

# Studies on Diversity of Grasshopper (Orthoptera) from Chandwad Tahasil of Nashik District, Maharashtra, India

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**Abstract:** Present investigation was undertaken to know diversity of grasshopper in ChandwadTahasil, of Nashik District. Grasshoppers belongs to order Orthoptera which is the largest and diverse group of insects as pest. A total of 9 species belonging to 9 genera and 3 families were recorded. The family Acrididae (56%) found to be dominating, followed by Tettigoniidae (22%) and Pyrgomorphida (22%). The study revealed the biodiversity of grasshopper in ecosystem during the month of august-december 2022. This study will definitely give and additional knowledge of data for pest management around the studied area.

**Keywords:** Tettigoniidae, Pyrgomorphida, Acrididae, Chandwad.

## I. INTRODUCTION

Insects are highly specialised group of invertebrates belonging to phylum Arthropoda. They are ubiquitous in nature, highly diversified creatures and hence are an interesting creature to study. In class Insecta, Orthoptera are polyneopteran insect order, found in different diverse ecosystem as a serious pest on agricultural as well as forest ecosystem. The number of species of orthoptera all over the world are about 20,000 out of this India has 1,750 species, about 10% are known from India (H. A. Dhamke et.al, 2011-12)<sup>3</sup>. The name Orthoptera means straight winged insects, which comprises of short and long-horned grasshoppers, crickets, katydids, tree crickets and locusts. The Orthoptera order is divided into two suborders i.e., Caelifera and Ensifera. Caelifera includes short horned grasshopper, and Ensifera includes long horned grasshopper.

Grasshoppers belongs to order Orthoptera which is largest order of insects. They are typically ground dwelling insects with elongated hindlegs and musculature adapted for jumping and allow them to escape from threats by leaping vigorously. Grasshoppers are medium to large size insects having narrow, elongated, cylindrical and bilaterally symmetrical body. Grasshoppers are essential elements in tropic food web as they represent first order consumers and often comprise a considerable fraction of arthropod biomass in grassland ecosystem (Odum et.al, 1962)<sup>7</sup>. Some of grasshopper's species are useful as source of food (Illgner, P. & Nel, E. 2000)<sup>4</sup> and they are vital components of food chain for many groups of birds and mammals (Capinera et.al, 1997)<sup>1</sup>.

In diversity study, investigation of species is of primary importance and it will help to formulate conservation strategies. Grasshoppers are known to be major component in grassland biodiversity (Weiss et.al, .2013; Weyer et.al, .2012)<sup>9&10</sup>. Most of the orthopteran insect are agricultural pest and this agricultural pest feeds on crops voraciously and damage crop largely. Nowadays agricultural fields and farmers already suffering from number of natural disasters, along with this agricultural pest damagr crops largely so it ultimately effect on the economy of our country because India is an agricultural land (Luoto et.al, .2000)<sup>6</sup>.

Review of literature revealed that study on diversity of grasshopper from Nashik area is not yet done so far, it is need to carry out such kind of research work for this area. Grasshoppers are often considered to be more harmful than helpful when it comes to interaction with vegetation and crop, therefore by studying them we can enlist and describe existence of their species richness and abundance in study area.

## II. OBJECTIVES

- Orthopteran fauna is a serious agricultural pest so Before control Agricultural pest, we need to know about the diversity of Orthopteran insects, is very important.
- It also reflects the ecological balance in nature.
- Try to solve the problems related to agricultural field.

## III. MATERIALS AND METHODS

The selected area is ChandwadTahasil located in Nashik district of Maharashtra, surrounded by mountains and resembles great biodiversity of animal and plant species. The grasshoppers were collected from various tree trunk, agricultural area and grass field. A monthly survey was undertaken during August to December (2022) by random sampling.

Adult free flying grasshoppers were collected from all types of grasslands in study area using a standard insect net or sweeping net and hand-picking method. Collected specimens were preserved using ethyl acetate or chloroform. Killed specimen were pinned. After setting, specimen kept directly in electric oven at temperature of 35 C to 55 C for 24 to 48 hours. Collected specimens were kept in insect box for further studies. Grasshoppers were classified according to modern systematics as used in the Orthoptera species file (Eades et.al.,2014)<sup>2</sup> also the specimens were identified using the book Fauna of British India (Kirby, 1914)<sup>5</sup> and also by referring to the web pages namely, <http://bugguide.net> and <http://www.orthoptera.org>.

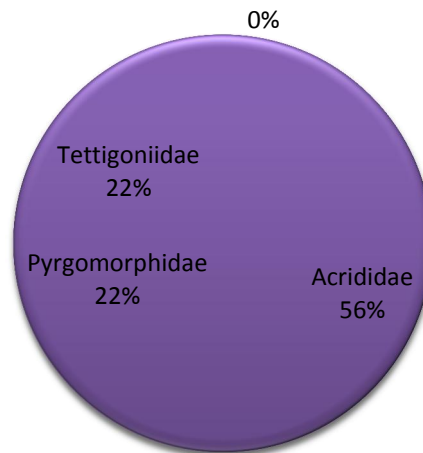
## IV. RESULT AND DISCUSSION

A total 9 species belonging to 9 genera and 3 families were recorded during the study. Of which 7 species pertaining to 7 genera and 2 families belongs to Caelifera (Short horned grasshopper), while 2 species pertaining to 2 genera from single family belongs to Ensifera (Long horned grasshopper). Acrididae family is represented by 5 species; Pyrgomorphidae family represented by 2 species and the family Tettigoniidae is represented by 2 species. In present study Acrididae family found to be dominating in Chandwad region of Nashik district.

**Table-1: Inventory of identified Grasshopper (Orthoptera) species from ChandwadTahasil, Nashik (MH) India**

SUBORDER	FAMILIES	Sr. No	GENUS	SPECIES
Caelifera	Acrididae	1.	<i>Pseudochorthippus</i>	<i>curtipennis</i>
		2.	<i>Melanoplus</i>	<i>femurrubrum</i>
		3.	<i>Hieroglyphus</i>	<i>banian</i>
		4.	<i>Acrida</i>	<i>cinerea</i>
		5.	<i>Schistocera</i>	<i>americana</i>
	Pyrgomorphidae	6.	<i>Poekilocerus</i>	<i>pictus</i>
		7.	<i>Atractomorpha</i>	<i>crenulata</i>
Ensifera	Tettigoniidae	8.	<i>Conocephalus</i>	<i>maculatus</i>
		9.	<i>Tettigonia</i>	<i>viridissima</i>

### Comparative study of species recorded from different families of grasshopper



The family Acrididae (56%) found to be dominating, followed by Tettigoniidae (22%) and Pyrgomorphidae (22%). As per comparative study family- Acrididae show great diversity.

#### V. CONCLUSION

Overall, the study result revealed the diversity of grasshopper in ecosystem, during August to December-2022. During the work total number of 9 species was counted, which belongs to Orthoptera order. The changing scenario in grassland, agriculture and forest ecosystem have influenced the primary consumers like grasshoppers and creating an effect on entire food web as well as pest. (Suganya et.al., 2016-17)8. However, this study will definitely give an additional knowledge for pest management around studied area and solve the problems of farmers in agricultural area of Chandwadtahshil of Nashik district.

Hopefully, there will be further research study on the Grasshopper in this area, in order to get better and comprehensive information Family- Acrididae is found to be diverse in study area.

#### REFERENCES

- [1] Capinera, J.L., Scherer, C.W & Simkins, J.B. 1997. Habitat associations of grasshoppers at the MacArthur agro-ecology research center, Lake placid, Florida Entomologist. 80(2): 253-261.
- [2] Eades D.C. Otte D. Cigiliano M.M. Braun H. .2014. Orthoptera species file online. (<http://orthoptera.speciesfile.org/HomePage.aspx>). WorldCat
- [3] H.A. Dhamke., Y.J. Koli. And G.P. Bhawane. .2011. Orthoptean (insect) diversity from Haveli and Maval Tahasil of the Pune District. 2(4): 1338-1341.
- [4] Illgner, P. & Nel, E. 2000. The geography of edible insects in Sub-Saharan Africa: A study of the Mopane Caterpillar. The Geographical Journal. 166(4): 336-351.
- [5] Kirby, W.F. 1914: The fauna of British India Including Ceylon and Burma. (Orthoptera) Volume I. Taylor and Francis, London. Pages: 276.
- [6] Luoto, M., 2000. Modelling of rare plant species richness by landscape variables in an agriculture area in Finland. Plant Ecol., 149:157-168.
- [7] Odum E.P. 1968. Energy flow in ecosystem a historical review. Am zool .8:11-18.
- [8] Suganya M, Gunasekaran C and Manimegalai K., 2016. Species Richness and Diversity of Grasshopper Fauna in Different Habitats of Bharathiar University Campus, Coimbatore, Tamil Nadu, India, 8(1): 10-17.

- [9] Weiss, N., Zucchi, H. and Hochkirch, A., 2013. The effects of grassland management and aspect on Orthoptera diversity and abundance: site conditions are as important as manangement. Biodiver. Conser., 2167-2178.
- [10] Weyer, J., Weinberger, J. and Hochkirch, A., 2012. Mobility and microhabitat utilization in a flightless wetland grasshopper, Chorthippusmontanus (Charpentier, 1825). J. Insect Conser., 16:379-390.

**IDENTIFICATION OF SPECIMEN**

**Family: Acrididae**

Plate 1

Plate 2

Plate 3



*Pseudochorthippuscurtipennis*

*Melanoplusfemurrubrum*

*Hieroglyphus banian*

Plate 4

Plate 5



*Acrida cinerea*

*Schistocera Americana*

**Family: Pyrgomorphidae**

Plate 6

Plate 7



*Poekilocerus pictus*

*Atractomorphacrenulata*

**Family: Tettigoniidae**

Plate 8

Plate 9



*Conocephalus maculatus*

*Tettigoniaviridissima*