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Review on Diversity of Orthoptera from India

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Abstract

Orthoptera, a varied order of insects, is defined by straight wings and jumping-legged hind legs. It is separated into two suborders: Caelifera (short-horned grasshoppers and locusts) and Ensifera (long-horned katydids, crickets, and mole crickets). Herbivorous, Orthoptera prefers habitats with lush vegetation, with rich agricultural fields and dense plant cover resulting in high diversity in such areas. Understanding their diversity is important for ecological balance and their role in ecosystems. This review integrates 17 studies on Orthopteran diversity in India, with emphasis on collection, classification, identification, distribution, and pest status. The family Acrididae (Caelifera) is the most diverse among Orthopteran families. Diversity parameters, including abundance and richness of species, are different in locations and show the impact of environmental factors on the dynamics of the population. Orthopterans have a twofold function in agroecosystems: they provide biodiversity as well as act as severe pests. Several species devour crops with insatiable appetites and impose huge economic losses. The present status and diversity of Orthopterans in India and species abundance trends through time are outlined in this review. One of the worrying trends is the reduction in Orthopteran populations, which is mainly caused by deforestation and the loss of agricultural land to non-agricultural purposes. These processes pose a threat to both biodiversity and ecosystem stability. It is critical to understand these trends in order to create effective conservation and pest management strategies. Habitat protection and encouraging sustainable land use practices can reduce population decline, maintaining the ecological balance of agricultural and natural ecosystems. This review highlights the necessity of ongoing research and surveillance to meet the challenges of Orthopteran diversity and pest dynamics in India.

Keywords: Diversity, Ecology, Pest, Caelifera, Ensifera, Orthoptera, India.

Introduction

Orthoptera is derived from greek terms or-thos meaning straight and pteron meaning wings. Orthoptera is one of the largest order of insect with 26,550 valid species found in the world The order is separated into two suborders i.e. Caelifera also called quick horned grasshoppers and ensifera also called long horned grasshoppers. Acridoidea is the most significant very good family consisting of 11,000 species globally and out of which 290 species belonging to 138 genera are reported from India. Family Acrididae indicates maximum extent, consisting of 8,000 species and out of which 285 species belonging to 135 genera are found in India and out of which 136 species and 28 genera are endemic. Members of own family Acrididae are called grasshoppers, with antennae usually shorter than the body, three-valved ovipositor and three segmented tarsi. Few Orthopteran insects are a serious agricultural pest voraciously feeds on crop & damage crop. The Orthopteran insects also plays vital role in ecological balance and are used as food by birds, frogs etc.

Diversity: In the diversity study identified 14 species of Acridoidea of three families, six subfamilies & two tribes found from pulse crop field by handpicking technique & sweeping net technique. (Mohd. Kamil Usmani et al.,2012). Present study indicated that total 12 species (Grasshopper) were found in Ekburji dam area of Washim. These species comprises of 4 families, those are acididae, Catantopidae, Tettigonidae & Pyrgomorphidae, by 7 belongs to family Acrididae, 3 belongs to tettigonidae & one belongs to Catantopidae & Pyrgomorphidae. (Mohale M.P. et al.,2016). At the site of study Radhanagri wildlife sanctuary, Maharashtra, India reported 11 species of long horned grasshopper among those 9 species are known from Maharashtra & two species are new reported from these locality. These species gathered with the assistance of light trap method & battery torch by handpicking method on night time from January 2012 to December 2014. (Sunil Gaikwad 2016). The research resulted in the counting of a total of 18 species of grasshopper were found from seven tahsils of Maharashtra state solapur district. These 18 Species of Pandharpur, Mohar, Malshirous indicate diversity richness of grasshoppers compared to other tahsil since river running through tahsil and also

good irrigation facility also present with cropping pattern diversification, collection of Acridid grasshopper was conducted by one man one hour search method at 15 days interval (A.R. Bhusnar 2012-13). They in their research total 1650 Orthopterans were collected from south Gujrat region during April 2014- 2015. Total 45 species reported which were included in 20 subfamilies and 7 families on the basis of habitat. Out of those Acrididae family (18 species)

Tettigonidae & Gryllidae (9 species), Pyrgomorphidae (3 species), Tetrigidae, Rhabdophoridae (2 species). Out of 7 identified families, two families reported first time in Gujrat. (Bhumi Takkar et al., 2015). In the year 2010-11 in Uttar Pradesh research on diversity of Grasshopper fauna was conducted. These research revealed 26 grasshopper species in rice field belonging to 14 genera of 2 families, 8 subfamilies & 12 tribes. Family Acrididae exhibits highest (85%) diversity followed by pyrgomorphidae exhibits (15%). These species feed voraciously on crops & damage them. These are regarded as major pest of rice. (Md. Humayoon Akhtar et al., 2012). The current study accounted for 37 species of locust & grasshoppers belonging to 25 genera & 11 subfamilies of the family acrididae from various localities of Rajasthan. Acridid fauna was for the first time reported in the region. (Hirdesh Kumar et al., 2014). 33 species of locust & grasshoppers were reported from Uttar Pradesh during the study. These 33 species of 30 genera, 11 subfamilies and 4 tribes in families Pyrgomorphidae, Catantopidae & Acrididae. These economically significant species indicates the correlation with vegetation. Harvesting of 230 specimens of grasshopper of both sexes from various localities of Aligarh, Etah, Manipur, & districts of Western Uttar Pradesh was conducted. (Mohd. Kamil Usmani et al., 2010). Short horned grasshopper survey conducted in 2013 in Solapur district, Maharashtra, India. Survey led to counting of 7 species of 7 genera viz. Among species reported were Gastrimargus, Acrida, Trilophidia, Calaptenopsis, Catantops, Chrotogonus & Atractomorpha and four subfamilies Cedipodinae, Tryxaline Catantopinae & Pyrgomorphidae. (Somnath Waghmare et al., 2013). For the period 1999 population outburst of Mecopoda elongate Linn. (Orthoptera: Tettigoniidae) near Pune, Maharashtra conducted. Metal Halloid sodium lamps of 500 watt. Was utilized for catching insects in the buildings of Zoological survey of India at Akurdi (above 30 km distance from pune). Outbreak of longed horned grasshopper Mecopoda elongate Linn. Was seen in the night. These outburst seen in hot days (temp. Max. 31.20) & Humidity was 65% & cloudy sky with spell of rain in some areas of pune. 750-800 species attracted to lamp. These study indicates the high species richness of Mecopoda elongate in these regions of Pune. (R.M. Sharma, et al., 1999).

Short horned grasshopper (Insecta: Orthoptera; Acrididae) was studied in Chandoli National Park, Maharashtra. The research comes up with 9 Subfamilies, 12 genera & 17 species & 1 subspecies from various localities & various plants of Chandoli National Park. The sampling was done from June 2008 to June 2009 from various habitats such as cultivated land, open grasslands, short bushy vegetation & ground surface with aerial sweeping net. (Y.j. Koli et al., (2009). Diversity of grouse locust was conducted in 2021 in various localities of Kolhapur & Sangli district. 11 species was recorded from these area. Out of those 8 species are very common and well adapted in climatic condition & remaining 3 are rare. These all are phytophagous & feeds on algae, mosses & wetland weeds. (A.R. Bhusnar et al., 2021). In the course of study of diversity of grasshopper fauna (Acrididae: Acridoidae: Orthoptera) 48 grasshopper species belong to 28 genera, 16 tribes & 10 subfamilies was found in central & eastern Uttar Pradesh. In the course of study 2768 specimens were collected from various districts of Uttar Pradesh. Subfamily Oedipodinae gives 29% of total species & was succeeded by Eyprepocnemidinae 17%, Oxyinae 15%, Hemiacridinae 13%, Acridinae 13% & Catantopinae, Cyrtacanthacridinae & Gomphocerinae 4% while minimum by Spathosterninae & Tropidopolinae 2%. The study area indicates the richness of grasshopper fauna. (Uzma Mohd Kamil Usmani et al., 2014). The study identified the counting of 23 species of Orthoptera fauna from Madhav National Park. These 23 species are of seven families that is Tettigoniidae (02), Gryllotalpidae (01), Gryllidae (02), Trigonidiidae (01), Acrididae (13), Pyrgomorphidae (02) & Trigidae (02) of Madhav National Park Shivpur Madhya Pradesh. These all species first time reported these park. Gelostorhinus laticornis (servile) & Eucoptacra saturata (walker) are new record to the fauna of Madhya Pradesh.

These park consisting of dry deciduous mixed type forest & thorn forest Sakhya Sagar lake & Madhav lake like big water bodies are located within the park. (Sunil Kumar Gupta & Kailash Chandra 2009). Maval Tahsil of Pune district exhibits species richness & Abundance of Orthoptera diversity. 20 species have been reported in Maval district represented by 5 Superfamilies, 5 families & 15 subfamilies & 20 genera. From June 2011 to April 2012 in district Haveli & Maval these study was conducted & exhibited diversification on orthopteran fauna. (H.A. Dhamke et al., 2014). Midnapore (East) has reported Orthopteran diversity from the period of Nov. 2007 to Oct 2010. 8 species has been reported from these place & these belong to 7 genera & 5 families. 8 various sites was chosen for investigation possessing contrasting ecological nature in coastal region of Midnapore (east) district of west Bengal. (Debdas Jana et al., 2015). For the period of August 2008-August 2010. Orthopteran diversity research conducted in Chandoli National Park. Total 62 species/ subspecies under 55 genera, 8 families were reported to be studied in the research. The suborder Caelifera consists of 32 species of 32 genera & 03 families i.e. There are 23 species and 22 genera of Acrididae, 8 species and 8 genera of Tetrigidae, and 2 species and 8 genera of Pyrgomorphidae. There are 29 species in the suborder Ensifera, which consist of 23 genera and 05 families i.e. Gryllidae (11 species and 9 genera), Tettigoniidae (12 species and 11 genera), Oecanthidae (03 & 01 genera), Trigonidiidae, Gryllotalpidae (01 species and 01 species). The research identified the species richness & abundance in that region. The National Park has high vegetation, open grassland & aquatic habitat which is accountable for the richness in faunal diversity of orthopteran in that region. (Y.J. Koli et al., 2010).

Conclusion:

Orthopteran diversity is largely distributed worldwide. This review shows the species richness and about all the information of Orthoptera from India. This reported different biodiversity fauna of Orthoptera from different

localities reported by different authors. This review also have been made that Diversity of Orthoptera reducing due to Some environmental factors and nonagriculture. Therefore, the research on Orthoptera in India is very important due to their large impact on diversity. To maintain the diversity for maintaining ecological balance is very important

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Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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