34 ± 0.08). The other average species diversity values were Spot 3 (2.44 ± 0.06) and Spot 1 (2.45 ± 0.03), respectively. The highest species evenness value was observed in Spot 2 (0.87 ± 0.01) and lowest in Spot 4 (0.76 ± 0.03). The other average species evenness values were Spot 1 (0.81 ± 0.03) and Spot 3 (0.79± 0.02), respectively.

In the Spot 1, the highest species richness was observed in April and highest species diversity and species evenness in January. In Spot 2, the highest species richness was observed in May and highest species diversity and species evenness in April. In Spot 3, the highest species richness was observed in April and highest species diversity and species evenness in March and June. In Spot 4, the highest species richness value was observed in February and highest species diversity and species evenness in December.

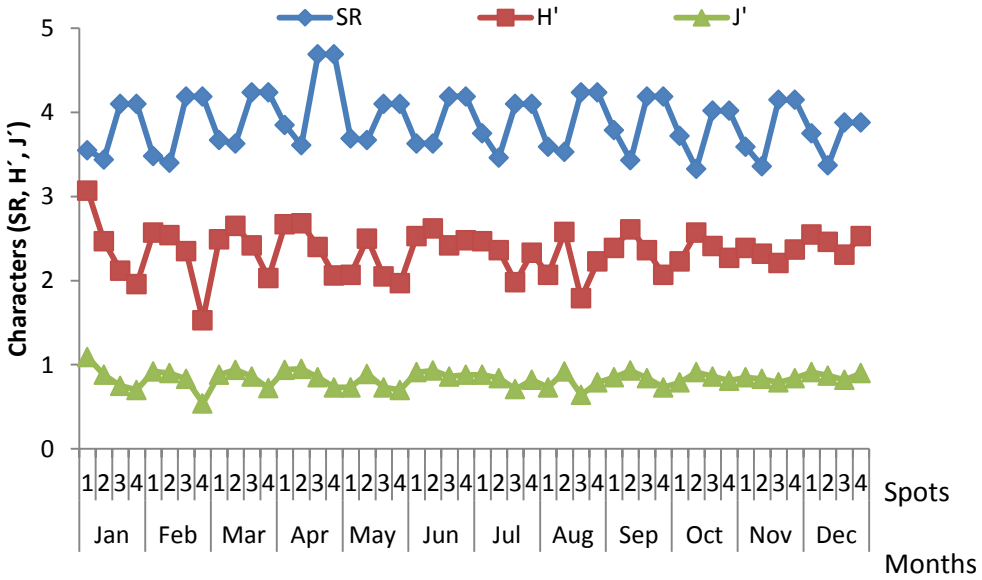

Fig. 1. Monthly fluctuation in Species richness (SR), Species diversity (H΄) and Species evenness (J΄) of the collected insects in four study spots of Chittagong University Campus during Jan-Dec, 2012.

The average data showed that highest species richness was observed in April (4.15 ± 0.25) and lowest in December (3.69 ± 0.11) whilst highest species richness was observed in Spot 3 (4.17 ± 0.06) and lowest in Spot 2 (3.49 ± 0.04). Highest species diversity was observed in June (2.51 ± 0.42)) and in Spot 2 (2.53± 0.03) and lowest in May (2.15±0.12) and in Spot 4 (2.34± 0.08). The highest species evenness value was observed in June (0.89 ± 0.15) and in Spot 2 (0.89 ± 0.01) and lowest in May (0.76 ±0 .83) and in Spot 4 (0.76 ± 0.03). Thus, from

the study it is seen that Spot 3 was more species rich (4.17 ± 0.06) with low abundance (333) and Spot 2 was less species rich (3.49 ± 0.04) with high abundance (636) of insects. Spot 2 was most diversified (2.53 ± 0.03) with highest abundance (636) and Spot 4 was least diversified (2.34 ± 0.08) with low abundance (352) of insects. Similarly Spot 2 had most species evenness (0.89 ± 0.01) due to highest abundance (636) and Spot 4 had least species evenness (0.76 ± 0.03) due to low abundance (352) of insects. Hence, insect abundance was positively related with Species diversity and species evenness but negatively related with species richness.

The number of insects fluctuated in different months of the year due to several reasons. Fluctuations in temperature and rainfall appeared to play a role in deciding the abundance of individual and overall fauna. Along with, other variables such as litter depth, litter moisture, humidity, temperature and rainfall are directly or indirectly related to insect population densities (Wagner *et al*. 2003, Vineesh *et al.* 2007). On the basis of the present observation it can be said that availability of insects not only depended on seasonal fluctuation, but also on suitable host plants. Abundance, diversity and species composition suggest the division of the insect fauna of Chittagong University into two main communities; one occurring in the area surrounding the forest and garden area where the insect abundance was high and the other community at the plain land and road side area where the abundance of insects was comparatively low. Insects are considered as an agent of nature conservation. Hence, their abundance and diversity monitor ecological changes thus warning us about the changes of habitat.

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