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Exploring of Grasshopper fauna in Udalguri district, BTR, Assam.

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ABSTRACT

The objective of this research was to find out grasshopper fauna of Udalguri District. A study on the fauna of grasshoppers was carried out from July 2022 to November 2023 at a number of locations within the Udalguri district of BTR, Assam. We classified a total of 424 collected specimens from the investigated locations into 19 genera and 19 species. It is possible to identify 19 species from 3 families. The specimen is classified under the following 3 families: Acrididae, Tettigoniidae and Pyrgomorphidae. This study revealed that, among the other families, the Acrididae family was the largest among other family. This study reveals that the area of Udalguri District is very much suitable for grasshopper fauna. This is the first research work carried out in this area on grasshoppers. This research will be considered the basis for further and future research.

KEY WORD

Grasshopper, Acrididae, Udalguri, Assam.

INTRODUCTION

The Orthoptera is the order of insects that include long and short – horned, pygmy grasshoppers, cricket, katydids and Locust.

Grasshoppers are most diverse and one of the largest group of insects. According to Scott *et al.*, 1979 and Risser *et al.*, 1981 grasshoppers are very active functionally, as they are dominant aerial invertebrate in natural grasslands when judged by biomass. Many of them causes damages to tree seedlings (Joshi *et al.*,2010) and agricultural crops. For many birds and mammals grasshoppers are an important component of their food chain (Capinera *et al.*, 1997; Mayya *et al.*, 2005).According to Capinera *et al.*,(1997), resource management practices that alter the vigorous population of grasshopper will affect the trophic level of food chain. Maximum grasshoppers are oligophagous. They show defined host preferences (Mulkern 1967). Grasshoppers are classified as herbivore (graminivore), forb-feeders (forbivore) or a mixture of two (ambivorous) (Isely, 1944). In last few years, farmers have drastically transformed their farming technique and agricultural practices due to urbanization, job problems and the desire for higher profits. The changing landscape of agriculture is affecting primary consumers such as grasshoppers and thus creating impacts for the entire food web, making it necessary to study the distribution of grasshoppers in relation to their habitats and host plants. Shrinivasan and Muralirangan (1992), Muralirangan *et al.*, (1992), Sanjayan *et al.* (1995), Joshi *et al.* (1999), Kandibane *et al.* (2004) and Mayya *et al.* (2005) added information on grasshopper fauna from different regions of India. Many times Grasshoppers have complex and camouflage types of behaviors (Latchininsky *et al.*, 2011) which usually help them indifferent functions like mating, flying, and feeding. Some species of grasshoppers are projected as an ecological indicator of the ecosystem and ecological networks (Bazelet, 2011).

Distribution is directly dependents on the vegetation of the location. Grasshopper (Orthopteran) fauna are distributed in all ecological zones with its important economical role. The distribution of Grasshopper (Orthopteran) fauna dependents on the vegetation like grassland, forest, and agricultural fields. Other environmental factors like rain fall , soil conditions and temperature are the factor of distribution of grasshoppers. The Grasshopper(Orthopteran) fauna has a significant role in the grassland ecosystem. It is an important primary consumers (herbivores) and also play major role as a food of many other animals (birds, reptiles, amphibians, and mammals including man). Besides, Orthoptera plays the major role in soil ecosystem by

creating plant litter for soil, plant growth, nutrients and cycling elements simultaneously. (Van Hook 1971)

Grasshoppers are vital to ecological functions. maintaining biodiversity by serving as essential nutrient recyclers, consumers, and suppliers of food for a range of species. Thus, targeted agroecological techniques to boost grasshopper abundance in farming fields are included in farmland bird species conservation plans. Research has indicated that the planting of edge strips can increase the number of grasshoppers; however, the specific composition of the seed mixture used to create the strips plays a critical role in this effect. Extensive investigation and attention have been devoted to the sophisticated chemical defenses that certain grasshopper species have evolved. *Romalia microptera* and *Rmaleaguttapa* employed a defense mechanism in which they released a protective fluid from their combined secretory system, the metathoracic spiracles. The amount of secretion that is stored and is essential to their existence varies depending on factors like food, sex, age, and frequency of release. At every stage, shedding frequently causes the depletion of replants.

The purpose of this study was to investigate and ascertain the distribution pattern and composition of the grasshopper fauna in the Udalguri District.

The eastern Himalayas, encompassing the state of Assam in northeast India, are renowned for their exceptional biodiversity and ecological significance (Singh & Sundriyal, 2005). (Murtem & Chaudhry, 2016). Udalguri district, located within the Bhutan Territorial Region of Assam, is a prime example of this rich and diverse ecosystem.

Grasshoppers, as one of the integral components of the region's insect fauna, have received limited attention in terms of systematic studies and documentation (Ward, 1940). This study aims to explore the diversity and distribution of grasshopper species found within Udalguri district, providing valuable insights into the ecological dynamics of this understudied region (Mazumdar et al., 2023). The purpose of this study was to investigate and ascertain the distribution pattern and composition of the grasshopper fauna in the Udalguri District

MATERIAL AND METHODS

STUDY AREA:

The coordinates of Udalguri District are between the latitudes 26°52'N and 26°81'N and the longitudes 91°070'E and 92°022'E. The district is located in the Bodoland Territorial Region

of Assam in northeastern India. The area shares borders with Bhutan, the West Kameng district of Arunachal Pradesh, Sonitpur, Baksa, and Darrang districts of Assam. Geographically, it is situated inside the foothills of the eastern Himalayas.

. The northern foothills transition into the southern plains. The rivers Suklai, Nonai, Kulsi, and Dhansiri originate from the eastern Himalayas. These rivers traverse the district and merge into the Brahmaputra. The region experiences a tropical monsoon climate. The mean temperature fluctuates between 35°C and 37°C in the summer and between 9°C and 10°C in the winter. The district experiences an annual precipitation of approximately 2000 mm.

MATERIAL:

A total of 424 mature grasshoppers, both male and female, were collected from various locations within the Udalguri district. These were the specimens used in this study. The specimens and other information, such as the names of the host plants, the collection date, the locality, and the reference number, were preserved in a file. Between July 2022 to November 2023, a comprehensive study was conducted to gather grasshoppers in a range of locations, including marshes, forests, and agricultural fields. The gathering methods included both hand picking and the use of bug nets. An insect killing jar with ethyl acetate were used to kill the specimens.

METHODS:

Dry mounts were made to enhance comprehension of specific attributes such as size, colour, texture, and so on. To do this, the specimens were initially relaxed, elongated, and subsequently affixed and labelled. Entomological pins were used for pinning the specimen. Pinned specimens were stored in boxes and cabinets as part of permanent collections for future examination of their morphological structures. Nephthalene balls and cotton were immersed in a preservative (phenol and paradichlorobenzene in equal ratio) were put in the corner of the box in order to prevent specimen deterioration and ant attack. In order to conduct a comprehensive examination of the different parts of the reproductive organs, permanent slides were created and analysed using a microscope to thoroughly investigate the anatomy of the genitalia. The camera lucida was initially used to create the drawings. The details were completed through microscopic examination. After the preservation the specimen were identified up to species level with available literature, orthoptera species file and key available in the lab.

RESULTS AND DISCUSSION

Udalguri district in Assam stands out not only for its diverse grasshopper fauna but also for its complex interplay of environmental and agricultural factors. The study has revealed a rich and diverse assemblage of grasshopper species within Udalguri district. A total of 19 species, belonging to 19 genera and 3 families, were identified. The dominant families were Acrididae, followed by Pyrgomorphidae and tettigoniidae comprising a significant portion of the grasshopper community.

Grasshoppers are a significant component of the fauna in Udalguri district, Assam. Studies have highlighted the species diversity of grasshoppers in the region, with Acrididae being the most predominant family. Additionally, orthopteran insects like grasshoppers and crickets are not only abundant but also form a major part of the diet for tribal communities in Udalguri district. The presence of such a diverse range of grasshoppers underscores the rich biodiversity of the area. Moreover, the region's environmental conditions, characterized by moderate rainfall and high humidity during the monsoon season.

Table-1 Grasshopper species diversity in Udalguri region(Order:Orthoptera)

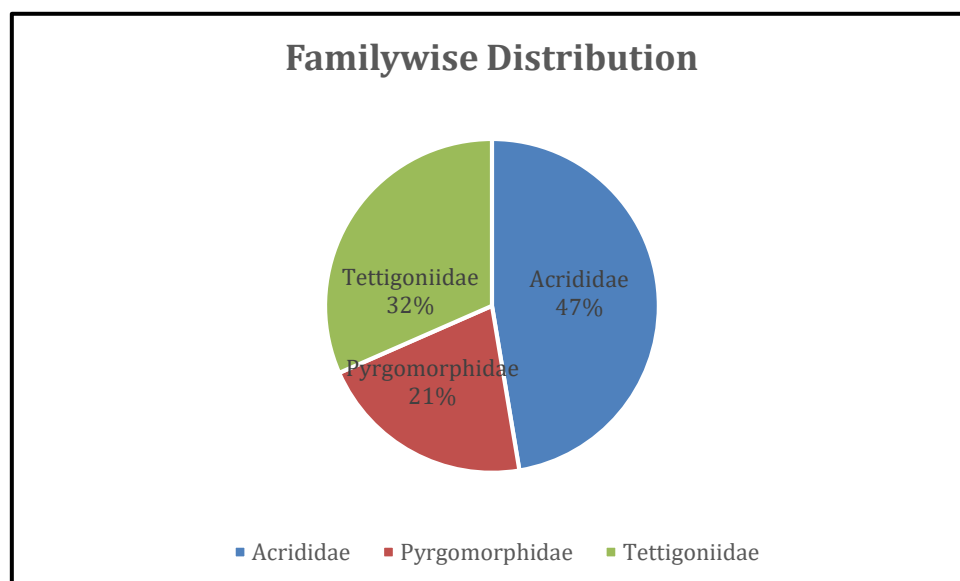
Sl.No.	Family	Sub-Family	Species
1	Acrididae	Acridinae	<i>Phlaeoba infumata</i> (Brunner Von Wattenwyl, 1893)
2	Acrididae	Catantopinae	<i>Xenocantatops humillis</i> (Serville, 1938)
3	Acrididae	Catantopinae	<i>Choroedocus robustus</i> (Serville,1838)
4	Acrididae	Catantopinae	<i>Diabolocantatops innotabilis</i> .(Walker,1870)
5	Acrididae	oedopodinae	<i>Ceracris striata</i> (Uvarov, 1925)
6	Acrididae	Cyrtacanthacridinae	<i>Chondracris rosea</i> (De Geer, 1773)
7	Acrididae	Leptysminae	<i>Leptysma marginicollis</i> (serville, 1838)
8	Acrididae	Oxyinae	<i>Oxya japonica</i> (Thunberg, 1815)
9	Acrididae	Oxyinae	<i>Oxya hyla hyla</i> (Serville, 1831)
10	Acrididae	Oxyinae	<i>Oxya fuscavittata</i> (Marschall, 1836)
11	Tettigoniidae	conocephalinae	<i>Euconocephalus varius</i> (Walker, 1869)

12	Tettigoniidae	conocephalinae	<i>Euconocephalus mucro</i> (Haan, 1843)
13	Tettigoniidae	Hexacentrinae	<i>Hexacentrus japonicus</i> (Serville, 1831)
14	Tettigoniidae	Mecopodinae	<i>Mecopoda elongata</i> (Linnaeus, 1758)
15	Tettigoniidae	Mecopodinae	<i>Mecopoda nipponensis</i> (Haan, 1843)
16	Tettigoniidae	Pseudophyllinae	<i>Onomarchus uninotatus</i> (Serville, 1838)
17	Pyrgomorphidae	Pyrgomorphinae	<i>Atractomorpha crenulate</i> (Fabricius, 1793)
18	Pyrgomorphidae	Pyrgomorphinae	<i>Atractomorpha lata</i> (Mochulsky, 1866)
19	Pyrgomorphidae	Pyrgomorphinae	<i>Tagasta marginella</i> (Thumberg, 1815)

Table-2: Comprehensive data on the grasshopper species diversity in the Udalguri District.

Sl. No.	Name of Family	No. of Species	No. of Individual
1	Acrididae	10	245
2	Tettigoniidae	6	117
3	Pyrgomorphidae	3	62

Figure -1



The diversified grasshopper fauna of different areas of Udalguri district is presented in **Table 1**; it is classified under the order Orthoptera, and **Figure 1 shows the** familywise distribution of species. All the information about the identified species is given in the table. The information includes things like the name of the species, the corresponding families, sub families and the recorded count of individuals for each species.

The sample collection time was in two different time periods. In the morning, it was 7.30 am to 10.30 am, and in the afternoon, it was 3.00 pm to 4.00 pm. During these periods, temperatures used to be a little bit low, from 20°C to 30°C. During this period, grasshoppers are less active.

Table-2 Furnishes a extensive records of grasshoppers species diversity in the Udalguri district ,with a specific emphasis on the three families observed during the survey: The recorded families are Acrididae, Tettigoniidae, and Pyrgomorphidae.

A total count of 424 grasshopper population was gathered, which was classified into 3 families. They are Acrididae, Tetigoniidae, and Pyrgomorphidae. The outcome of the finding reveals that the family Acrididae had the most diversified species, with a total of 10 species. Acrididae is the largest population size, with a count of 245 grasshoppers. The Tettigoniidae show six distinct species, with a total of 117 individuals found in the taxonomic group. The Pyrgomorphidae family includes three distinct species with 62 individuals.

The provided data shows the significant and diverse fauna of grasshoppers in our study area. The study reveals the population dynamics and geographic pattern of distribution of grasshoppers within the specified research area.

DISCUSSION:

This comprehensive study emphasizes the grasshopper fauna and its ecological importance in the Udalguri districts of Assam. The climatic condition, location, and vegetation of the Udalguri region provide very suitable habitat for the grasshopper fauna.

Grasshoppers play a crucial ecological role in facilitating plant decomposition, enhancing soil fertility, and promoting natural fertilization, highlighting their indispensable contribution to ecosystem balance and productivity. By gaining insights into their behaviors and ecological requirements, we can develop targeted conservation strategies to protect and preserve the

diverse grasshopper population in the Udalguri area, thereby creating a healthy and balanced ecosystem. The findings of this study serve as vital reference points for subsequent research and conservation endeavors, informing strategies to safeguard the rich grasshopper fauna and maintain ecological balance in the region.

The objective of this research is to explore and understand the grasshopper fauna of Udalguri district, ASSAM, and provide proper, comprehensive data through documentation. The diverse range of grasshopper species in the area can be attributed to the interplay of multiple factors, like geographical location, climatic conditions, and prevalent plant composition. Documented data will be considered a very important resource to know about the habitat, ecology, behavioral tendencies, and climatic preferences of different grasshopper fauna in a particular geographical region.

As a highly visible and ecologically influential group of arthropods, grasshoppers play a significant role in shaping their ecosystem, with consequences that can be both positive and negative. The present study included the identification of 19 grasshopper species belonging to the families Acrididae, tettigoniidae, and Pyrgomorphidae. The family Acrididae shows the largest diversity and abundance compared to the other two families, showing a clear ecological presence inside the study region.

The distribution of the grasshopper species was found to be influenced by habitat characteristics, with certain species preferring specific microhabitats. For instance, the high-altitude grasslands harbored a distinct assemblage, while the agricultural landscapes supported a different set of species.

Interestingly, the study also identified a few species that are of conservation concern, underscoring the importance of targeted efforts to protect the fragile ecosystems of the region.

CONCLUSION

This study provides a comprehensive baseline assessment of the grasshopper fauna in the Udalguri district, Bhutan Territorial Region, Assam. The findings highlight the region's ecological significance and the need for further research and conservation efforts to safeguard the rich biodiversity of the eastern Himalayas.

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