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BIODIVERSITY OF GRASSHOPPERS IN WASHIM DISTRICT (MAHARASHTRA), INDIA

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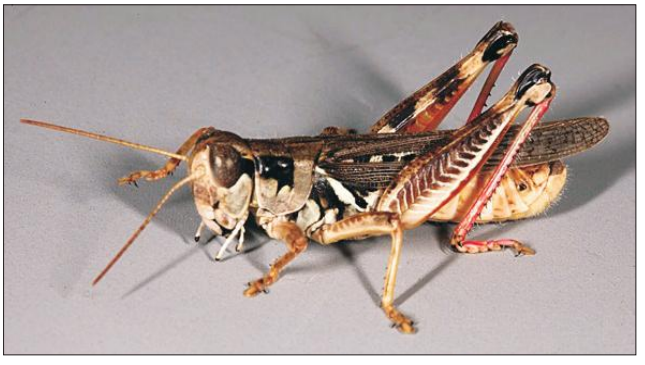
ABSTRACT

Biodiversity can indicate environmental quality and is change over time. Biodiversity is often considered to be synonymous with species richness and relative species abundance. Insects are a class of invertebrates within the arthropod phylum that have a chitinous exoskeleton. Orthoptera is one of the largest order of insect comprising 26,550 valid species found throughout the world. These insects belong to the order Orthoptera and suborder Caelifera. Again this order is divided into two suborder i.e. Caelifera and Ensifera. Acrididea is the largest super family comprising 11,000 species worldwide and out of that 290 species representing 138 genera reported from India. The order othroptera are distributed throughout the physiographic zones of the world but their distribution largely depends upon the vegetation prevailing in grass fields, forests and agricultural lands. Family Acrididae show maximum diversity, comprising 8,000 species and 28 genera are endemic. Grasshoppers are dominant species in terrestrial landscapes having integral ecological roles the largest and most plentiful insects, yet they are least studied and poorly known for conservation. The present investigation reveals the occurrence of 12 species of grasshoppers belonging to 4 families and 11 genera from Washim region of Maharashtra.

KEYWORDS:*Grasshoppers, Biodiversity, Washim, Maharashtra.*



INTRODUCTION:

Biodiversity may be defined as, the total sum of species richness, that is the number of species of plants, animals and microorganism occurring in a given habitat (Wilson 1991).Insectbiodiversity accounts for a large proportion of all biodiversity on the planet, with over 1,000,000 insect species described.Orthoptera is one of the largest order of insect comprising 26,550 valid species found throughout the world. The order othroptera are distributed throughout the physiographic zones of the world but their distribution largely depends upon the vegetation prevailing in grass fields, forests and agricultural lands. Distribution of grasshoppersis determined by the Temperature, seasonal precipitation of rain fall and soil conditions. India provides a unique habitat for this group of insects, for there exist humid commonly seen in autumn; a few appear in summer and spring. Habitat can varied, ranging from moist rain forests to hot deserts (Key and Hazra 2003). The habitats are generally concentrated in areas that have low growing plants, since they like to eat grass, leaves, and cereal crops. Grasshoppers are insects that belonging to order orthoptera and suborder Caelifera (Arnett 2004). The order is divided into two suborder i.e. Caelifera called short horned grasshopper and Ensifera called long horned grasshoppers. Acrididea is the largest super family comprising 11,000 species worldwide and out of that 290 species representing 138 genera reported from India (Shishodia et al., 2010). Family Acrididae show maximum diversity, comprising 8,000 species and 28 genera are endemic (Chandra and Gupta 2013).

Grasshoppers are funnily shaped and are distinguishable by their long legs and the surprisingly loud noise they make grasshoppers insects which can jump, walk and fly. They are divided into, head, thorax and abdomen. They also have 2 antennae, 2 pairs of wings and 6 legs. Grasshoppers are Migrate In case of adverse conditions, they can travel 15 miles or more per day. An adult grasshopper goes through the stages egg, immature (nymph) and adult, and has a lifespan of approximately one year.The diversity of grasshoppers has been studied by various researchers throughout India (Khalid 2013) morphological study of grasshoppers in Azadnagar, Walgaon Road, Amravati (Prabakar et al., 2015) studied Diversity of Insecta. Orthoptera of Kanchipuram District in Tamil Nadu, taxonomy distributionof Acridoidea (Orthoptera) of Bihar reported by, (Usmani and Nayeem 2012), (More and Nikam 2016) Studied on grasshoppers (Orthoptera) In Tilari Forest, Chandgad, Kolhapur District of Maharashtra (India), in which 17 species were studied. (Akhtar et al., 2014) They carried out Abundance, Distribution and Taxonomic Studies on hemiacridinae (Acrididae: Acridoidea: Orthoptera) In Uttar Pradesh, India in which they studied Members of the subfamily are large sized and generally called rice grasshoppers.

Orthoptera play an important role in the food chain by providing an abundant amount of protein to their predator's diets as well as nutrients to plants and also contribute to nutrient turnover in the ecosystem by returning nutrients as fertilizer to plants the study of grasshoppers play important ecological role in forest ecosystem. Study of grasshoppers is needed because a large number of grasshoppers species are under the risk of extinction is the indication of environment influence. Insect outbreaks may have significant effects on an avian biodiversity, either directly by altering food availability or indirectly by altering habitat suitability.There is need to study biodiversity of grasshoppers in Washim region, as there were no previous records of grasshoppers and their diversity from this region The study of grasshoppers play important ecological role in forest ecosystem in initiating and promoting the decay process of dead specimens.

3. MATERIALS AND METHODS

Description of Study area:-

Washim is located in the eastern region of Vidharbha and is one of four municipal councils of Washim district of Maharashtra. Washim was known earlier as vastsagulma and it was the seat of power of the vakatakadynasty.Washim is also known as Basim, Arabic name that means the *'one that smile*. It is especially famous for its ancient Balaji temple.Washim is the head-quarter of district. There are five minor rivers in the region viz., the Katepurna, the Adan, the Chandrabhaga, the Watsara and the Pus. The region is occupied by valleys of the river Godavari and the Tapi.For present study of grasshoppers seven sites of different habitat types were selected for the present work this site includes Jambhrunparande, PDKV, Ekburji, IUDP, Kata, Tamshi, and R. A. College taking under studied. This surrounding area is covered with dense lush green forest and semi evergreen mixed forest. **Collection period:-**for present studyGrasshoppers species collected during month of September 2016- January 2017 in winter season.

Collecting and preserving methods and equipment insects:-Insects are a remarkable group of animals. They occur virtually everywhere and make up more than half of all living things on earth. Methods used for present study insect net, killing jar, forceps, relaxing jar, spreading board and pinning block, insect pins and labels, storage box.Before proceeding to collecting the Grasshoppers the equipments used for collection was assembled. The equipments used were simple and inexpensive. The collecting kit include following items. Collecting net, Sweep Net, Glass Specimen Tube,plastic jar, Forceps, Thermacool sheath, Pins, Notebook, Pencils, Formalin, Camera, ethyl acetate, Adhesive solution. All collected grasshoppers specimens were identifying by using the identification key of www.insectidentification.org. also www.biodevercityexplorer.org , while some species are identify by using photographs and available research paper.

RESULT AND DISCUSSION

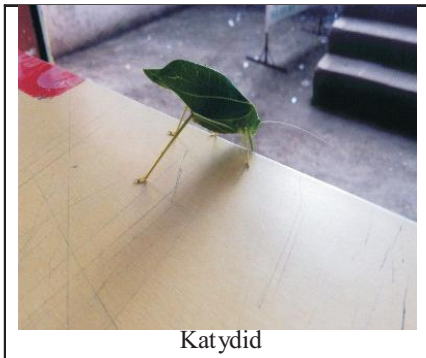
The study of Biodiversity of grasshoppers in Washim region was carried for the period of 6 months that is from September 2016 to January 2017. The specimens were collected from Ekburji dam area of Washim, Jambhrun parande, Tamshi, Kata, PDKV (Dr.Panjabrao Desmukh Krushi Vidyapith) site and R. A. collage Washim. Total 12 species of grasshopper was found all belonging to order orthoptera. These species including 4 families those are Acrididae, Tettigoniida, Catantopidae and Pyrgomorphidae, among in which 7 families belonging Acrididae, 3 are belonging to family Tettigoniidae, then one each belonging to family Catantopidae, Pyrgomsorphidae. The total species were observed and collected tabulated in **Table I and Photoplate I**. Orthopterans play an important ecological role in many

ecosystems. The study of grasshoppers play important ecological role in forest ecosystem in initiating and promoting the decay process of dead specimens. A large number of grasshoppers species are under the risk of extinction is the indication of environment influence. Insect outbreaks may have significant effects on an avian biodiversity, either directly by altering food availability or indirectly by altering habitat suitability.The presence of these species suggest that the study area might have abundant grasshopper's diversity .However it is suggested that the diversity of grasshoppers in these area should be studied exclusively. A long term study is needed to observe the species occurred all season and their interaction with the environment changes. Different habitat should also be studied for better results in Washim.

Table No. 1. Show Diversity of Grasshopper

Sr.	Common name	Class	Order	Family	Genus	Species	seasonal occurrence	Collection place
1.	Comman Katydid	Insecta	Orthoptera	Tettigoniidae	*Pterophylla*	*camellifolia*	July-Jan.	Jambhrun Parande
2.	Fork-Tailed Bush katydid	Insecta	Orthoptera	Tettigoniidae	*Scudderia*	*furcate*	July-Jan.	Kata
3.	Melanoplus Packardii	Insecta	Orthoptera	Acrididae	*Melanoplus*	*packardii*	July-Jan.	Washim
4.	Poekilocerus pictus	Insecta	Orthoptera	Pyrgomorphidae	*Poekilocerus*	*pictus*	July-Jan.	Kata
5.	Acrida conica	Insecta	Orthoptera	Acrididae	*Acrida*	*conica*	July-Jan.	PDKV
6.	Patana japonica	Insecta	Orthoptera	Catantopidae	*Patanga*	*japonica*	July-Jan.	Jambhrun Parande
7.	Schistocerca Americana	Insecta	Orthoptera	Acrididae	*Schistocerca*	*americana*	July-Jan.	Jambhrun Parande
8.	Rice grasshoppers	Insecta	Orthoptera	Acrididae	*Hieroglyphus*	*banian*	July-Jan.	Washim
9.	Comman coneheads	Insecta	Orthoptera	Tettigoniidae	*Neoconocephalus*	*Sp.*	July-Jan.	Tamshi
10	Calliptamus sp.	Insecta	Orthoptera	Acrididae	*Calliptamus*	*calliptamus sp.*	July-Jan.	Jambhrun parande
11	Acrida ungarica	Insecta	Orthoptera	Acrididae	*Acrida*	*ungarica*	July-Jan.	Kata
12	Medow grasshoppers	Insecta	Orthoptera	Acrididae	*Chorthippus*	*parallelus*	July-Jan.	PDKV

Photo Plate No. 1. Shows Diversity of Grasshopper



Katydid

Fork-Tailed Bush katydid

Melanoplus packardii


Poekilocerus pictus


Patanga japonica

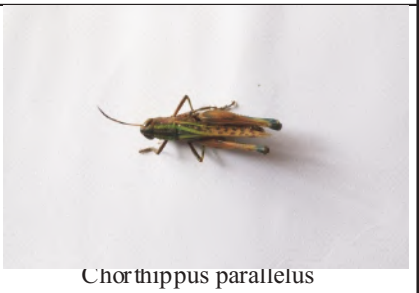

Schistocerca Americana


Acrida Conica


Hieroglyphus banian


Comman coneheads


Calliptamus sp.


Chorthippus parallelus


Acrida ungarica

CONCLUSION

This study is an preliminary step to explore the moth diversity from washim city of Maharashtra (India). Study carried out only for short period that is from September to January. This work was an attempt to describe some aspects of biodiversity of Grasshoppers fauna. A lot of further work is necessary in the regard and further collections are essential for getting a detailed periodic estimate of the faunal diversity of moths in this area. Finally it is hoped that such work may lead to the development of standard monitoring procedure which could be of value in assessing the environmental stability of areas under cultivation of plants and the prediction of the effect on the structure of grasshopper populations of tropical forest destruction .

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