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ORTHOPTERA DIVERSITY IN PACHMARHI BIOSPHERE RESERVE, MADHYA PRADESH, INDIA

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The present investigation deals with the study of species composition and diversity of Orthoptera in Pachmarhi Biosphere Reserve, which was studied from 1999 to 2003. A total of 50 species belonging 47 genera and 8 families were recorded. Acrididae was the most dominant family with 25 species followed by Gryllidae (8), Tettigoniidae (7), Tetrigidae (4), Pyrgomorphidae (2), Trigonidiidae (2), Gryllotalpidae (1) and Tridactylidae (1).

Key words : Orthoptera, Pachmarhi Biosphere Reserve, Acrididae.

INTRODUCTION

The Pachmarhi Biosphere Reserve situated in Hoshangabad, Betul and Chhindwara districts of Madhya Pradesh. It derives its name from a tiny hill station Pachmarhi in Hoshangabad district. The forest of Pachmarhi Biosphere Reserve can be broadly classified into three major types *viz.* moist deciduous, dry deciduous, Central Indian sub tropical hill forest. Teak and Sal is the dominant species in the area.

A stray accounts of Orthoptera fauna of Madhya Pradesh done by Shishodia (1999, 2006, 2008), Chandra & Gupta (2009), Gupta (2008, 2009a & b), Chandra *et. al.* (2009), Gupta & Shishodia (2009), Gupta & Chandra (2008a, b & 2011). Shishodia *et al.* (2010) published an annotated checklist of Orthoptera from India, wherein 121 species belonging 87 genera under 9 families are reported from Madhya Pradesh.

Study Area

The present study was carried out in Pachmarhi Biosphere Reserve (Hoshangabad, Betul and Chhindwara districts) state of Central Region of India enclosing an area of 4926.20 sq. km enveloping three wildlife conservation units, *viz.,* The Bori Sanctuary (518.00 sq km), the Satpura National Park (524.37sq km), and the Pachmarhi Sanctuary (461.85 sq km). The reserve area also comprises 1709.1 sq km of Reserved and Protected forests and 511 villages with an area of 1364.56 sq km of agricultural land; 122.01 sq km wasteland; 204.30 sq km of water bodies and 22.09 sq km built up land. The area lies between latitudes 20° 10' to 22° 50' N and Longitudes 77° 45' to 78° 50' E. The study area is divided in two sites :

1. Core Area
2. Buffer Area

Site-1, Core Area : This ranges is consists of villages viz. Jhalai, Suplai, Dhain, Bori, Khapa, Marai, Pallan, Nagduari, Dhupgarh, Rorighat, Ghukhera, Nandia, Sankri, Chauragarh, Pachmarhi, Denwa River, Sankari, Kurka, Dhargaon, Mongra, Pisua, Matkuli, Raikheri, Pagara, Mongra, and Mahgaon.

Site-2, Buffer Area : This ranges consists of forests villages *viz.* Ranipur, Tawa River, Semri, Kharda, Bamori, Pathi, Kharpawar, Saranpur, Thapa, Denwa River, Bhajiadhana, Niwari, Kumabarh, Kallukhana, Moharkalan, Hathipura, Lanji, Turra, Singhora, Dudhi River, Junawani, Naddipura, Chawalpani, Bandi, Tekapar, Bamni, Jamun dhara, Kapur Nala, Sita dongri, Gurhi, Tamia, Sitaghat, Bhawra.

METHODOLOGY

The specimens of Orthoptera were collected by sweeping over vegetation by means of a butterfly net from 1999 to 2003. The specimens were collected by sweeping over vegetation by insect net, and the larger specimens were picked up directly by hand or with the help of fine forceps. The specimens after collection from the field were killed in benzene or ethyl acetate in a killing bottle. For temporary storage in the field they were kept in insect envelopes. The specimens were brought to laboratory and pinned, labeled and preserved for the identification.

Species Diversity :

The species diversity will be calculated by using "Shanon-Wiener Index" which is defined as :

$$H'(S) = -\sum_{i=1}^{n} Pi \log Pi$$

$$PI = ni/N$$

ni = Number of individuals of a species at time i

N = Size of whole community

RESULTS AND DISCUSSION

Species composition

During the study period, total 50 species belonging 47 genera and 09 families were reported (Table I). Acrididae was the most dominant family with 25 species followed by Gryllidae (8), Tettigoniidae (7), Tetrigidae (4), Pyrgomorphidae (2), Trigonidiidae (2), Gryllotalpidae (1) and Tridactylidae (1) (Table II).

The family Acrididae dominated in terms of total number of individuals and constituted 62.12% of total specimens collected, followed by Gryllidae 16.16%, Tettigoniidae 9.57%, Pyrgomorphidae 7%, Tetrigidae 2.55%, Tridactylidae 1.48%, Trigonidiidae 0.63% and Gryllotalpidae 0.42%.

The species *Diabolocatantops innotabilis* (Walker) belonging to family Acrididae was the most abundant species constituting 20.21% of the total Orthopteran insects from all study sites during the study period. *Aulacobothrus* sp. of the family Acrididae constituting 9.574% of total number of individuals was the second most abundant species. *Modicogryllus modicogryllus confirmatus* (Walker) belonging to family Gryllidae was the third most abundant species, constituting 9.362% of the total maximum numbers of individuals. The number of all these species was maximum in core area than buffer area. The Orthopteran species diversity of Pachmarhi Biosphere Reserve calculated on the basis of (Table I) was 4.506 during the study period.

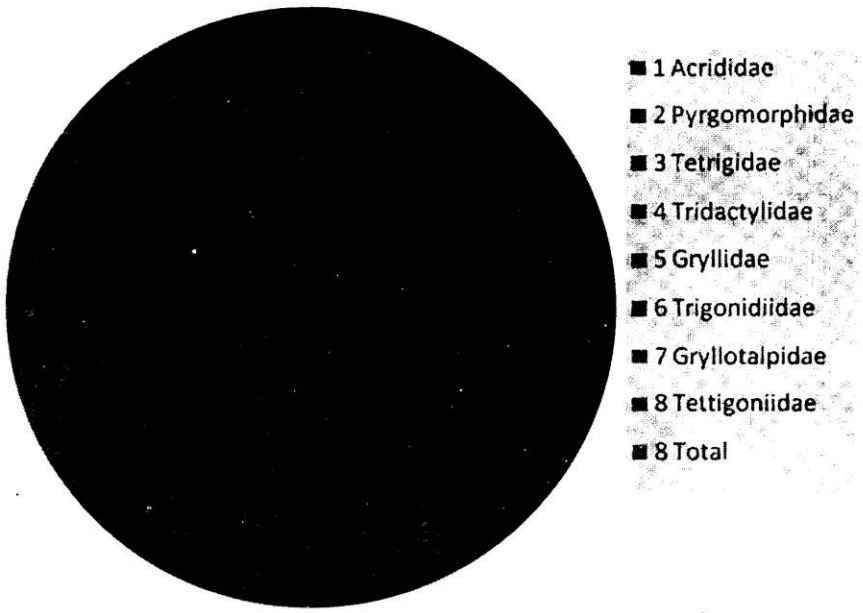

Fig.1 : Total No. of individuals of different families from Pachmarhi Biosphere Reserve.

In the present study, site no. 1 supported the maximum number of species (50) followed by site no. 2 (36); 36 species were common in all study sites.

Species diversity

Species diversity has been calculated using Shannon-Wiener Index. The total species diversity of Pachmarhi Biosphere Reserve calculated on the basis of (Table I) was 4.506 during the study period. Species diversity of Orthoptera was recorded maximum in site no. 2 (4.886) followed by site no. 1 (4.611).

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Table 1 : Species composition and number of individuals collected from different study sites at Pachmarhi Biosphere Reserve during study period.

S. No.	Name of species	Site-1	Site-2	Total No. of Individuals	%
	Family Acrididae				
1	*Acrida exaltata* (Walker)	12	10	22	4.681
2	*Phlaeoba panteli* Bolivar	5	3	8	1.702
3	*Aiolopus thalassinus tamulus* (Fabricius)	10	9	19	4.043
4	*Chloebora crassa* (Walker)	2	1	3	0.638
5	*Gelastorhinus laticornis* (Serville)	1	1	2	0.426
6	*Gastrimargus africanus africanus* (Saussure)	17	10	27	5.745
7	*Oedaleus abruptus* (Thunberg)	1		1	0.213
8	*Pternoscirta cinctifemur* (Walker)	1		1	0.213
9	*Trilophidia annulata* (Thunberg)	2	1	3	0.638
10	*Dittopternis venusta* (Walker)	3	2	5	1.064
11	*Morphacris fasciata sulcata* (Thunberg)	1		1	0.213
12	*Aulacobothrus* sp.	25	20	45	9.574
13	*Leva cruciata* Bolivar	1		1	0.213
14	*Spathosternum prasiniferum prasiniferum* (Walker)	8	5	13	2.766
15	*Oxya* sp.	1		1	0.213
16	*Oxya hyla hyla* Serville	3	2	5	1.064
17	*Coptacra punctoria* (Walker)	3	2	5	1.064
18	*Eucoptacra praemorsa* (Walker)	2	2	4	0.851
19	*Tristria pulvinata* (Uvarov)	1		1	0.213
20	*Cyrtacanthacris tatarica* (Linnaeus)	1		1	0.213
21	*Choroeodocus illustris* (Walker)	1	1	2	0.426
22	*Tylotropidius varicornis* (Walker)	3	2	5	1.064
23	*Diabolocatantops innotabilis* (Walker)	51	44	95	20.213
24	*Stenocatantops splendens* (Thunberg)	8	7	15	3.191
25	*Xenocatantops humilis humilis* (Serville)	3	4	7	1.489

	Family Pyrgomorphidae				
26	*Atractomorpha crenulata* (Fabricius)	4	5	9	915
27	*Chrotogonus* (*Chrotogonus*) *trachypterus trachypterus* (Blanchard)	10	14	24	5.106
	Family Tetrigidae				
28	*Euscelimena harpago* (Serville)	1		1	0.213
29	*Eucriotettix* sp.	1	1	2	0.426
30	*Hedotettix gracilis* (de Haan)	4	3	7	1.489
31	*Ergatettix dorsifera* (Walker)	1	1	2	0.426
	Family Tridactylidae				
32	*Tridactylus thoracicus* Guer	4	3	7	1.489
	Family Gryllidae				
33	*Gryllus bimaculatus* De Geer	4	4	8	1.702
34	*Modicogryllus modicogrllus confirmatus* (Walker)	24	20	44	9.362
35	*Plebeiogryllus guttiventris* (Walker)	1		1	0.213
36	*Teleogryllus* sp.	1		1	0.213
37	*Teleogryllus mitratus* (Burmeister)	1	1	2	0.426
38	*Paranemobius pictus* (Saussure)	1		1	0.213
39	*Dianemobius fascipes* (Walker)	8	5	13	2.766
40	*Oecanthus indicus* Saussure	4	2	6	1.277
	Family Trigonidiidae				
41	*Anaxipha sp.*	1		1	0.213
42	*Trigonidium sp.*	1	1	2	0.426
	Family Gryllotalpidae				
43	*Gryllotalpa africana* Beauvois	1	1	2	0.426
	Family Tettigoniidae				
44	*Conocephalus anisoptera maculatus* (Le Guillou)	4	3	7	1.489
45	*Euconocephalus incertus* (Walker)	6	5	11	2.340
46	*Holochlora sp.*	3	2	5	1.064
47	*Letana* sp.	10	6	16	3.404
48	*Mecopoda elongata* (Linnaeus)	1		1	0.213
49	*Phaneroptera* sp.	1		1	0.213
50	*Phaneroptera gracilis* Burmeister	2	2	4	0.851
	Total	**265**	**205**	**470**	**100**

Table II : Total number of species and individuals of different families of Orthoptera from Pachmarhi Biosphere Reserve and their percent contribution to total number of species and individuals during study period.

S.No.	Families	No. of species	%	No. of individuals	%
1.	Acrididae	25	50	292	62.128
2.	Pyrgomorphidae	2	4	33	7.021
3.	Tetrigidae	4	8	12	2.553
4.	Tridactylidae	1	2	7	1.489
5.	Gryllidae	8	16	76	16.161
6.	Trigonidiidae	2	4	3	0.638
7.	Gryllotalpidae	1	2	2	0.426
8.	Tettigoniidae	7	14	45	9.574
	Total	**50**	**100**	**470**	**100**

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