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Diversity Of Hymenoptera In Jai Narain Vyas University, New Campus, Jodhpur, Rajasthan

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Abstract

This study examines the diversity of Hymenoptera in Jai Narain Vyas University new campus in Jodhpur, Rajasthan. Analyse their distribution and abundance in different microhabitats. Survey runed over a ten-month period from September 2022 to June 2023. Total 15 species from6 different families (Apidae, Formicidae, Sphecidae, Braconidae, Vespidae, Ichneumonidae) were recorded. The results showed that the diversity of species had different microhabitats, with the highest diversity found in gardens and trees. The results of this study are important for understanding the bee diversity of JNVU and suggesting conservation and management strategies to preserve the rich biodiversity of the region.

Keywords: Biodiversity, Insects, Hymenoptera, Documentation.

INTRODUCTION:

Hymenoptera, encompassing bees, wasps, and ants, are essential insects. These remarkable insects play pivotal roles in maintaining the balance and vitality of terrestrial ecosystems.Their important role in terrestrial ecosystem is help in plant reproduction through pollination thus proving goods to community (Potts *et al.,* 2009, ; Kannagi, *et. al.* 2013). Their diversity ranges from solitary species to highly social colonies, and they inhabit a wide range of ecosystems worldwide. Among the 1, 20,000 species of hymenoptera known as worldwide, India represented approx. 10,000 species. (Alfred *et al.,* 1998).

Among their key contributions are pollination services, biological pest control, and the recycling of nutrients, each of which underpins the health and sustainability of both natural and managed environments. Losses of these pollinators would be unfavourable for the production of food and preservation of the biodiversity (Klein, *et.al.* 2006).

This study focuses on the within the JNV University campus, examining their diversity and distribution, This research aims to provide insights into the campus's ecosystem, the impact of Hymenoptera within it, and the broader relevance of this study in conservation and academic settings.

Clarke *et. al.,* (2008) did survey in the twenty four natural areas of San Francisco to collect data regarding abundance and distribution of ants fauna. They collected sum of 2068 individuals of ants from 15 species, among of them 04 species of ants were not recorded previously in San Francisco. Kannagi *et.al* (2013) investigated diversity of order hymenoptera at the deciduous forest of South India from July 2009 to June

2010. They collected 38 species out of which 36 hymenoptera species were belonging from 09 families and including 21 genuses. Two species were unidentified. Megachilidae, Vespidae, Formicidae, Apidae, Sphecidae were found dominant families. Belamkar and Jadesh (2014) conducted study on insect species diversity at Agriculture fields of village Hadgil Harutti of Gulbarga, in Karnataka. They recorded total number of 11,318 insects belonging from 6 different orders including 26 families and 54 insect species, Among all orders, hymenoptera showed dominant order with total 78.86% individuals.
Anbalagan *et. al.* (2015) did study on diversity of hymenoptera families on vegetables crops in Tiruvallur District of Tamil Nadu from January 2009 to December 2012, they reported 100 species under 37 families of order hymenoptera. Formicidae family was found most dominant, Braconidae, Eulophidae, Platygastridae and Encyrtidae families were also abduance. Bhati and Srivastava (2016) collected 71 insects from 6 various orders and 32 different families on cauliflower crop at Bikaner, Rajasthan, they documented Xylocopa fenestrate, Apis cerana and Apis mellifera as three dominant species of order hymenopteran. Kulshrestha and Jain (2016) recorded 5 species of order hymenoptera belongs to the 3 families viz., Apidae, Vespidae and Sphecidae during the month of Feburary - March and September – October of calender year 2012. Saini *et al.,* (2018) documented diversity of bees in Arunachal Pradesh from Oct. 2016 to July 2017, they found 49 species in 12 genera of three families, Apidae, Megachilidae and Halictidae, thirteen species of bees for the first time recorded. Sahoo (2023) collected 6773 individuals comes under 26 families from Telangana State Agricultural University, Hyderabad using 05 methods of insect collection, formicidae was found most dominant family. Maximum number of insects individuals (2734) and families (25) were recorded with yellow pan trap.

MATERIALS AND METHODS

Site Selection: The study was conducted in New Campus, Jai Narain Vyas University (JNVU), Jodhpur, Rajasthan. It includes a diverse range of habitats, including natural forest, open spaces, landscaped garden, pond and buildings. These sites were carefully selected based on their diverse insect populations and represent different microhabitats within the campus. The primary sites include Zoology Department, Botanical Garden, Scout Ground, opposite Girls hostel, back side area.

Study period: the present study was conducted over a period of ten months from September 2022 to June 2023 by visiting once in a week, during day time.

Techniques and methods: Insects were collected and photographed. Collection is done by visual survey, sweep netting method, sample collection and killed with the help of ethyl acetate, stored in insect collection box and placed in entomology laboratory, Department of Zoology, JNVU, Jodhpur. The insects were collected with the utmost care and handled in accordance with established procedures to minimize their suffering.Identification of collected insects was done with the help of standard key; pictorial and dichotomous key and available literature.

***Area A-Zoology Department, Area B-Botanical Garden, Area C-Scout ground, Area D-Back side area, Area E-Oppositegirls hostel**

Fig. 1: Area covered.

RESULTS AND DISCUSSION:

The present study on Hymenoptera diversity in a JNVU New campus ecosystem. The investigation identified a total of 14 species from 6 different families (Apidae, Formicidae, Sphecidae, Braconidae, Vespidae, Ichneumonidae) within the study area, showcasing a considerable level of diversity within the local Hymenoptera fauna. Area B (botanical garden) showed the highest diversity, indicates a rich fauna within the study area. Bishnoi and Dang (2019) conducted study on diversity of order hymenoptera at four different regions of Kota, Rajasthan, they reported 17 species comprises 05 families viz., Apidae, Megachilidae, Xylocopidae, Halictidae , Sphecidae. Gupta (2019) noted 8 species from 11 genera and 4 sub-family of Formicidae. Hooda and Jain (2020) found 44 species of Hymenoptera in Kota district. Prakash and Bijoy (2020) reported 87 bees species belonging from 19 genera under the 03 families of order hymenoptera in the kerala. Yadav and Sarma (2022) reported 21 insect species of order hymenoptera comprising 04 families, Apidae, Halictidae, Vespidae, and Xylocopidae from 04 different localities of Jorhat, Assam. Nalwaya and Saxena (2023) reported sum of 35 insect species from five different orders including thirteen families from urban area of Meera Girls College, District Udaipur, Rajasthan, among hymenoptera *Apis dorsata*, *Apis mellifera* and *Apis florea* were found in abduance. The presence of multiple families and species not only contributes to the overall biodiversity of the area but also highlights the interdependence and ecological significance of these insects in the ecosystem. It is crucial to protect and preserve the habitats that support these species to maintain the ecological balance within the ecosystem.

Table1: List of insects observed in the study area.

S.N.	ORDER	FAMILY	SCIENTIFIC NAME	COMMON NAME
1.	**Hymenoptera**	Apidae	*Apis indica*	Honeybee
2.	**Hymenoptera**	Apidae	*Apis dorsata*	Giant Honeybee
3.	**Hymenoptera**	Apidae	*Amegilla cingulata*	Blue-Banded Bee
4.	**Hymenoptera**	Apidae	*Xylocopa latipes*	Tropical Carpenter Bee
5.	**Hymenoptera**	Apidae	*Xylocopa pubescens,*	Carpenter Bee
6.	**Hymenoptera**	Formicidae	*Solenopsis*	Fire Ant
7.	**Hymenoptera**	Formicidae	*Ochetellus spp.*	Black Ant
8.	**Hymenoptera**	Formicidae	*Camponotus*	Carpenter Ants
9.	**Hymenoptera**	Formicidae	*Dorylus laevigatus*	Driver Ant
10.	**Hymenoptera**	Sphecidae	*Sceliphron*	Black Mud-Dauber Wasps
11.	**Hymenoptera**	Braconidae	*Bracon*	Braconid Wasp
12.	**Hymenoptera**	Vespidae	*Polistes olivaceus*	Yellow Paper Wasp
13.	**Hymenoptera**	Vespidae	*Vespa orientalis*	Oriental hornet
14.	**Hymenoptera**	Vespidae	*Delta dimidiatipenne*	Red colored Potter Wasp
15.	**Hymenoptera**	Ichneumonidae	*Xanthopimpla punctata*	Parasitic Wasp

Table 2: No. of species present, area wise.

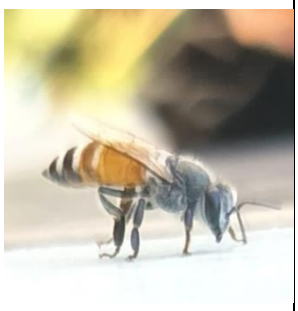
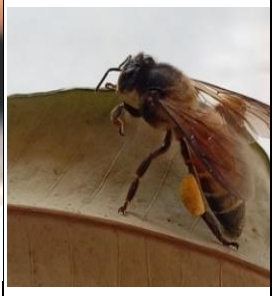
ORDER	TOTAL SPECIES IDENTIFIED	AREA A	AREA B	AREA C	AREA D	AREA E
Hymenoptera	15	8	10	5	7	6

Amegilla cingulata

Vespa orientalis

Xylocopa latipes

Xylocopa pubescens

 *Camponotus*	 *Solenopsis*	 *Ochetellus spp.*	 *Sceliphron*
 *Doryluslaevigatus*	 *Bracon sp.*	 *Delta dimidiatipenne*	 *Xanthopimpla punctata*
 *Apis indica*	 *Apis dorsata*	 *Polistes ovlivaceus*	

CONCLUSION:

The results of this study demonstrate that the diversity of Hymenoptera seen during a ten-month period at the Jai Narain Vyas University, New campus, has provided important insights into the number and dispersion of these species in a variety of microhabitats. The differences in species diversity that have been noted, especially the higher richness in the Botanical Garden, highlight the importance of focused conservation efforts in these habitats. Our research provides important insights for maintaining the wide diversity of bees on campus.

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