



## An Annotated Checklist, Spatial Distribution Patterns and New Orthopteran Species Reported in Agroclimatic Region of Rajasthan, India

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### ABSTRACT

Orthopteran insects are considered to be a great indicator of diversity and ecosystem health. A biannual study undertaken in an agroclimatic region, semiarid eastern plain of Rajasthan, India during the year 2021-2023 comprising four study sites. These study sites provided checklist of orthopteran insects and the species composition, distribution, abundance and diversity have been investigated. A total 30 species belonging to 6 families and 15 subfamilies comprising two suborders, Caelifera (24 species with 6 new record) and Ensifera (6 species with 1 new record) have been reported. The Acrididae family, comprising 18 orthopteran species (6 new records), exhibited the highest species richness, dominance, and abundance, followed by Pyrgomorphidae (5 species), Tettigoniidae (3 species with 1 new record), Gryllidae (2 species) and Gryllotalpidae and Tetrigidae (1 species each, respectively). The acridid species, *Hieroglyphus banian* represented the highest IVI at Jaipur (63.19) and *Dausa* (36.46), signifying its dominance in agriculture farms, while gryllid species, *Acheta domesticus* constantly exhibited high IVI across all the sites. The highest species richness was observed in Jaipur and Tonk, with many species occurring frequently. The highest species Dominance ( $D = 0.1021$ ) observed in Ajmer, Simpson's diversity index ( $D^x = 0.9107$ ) and Shannon Wiener index ( $H^x = 2.698$ ) were maximum in Tonk, and Evenness ( $E = 0.6259$ ) in Jaipur showed statistically significant differences ( $p < 0.05^*$ ), highlighting distinct species compositions in Ajmer and Tonk. The diversity ordering curve across different sites revealed that Jaipur was the most diverse and evenly distributed site. This pioneering study makes a significant contribution of the orthopteran fauna in Rajasthan by documenting new species from the region.

**KEY WORDS:** Abundance, Diversity, Distribution, New record, Orthoptera, Semiarid eastern plain

### INTRODUCTION

Orthoptera is one of the most diverse and dominant groups of herbivorous insects, comprising short and long-horned grasshoppers, grouse locusts, pygmy grasshoppers, crickets, mole crickets, raspy crickets, cave crickets, and katydids (Sinclair, 1975; Shishodia, 1997). The distribution of orthopterans covers all physiographic regions but mainly inhabits forests, agricultural fields, grasslands, and hilly areas across the world. They display a versatile range of food preferences, including tender plant parts, decaying vegetation, and forest floor litter (Joshi *et al.*, 1999). Orthoptera comprises about 29,896 species all around the world, comprising 2.79% of the total

insect fauna. In India including over 12,00 species comprises around 310 species of family Gryllidae, 285 species of Acrididae, 159 species of Tettigoniidae, and 70 species of Pyrgomorphidae reported a rich faunal diversity of neopteran order Orthoptera (GBIF, 2024; Cigliano *et al.*, 2023).

Orthopterans are proposed important bioindicators of threatened environments because of their unique microhabitat preferences, functional importance in ecosystems, and sensitivity to changes in biotic and abiotic factors of their habitats (Weiss *et al.*, 2013; Soliman *et al.*, 2017; Welti *et al.*, 2020). Orthopterans are regular contributors to the geographical

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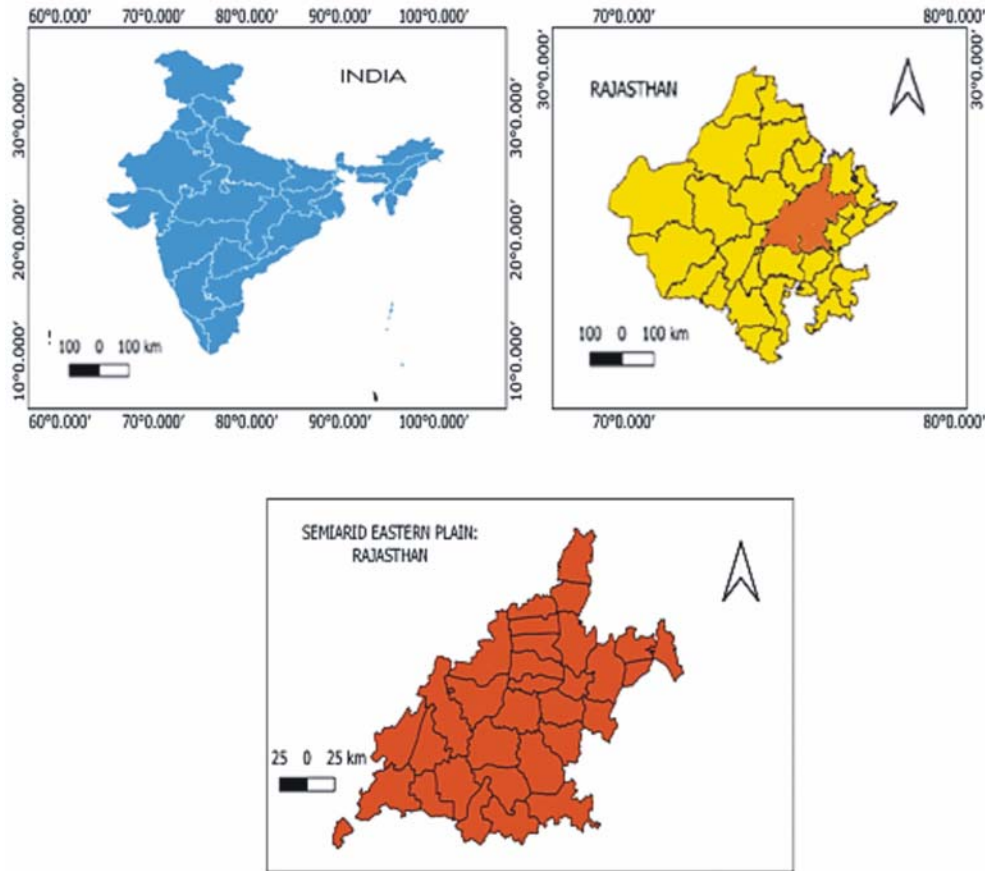


Figure 1: Map of semiarid eastern plain, Rajasthan, India (Source- Google earth, q-GIS 3.38)

biomass, enormous diversity, ecological validity, and influence vegetation structure, soil health, and food web dynamics, showing the complex interrelationships within ecosystems (Fartmann *et al.*, 2012). Despite their ecological significance, the majority of orthopterans are often recognized as pests, responsible for outbreak conditions. As pests, grasshoppers and locusts cause severe damage to agricultural crops and rangelands (Lockwood, 2023).

The order Orthoptera comprises most diverse families viz. Acrididae, Pyrgomorphidae, Gryllidae, Gryllotalpidae, Tettigidae, and Tettigonidae. The Acridids (short-horned grasshoppers) and Pyrgomorphids (gaudy grasshoppers) are primarily herbivore insects that are mostly reported as crop pests, e.g., locusts, and served as prey for numerous predators, thus maintaining ecological balance (Meyer *et al.*, 2002; Pener & Simpson, 2009; Soomro & Sultana, 2020). The members of Gryllidae (true crickets) and Gryllotalpidae (mole crickets) are well-known for their distinctive chirping sounds and also contribute to soil aeration and nutrient recycling through their burrowing activities (Ulagaraj, 1975; Gawalek *et al.*, 2014).

Tetrigids (pygmy grasshoppers) are small, cryptic insects that thrive in moist habitats, playing an important role in detritus breakdown and nutrient cycling (Koërek *et al.*, 2011; Subedi *et al.*, 2024). Tettigoniids (katydids or bush crickets) exhibit varied diets ranging from herbivory to predation, affecting plant dynamics and aiding in the control of insect populations (Bailey, 1993).

In the year 2020, India had faced the worst locust attack after severe attack in 1993, in which locust had migrated from the thar desert of Rajasthan to Delhi, Uttar Pradesh, Madhya Pradesh, and north western parts of Bihar during attack (Rai & Sharma, 2020). Orthopteran diversity was documented in small segments from the Rajasthan state by various researchers (Tandon & Shishodia, 1976; Ahluwalia *et al.*, 1977; Chandra, 1983; 1985; Shishodia, 2007; Jat *et al.*, 2010a,b; Kumar & Usmani, 2014; 2015; Dhakad *et al.*, 2014; Pareek *et al.*, 2014; 2017a, b; Purushan *et al.*, 2017; Meena *et al.*, 2019, 2021, 2022). The semiarid eastern plain covers approximately 8.67% of the state's land area and includes a variety of ecoregions,

Table 1: Checklist, taxonomic composition and Important Value Index of orthopteran insect species recorded with systematic extensive survey in the semiarid eastern plain, Rajasthan with pest status.

Suborder	Family	Sub family	Tribe	Species	Site I (Jaipur)	Site II (Ajmer)	Site III (Dausa)	Site IV (Tonk)	Pest Status
Caelifera	Acrididae	Hemiacridinae	Hieroglyphini	<i>Hieroglyphus banian</i> (Bolivar, 1912)#	63.19	0	36.46	0	###
		Spathosterninae	Spathosternini	<i>Spathosternum prasiniferum</i> (Walker, 1871)	19.24	31.85	22.75	19.45	##
		Gomphocerinae	Arcypterini	<i>Aulacobothrus sp.</i> (Bolivar, 1902)	0	6.52	5.82	3.93	#
		Catantopinae	Catantopini	<i>Xenocatantops karnyi</i> (Kirby, 1910)†	0	7.93	5.44	4.82	#
				<i>Diabolocatantops pinguis</i> (Stal, 1861)	7.34	6.89	6.89	6.77	##
		Oedipodinae	Locustini	<i>Gastrimargus africanus</i> (Saussure, 1888) †	7.41	9.28	7.1	7.55	-
				<i>Oedaleus abruptus</i> (Thunberg, 1815)†	0	0	9.29	9.11	#
				Acrotylini	<i>Acrotylus longipes</i> (Charpentier, 1845)#	7.59	6.59	6.33	7.16
		<i>Acrotylus humbertianus</i> (Saussure, 1884)	8.37		7.68	7.59	6.9	#	
		Trilophidiini	Trilophidiini	<i>Aiolopus simulatrix</i> (Fieber, 1853)	0	0	2.68	2.52	##
				<i>Trilophidia annulata</i> (Thunberg, 1815)	11.11	13.74	13.46	14.05	#
		Acridinae	Acridini	<i>Acrida exaltata</i> (Walker, 1859)	8.82	10.32	8.91	9.04	##
				<i>Acrida turrata</i> (Linnaeus, 1758)#	9.64	12.21	8.19	6.96	-
		Truxalinae	Truxalini	<i>Truxalis indica</i> (Bolivar, 1902)#	7.91	6.95	0	0	-
				<i>Truxalis eximia</i> (Eichwald, 1830)	4.96	6.4	5.86	5.53	-
		Coptacrinae	-	<i>Eucoptacra praemorsa</i> (Bolivar, 1902)#	0	0	8.91	9.11	-
				<i>Epistaurus sinetyi</i> (Bolivar, 1902)#	0	0	5.32	5.73	-
Eyprepocnemidinae	Eyprepocnemidini	<i>Heteracris notabilis</i> (Uvarov, 1942)	5.33	4.46	3.92	3.53	-		
		Pyrgomorphae	Pyrgomorphae	Chrotogonini	<i>Chrotogonus trachypterus</i> (Blanchard, 1836)	7.96	9.4	0	0
<i>Chrotogonus oxypterus</i> (Serville, 1838)	8.61				7.26	6.58	6.64	-	
Pyrgomorphini	<i>Pyrgomorpha bispinosa</i> (Walker, 1870)			10.05	11.85	14.28	16.39	##	
Atractomorphi	<i>Atractomorpha crenulata</i> (Fabricius, 1793)			10.33	12.64	9.73	13.34	#	
Poekilocerini	<i>Poekilocerus pictus</i> (Fabricius, 1775)			11.85	15.82	0	15.03	##	
Tetrigidae	Tetriginae	Tetrigini	<i>Tetrix sp.</i> (Latreille, 1802)	6.11	5.97	0	2.24	-	
Ensifera	Gryllidae	Gryllinae	Gryllini	<i>Gryllus bimaculatus</i> (De Geer, 1773)	12.71	14.1	10.78	26.09	-
				<i>Acheta domesticus</i> (Linnaeus, 1758)	24.49	36.14	25.66	26.87	-
	Gryllotalpidae	Gryllotalpinae	Gryllotalpini	<i>Gryllotalpa africana</i> (Palisot de Beauvois, 1805)†7.87	7.32	6.64	6.64	-	
	Tettigoniidae	Phaneropterinae	Phaneropterini	<i>Phaneroptera sp.</i> (Stal, 1857)	2.26	6.34	4.23	3.69	-
				<i>Isopsera pedunculata</i> (Brunner von Wattenwyl, 1878) #	2.63	0	3.85	0	-
	Conocephalinae	Copiphorini	<i>Euconocephalus incertus</i> (Walker, 1869)	0	0	4.23	4.69	-	
6	15	20	25 Genera and 30 Species						

-(Not identified); # -Least severe pest; ## - Moderate pest; ### - Serious pest; †: New species record from Semiarid eastern plain region; # -New species record from Rajasthan



attract a variety of orthopteran insects. The Aravali (the oldest mountain range in India) influences the study region's climate, affecting temperature, rainfall, agriculture, population, and biodiversity. The area hosts tropical thorn forests dominated by species such as *Acacia nilotica*, *Acacia leucophloea*, *Prosopis cineraria*, *Capparis aphylla*, *Zizyphus sp.*, and *Flacourtia sp.*

**b) Survey and sampling:** The survey was conducted for two consecutive years, from March 2021 to February 2023, in various habitats across three seasons (summer, rainy and winter). Sampling was done inside a 10 m<sup>2</sup> area with 5-10 replicas at each sampling site. Sampling of orthopteran insects was conducted twice a month in the morning from 7 am to 11 am during the study period using various sampling methods, like visual method and line transect method (Moses *et al.*, 2019; Leksono *et al.*, 2022). The orthopterans were collected through aerial netting, sweep netting, and hand picking to estimate population densities and diversity, while the nocturnal katydids and crickets by the light trap method. Their numbers were counted and recorded for various data analysis (Tripplehorn & Johnson, 2005).

**c) Preservation and identification:** The insects collected in killing jars, stretched out, pinned and preserved in insect boxes using the preservatives. The specimens were identified under a stereoscopic binocular microscope (MagnUs MS30/MS24-0699), using dichotomous identification keys (Drish, 1961; Zahid *et al.*, 2020; Baba *et al.*, 2022), previous studies literature (Shishodia & Gupta 2009; Shishodia *et al.*, 2010; Chandra *et al.*, 2012; Chandra & Gupta, 2013; Swaminathan & Swaminathan, 2019), and OSF (*Orthoptera Species File*) online data base (Cigliano *et al.*, 2023). Identification of some specimens was done in the museum of MPUAT, Department of Entomology, Udaipur with the help of expertise.

**d) Data analysis:** The Important Value Index (IVI) represented the ecological significance of species comprising the relative abundance, density, and frequency and cumulative species distribution across sites calculated with MS Excel 2023. Species richness is the number of species in an ecosystem, while abundance is the count of individuals per species. Evenness reflects how evenly species are represented. The alpha diversity attributes and diversity ordering curve emphasizing species dominance were calculated for each site using Paleontological Statistical Software version 4.0 (Hammer *et al.*, 2001).

**RESULTS**

A total of 30 species of Orthoptera belong to 26 genera, 19 tribes, 14 subfamilies, and 6 families have been identified from the semiarid eastern plain of Rajasthan, which constituted 0.42% of the total orthopteran fauna from India. The family Acrididae represented the most (18 species, 60% including 6 new records), followed by Pyrgomorphidae (5 species, 17%), Tettigonidae (3 species, 10%, and 1 new record), Gryllidae (2 species, 7%), Tetrigidae and Gryllotalpidae (1 species, 3%, each respectively) across all the habitats in the study area. The subfamily Oedipodinae was the most dominant (6 species, 20%, and 1 new record) of the total collected species, followed by Pyrgomorphinae (5 species, 16.67%), Truxalinae (1 new record), Acridinae (1 new record), Gryllinae, Phaneropterinae (1 new record), and Catantopinae (1 new record) with 2 species and 6.67% each respectively. Subfamilies Conocephalinae, Eyprepocnemidinae, Tetriginae, Gomphocerinae, Gryllotalpinae, Hemiacridinae (1 new record), and Spathosterninae had least dominant (1 species, 3.33% each respectively). The members of Acrididae were highly distributed at site I (Jaipur) and III (Dausa), that represent agriculturally rich areas which provides significant habitats for acridid grasshoppers as pests of various crops and vegetation, while site II (Ajmer) and IV (Tonk) have rich soil, urban gardens, and hilly regions providing habitat for Pyrgomorphidae, Tetrigidae, and Gryllidae families (Table 1, Fig. 2).

The family Acrididae had shown the highest numbers across all the sites, with site I (Jaipur) hosting the most individuals. The members of Gryllidae family also had a significant presence, particularly at site II (Ajmer). Gryllotalpidae and Pyrgomorphidae had lower counts, with Pyrgomorphidae showing a notable decrease in individuals at site I (Jaipur) and III (Dausa). Tetrigidae had very low numbers, especially absent at site III (Dausa), while Tettigonidae members maintains a consistent but low presence across all the sites (Table 1).

The Important Value Index (IVI) represent the ecological significance of orthopteran species across the

Table 2: Alpha diversity attributes calculated of orthopteran fauna across the study sites during study period (2021-23)

Sites	Shannon Wiener Index(H*)	Evenness Index(E)	Simpson Index(D*)	P-Value
Site I (Jaipur)	2.65	0.645667	0.903333	0.066547
Site II (Ajmer)	2.616	0.613333	0.896667	0.03421*
Site III (Dausa)	2.643	0.555667	0.9	0.163064
Site IV (Tonk)	2.672333	0.588	0.906667	0.034192*

(Level of significance: 0.05)

study sites, including relative abundance, density, and frequency. Acridid species, *Hieroglyphus banian* represented the highest IVI at site I (Jaipur) (63.19) and III (Dausa) (36.46), signifying its dominance in agriculture farms, while no comparable records have been reported at sites II (Ajmer) and IV (Tonk). However, *Acheta domesticus* constantly exhibited high values of IVI across all the study sites. Moreover, species *Isopsera pedunculata* and *Phaneroptera sp.* represented with low IVI value, with specific ecological niche, while *Acrida exaltata*, *Acrida turrita*, *Diaboloecatantops pinguis*, *Gastrimargus africanus*, *Acrotylus longipes*, *Acrotylus humbertianus*, *Trilophidia annulata*, *Spathosternum prasiniferum*, *Truxalis eximia*, *Chrotogonus oxypterus*, *Pyrgomorpha bispinosa*, *Atractomorpha crenulata*, *Gryllus bimaculatus*, and *Acheta domesticus* were observed with high occurrence across all the sites (Table 1, Fig. 3).

The acridid species, *H. banian* was reported serious polyphagous pest (#) in agriculture farms of site I (Jaipur) and III (Dausa). The grasshopper infested crops like, pearl millet, sorghum, cluster bean, sesame, pulses, and vegetables viz., bottle guard, tomato and some grasses in the agriculture habitats. Some other orthopteran species viz., *P. bispinosa*, *T. annulata*, *A. crenulata*, *A. humbertianus*, *S. prasiniferum*, *P. pictus*, *D. pinguis*, *A. exaltata*, *X. karnyi*, *A. longipes*, *Aulacobothrus sp.*,

and *A. simulatrix* were also observed as least concern pest with moderate abundance in the agriculture farms (Table 1). Orthopteran serves as significant consumers and prey in an ecosystem. They adopted an herbivorous diet and voraciously fed on plant parts in both their nymphal and adult stages, sometimes becoming pests on a large scale.

The variations in alpha diversity indices revealed that highest species Dominance ( $D = 0.1021$ ) was recorded at site II (Ajmer), while the Simpson's diversity index ( $D^x = 0.9107$ ) was recorded maximum at site IV (Tonk). The Shannon Wiener index was recorded as the highest ( $H^x = 2.698$ ) at site IV (Tonk), and Evenness was recorded highest ( $E = 0.6259$ ) at site I (Jaipur). Statistically significant differences ( $p < 0.05^*$ ) were observed for site II (Ajmer) and site IV (Tonk), highlighting their distinct species compositions (Table 2, Fig. 5).

The cumulative distribution of species across the study sites, revealed that sites I (Jaipur) and IV (Tonk) had the high species richness, with many species occurring frequently. Site II (Ajmer) also had high species presence but with few species' occurrence, while site III (Dausa) has a moderate species distribution (Fig. 4). The diversity ordering curve across different sites revealed that site I (Jaipur) was the most diverse and evenly distributed site among the all. While, site II (Ajmer) had a moderate diversity value across increasing  $q$ -values. In contrast,

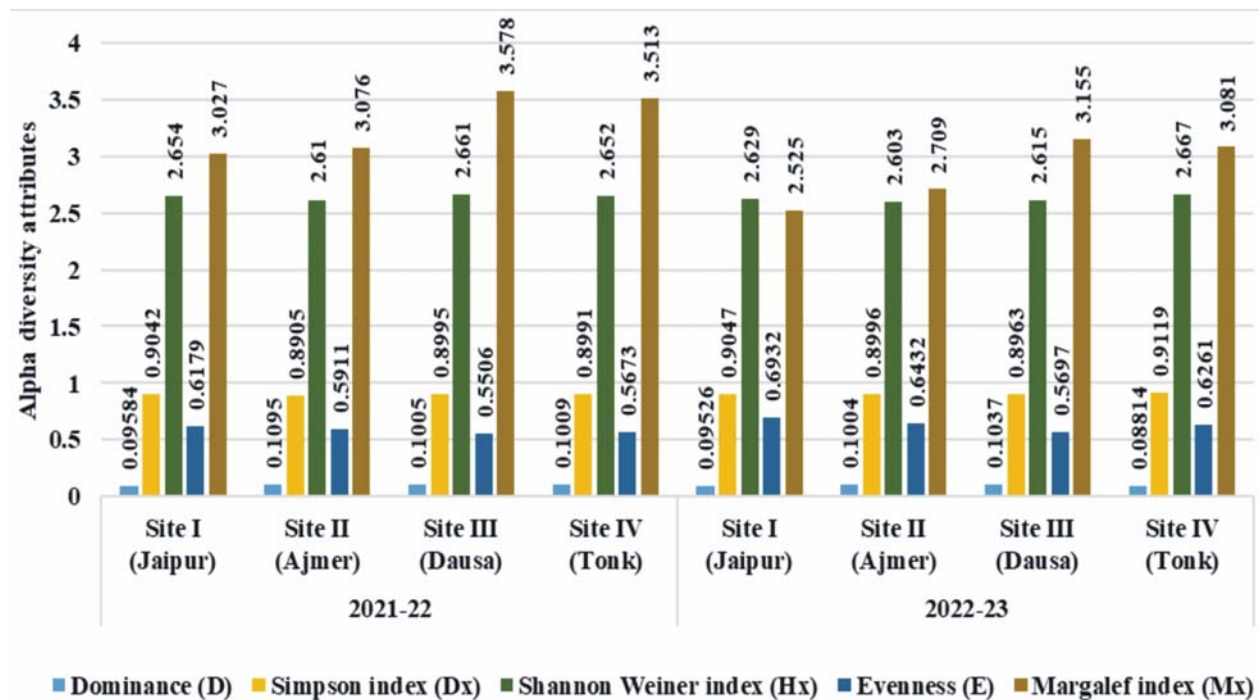


Figure 5: Alpha diversity attributes of Orthoptera across the study sites during study period (2021-2023)

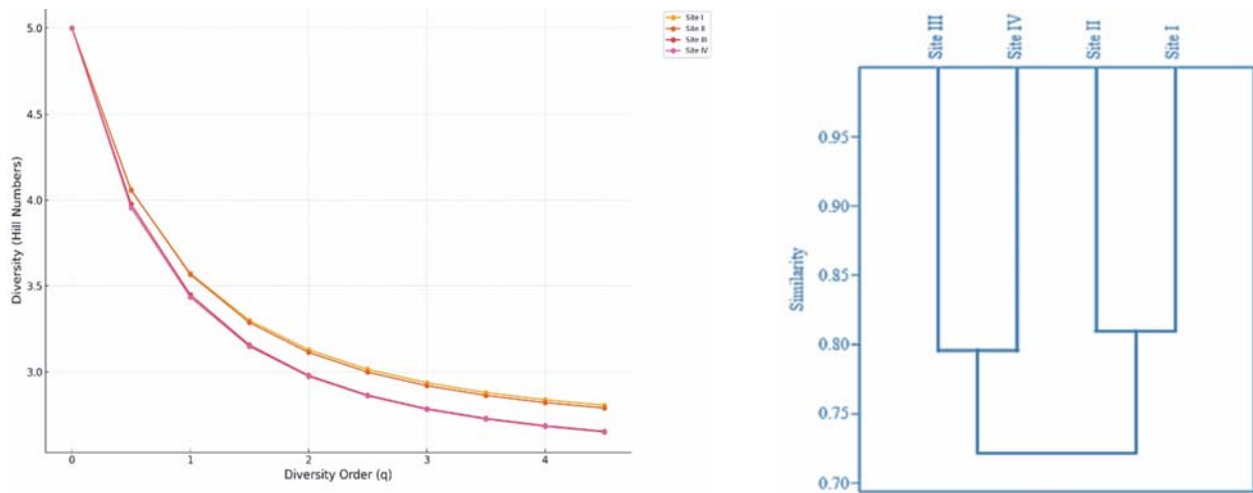


Figure 6: (A) Diversity ordering curve; (B) Similarity matrix (Paired Group UPGMA) at the Bray Curtis scale across different sites of semiarid eastern plain, Rajasthan during the study period (2021-2023)

site III (Dausa) and IV (Tonk) showed a sharper decline in diversity at higher  $q$ -values, reflecting dominance by a few abundant species and reduced evenness (Fig. 6A). The Bray-Curtis similarity of orthopteran species composition among different sites showed that orthopterans composition between sites I and II (0.810); sites I and III (0.775); sites I and IV (0.698); sites II and III (0.658); sites II and IV (0.755); sites III and IV (0.796) were observed similar to each other (Fig. 6B).

In the present study, several new orthopteran species have been documented as significant new records from Rajasthan, highlighting the ecological importance and scientific contribution of augmenting the orthopteran faunal database of India. The family Acrididae contributed 6 newly recorded species including *H. banian*, *Acrida turrata*, *Truxalis indica*, *Eucoptacra praemorsa*, *Epistaurus sinetyi*, and *Acrotylus longipes*, while the family Tettigoniidae added one species, *Isopsera pedunculata*, to the regional faunal inventory (#). Furthermore, 3 additional acridid species, *Gastrimargus africanus*, *Oedaleus abruptus*, and *Xenocatantops karnyi* along with one gryllotalpid species, *Gryllotalpa africana*, a newly reported from the semiarid eastern plain of Rajasthan (†), as detailed in Table 1.

## DISCUSSION

In the present study about 30 orthopteran species belonging to six families viz., Acrididae, Pyrgomorphidae, Tettigoniidae, Gryllidae, Gryllotalpidae and Tetrigidae have been identified. Among these, family Acrididae represented by 18 species and subfamily Oedipodinae with 6 species were the highest amongst other groups.

The similar trend have been reported earlier by Akhtar *et al.* (2012), recorded 26 grasshoppers belonged to family Acrididae under 22 species and subfamily Oedipodinae with 7 species, exhibited the highest number in Uttar Pradesh, India. Rafi *et al.* (2014) also reported higher number of orthopterans about 48 grasshopper species from Uttar Pradesh, and subfamily Oedipodinae as the most dominant with 14 species having 29% composition of all. Kumar & Usmani (2015) reported 36 species of acridids from Haryana, and Parmar (2021) accounted for 23 species of orthoptera belonging to six families from Gujrat. Similarly, Thakkar *et al.* (2015) reported 45 Orthopteran species from Gujarat, in which Acrididae contained 18 species from the open grassland habitats, which aligns with the present study. Divya & Senthilkumar (2017), Mounika *et al.* (2024), and Sidharth *et al.* (2024) reported orthopteran diversity from the southern regions of India, represented maximum species represented family Acrididae. Similar pattern reported from southern Rajasthan, in agricultural regions, which had a high density of individuals belong to the family Acrididae (Dhakad *et al.*, 2014; Pareek *et al.*, 2017) and a relatively low abundance of Pyrgomorphidae, Tetrigidae, and Gryllidae (Jat *et al.*, 2010a). The high diversity of Acrididae in the study sites may be attributed to its semiarid climate, scattered vegetation, and open grasslands, which provide an ideal habitat for short-horned grasshoppers.

Likewise Jat *et al.* (2010a, b) observed 5 pyrgomorphid distribution in maize-wheat agriculture farms of southern Rajasthan. Dhakad *et al.* (2014) also observed Acridids and Pyrgomorphids in the sugarcane fields of Udaipur, Rajasthan. The genera, *Hieroglyphus*, *Spathosternum*, and

*Chrotogonus* were dominant in the farms, whereas the genera of Tetrigidae and Tettigonidae had the least abundance. *Oxya fuscovittata*, *Aiolopus thalassinus*, and *Chorthippus biguttulus* were the dominant species in sugarcane fields, with soil-dwelling orthopterans like *Atractomorpha crenulata* adopted to dry soil conditions. In contrast, Bhati & Srivastava (2016) reported 9 orthopteran species diversity under families Acrididae, Pyrgomorphidae, and Gryllidae from agroecosystems of Bikaner, Rajasthan. The highest abundance of *Ochrilidia sp.*, *Gryllus assimilis*, and *Chrotogonus sp.* have been reported followed by *Oxya chinensis*, *Schistocerca gregaria*, *Acheta domesticus*, *Pyrgomorpha sp.*, *Atractomorpha sp.*, and *Acrida sp.* Moreover, Pareek *et al.* (2017b) reported that *Hieroglyphus nigrorepletus* and *Spathosternum prasiniferum* had high dominance in the maize ecosystems of southern Rajasthan. Other species, such as *Trilophidia annulata*, *Catantops pinguis*, *Gastrimargus africanus*, and *Oxya spp.*, exhibited moderate abundance in the small farms in Rajasthan (Jat *et al.*, 2010 a,b; Dhakad *et al.*, 2014; Pareek *et al.*, 2017b) and in similar habitats of Madhya Pradesh (Bhusnar, 2015), Haryana (Kumar & Usmani, 2015), and Gujrat (Thakkar *et al.*, 2015). On the basis of the previous reports, seven species of Orthoptera have been recorded for the first time from Rajasthan, indicating an expansion of the known regional diversity.

Various studies reported species richness, population density, species diversity and abundance of orthopteran insects from different regions. Likewise, Jat *et al.* (2010b) recorded maximum Simpson and Shannon Weiner diversity indices in the month of August in southern Rajasthan. The Monsoon season had a greater diversity of Pyrgomorphids than the Spring season. Also, Akhtar *et al.* (2012) recorded 26 species of grasshoppers from rice fields in Uttar Pradesh, with a Shannon index of 2.15 and 0.83, and Margalef index of 4.35. Similarly, Dhakad *et al.* (2014) reported the high Shannon-Wiener index values for Acrididae diversity (2.02 to 2.28). In comparison, Pareek *et al.* (2014) in maize ecosystems across Southern Rajasthan, recorded Shannon-Weiner diversity index ranged from 1.838 in Chittorgarh district to 2.082 in Banswara district, indicated varying levels of species diversity across different regions. Further, Pareek *et al.* (2017b) recorded the diversity of Acrididae in maize ecosystems of Southern Rajasthan and reported the highest diversity in Dungarpur (2.138), and lowest in Chittorgarh (1.838).

## CONCLUSION

In the present study 30 species have been reported from Orthoptera confirms that, semiarid eastern plain of

Rajasthan is a peculiar region for existence of significant orthopteran species in the ecosystem, that show the complex interrelationships with habitats and good resource of biodiversity for environmental stability. The climatic conditions of the semiarid eastern plain inherently support moderate to higher orthopteran diversity compared to previous orthopteran records in Rajasthan. Orthopteran pest status also highlighted for identification of key species and their timely management in affected areas. The present investigation represents some new record of orthopteran species from Rajasthan as well as semiarid eastern plain, emphasize the underexplored biodiversity of orthopterans in India. The above findings, not only enriches the regional and national orthopteran databases but also underscores the ecological role and potential conservation significance of these species in semiarid landscapes.

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