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# Sighting and Documentation of Butterflies and Moths (Lepidoptera: Insecta) from Urban Region of Jodhpur, Rajasthan, India

***Lekhu Gehlot[1], Mohan Singh[2,*], Bharti Tanwar[2], Mahima Soni[2] and Suman Bhadala[2]***
*[1]Assistant Professor, Entomology laboratory, Department of Zoology,*
*Jai Narain Vyas University, Jodhpur, (342001) Rajasthan, India.*
*[2]Post Graduate Students, Entomology laboratory, Department of Zoology,*
*Jai Narain Vyas University, Jodhpur, (342001) Rajasthan, India.*

*(Corresponding author: Mohan Singh)*
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**ABSTRACT: In the present study a short communication carried out with sighting of butterflies and moths from urban region of Jodhpur. Study area included three sites; Near Kaylana Lake, Mandore Garden and Botanical Garden JNVU New Campus.**
**This exploration show the presence of Lepidopterans, represented by common families; Nymphalidae, Pieridae, Papilionidae, Lycaenidae of sub-order Rhopalocera and Erebidae, Sphingidae, Crambidae, Pyralidae, Saturniidae, Pterophoridae, Geometridae, Noctuidae of sub-order Heterocera. The exploration and identification yielded a total of 47 species of Lepidoptera including 28 species of Butterflies under 17 genera and 19 species of Moths under 18 genera.**

***Keywords:*** Lepidoptera, Documentation, Photographic evidence, urban, Jodhpur

## INTRODUCTION

The variety of organisms reflects the biological diversity of that particular region. Biodiversity is supporting the ecosystems and the functional values of the species that provide bio-resources and services for human civilization. In urban regions, evaluating species diversity can be used as a method to minimize pollution and other climatic issues in urbanized, industrial and rural regions. Evaluation of species-diversity in urban regions are important to realize the effect of anthropocentrism on the sustainable development of ecosystem (Mukherjee *et al*, 2015).

Insects constitute two-third (2/3) of total fauna in India and comprise about **1,00,000** species. (Roonwal, 1989**;** Belamkar and Jadesh,2014). Varshney (1998) reported **589** families and **51,450** insect species. About **1,501** species of butterfly reported from India by (Kunte, 2000) and (Sharma and Joshi, 2009). Order lepidoptera include both Butterflies and Moths in considerable number of families, genera and species having widespread geographical diversity. There are approximately **152** species of Lepidopterans recorded throughout the India, out of these, Rajasthan, the largest state of india in terms of area contributes **38** species (Sharma, 2011; Kulshrestha and Jain, 2016). Insects play important role to maintain ecosystem, they pollinate plants and disperse seeds (Majer, 1987; Belamaker and Jadesh, 2014). Density of insects has been affected by various environmental factors like urban sprawl, use of pesticides and increasing pollution loads. Human activities becoming real threat to conserve biodiversity resources.

Increases in human population and advances in technology have directly affected the ecosystems of the world and many lepidopterans and other organisms cannot adapt these changes. Threats to the lepidopteran fauna include the use of pesticides, urbanization, intensive forestry, agriculture and exotic species (Bhatt and Nagar, 2017). In present study an attempt was made to explore and sight the diversity of butterflies and moths for the documentation of diversity of Lepidopterans from urban areas of Jodhpur, Rajasthan.

## MATERIALS AND METHODS

**Study area:** The survey was conducted ins Jodhpur urban region which covered urbanized Jodhpur city and its surroundings sub urban and rural areas. During this survey, three study areas were selected from Jodhpur urban region those are; Near Kaylana Lake, Mandore Garden and Botanical Garden of Jai Narain Vyas University (JNVU) New Campus (Fig. 1).

Global Positioning System (GPS; Garmin) was use to record the geographic coordinates. The central location of the study area was Botanical Garden, JNVU, New Campus ($26^{O}14'46.94''$ N, $73^{O}1'17.59''$E). Two alternative study areas were Near Kaylana Lake ($26^{\circ}17'57.68''$N, $72^{\circ}58'22.01''$E) and Mandore Garden ($26^{\circ}21'6.40''$N, $73^{\circ}2'6.59''$E).

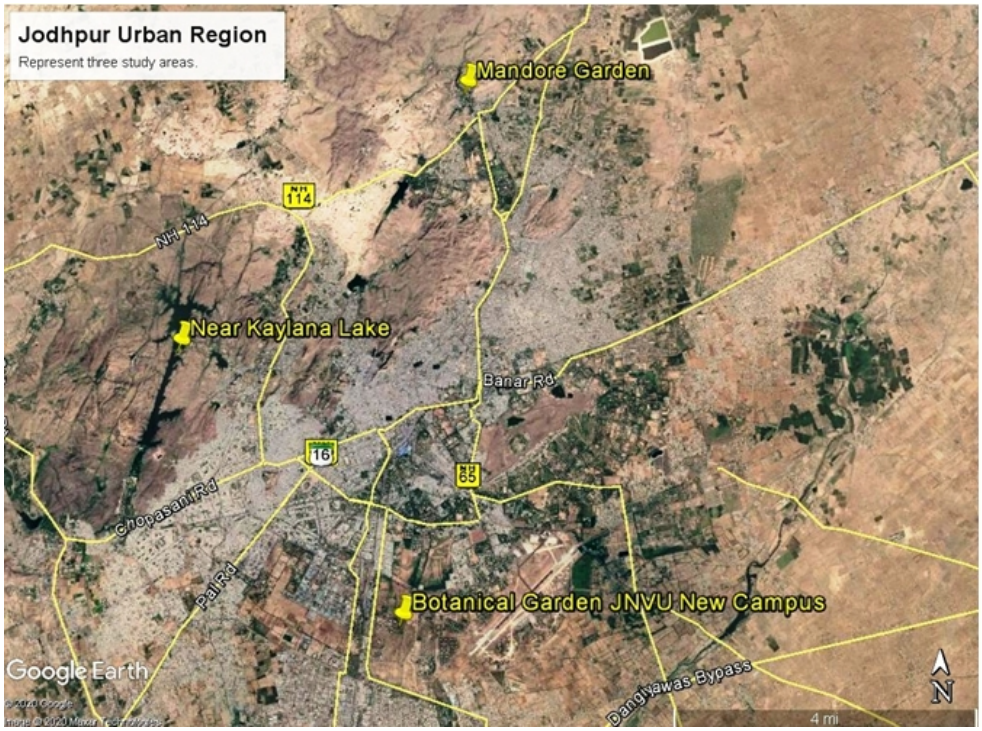


**Fig. 1.** Location Map (Jodhpur Urban Region).

**Study period:** Lepidopterans were explored in the study area for a period of 7 months between August 2019 and January 2020. Each study area was visited once in a month and observed from early morning (7:00 AM) to afternoon (5:00 PM) for study of butterflies and from evening (06:00 PM) to late night for moths.

**Techniques and methods:** All insects were identified directly in the field by visual search method followed by capture or photography. The collection of moths was made with the help of vertical sheet light traps during night time. Insects were also collected with hand held aerial sweep nets and killed with the help of ethyl acetate vapors. Dry preservation is done in fumigated ento-boxes and stored in the insect cabinets at Entomology laboratory, Department of Zoology, Jai Narain Vyas University, Jodhpur, Rajasthan. The identification were done with the help of field guide. (Wynter-Blyth, 1957; Kunte, 2000). All scientific names followed in the present study are according to (Nieukerken *et al*. 2011, Zahiri *et al*. 2012, and Singh and Ahmad, 2017). Photographic evidence of all Lepidopterans were taken using cameras and smartphone's cameras [Canon EOS 350D; Nikon Coolpixp510;Minote7/note4sandiphone X] for the present study.

## RESULTS AND DISCUSSION

During the study about 47 species belongs to order Lepidoptera including 28 species of butterflies under 17 genera and19 species of moths under 18 genera were recorded and these are distributed under 12 families; Nymphalidae, Pieridae, Papilionidae, Lycaenidae of sub-order Rhopalocera and Erebidae, Sphingidae, Crambidae, Pyralidae, Saturniidae, Pterophoridae, Geometridae, Noctuidae of sub-order Heterocera. Maximum number of butterflies and moths were recorded in the month of September. The detail list of the identified species of butterflies and moths, their Family, scientific name and common name are present in Tables. For better experience photographic evidences of these Lepidopteran species is also given in Figs. 2 and 3 for moth and butterflies respectively.

Simhachalam *et al.,* (2017) reported 40 species of butterflies belonging to 35 genera of 05 families from Port blavi, South Andamon. (Ahoosha *et al.,* 2018) investigated the diversity abundance and pollination efficiency of various insects pollinating the Rauvalfia serpentine. They reported that Rauvalfia serpentine attract 17 insect species, out of which order Lepidoptera comprises major visitors with three families: Papilionidae, Pieridae and Hesperiidae. (Suthar *et al.,* 2019) reported about 32 butterflies species belonging to 4 families from Pipladevi forest range of Dangs. (Sharma, 2016) investigated 56 species of moths belonging under 41 families. (Singh and Ahmad, 2017) reported 89 Lepidopteran species from palkot wildlife sanctuary, Jharkhand out of which 30 species of butterflies comprises 26 genera and 59 species of moths comprises 42 genera.

**Table 1: List of Butterflies reported from Jodhpur (Urban) region during August-2019 to January 2020.**

| Order | Sub Order | Family | Common Name | Scientific Name | Status |
|---|---|---|---|---|---|
| Lepidoptera | Rhopalocera | Nymphalidae | Blue Moon Butterfly | *Hypolimnas bolina* (Linnaeus,1758) | VR |
| | | | Danaid eggfly | *Hypolimnas misippus* (Linnaeus,1764) | VR |
| | | | Blue Pansy | *Junonia orithya* (Linnaeus,1758) | NR |
| | | | Peacock Pansy | *Junonia almanac* (Linnaeus,1758) | VR |
| | | | Yellow Pansy | *Junonia hierta* (Fabricius,1798) | R |
| | | | Lemon Pansy | *Junonia lemonias* (Linnaeus,1758) | C |
| | | | Tawny Rajah | *Charaxes bernardus* (Fabricius,1793) | R |
| | | | Baronet | *Euthali anais* (Forster,1771) | R |
| | | | Common Sailor | *Neptis hylas* (Linnaeus, 1758) | R |
| | | Nymphalidae | Plain Tiger | *Danaus chrysippus* (Linnaeus, 1758) | VC |
| | | | Common Tiger | *Danaus genutia* (Cramer,[1779]) | R |
| | | | Common Baron | *Euthalia aconthea* (Cramer,[1777]) | R |
| | | | Commander | *Moduza procris* (Cramer, 1777) | VR |
| | | | Common Evening Brown | *Melanitis leda* (Linnaeus,1758) | VR |
| | | | Indian Leaf wing | *Kallima paralekta* (Horsfield,[1829]) | VR |
| | | | Blue Tiger | *Tirumala limniace* (Cramer,[1775]) | R |
| | | Pieridae | Indian Pioneer | *Belenois aurota* (Fabricius,1793) | VR |
| | | | Small Salmon Arab | *Colotis amata* (Fabricius, 1775) | NR |
| | | | White Arab | *Colotis vestalis* (Butler,1876) | NR |
| | | | Spotless Grass Yellow | *Eurema laeta* Boisduval,1836 | R |
| | | Pieridae | Common Grass Yellow | *Eurema hecabe* (Linnaeus, 1758) | C |
| | | | Mottled Emigrant | *Catopsilia pyranthe* (Linnaeus, 1758) | VC |
| | | | Common Emigrant | *Catopsilia pomona* Fabricius, 1775 | VC |
| | | Papilionidae | Lime Swallowtail | *Papilio demoleus* Linnaeus, 1758 | NR |
| | | | Common Mormon | *Papilio polytes* Linnaeus,1758 | C |
| | | Papilionidae | Blue Mormon | *Papilio polymnestor* Cramer,1775 | NR |
| | | | Common Rose | *Pachliopta aristolochiae* (Fabricius,1775) | C |
| | | Lycaenidae | Long-Tailed Blue | *Lampides boeticus* (Linnaeus, 1767) | VR |

[VC-very common (> 100 sightings); C -common(50–100sightings); NR -not rare (15–50sightings);R –rare (2–15sightings); VR -very rare(1-2 sightings)]

**Table 2: List of Moths reported from Jodhpur (Urban) region during August-2019 to January 2020.**

| Order | Sub Order | Family | Common Name | ScientificName | Status |
|---|---|---|---|---|---|
| Lepidoptera | Heterocera | Erebidae | Salt-And-Pepper Moth | *Utetheisa lotrix* (Cramer,[1777]) | NR |
| | | | Heliotrope Moth | *Utetheisa pulchelloides* Hampson, 1907 | NR |
| | | | Arctiine Moth | *Creatonotos gangis* (Linnaeus,1763) | R |
| | | | Common Owl Moth | *Erebus macrops* (Linnaeus, 1768) | R |
| | | | Underwing Kin Moth | *Dysgonia stuposa* (Fabricius, 1794) | R |
| | | | Erebid Snout Moth | *Hypena iconicalis* Walker, 1859 | R |
| | | Sphingidae | Lesser Death's Head Hawkmoth | *Acherontia styx* Westwood, 1847 | R |
| | | | Vine Hawk-Moth | *Hippotion celerio* (Linnaeus, 1758) | NR |
| | | | Oleander Hawk-Moth | *Daphnis nerii* (Linnaeus, 1758) | C |
| | | | Crepuscular Hawk-moth | *Nephele hespera* (Fabricius,1775) | NR |
| | | Crambidae | Jasmine Moth | *Palpita vitrealis* (Rossi, 1794) | NR |
| | | | Trapeze Moth | *Cnaphalocrocis trapezalis* (Guenée, 1854) | R |
| | | | Cucumber Moth | *Diaphania indica* (Saunders, 1851) | C |
| | | Pyralidae | Snout Moth | *Endotricha luteogrisalis* Hampson, 1896 | R |
| | | Saturniidae | Tussar Silk Moth | *Antheraea mylitta* (Drury, 1773) | NR |
| | | | Cabbage Tree Emperor Moth | *Bunaea alcinoe* (Stoll, 1780) | R |
| | | Pterophoridae | Lantana Plume Moth | *Lantanophagapusillidactyla* (Walker, 1864) | VR |
| | | Geometridae | Pale Oak Beauty | *Hypomecis punctinalis* (Scopoli, 1763) | C |
| | | Noctuidae | Tobacco Cutworm | *Spodoptera litura* (Fabricius, 1775) | NR |

[VC-very common (> 100 sightings); C -common(50–100sightings); NR -not rare (15–50sightings);R –rare (2–15sightings); VR -very rare(1-2 sightings)]


**Fig. 2.** Moths reported from Jodhpur (Urban) region.

*1.Hypolimnas bolina* (Linnaeus, 1758), 2.*Hypolimnas misippus* (Linnaeus, 1764), 3.*Junonia orithya* (Linnaeus, 1758), 4.*Junonia almanac*(Linnaeus, 1758), 5.*Junonia hierta* (Fabricius, 1798), 6.*Junonia lemonias* (Linnaeus, 1758), 7.*Charaxes hernardus* (Fabricius, 1793), 8.*Euthalia nais* (Forster, 1771), 9. *Neptis hylas* (Linnaeus, 1758), 10.*Danaus chrysippus*(Linnaeus, 1758), 11.*Danaus genutia* (Cramer,[1779]), 12.*Euthalia aconthea* (Cramer, [1777]), 13.*Moduza procris* (Cramer, 1777), 14.*Melanitis leda* (Linnaeus, 1758), 15.*Kallima paralekta* (Horsfield, [1829]), *16.Tirumala limniace* (Cramer,[1775]), 17.*Belenois aurota* (Fabricius, 1793), 18.*Colotis amata* (Fabricius, 1775), 19.*Colotis vestalis* (Butler, 1876), 20.*Eurema laeta* Boisduval, 1836, 21.*Eurema hecabe* (Linnaeus, 1758), 22.*Catopsilia pyranthe* (Linnaeus, 1758), 23.*Catopsilia Pomona* Fabricius, 1775, 24.*Papilio demoleus* Linnaeus, 1758, 25.*Papilio polytes* Linnaeus, 1758, 26.*Papilio polymnestor* Cramer, 1775, 27.*Pachliopta aristolochiae* (Fabricius, 1775), 28.*Lampides boeticus* (Linnaeus, 1767).

**Fig. 3.** Butterflies reported from Jodhpur (Urban) region.

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