Diversity Assessment Report of Birds and Butterflies, Mody University Campus, Lakshmangarh, (Raj.), 27.03.21 to 28.03.21

Avifauna

Introduction

Birds are among the best monitors of environmental changes and play an important role in the control of insect pests, as predators of rodents, scavengers, seed dispersers and as pollinating agents and thus form an important component in natural ecosystem (Manjunath and Joshi, 2012, Yadav and Chauhan, 2018). The Indian subcontinent has rich in avifaunal diversity, more than 1,300 bird species (Rasmussen and Anderton, 2012). Avian community composition and species richness is associated with habitat structure as well as with abiotic factors such as temperature and precipitation; these are directly related to primary productivity, and have been broadly studied, both at local and regional scales and at different periods of the year (Wiens 1989; Honkanen *et al.* 2010). Avifaunal diversity has been decreasing rapidly due to the destruction of natural habitat by human activities (Bhadja and Vaghela, 2013). Protection and maintenance of avifaunal diversity is important in maintaining species diversity of plants and animals (Simeone *et al.,* 2002).

Present bird diversity survey intends to have the status of birds present in the Mody University Campus area. Earlier survey report was not considered for present records. This is the current checklist of birds present in the university campus with common names, scientific names, their international conservation status (IUCN Status), residential status to understand the seasonal variation in bird diversity and feeding habit to understand the feeding behaviour of different species. According to earlier survey, there are 96 species available but presently 74 species were reported because of the seasonal variation and **14 species** of birds reported first time from the university campus, based on earlier survey and present survey no. of species increased **from 96 to 110 species.**

Checklist of Avian Diversity based on current survey

S.No.	Common Name	Scientific Name	IUCN Status	Residential Status	Feeding Habit
	Accipitriformes: Accipitridae				
1.	Black Kite	*Milvus migrans* (Boddaert, 1783)	LC	R	C
2.	Black-winged Kite	*Elanus caeruleus* (Desfontaines, 1789)	LC	R	O
3.	Shikra	*Accipiter badius* (Gmelin, 1788)	LC	R	C
	Anseriformes: Anatidae				
4.	Spot-billed Duck	*Anas poecilorhyncha* (Forster, 1781)	LC	WV	O
	Apodiformes: Apodidae				
5.	Little Swift	*Apus affinis* (J.E. Gray, 1830)	LC	R	O
	Bucerotiformes: Upupidae				
6.	Hoopoe	*Upupa epops* (Linnaeus, 1758)	LC	R	I
	Bucerotiformes: Bucerotidae				
7.	Indian Grey Hornbill	*Ocyceros birostris* (Scopoli, 1786)	LC	R	O
	Charadriiformes: Recurvirostridae				
8.	Black-winged Stilt	*Himantopus himantopus* (Linnaeus, 1758)	LC	R	O
	Charadriiformes: Scolopacidae				
9.	Common Sandpiper	*Actitis hypoleucos* (Linnaeus, 1758)	LC	WV	O
10.	Green Sandpiper	*Tringa ochropus* (Linnaeus, 1758)	LC	WV	O
11.	Little Stint	*Calidris minuta* (Leisler, 1812)	LC	WV	O
12.	Wood Sandpiper	*Tringa glareola* (Linnaeus, 1758)	LC	WV	O
	Charadriiformes: Charadriidae				
13.	Little ringed Plover	*Charadrius dubius* (Scopoli, 1786)	LC	R	I
14.	Red-wattled Lapwing	*Vanellus indicus* (Boddaert, 1783)	LC	R	O
15.	White-tailed Lapwing	*Vanellus leucurus* (Lichtenstein, 1823)	LC	R	I
	Charadriiformes: Sternidae				
16.	River Tern	*Sterna aurantia* (J.E. Gray, 1831)	NT	R	O
	Columbiformes: Columbidae				
17.	Blue Rock Pigeon	*Columba livia* (Gmelin, 1789)	LC	R	G
18.	Eurasian Collared Dove	*Streptopelia decaocto* (Frivaldszky, 1838)	LC	R	G
19.	Laughing Dove	*Spilopelia senegalensis* (Linnaeus, 1766)	LC	R	G
20.	Red-collared Dove	*Streptopelia tranquebarica* (Hermann, 1804)	LC	R	G
21.	Spotted Dove	*Spilopelia chinensis* (Scopoli, 1786)	LC	R	G
22.	Yellow-footed Green Pigeon	*Treron phoenicoptera* (Latham, 1790)	LC	R	G
	Coraciiformes: Coraciidae				
23.	Indian Roller	*Coracias benghalensis* (Linnaeus, 1758)	LC	R	C
	Coraciiformes: Halcyonidae				
24.	White-breasted Kingfisher	*Halcyon smyrnensis* (Linnaeus, 1758)	LC	R	C
	Coraciiformes: Meropidae				
25.	Green bee-eater	*Merops orientalis* (Latham, 1801)	LC	R	I
	Cuculiformes: Cuculidae				
26.	Asian Koel	*Eudynamys scolopaceus* (Linnaeus, 1758)	LC	R	O
27.	Common hawk-Cuckoo	*Hierococcyx varius* (Vahl, 1797)	LC	R	O
28.	Greater Coucal	*Centropus sinensis* (Stephens, 1815)	LC	R	O
	Galliformes: Phasianidae				
29.	Grey Francolin	*Francolinus pondicerianus* (Gmelin, 1789)	LC	R	O
30.	Indian Peafowl	*Pavo cristatus* (Linnaeus, 1758)	LC	R	O
31.	Rock Bush Quail	*Perdicula argoondah* (Sykes, 1832)	LC	R	O

	Gruiformes: Rallidae				
32.	Common Moorhen	*Gallinula chloropus* (Linnaeus, 1758)	LC	R	O
	Passeriformes: Alaudidae				
33.	Ashy-crowned Sparrow Lark	*Eremopterix griseus* (Scopoli, 1786)	LC	R	I
34.	Crested Lark	*Galerida cristata* (Linnaeus, 1758)	LC	PV	O
35.	Indian Bushlark	*Mirafra erythroptera* (Blyth, 1845)	LC	R	O
36.	Oriental Skylark	*Alauda gulgula* (Franklin, 1831)	LC	R	O
37.	Rufous-tailed Lark	*Ammomanes phoenicura* (Franklin, 1831)	LC	SV	I
	Passeriformes: Cisticolidae				
38.	Ashy Prinia	*Prinia socialis* (Sykes, 1832)	LC	R	I
39.	Common Tailorbird	*Orthotomus sutorius* (Pennant, 1769)	LC	R	I
40.	Grey-breasted Prinia	*Prinia hodgsonii* (Blyth, 1844)	LC	R	I
41.	Rufous-fronted Prinia	*Prinia buchanani* (Blyth, 1844)	LC	R	I
	Passeriformes: Corvidae				
42.	House Crow	*Corvus splendens* (Vieillot, 1817)	LC	R	O
43.	Indian Jungle Crow	*Corvus macrorhynchos* (Wagler, 1827)	LC	R	O
44.	Rufous Treepie	*Dendrocitta vagabunda* (Latham, 1790)	LC	R	F
	Passeriformes: Dicruridae				
45.	Black Drongo	*Dicrurus macrocercus* (Vieillot, 1817)	LC	R	I
	Passeriformes: Estrildidae				
46.	Indian Silverbill	*Lonchura malabarica* (Linnaeus, 1758)	LC	R	O
	Passeriformes: Hirundinidae				
47.	Dusky Crag Martin	*Ptyonoprogne concolor* (Sykes, 1832)	LC	R	I
48.	Red-rumped Swallow	*Cecropis daurica* (Laxmann, 1769)	LC	R	I
49.	Wire-tailed Swallow	*Hirundo smithii* (Leach, 1818)	LC	R	I
	Passeriformes: Laniidae				
50.	Bay-backed Shrike	*Lanius vittatus* (Valenciennes, 1826)	LC	R	C
51.	Long-tailed Shrike	*Lanius schach* (Linnaeus, 1758)	LC	R	C
52.	Southern Grey Shrike	*Lanius meridionalis* (Temminck, 1820)	LC	R	C
	Passeriformes: Leiothrichidae				
53.	Common Babbler	*Turdoides caudate* (Dumont, 1823)	LC	R	O
54.	Jungle Babbler	*Turdoides striata* (Dumont, 1823)	LC	R	O
55.	Large Grey Babbler	*Turdoides malcolmi* (Sykes, 1832)	LC	R	O
	Passeriformes: Muscicapidae				
56.	Brown Rock Chat	*Cercomela fusca* (Blyth, 1851)	LC	R	I
57.	Indian Robin	*Saxicoloides fulicatus* (Linnaeus, 1766)	LC	R	I
58.	Oriental Magpie Robin	*Copsychus saularis* (Linnaeus, 1758)	LC	R	I
	Passeriformes: Nectariniidae				
59.	Purple Sunbird	*Cinnyris asiaticus* (Latham, 1790)	LC	R	N
	Passeriformes: Passeridae				
60.	Chestnut-shouldered Petronia	*Petronia xanthocollis* (E. Burton, 1838)	LC	R	O
61.	House Sparrow	*Passer domesticus* (Linnaeus, 1758)	LC	R	G
	Passeriformes: Pycnonotidae				
62.	Red-vented Bulbul	*Pycnonotus cafer* (Linnaeus, 1766)	LC	R	F
	Passeriformes: Sturnidae				
63.	Asian Pied Starling	*Gracupica contra* (Linnaeus, 1758)	LC	R	O
64.	Bank Myna	*Acridotheres ginginianus* (Latham, 1790)	LC	R	G
65.	Brahmini Starling	*Sturnia pagodarum* (Gmelin, 1789)	LC	R	G
66.	Indian Myna	*Acridotheres tristis* (Linnaeus, 1766)	LC	R	G
67.	Rosy Starling	*Pastor roseus* (Linnaeus, 1758)	LC	PV	O

	Passeriformes: Zosteropidae				
68.	Oriental White-eye	*Zosterops palpebrosus* (Temminck, 1824)	LC	R	O
	Pelecaniformes: Ardeidae				
69.	Cattle Egret	*Bubulcus ibis* (Linnaeus, 1758)	LC	R	C
	Pelecaniformes: Threskiornithidae				
70.	Red-napped Ibis	*Pseudibis papillosa* (Temminck, 1824)	LC	R	C
	Piciformes: Picidae				
71.	Black-rumped Flameback	*Dinopium benghalense* (Linnaeus, 1758)	LC	R	I
	Podicipediformes: Podicipedidae				
72.	Little Grebe	*Tachybaptus ruficollis* (Pallas, 1764)	LC	R	C
	Psittaciformes: Psittaculidae				
73.	Rose-ringed Parakeet	*Psittacula krameri* (Scopoli, 1769)	LC	R	F
	Strigiformes: Strigidae				
74.	Spotted Owlet	*Athene brama* (Temminck, 1821)	LC	R	C

Note: LC – Least Concern; NT – Near Threatened; R – Residential, WV – Winter Visitor; PV – Passive Visitor; SV – Summer Visitor, C – Carnivorous, F – Frugivorous; I – Insectivorous; O – Omnivorous; N – Nectarivores; G – Granivorous

Some new reported bird species –

Spotted Dove

White-tailed Lapwing

Little Greb

Red-napped Ibis

Wood Sandpiper

Red-wattled Lapwing

Long-tailed Shrike

Common Moorhen

Types of birds -

1. **Terrestrial birds** are type of birds that are generally found on the ground, not only foraging but also nesting and roosting on the ground or very low bushes. For most terrestrial birds that do fly, they generally stay low above the ground or close to cover when flying.
2. **Water birds**, **alternatively waterbirds, wetland birds or aquatic birds**, are birds that lives on or around water. These adaptations include webbed feet, beaks, and legs adapted to feed in the water and the ability to dive from the surface or the air to catch prey in water.

Suggestion for increasing the diversity of birds –

1. Improvement in water quality and oxygen level of water for wetland birds through addition of phytoplanktons in wetlands.

2. Area of the wetland should be increases in different depths, as many birds are surviving in deep water but some are in shallow water.
3. Wetlands are 100% opened to the predators, so it is required that 30-40% area of wetlands surrounding should have shrubs or bushes, for their protection and breeding.
4. Wetland birds are mostly depended on phytoplanktons, zooplanktons, fishes, crustaceans, molluscs, amphibians, reptiles etc., so quality and quantity should be increased by naturally without interrupting their behaviour.
5. Terrestrial birds are mainly feeding on seeds, grains, fruits, insects, grasses, nectar, flowers etc. so quality and quantity should be increased.
6. Food related to humans should not feed to the birds like cooked food material, grains and seeds should be provide in natural form.
7. Still fruiting plants and trees requires near to wetlands and campus.

Butterfly

Introduction

Butterflies support a range of other predators as well as parasites. They have been widely used by ecologists as model organisms to study the impact of the loss of habitat and climate change. Every butterfly has developed its own set of chemicals to prevent predators and parasites, discover a mate, and conquer the chemical defences of its host plant. Each of these chemicals has a potential value and could be subjugated cost-effectively.

Butterflies are central pollinators to many agricultural crops. Additionally, their ecological function is also a food source to predators like birds, spiders, lizards and other animals. Butterfly's beauty is like a flower, which displays attraction wherever it flies. Surprisingly, 90% of plants need pollinators for reproduction. Currently, there has been a decline of the bee population. Hence, butterflies are proving crucially vital to the eco system. The plants involved become more resistant to diseases. This gives them a better chance of survival. Reacting quickly and with careful evaluation, butterflies are known to react even to the slightest changes within the areas that they occupy. Stephen Dickie at Butterfly Conservation says that, "*Birds plan their whole breeding season around when caterpillars will be most abundant. If the butterfly and caterpillar numbers are depleted then there's not going to be a lot of food for developing chicks.*"

According to earlier survey 18 species of butterflies were recorded from the university, presently 19 species were recorded out of which 7 species were recorded first time. Now we say overall diversity of butterflies is **25 species** in the university.

Checklist of Butterflies based on current survey

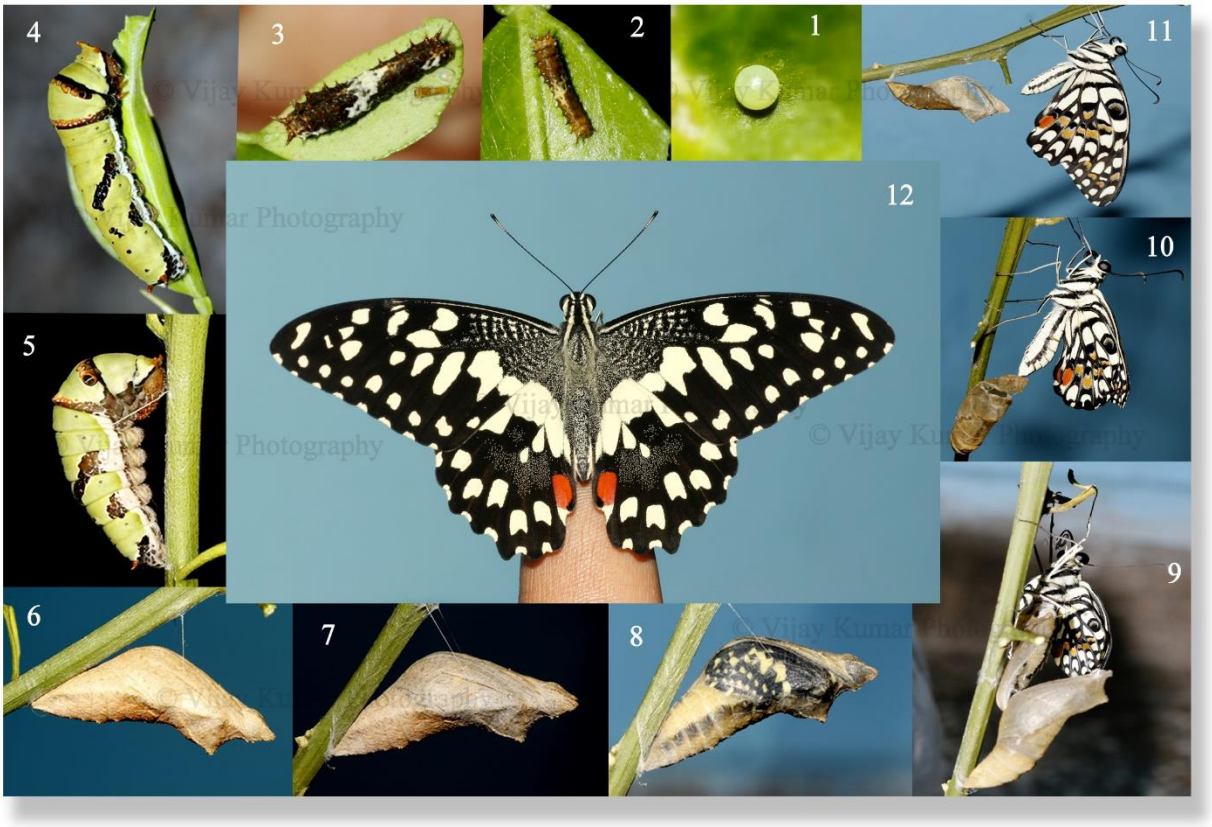
S,No.	Common Name	Scientific Name	Remarks
	Hesperiidae		
1.	Indian Palm Bob	*Suastus gremius* (Fabricius, 1798)	New
	Pieridae		
2.	Mottled Emigrant	*Catopsilia pyranthe* (Linnaeus, 1758)	
3.	Common Emigrant	*Catopsilia pomona* (Fabricius, 1775)	
4.	Common Grass Yellow	*Eurema hecabe* (Linnaeus, 1758)	
5.	Spotless Grass Yellow	*Eurema laeta* (Boisduval, 1836)	New

6.	Pioneer	*Belenois aurota* (Fabricius, 1793)	
7.	Small Salmon Arab	*Colotis amata* (Fabricius, 1775)	
	Lycaenidae		
8.	Peablue	*Lampides boeticus* (Linnaeus, 1767)	
9.	Zebra Blue	*Leptotes plinius* (Fabricius, 1793)	New
10.	Gram Blue	*Euchrysops cnejus* (Fabricius, 1798)	
11.	Indian Lime Blue	*Chilades lajus lajus* (Stoll, [1780])	New
12.	Pale Grass Blue	*Pseudozizeeria maha maha* (Kollar, [1844])	
	Nymphalidae		
13.	Plain Tiger	*Danaus chrysippus* (Linnaeus, 1758)	
14.	Striped Tiger	*Danaus genutia* (Cramer, 1779)	New
15.	Blue Pansy	*Junonia orithya* (Linnaeus, 1758)	
16.	Lemon Pansy	*Junonia lemonias* (Linnaeus, 1758)	
17.	Painted Lady	*Vanessa cardui* (Linnaeus, 1758)	New
	Papilionidae		
18.	Common Rose	*Pachliopta aristolochiae* (Fabricius, 1775)	
19.	Lime Butterfly	*Papilio demoleus* Linnaeus, 1758	New

Life cycle of a butterfly –

To study life cycle of a butterfly needs peculiar observation in the field and expert in field survey

1. Egg
2. First Instar
3. Fourth instar
4. Final Instar
5. Formation of Pupa
6. Pupa I stage
7. Pupa II Stage
8. Pupa Final Stage
9. Eclosion of Butterfly
10. Drying wings
11. Spreading wings and drying
12. Complete drying and open wings



Life cycle of Lime Butterfly

Behaviour of butterflies – (Photos are used for awareness purpose)

1. **Feeding on flower nectar**

Plain Tiger

Lime Swallowtail

2. Feeding on micro nutrient (Mud-puddling)

Common Grass Yellow

Lime Swallowtail

3. Feeding on rotten food, fruits or any other materials

Common Baron

Common Mormon

4. Social behaviour of butterflies

Suggestions to improve butterfly diversity

1. To improve butterflies diversity in the campus, need to plant more larval host plants in the university campus.
2. Needs to provide extra feeding materials like above mentioned.
3. Need to observe regularly for breeding sites and feeding sites of the butterflies.
4. To improve butterflies diversity, needs to provide different habitat substrates like – grass, herbs, shrubs, climbers, small trees and large trees etc.
5. To regulate butterfly breeding needs active sites in the campus regarding their host plants for breeding, feeding, roosting, mud-puddling etc.

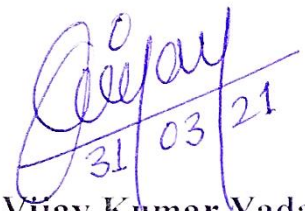
Strategic suggestion for the improvement of campus habitat -

1. Need to remove ***Tectona grandis*** (Teak) new plantation near to wetland because it's affects the soil quality and perform **allelopathic effects** on other vegetation ultimately affects the diversity of birds.
2. Recommending ***Dendrocalamus gigantea*** (Giant Bamboo) for plantation to create micro-habitat and provides extra subtract for birds and butterflies breeding and protection.
3. Recommending to create **Butterfly Park** in the campus, students will learn about the ecological research on butterflies.
4. Needs to create rosary and allied floricultural plantation in the campus to provides feeding substrates to the **bees, birds and butterflies**, an important "**B**" for nature.
5. To observe seasonal variation in diversity of birds and butterflies, it is requiring to evaluate diversity **once in two months (Bimonthly).**
6. As I have observed the campus habitat, it has potential to regenerate the population of birds and butterflies but for that **need to recruit Biodiversity Expert or Ecologist** to monitor these issues in regular basis and established the trend with the regional climate change.
7. Creation of expert panel of scientists for the suggestions and habitat improvement and scientific restoration in the campus in all aspects so that, the site itself be a model for biodiversity and others may desire to replicate the same.

Working model with your institution for me-

1. Appoint as an **Independent Biodiversity Expert or Ecologist,** to monitor research and improvement in biodiversity in all aspects (Flora and Fauna – Wildlife) on regular basis.
2. Work as a **Consultant** with your esteemed institution.
3. Any more suggestions from your side?

"Make efforts to get what you like, Otherwise you will be forced to like what you get" - **Sir George Bernard Shaw**



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