

Animal Diversity of Central University of Punjab

Conducted & Compiled by Department of Zoology



Scan Code



Table of Contents

S. No.		PAGE NO.
1	Message from the Vice Chancellor	I
2	Preface by Dean, Academics	II
3	Acknowledgements	III
4	Enumeration of Animal Species	IV
5	Methodology	V
6	List of Animal Species Recorded	VI-VIII
7	Arthropods	1- 31
8	Amphibians and Reptiles	32- 34
9	Aves	35-52
10	Mammals	53- 56
11	References	57- 62



Message from the Vice Chancellor



I am delighted that a first phase documentation of the university campus fauna has been taken up with the support of faculty members, research scholars, masters' students and nature enthusiasts. I believe that this report will serve as a strong baseline foundation to provide scientific insights into the variation of animal diversity to explore and build upon further in the near future. It also gives me immense pleasure to learn that the Department of Zoology is going to publish a report related to the faunal diversity of the University campus. I feel obliged to pen a few candid thoughts in this regard.

Since age timeless human beings and nature coexisted until recently. Ancient texts and scriptures of India including Vedas and Upanishads laid great emphasis on biodiversity conservation. For eg., Rigveda mentions five elements which form the basis to life i.e., Earth, Water, Fire, Space and Air. Rigveda also makes a clear reference to the presence of a protective layer which we now know as the ozone layer that filters the harmful rays of the sun and protects the earth. There are also references in holy religious discourse in Guru Nanak Bani about Joga and Jagat tracing creation of the world from natural resources of water, fire, air, and sky. In Atharvaveda, there is a clear statement that one should take from the earth and atmosphere only so much as one would give back. Several animal species are associated with Gods and Goddesses with an objective of conservation. For eg, Bull is associated with Shiva, Mouse with Ganesha, Lion with Goddess Durga etc.

The lush green and vibrant 500-acre University campus serves as a habitat to many animal species including Insects, Birds, Reptiles and Mammals. All efforts are being made to conserve and preserve this diversity in spite of the essential infrastructural development and landscaping works. With our philosophy of 'the world is one family', I wholeheartedly present this book to the present and future generations.



(Prof. Raghavendra P. Tiwari)



Preface by Dean, Academics



The present study deals with the first documentation of the faunal diversity in and around the University campus by Department of Zoology. Situated in the rural heartland of Punjab, Ghudda, the University bears an impressive animal diversity. A total of 102 animal species including insects, arachnids, amphibians, reptiles, mammals and birds were identified.

This kind of documentation aims to understand how an organism fits into its environment, how an organism obtains its food and the limiting factors for its growth, reproduction, distribution etc. Such study also imparts practical knowledge regarding methods of collection & preservation of animals in the course of field work. Further such studies would enable students to classify and identify the animals into their respective taxa on the basis of their characteristic features, undertake the floral and faunal survey of different ecosystems to study the wonder of biodiversity and study the interactions and interdependence among the organism for the maintenance of great diversity. Lastly, it would kindle the light of bio-ethical spirit and sense to justify the protection of biodiversity and to arouse the sense of responsibility to prevent environmental degradation and destruction

I congratulate the Department of Zoology to bring out this report.

A handwritten signature in blue ink, appearing to read 'WRK', with a horizontal line underneath.

(Prof. Ramakrishna Wusirika)



Acknowledgments

The documentation of Animal Diversity of Central University of Punjab Campus, Ghuddha brought out in the form of a book and E-version, is a result of support and contribution by many faculty members, research scholars, masters' students and nature enthusiasts of the University. We have given image credits wherever applicable and also take this opportunity to thank each one individually.

Firstly, we express our gratitude to Hon'ble Vice Chancellor, Prof. Raghavendra Prasad Tiwari for providing us this opportunity.

We express our sincere thanks to Dean, Incharge Academics, Prof. Ramakrishna Wusirika, Dean, Students' Welfare, Prof. V. K. Garg and Dean, Research, Prof. Anjana Munshi for necessary administrative and academic support and encouragement.

We are very grateful to faculty members who have contributed to this endeavour: Prof. Monisha K Dhiman, Department of Microbiology, Dr. Narender Kumar, Dr. Aditya Kapoor, Department of Sociology, Dr. Prithvi Raj, Department of English.

We acknowledge the contribution of research scholars Mr. Samir K. Beura (Zoology) and Mr. Alok Dubey (Zoology) & M.Sc. students Rashmi Rekha Panda (Zoology), Swetha Vaishnavi (Human Genetics), Graison Kenny (Sociology) and Piyush R. Maharana (Computational Physics).

This work is planned, conducted, and compiled by the Department of Zoology, Semester 2 (2021-23 batch) post-graduate students- Abhinandana Sahu (21mslsas01), Pratikshya Sahoo (21mslsas04), Bhagyashree Mahanta (21mslsas06), Rahul kumar Singh (21mslsas07), Sonika (21mslsas08), Sooraj V (21mslsas09), Arpit Verma (21mslsas10), Keshav (21mslsas11), Birupama Bag (21mslsas13), Adrija Mohanta (21mslsas14), Suman Shekhar Dash (21mslsas15), Suraj Kumar Naik (21mslsas18), Mahesh J (21mslsas19), Surojit Mandal (21mslsas20), Saswat Padhi (21mslsas21), Shubhangi Sharma (21mslsas22), Mayuri Sharma (21mslsas23), Ritu Yadav (21mslsas24), Subhrajit Rajbangshi (21mslsas25), Rajiv Ranjan Kumar (21mslsas26), Hari Shankar Meena (21mslsas27), Jeet Singh Rautela (21mslsas29), Amiksha Meena (21mslsas32), Chandrasekhar Pattnaik (21mslsas33), Mithlesh Kumari Yadav (21mslsas34), Harshita (21mslsas35), Rinku (21mslsas36), Gaurahari Sahoo (21mslsas37), Mahima Banerjee (21mslsas38), B Swarup Kumar Subudhi (21mslsas39), Rakesh Raman (21mslsas40), Savleen Singh Kanda (21mslsas41) and Vishnu Hari (21mslsas42).

Special thanks to Rahul and Abhinandana for their efforts.

Special thanks to Sunil Kumar Birua (CUP Alumni, Zoology) and Suresh Gopi (CUP Alumni, Zoology) for help in identification of few species.

Coordinator

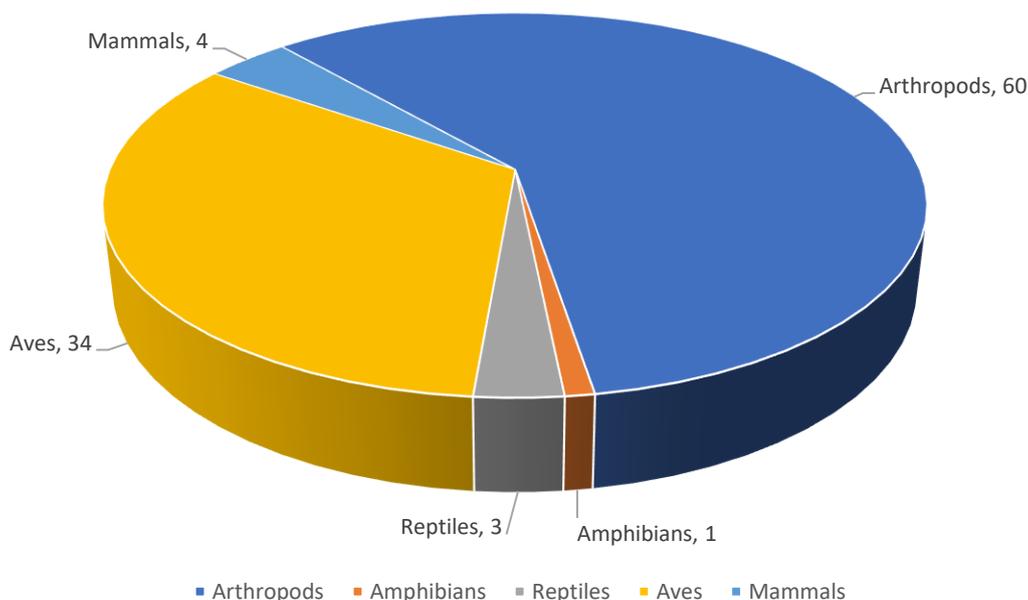
Dr. R.K. Chaitanya



Enumeration of Animal species

Central University of Punjab is located in Ghudda village, which lies in the rural heartland of Punjab, 22 kms away from Bathinda city. It is spread in a 500 acre green campus which is home to numerous plant and animal species. Diverse animal species have been identified in different regions of the campus that exist together in harmony. The identified animal species were categorized in two phyla, namely Arthropoda (Class- Insecta, Arachnida, Chilopoda) and Chordata (Classes- Amphibia, Reptilia, Aves and Mammalia). Animals belonging to these phyla are further placed under different classes, orders and families. Sixty species of class Insecta were identified along with 34 species of birds, 4 species of mammals and 1 amphibian and 3 reptile species so far. Moreover, obtaining an accurate number is constrained by the fact that many of the species live in varying habitats and are only sighted in certain seasons and times. The animal diversity in the university corresponds to its climatic conditions, which is semi-arid. The summers are dry (April-July), followed by a mild rainy season (August-September) which finally ends in a frosty winter (December-January). These species inhabit in a wide range of habitats including trees, shrubs, water, soil, burrows etc. All these species have close association with each other. Some act as predators, some others exhibit parasitism and therefore, exercise a check on their population increase.

Pie chart depicting the distribution of Animal Diversity in Central University of Punjab Campus

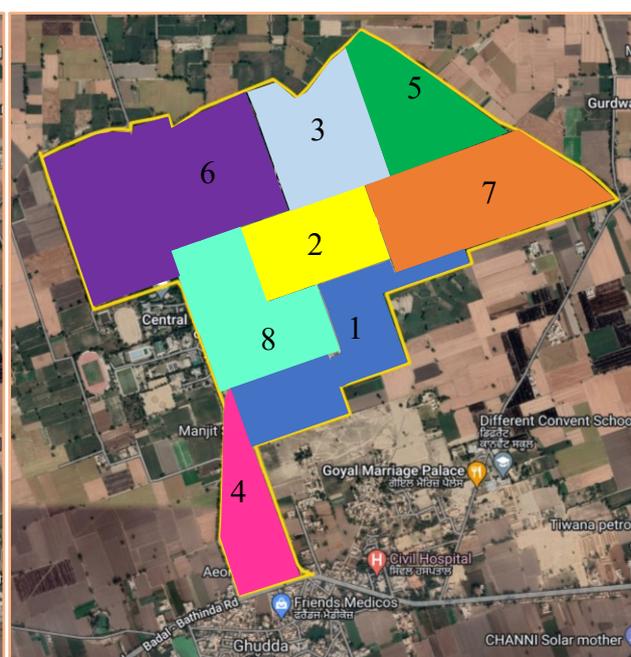


Methodology

The study involved seasonal documentation of the flora and fauna for its abundance and distribution. The study involved 120 days of field visit during March-June, 2022. For collecting data, the main campus of Central University of Punjab was divided into eight zones based on its geographical map. The students were divided into 8 groups, each comprising of 4-5 members. All the groups were issued the necessary equipment like binoculars, cameras, insect catching nets, notes, magnetic compass, torch lights etc. Each of the groups were assigned a zone to visit daily in particular timings to observe and identify species in the University. Each group went on with the survey twice a day for an hour each, once after dawn (5:00 - 6:00 AM) and once before dusk (6:00 - 7:00 PM) to their respectively assigned zones in a particular marked route. Multiple snapshots of the various species of animals were obtained during the expedition, and later identified particular species using various description keys available. One representative image per species identified is added in the report. A total of 102 animal species including insects, arachnids, amphibians, reptiles, mammals and birds. The insects were studied using keys available, habitats as well as indirect evidences like molts. The light trap method was used to study moths as wells as other nocturnal insects. The birds on the campus were studied by frequency of occurrence for sighting, calls as well as keys available. The reptiles and amphibians were studied by direct sighting. The mammals in the campus were listed along with the frequency of occurrence for sighting, calls, scats/ fecal matter, track marks.



Campus Outline



Zone Map



List of Animal Species Recorded

Arthropods

1. Six-spot Ground Beetle.....	2
2. Black Lawn Beetle.....	2
3. Banded Hickory Borer.....	3
4. European Mantis.....	3
5. Cream Wave Moth.....	4
6. Red Velvet Mite.....	4
7. Blister Beetle.....	5
8. Jewel Bug.....	5
9. Rice Grasshoppers.....	6
10. Pantropical Jumping Spider.....	6
11. Crimson Speckled Moth.....	7
12. Lynx Spider.....	7
13. Cellar Spider.....	8
14. Three Striped Lady Beetle.....	8
15. Cotton Seed Bug.....	9
16. Seed Bug.....	9
17. Plaster Bagworm.....	10
18. Yellow-legged Mud-dauber Wasp.....	10
19. Sloe Bug.....	11
20. Lateral Jumping Spider.....	11
21. Asiatic Garden Beetle.....	12
22. Wolf Spider.....	12
23. Bombardier Beetle.....	13
24. Sugarcane White Grub.....	13
25. Indian House Cricket.....	14
26. Scarab Beetles.....	14
27. Click Beetle.....	15
28. Box Bug.....	15
29. Painted Grasshopper.....	16
30. Lantana Plume Moth.....	16
31. Assassin Bug.....	17
32. Flower Moth.....	17
33. Broad-nosed Weevil.....	18
34. Flesh Fly.....	18



35. Black Garden Ant.....	19
36. Driver Ant	19
37. Camel Spider.....	20
38. Red-headed Centipede.....	20
39. Two-Spotted Cricket	21
40. Oriental Latrine Fly	21
41. Ground Spider	22
42. Blue Pansy.....	22
43. Housefly	23
44. Long-horned Beetle.....	23
45. Pioneer White Butterfly	24
46. Plain-Tiger Butterfly	24
47. Lime Swallowtail	25
48. Pea Blue.....	25
49. Bordered Straw.....	26
50. Slant-faced Grasshopper	26
51. Lemon Emigrant Butterfly	27
52. Treehooper Mimicking Fly	27
53. Cotton Bollworm.....	28
54. Robber Fly.....	28
55. Shield Tailed Scorpion.....	29
56. Isturgia sp.	29
57. Dung Beetle.....	30
58. Mupli Beetle.....	30
59. Cicada sp.	31
60. Common Green Lacewing	31

Amphibians & Reptiles

1. Marbled Toad	33
2. House Lizard.....	33
3. Indian Chameleon.....	34
4. Common Sand Boa.....	34

Aves

1. Common Myna.....	36
2. White-eared Bulbul.....	36
3. Familiar Chat.....	37
4. Ashy Drongo.....	37



5. Indian Roller	38
6. Little Egret	38
7. Asian Green Bee Eater	39
8. Rock Pigeon.....	39
9. Red-Wattled Lapwing.....	40
10. Jungle Babbler.....	40
11. Black Drongo	41
12. Eurasian Hoopoe	41
13. Rose Ringed Parakeet.....	42
14. Red-naped Ibis.....	42
15. White-throated Kingfisher.....	43
16. Brown Rock Chat	43
17. Jacobin Cuckoo	44
18. Indian Grey Hornbill	44
19. Cattle Egret.....	45
20. Great Egret	45
21. Black-rumped Flameback	46
22. Black-winged Kite.....	46
23. Common Wood Shrike.....	47
24. Common Moorhen	47
25. Purple Sunbird.....	48
26. Indian Pond Heron	48
27. Rufous Treepie	49
28. Indian Scops-owl.....	49
29. Little Banded Goshawk.....	50
30. Roadside Hawk	50
31. White Wag Tail	51
32. Cooper's Hawk.....	51
33. Eurasian Collared-Dove	52
34. European Stonechat.....	52

Mammals

1. Three-striped Palm Squirrel.....	54
2. Rhesus Macaque	54
3. Asian Antelope	55
4. Indian Hare	56
References:.....	57 - 62





Arthropods

“The greatness of a nation and its moral progress can be judged by the way its animals are treated.”

- Mahatma Gandhi

1. Six-spot Ground Beetle

Scientific Name: *Anthia sexguttata*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Coleoptera

Family: Carabidae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: Grasslands and boreal forests.

Description: Adults are black with six relatively large, white, dorsal spots (four over the elytra and two on the thorax). It occurs throughout the drier areas of Southern Asia but is most common in southern India. Like other ground beetles this species is aggressive and will run down and feed on insects, snails and annelids. If threatened, it can deliver a painful bite or spray a chemical irritant [1]. [Credit: Rashmi Rekha Panda]



2. Black Lawn Beetle

Scientific Name: *Heteronychus arator*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Coleoptera

Family: Scarabaeidae

IUCN Status: Not Evaluated

Spotted at: Zone 7

Habitat: Lawns, farms & gardens.

Description: It is a species of beetle in the subfamily Dynastinae (the rhinoceros beetles). It is commonly called African black beetle or black lawn beetle. This invasive species is a serious pest of crops in Tropical and sub-Tropical regions. This species damages lawns and other turf, especially during the summer, as well as many crop plants, garden flowers, trees and shrubs [2]. [Credit: Rashmi Rekha Panda]



3. Banded Hickory Borer

Scientific Name: *Knolliana cincta*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Family: Cerambycidae

Genus: Knolliana

IUCN Status: Not Evaluated

Spotted at: Zone 3

Habitat: Found on hickory trees and oak trees.

Description: The longhorn beetles are a cosmopolitan family of beetles, typically characterized by extremely long antennae, which are often as long as or longer than the beetle's body. In various members of the family, however, the antennae are quite short (e.g., *Neandra brunnea*) and such species can be difficult to distinguish from related beetle families [3]. [Credit: Department of Zoology]



4. European Mantis

Scientific Name: *Mantis religiosa*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Mantodea

Family: Mantidae

Spotted at: Zone 2

IUCN Status: Least Concern

Habitat: Lives in trees and in grasslands at the edges of forests.

Description: Their common name is derived from the distinctive posture of the first pair of legs that can be observed in animals in repose. It resembles a praying attitude. Both males and females have elongated bodies with two pairs of wings. The most striking features that all Mantodea share are a very mobile, triangular head with large compound eyes and their first pair of legs (the 'raptorial legs'), which is highly modified for the efficient capture and restraint of fast-moving or flying prey [4]. [Credit: Rashmi Rekha Panda]



5. Cream Wave Moth

Scientific Name: *Scopula sp.*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Lepidoptera

Family: Geometridae

IUCN Status: Least Concern

Spotted at: Zone 1

Habitat: Found in humid forests, swamps, bogs, wet meadows and along water bodies.

Description: The wingspan is 24–27 mm. The length of the forewings is 12–13 mm. The ground colour is silk white with yellow dusting of varying intensity (particularly in the males). The wavy crosslines are yellowish, ochreous to light brown in colour (with a fine scattering of black scales) [5]. [Credit: Department of Zoology]



6. Red Velvet Mite

Scientific Name: *Trombidium sp.*

Scientific classification:

Phylum: Arthropoda

Class: Arachnida

Order: Trombidiformes

Family: Trombidiidae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: It is found creeping around on rocks, planters, tree trunks, or on the ground, especially after a rain.

Description: These are also known as red velvet mites, true velvet mites, or rain bugs, are small arachnids (eight-legged arthropods) found in plant litter and are known for their bright red color. While adults are typically 4 mm in length, some, such as the genus *Dinothrombium*, may reach up to 12 mm [6]. [Credit: Samir K Beura]



7. Blister Beetle

Scientific Name: *Mylabris pustulata*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Coleoptera

Family: Meloidae

IUCN Status: Not Evaluated

Spotted at: Zone 8

Habitat: Occur in almost all habitats.

Description: Adults are soft-bodied, long-legged beetles with the head deflexed, fully exposed, and abruptly constricted behind to form an unusually narrow neck, the pronotum is much narrower at the anterior end than the posterior and not carinate (keeled) laterally, the forecoxal cavities open behind. Exhibits aposematic coloration. Secretes a defensive chemical, Cantharidin. About 2500 species are known worldwide [7]. [Credit: Swetha Vaishnavi]



8. Jewel Bug

Scientific Name: *Chrysocoris stollii*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Hemiptera

Family: Scutelleridae

IUCN Status: Not Evaluated

Spotted at:

Habitat: Found in farmland, garden, forest, jungle, or woodlands. They may live on a plant or tree that is dying.

Description: They are also known as shield-backed bugs due to the enlargement of the thoracic scutellum into a continuous shield over the abdomen and wings. Jewel bugs are small to medium-sized oval-shaped bugs with a body length averaging at 5 to 20 mm. The heads of jewel bugs are triangular and the antennae have three to five segments. Both adults and nymphs, are also capable of releasing pungent defensive chemicals from glands located on the sides of the thorax [8]. [Credit: Prof. Monisha Dhiman]



9. Rice Grasshoppers

Scientific Name: *Oxya chinensis*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Orthoptera

Family: Acrididae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: Found in rice paddies, in sugar cane and other gramineous plants.

Description: *Oxya* is a genus of grasshoppers found in Africa and Asia. General body colouration is green; a brown band start from each eye along superior margin of lateral lobe continuing upto episternum; tegmen with costal region slightly opaque; wings hyaline; hind tibia blue. Head: Smooth; eyes oval; antenna filiform, with fine bristles; antenna slightly shorter than head and pronotum together [9]. [Credit: Department of Zoology]



10. Pantropical Jumping Spider

Scientific name: *Plexippus paykulli*

Scientific classification:

Phylum: Arthropoda

Class: Arachnida

Order: Araneae

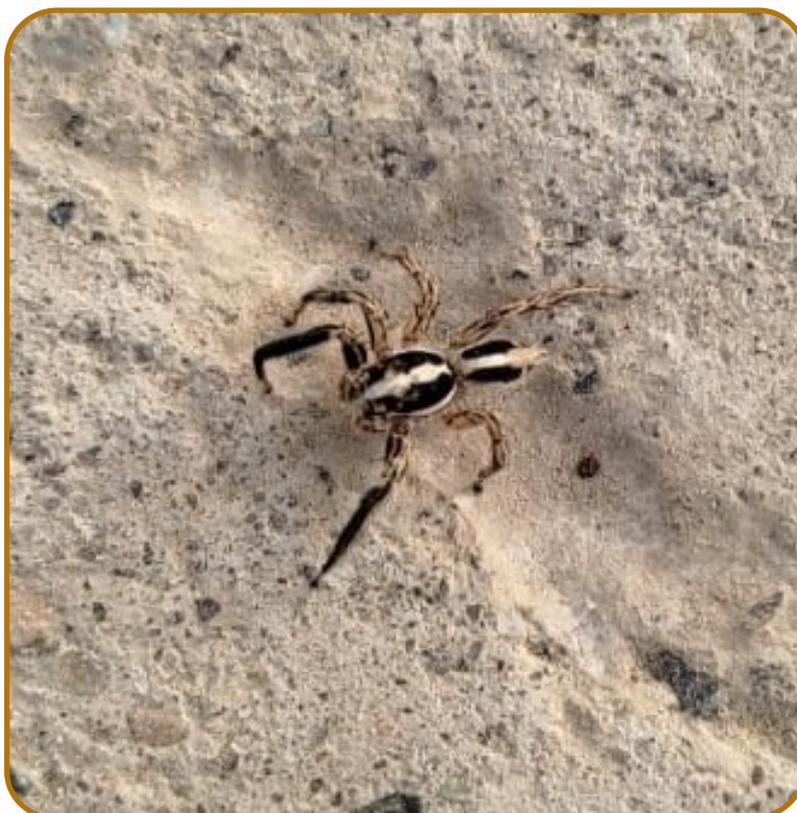
Family: Salticidae

IUCN Status: Not Evaluated

Spotted at: Zone 3

Habitat: Found around man-made structures; also recorded from citrus groves and cotton fields.

Description: These spiders are robust, with a high carapace. It is covered with short greyish hairs with dramatic accents of red in the male. Females are 9 to 12 mm in body length, while males are 9 to 11 mm. The sexes are easy to tell apart as the males have a black carapace and abdomen with a broad white central stripe, another broad white stripe on either side and a pair of white spots near the posterior end of the abdomen. The female is brownish grey, the carapace being darker especially around the eyes [10]. [Credit: Department of Zoology]



11. Crimson Speckled Moth

Scientific name: *Utetheisa pulchella*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Lepidoptera

Family: Erebidae

IUCN Status: Not Evaluated

Spotted at: Zone 3

Habitat: Inhabits mainly coastal dunes, rocky areas, dry slopes and other warm, gappy vegetated habitats.

Description: The front wings are narrow, white or cream coloured with a variable pattern of numerous small black spots located between the larger-sized bright red spots. Sometimes the red spots are merged to transversal bands. The hindwings are wide, white, with an irregular black border along the outer edge and two black markings in the middle of the cell [11]. [Credit: Department of Zoology]



12. Lynx Spider

Scientific name: *Oxyopes sp.*

Scientific classification:

Phylum: Arthropoda

Class: Arachnida

Order: Araneae

Family: Oxyopidae

IUCN Status: Not Evaluated

Spotted at: Zone 6

Habitat: Seen in grasses and shrubby vegetation during daytime. At night they hide underneath the leaves.

Description: Lynx spider is a family of araneomorph spiders. Most species make little use of webs, instead spending their lives as hunting spiders on plants. Many species frequent flowers in particular, ambushing pollinators, much as crab spiders do. They tend to tolerate members of their own species more than most spiders do, and at least one species has been identified as exhibiting social behavior [12]. [Credit: Department of Zoology]



13. Cellar Spider

Scientific name: *Pholcus phalangioides*

Scientific classification:

Phylum: Arthropoda

Class: Arachnida

Order: Araneae

Family: Pholcidae

IUCN Status: Not Evaluated

Spotted at: Zone 3

Habitat: Found in undisturbed, low light locations, basements, under stones, under ledges, and in caves.

Description: Pholcids are thin and delicate arachnids. The body, resembling the shape of a peanut, is approximately 2-10 mm in length, and the legs may be up to 50 mm long. The females are slightly bigger than the males. The long legs are covered by thin grey bristles. The eight eyes are arranged in a central couple and two lateral groups of three. The eyes of the central couple are much smaller than the lateral ones [13]. [Credit: Department of Zoology]



14. Three Striped Lady Beetle

Scientific name: *Brumoides suturalis*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Coleoptera

Family: Coccinellidae

IUCN Status: Not Evaluated

Spotted at: Zone 3

Habitat: Found in almost all terrestrial ecosystems.

Description: Adult is small and ovate. Head and thorax are brown. Eyes are black. Elytra yellowish white with two black stripes. One strip runs down the trailing edge, whereas the other stripe runs the middle of each elytron. Pronotum brownish antero-laterally and creamy in the center. Scutellum and ventrum are brownish [14]. [Credit: Department of Zoology]



15. Cotton Seed Bug

Scientific name: *Oxycarenus hyalinipennis*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Hemiptera

Family: Lygaeidae

IUCN Status: Not Evaluated

Spotted at: Zone 6

Habitat: Terrestrial, seen feeding on Plants.

Description: It is sometimes known as the Egyptian cotton stainer, and is found in southern Asia where it is a pest of cotton, okra and other crops. It can reach a length of about 3.8 mm in males, of 4.3 mm in females. Therefore, males are slightly smaller than females. Body of this bug is black with translucent wings. Head is black, with brownish-black antennae.

Femora are black, while tibiae are brown with a yellow-white band [15]. [Credit: Department of Zoology]



16. Seed Bug

Scientific name: *Spilostethus pandurus*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Hemiptera

Family: Lygaeidae

IUCN Status: Not Evaluated

Spotted at: Zone 1

Habitat: Usually found in association with Indian Milkweed.

Description: Body shows a red-black coloration with a white spot in the center of the membrane. Two wavy, broad, black, longitudinal stripes run from the front to the rear edge of the pronotum. Scutellum is black, sometimes with a small red spot at the end. The nymphs are bright red, with black markings. These bugs have two dorsolateral prothoracic glands capable of secreting substances repugnant to predators [16]. [Credit: Department of Zoology]



17. Plaster Bagworm

Scientific name: *Phereoeca uterella*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Lepidoptera

Family: Tineidae

IUCN Status: Not Evaluated

Spotted at: Zone 3

Habitat: It is commonly found in houses- on wool clothing.

Description: The adult female has a wingspan of up to 13 mm. The forewings are gray with distinct dark spots and the plain hindwings are fringed with long gray hairs. The male is smaller (wingspan up to 9 mm) and slenderer with less distinct markings. It is found in warm, humid climates [17]. [Credit: Department of Zoology]



18. Yellow-legged Mud-dauber Wasp

Scientific name: *Sceliphron caementarium*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Hymenoptera

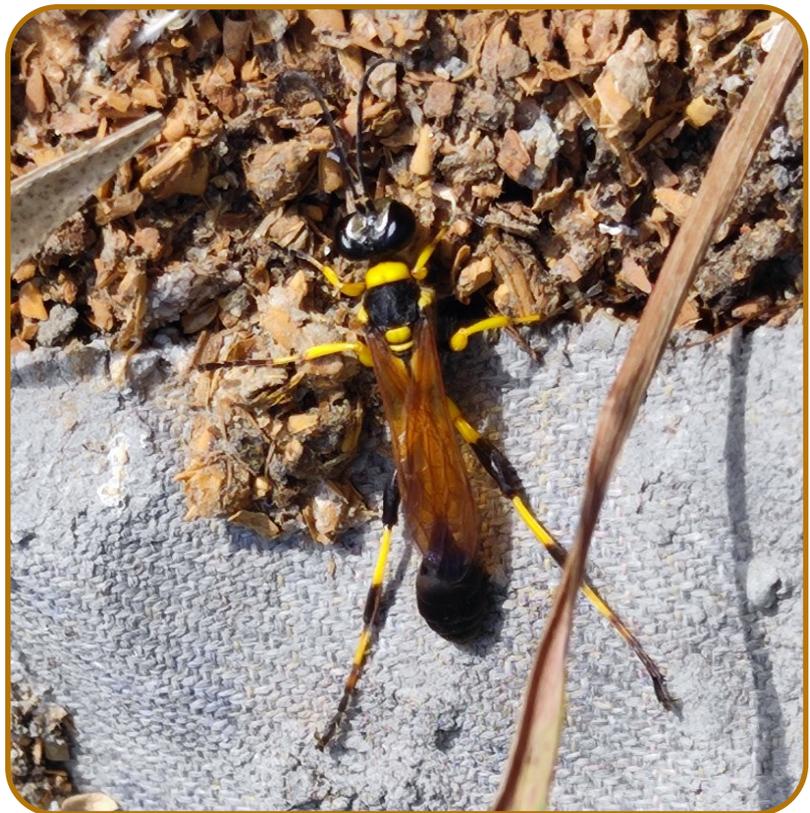
Family: Sphecidae

IUCN Status: Not Evaluated

Spotted at: Zone 3

Habitat: found in a wide variety of habitats, such as rock ledges, man-made structures, puddles and other water edges, in long leaf pines etc.

Description: The black and yellow mud daubers are solitary parasitoid wasps that build nests out of mud, that are usually attached to ceilings or walls of sheds, sides of buildings, rock ledges, cliff faces, or in the hollow part of a tree. Adults nectar at flowers [18]. [Credit: Department of Zoology]



19. Sloe Bug

Scientific name: *Dolycoris baccarum*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Hemiptera

Family: Pentatomidae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: Mainly inhabit hedgerows and woodland edges, fields, forests, parks and gardens.

Description: It can reach a length of about 10–12.5 mm. The basic color of pronotum and elytra is quite variable, but usually it is reddish purple, while scutellum is ocher. During the winter the basic color is dull brown. The whole body is quite hairy. This species is widespread in most of Europe and Central Asia [19]. [Credit: Department of Zoology]



20. Lateral Jumping Spider

Scientific name: *Rudakius ludhianaensis*

Scientific classification:

Phylum: Arthropoda

Class: Arachnida

Order: Araneae

Family: Salticidae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: Found on leafy green trees in dry and semi dry regions.

Description: Carapace reddish brown, with a mid-longitudinal broad white stripe and white lateral margins. Posterior eyes surrounded by black patches. Female similar to male but differs only in the posterior marking of the abdomen. Epigyne with large, oval fossae separated by the median septum; copulatory openings lie at the posterior medial region [20]. [Credit: Department of Zoology]



21. Asiatic Garden Beetle

Scientific name: *Maladera formosae*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Coleoptera

Family: Scarabaeidae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: Adults feed on various kinds of ornamental and edible plants in normal open gardens.

Description: Asiatic Garden Beetles are chestnut brown and may have a slight iridescent or velvety sheen. The abdomen protrudes slightly from the wing covers. Adults are active in the summer and can be seen feeding on plant leaves at night or found around porch lights. Adults range in length from 8-11 mm and possess a cinnamon-brown color. Larvae usually feed on the roots of various plants [21]. [Credit: Department of Zoology]



22. Wolf Spider

Scientific name: *Lycosa sp.*

Scientific classification:

Phylum: Arthropoda

Class: Euchelicerata

Order: Araneae

Family: Lycosidae

IUCN Status: Not Evaluated

Spotted at: Zone 1

Habitat: Open habitats like grasslands, farm fields and meadows.

Description: These spiders are rather large, the females being as large as 30 mm in body length and the males around 19 mm. As with other wolf spiders, the silken sac containing numerous eggs is carried attached to the mother's spinnerets, and then after they hatch, the spiderlings climb on their mother's abdomen and ride around with her until they are sufficiently mature to survive on their own. After leaving their mother's protection, the young spiders disperse and dig burrows [22]. [Credit: Department of Zoology]



23. Bombardier Beetle

Scientific name: *Pheropsophus cator*

Scientific classification:

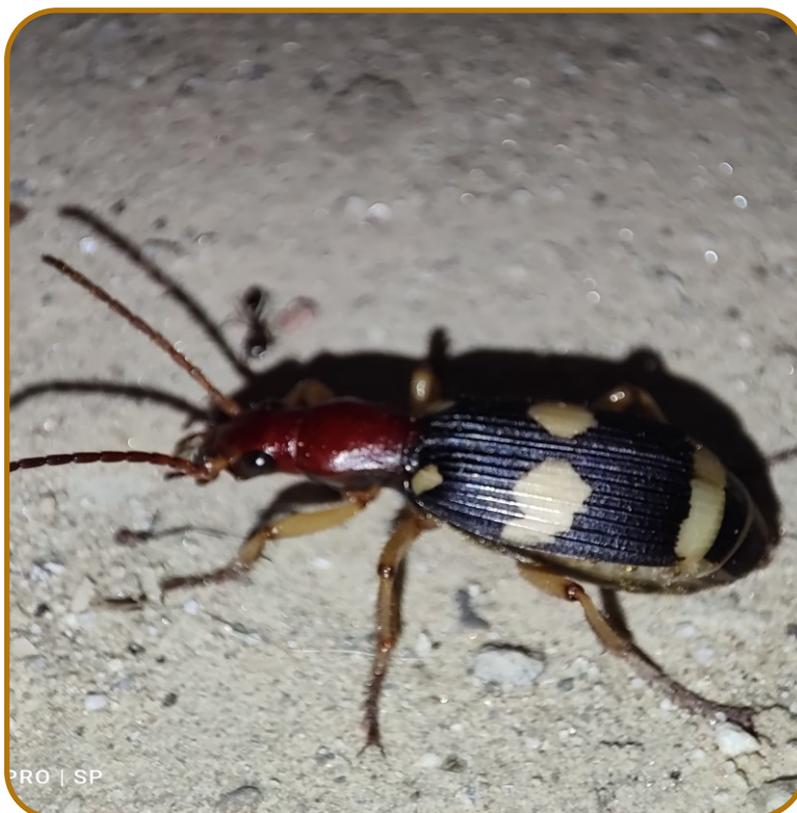
Phylum: Arthropoda
Class: Insecta
Order: Coleoptera
Family: Carabidae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: Woodlands or grasslands in the temperate zones, humid and hot climate.

Description: Each has blue elytra (wing coverings) and a reddish head and limbs, most notable for the defense mechanism that gives them their name. When disturbed, they eject a hot noxious chemical spray from the tip of the abdomen [23]. [Credit: Department of Zoology]



24. Sugarcane White Grub

Scientific name: *Holotrichia serrata*

Scientific classification:

Phylum: Arthropoda
Class: Insecta
Order: Coleoptera
Family: Scarabaeidae

Spotted at: Zone 2

IUCN Status: Not Evaluated

Habitat: Urban. Forest. Grassland.

Description: Adult female beetles lay white, almost round eggs. The first and second instars are translucent, whitish-yellow with a characteristic 'C' – shape. The clearly marked brownish-orange colored head consists of strong mandibles. Slender antennae are long and brown. The pupa is about 25 to 27 mm in length where the pupal period is 13 to 19 days. After the onset of rain, beetles are emerged

within 3 to 4 days. Adult beetles are brown in color where females are larger than males with an average length about 23 to 25 mm [24]. [Credit: Department of Zoology]



25. Indian House Cricket

Scientific name: *Grylloides sigillatus*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Orthoptera

Family: Gryllidae

Spotted at: Zone 2

IUCN Status: Not Evaluated

Habitat: Grassy areas such as lawns, fields, pastures, prairies, roadsides, but also in woods.

Description: The house cricket is typically gray or brownish in color, growing to 16–21 mm in length. Males and females look similar, but females will have an ovipositor emerging from the rear, around 12 mm long [25]. [Credit: Department of Zoology]



26. Scarab Beetles

Scientific name: *Cyclocephala hirta*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Coleoptera

Family- Scarabaeidae

Spotted at: Zone 2

IUCN Status: Not Evaluated

Habitat:

Description: Scarabs are stout-bodied beetles, many with bright metallic colors, measuring between 1.5 and 160 mm. They have distinctive, clubbed antennae composed of plates called lamellae that can be compressed into a ball or fanned out like leaves to sense odours. Many species are fossorial, with legs adapted for digging. In some groups males (and sometimes females) have prominent horns on the head and/or pronotum to fight over mates or resources [26]. [Credit: Department of Zoology]



27. Click Beetle

Scientific name: *Lanelater sallei*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Coleoptera

Family: Elateridae

Spotted at: Zone 2

IUCN Status: Not Evaluated

Habitat: Frequent on foliage of trees, bushes, flowers and soil.

Description: Click beetle, also called skipjack, snapping beetle, or spring beetle, named for the clicking noise made when seized by a predator. Most click beetles range between 2.5 and 18 mm (less than 0.75 inch) in length and are brown or black in colour with either little or no ornamentation. They have elongated bodies [27]. [Credit: Department of Zoology]



28. Box Bug

Scientific name: *Gonocerus acuteangulatus*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Hemiptera

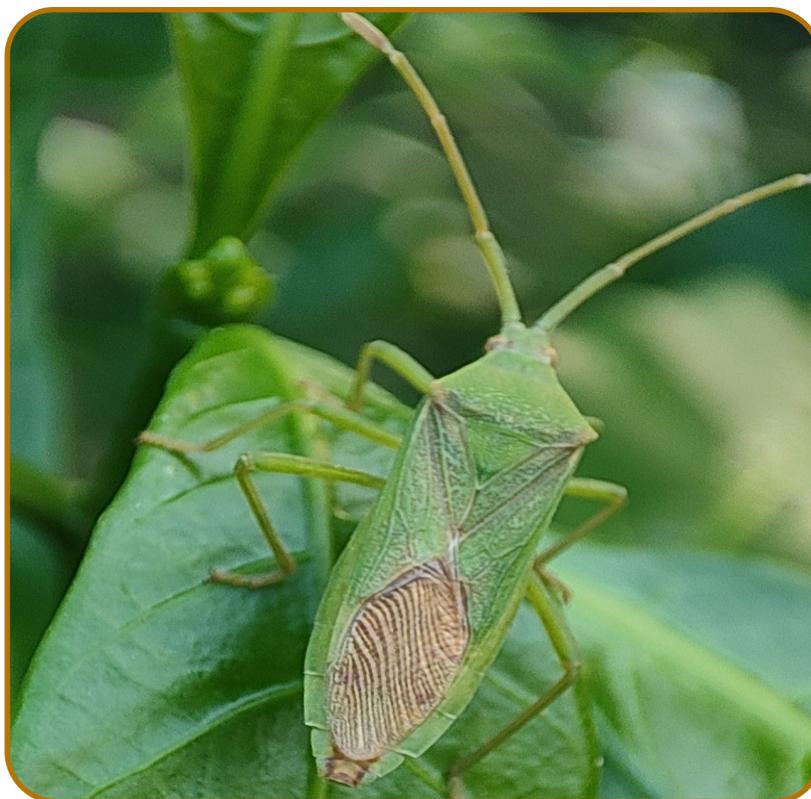
Family- Coreidae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: Inhabit mainly dry and warm environment, bushes and forest edges.

Description: A medium-sized bug, between 11 and 14 mm long as an adult. These bugs are speckled reddish-brown with a slightly expanded abdomen. The nymphs have a green abdomen. It shows a narrower abdomen and has sharper lateral margins of the pronotum [28]. [Credit: Department of Zoology]



29. Painted Grasshopper

Scientific name: *Poekilocerus pictus*

Scientific classification:

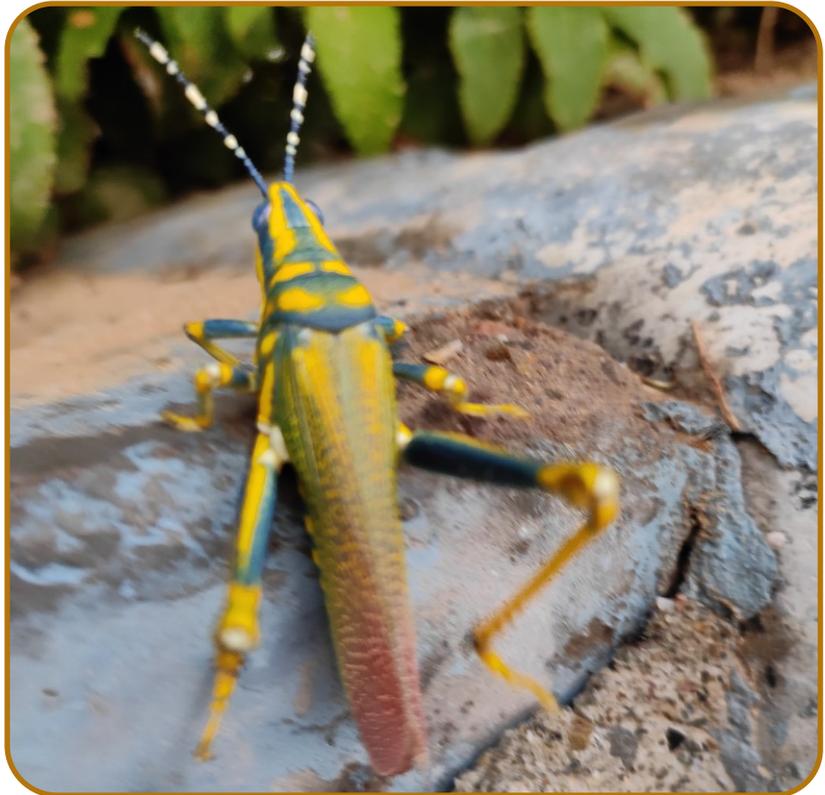
Phylum: Arthropoda
Class: Insecta
Order: Orthoptera
Family- Pyrgomorphidae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: Humid and arid areas in tropical and sub-tropical regions of the world.

Description: One of the most colorful grasshoppers of India. The half-grown immature form is greenish-yellow with fine black markings and small crimson spots. The mature grasshopper has canary yellow and turquoise stripes on its body, green tegmina with yellow spots, and pale red hind wings. It changes its outward appearance by molting [29]. [Credit: Department of Zoology]



30. Lantana Plume Moth

Scientific name: *Lantanophaga sp.*

Scientific classification:

Phylum: Arthropoda
Class: Insecta
Order: Lepidoptera
Family: Pterophoridae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: Hedgerows and shrubby areas where hostplants grow; adults are active at night and attracted to light.

Description: Adult plume moths are generally small, with wingspans of about 2 cm, but range from 6 to 40 mm. They are easily recognized by their characteristic T-shaped resting posture with the narrow forewings held perpendicular to the body and the hindwings tucked under or folded within the forewings. The wings are often divided into lobes, or plumes, with long fringe scales accentuating the feather-like appearance [30]. [Credit: Department of Zoology]



31. Assassin Bug

Scientific name: *Rhynocoris marginatus*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Hemiptera

Family - Reduviidae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: Agricultural fields; feeds on pests of sugarcane, pigeon pea, cardamom, cotton, tea, and peanuts.

Description: They have an oval-shaped abdominal area, over which is superimposed overlapping wings that create the appearance of an "X" on the back. They are variously colored, and have a small narrow head that projects outward from the body. The front two pairs of legs are longer and more powerful than the hind legs: they are used to grab and hold insect prey [31]. [Credit: Department of Zoology]



32. Flower Moth

Scientific name: *Eretmocera impactella*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Lepidoptera

Family- Scythrididae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: Agricultural and horticultural areas.

Description: The forewings are blackish brown with more or less distinct whitish or white yellowish markings. The larvae feed on various Amaranthaceae species and other food plants [32]. [Credit: Department of Zoology]



33. Broad-nosed Weevil

Scientific name: *Compsus sp.*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Coleoptera

Family - Curculionidae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: Found in the agricultural fields, including urban environments

Description: It grows to a length of about 4 to 5.5 mm. The rostrum or beak is short and broad. The frons is half as wide as the rostrum while the pronotum is broadest in the center. The larva has a distinctive black head and no legs; it is yellowish-green, with a white dorsal stripe and faint white lateral stripes. It pupates in a white, pea-sized cocoon made of loosely-woven silk [33]. [Credit: Department of Zoology]



34. Flesh Fly

Scientific name: *Sarcophaga carnaria*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Diptera

Family: Sarcophagidae

IUCN Status: Not Evaluated

Spotted at: Zone 1

Habitat: Found in most habitat types particularly during summer.

Description: These flies are generally well-sized and of a greyish color; like many of their relatives, the typical patterns are lengthwise darker stripes on the thorax and dark and light square dots on the abdomen. Many have conspicuous red compound eyes. These are set further apart in females than in males; the females are also larger on average[34]. [Credit: Department of Zoology]



35. Black Garden Ant

Scientific name: *Lasius niger*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Hymenoptera

Family: Formicidae

IUCN Status: Not Evaluated

Spotted at: Zone 5

Habitat: It nests in many different environments and objects such as stumps, under rocks, in crevices, fields, pastures or lawns.

Description: The black garden ant, is also known as the common black ant. Their colonies can reach in size up to around 4,000-7,000 in number. A *Lasius niger* queen can live for up to 29 years the longest recorded lifespan for any eusocial insect [35]. [Credit: Department of Zoology]



36. Driver Ant

Scientific name: *Dorylus sp.*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Hymenoptera

Family: Formicidae

IUCN Status: Not Evaluated

Spotted at: Zone 5

Habitat: Humid habitats such as rainforest and gallery forest in mixed savanna-forest landscapes.

Description: Dorylus, also known as driver ants or safari ants is a large genus of arm ants found primarily in central and east Africa, although the range also extends to southern Africa and tropical Asia. Members of this genus form temporary subterranean bivouacs in underground cavities which they excavate and inhabit. Workers exhibit caste polymorphism

with the soldiers having particularly large heads that power their scissor-like mandibles. Driver ant queens are the largest living ants known [36]. [Credit: Department of Zoology]



37. Camel Spider

Scientific name: *Galeodes indicus*

Scientific classification:

Phylum: Arthropoda

Class: Arachnida

Order: Solifugae

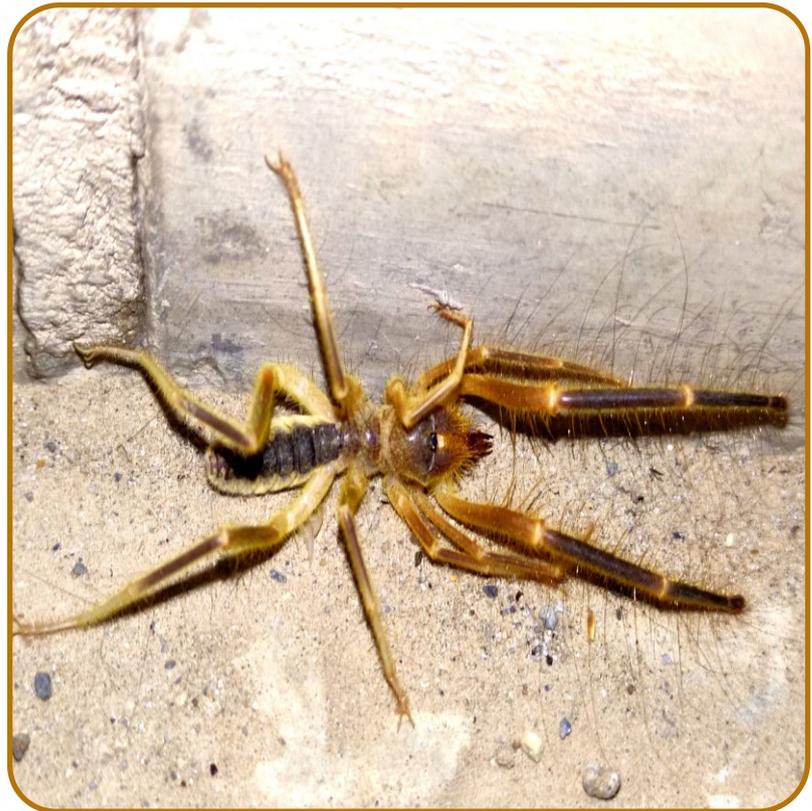
Family: Rhagodidae

IUCN Status: Not Evaluated

Spotted at: Zone 6

Habitat: Arid regions across the world.

Description: Arachnid groups characterized by a prosomal dorsal shield composed of three distinct elements: the pro-, meso- and metapeltidium. They have a well-developed tracheal system instead of book lungs. They have adhesive organs on the ends of pedipalps, called the suctorial organs [37]. [Credit: Department of Zoology]



38. Red-headed Centipede

Scientific name: *Scolopendra subspinipes*

Scientific classification:

Phylum: Arthropoda

Class: Chilopoda

Order: Scolopendromorpha

Family: Scolopendridae

IUCN Status: Not Evaluated

Spotted at: Zone 8

Habitat: Dark, damp environments such as beneath logs and in leaf litter.

Description: This is a large species which can grow up to 20 cm in length. Its body is usually red or reddish brown with yellow or yellow-orange legs. It has 22 body segments, with each segment having one pair of legs. A pair of modified legs known as forcipules can be found on its head, which is covered by a flat shield and bears a pair of antennae. The forcipules are the major tools used by the centipede to kill its prey or for defense, as they have sharp claws that connect to venom glands [38]. [Credit: Department of Zoology]



39. Two-Spotted Cricket

Scientific name: *Gryllus bimaculatus*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Orthoptera

Family: Gryllidae

IUCN Status: Not Evaluated

Spotted at: Zone 8

Habitat: Found in almost any environment- in ground debris, rock piles, under shrubs and in burrows.

Description: It is a solitary, aggressive, omnivorous, burrow-inhabiting species of cricket. This species is commonly confused with *Gryllus pennsylvanicus* (fall field cricket), as they inhabit the same geographical area. However, the two species are easily distinguished through examination of life history, ovipositor and behavioural differences [39]. [Credit: Department of Zoology]



40. Oriental Latrine Fly

Scientific name: *Chrysomya megacephala*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Diptera

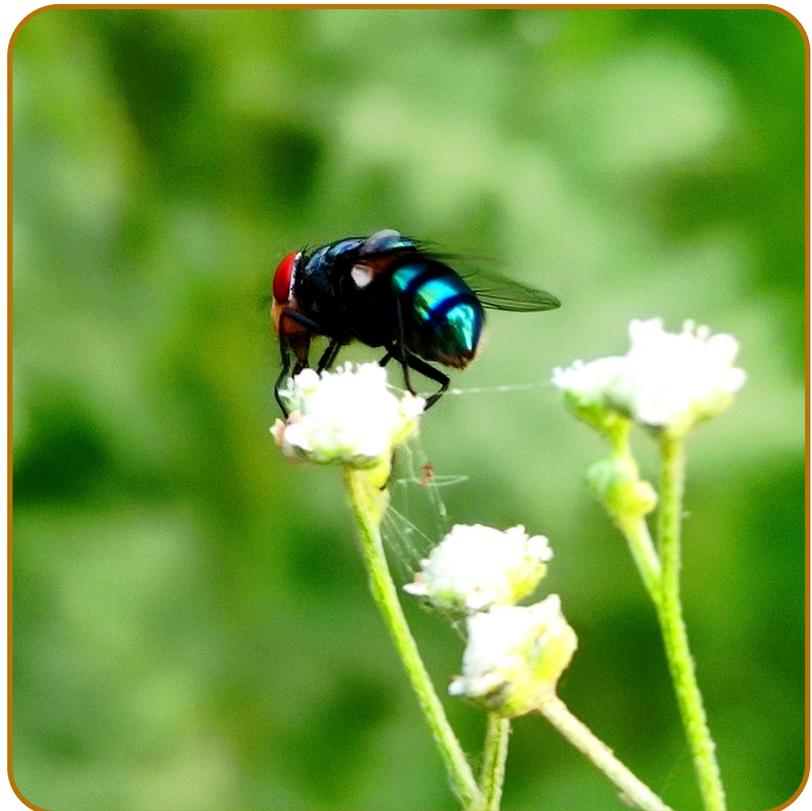
Family: Calliphoridae

IUCN Status: Not Evaluated

Spotted at: Zone 6

Habitat: Generally found on meat, rotten logs, carrion, human feces, fish, garbage dumps etc.

Description: Prothoracic spiracle brown, eyes in male closely approximated (holoptic) and sharply demarcated, the upper two-third with large facets and lower one-third with smaller facets, parafacialia and jowls brilliant orange and the later clothed with golden hairs, the adult fly is bluish-green in color. Larval stages are saprophages. The adult flies (females) prefer protein diet eg. Blood, body fluids etc. [40]. [Credit: Department of Zoology]



41. Ground Spider

Scientific name: *Zelotes sp.*

Scientific classification:

Phylum: Arthropoda

Class: Arachnida

Order: Araneae

Family: Gnaphosidae

IUCN Status: Not Evaluated

Spotted at: Zone 6

Habitat: Found in steppes, dry meadows, dunes & under stones.

Description: Generally, ground spiders are characterized by barrel-shaped anterior spinnerets. Another characteristic is an indentation in the endites (paired mouthparts anterior and lateral to the labium, or lip). All ground spiders lack a prey-capture web and generally run prey down on the surface. They hunt at night and spend the day in a silken retreat. The thick-walled egg sacs are guarded by the mother until the spiderlings hatch [41]. [Credit: Department of Zoology]



42. Blue Pansy

Scientific name: *Junonia orithya*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Lepidoptera

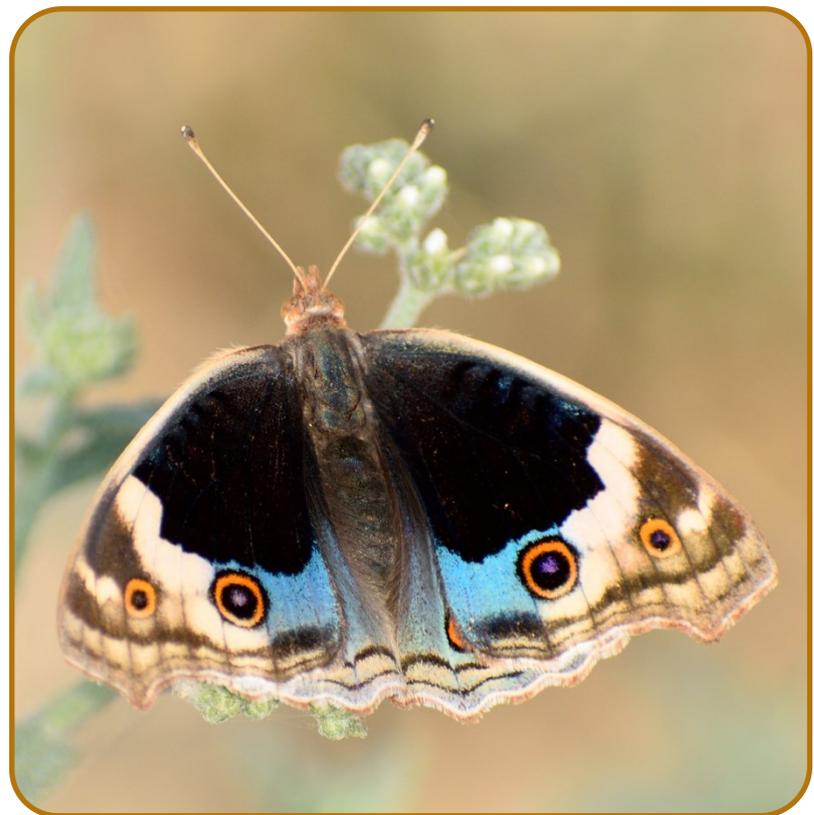
Family: Nymphalidae

IUCN Status: Least Concern

Spotted at: Zone 4

Habitat: Sunny open lands, grassy patches in open areas.

Description: The butterfly has electric blue on the upperwing and an earthy brown on the under. The male and the female look similar though the male is slightly more vibrant. The forelegs or the front pair of legs in this family (mostly) are much reduced in size and are covered with hair, thus tend to look like brushes, thereby also being regarded as the Brush-footed butterflies [42]. [Credit: Samir K Beura]



43. Housefly

Scientific name: *Musca domestica*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Diptera

Family: Muscidae

IUCN Status: Not Evaluated

Spotted at: Zone 6

Habitat: *Musca domestica* is commonly found in homes, food markets, farms, and ranches, hovering around decaying matter, garbage, feces, and human food.

Description: Adult houseflies are usually 6 to 7 mm long with a wingspan of 13 to 15 mm. Females tend to be larger winged than males, while males have relatively longer legs. The head is strongly convex in front and flat and slightly conical behind. The pair of large compound eyes almost touch in the male but are more widely separated in the female [43]. [Credit: Graison Kenny]



44. Long-horned Beetle

Scientific name: *Derobrachus geminatus*

Scientific classification:

Class: Insecta

Order: Coleoptera

Family: Cerambycidae

Spotted at: Zone 6

IUCN Status: Not Evaluated

Habitat: Suburban gardens and urban environments like campuses, cemeteries, and parks.

Description: It is a fairly large species, reaching 70 mm in length. They have long antennae, and spines on the thorax which form a collar around the "neck" of the beetle. They range from brown to black in color. They have wings and can fly, albeit awkwardly at times. The adults lay eggs in the soil. Adult beetles come out in the summer time, especially in the early evening when attracted by outside lighting [44]. [Credit: Dr. Narender Kumar]



45. Pioneer White Butterfly

Scientific name: *Belenois aurota*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Lepidoptera

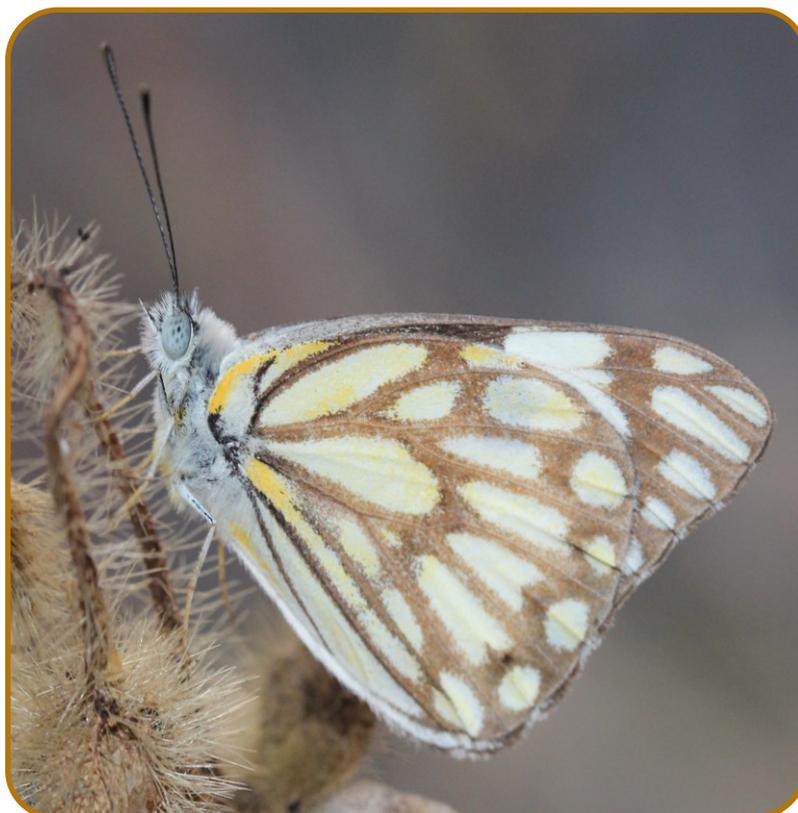
Family: Pieridae

IUCN Status: Least Concern

Spotted at: Zone 4

Habitat: Fairly arid habitats including deserts, steppes and thorn scrub, at altitudes between sea level and about 1200 m

Description: Upperside pure white with black apex in the forewing and black outer margins in both wings. A characteristic hockey stick-like spot in the middle of forewing. Underside spots in the apex, yellowish in the forewing and yellow with black veins in hindwing. Apex yellowish in the forewing and yellow with black veins in hindwing. [45]. [Credit: Dr. R.K. Chaitanya]



46. Plain-Tiger Butterfly

Scientific Name- *Danaus chrysippus*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Lepidoptera

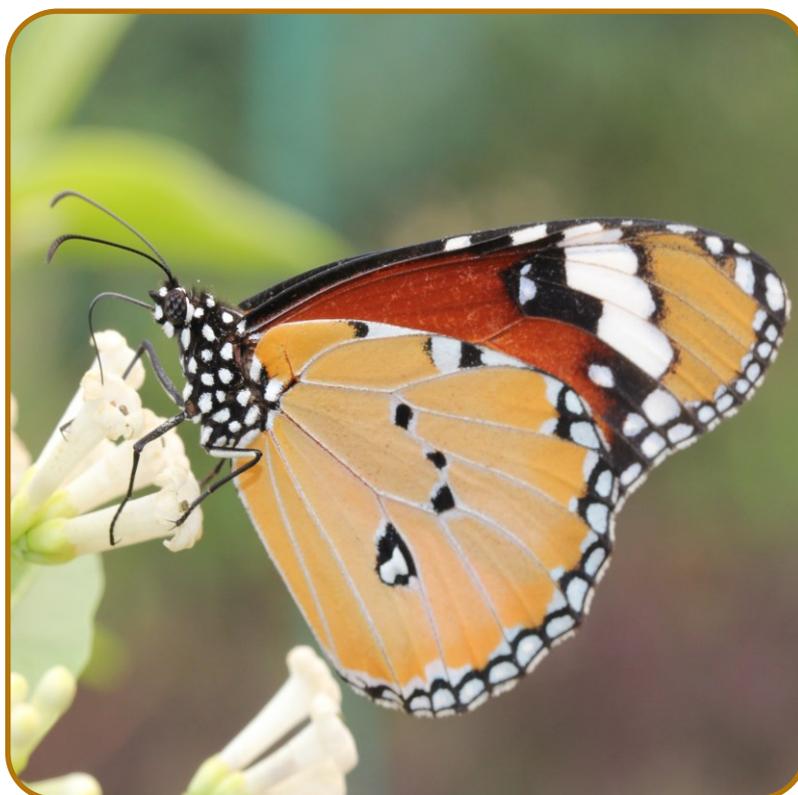
Family: Nymphalidae

IUCN Status: Least Concern

Spotted at: Zone 4

Habitat: Found in arid, open areas, including deserts, mountains, deciduous forests, and human-tended gardens in cities and parks.

Description: The Plain Tiger (*Danaus chrysippus*) is a medium-sized vibrant butterfly with orange on the upperside with wings edged with black and white. The segmented body (head, thorax and abdomen) is black. The underside of the wings are a lighter shade of orange [46]. [Credit: Dr. R. K. Chaitanya]



47. Lime Swallowtail

Scientific name: *Papilio demoleus*

Scientific Classification:

Phylum: Arthropoda

Class: Insecta

Order: Lepidoptera

Family: Papilionidae

IUCN Status: Not Evaluated

Spotted at: Zone 1

Habitat: Found in the plains, hills, and urban gardens.

Description: The common name of this species is derived from its host plants, which are usually citrus species such as the cultivated lime. The fore wings are black. At the outer edge there is a chain of yellow spots. Next to the body there are four chains of little yellow spots. There are some other yellow spots on the rest of wing. Next to the body there are four yellow lines [45]. [Credit: Dr. R.K. Chaitanya]



48. Pea Blue

Scientific name: *Lampides boeticus*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Lepidoptera

Family: Lycaenidae

IUCN Status: Least Concern

Spotted at: Zone 1

Habitat: In the edge of forests, mountain meadows and hot flowery places.

Description: It is a medium or small sized butterfly. It is shiny purple with two black tornal spots on the upper side of the hind wings. In males the underside is buff shade transverse by white fasciae with two black tornal spots crowned in orange. It has a white tipped tail. Females are exceptionally bright with dull upper side and dark brown with the basal area of the wings having a touch of pale shining blue [45]. [Credit: Dr. R.K. Chaitanya]



49. Bordered Straw

Scientific name: *Heliothis peltigera*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Lepidoptera

Family: Noctuidae

Spotted at: Zone 2

IUCN Status: Not Evaluated

Habitat: Mainly in hot wastelands and warm slopes.

Description: It has a wingspan of 29-40 mm and forewings reaching a length of 16-19 mm. These moths are rather variable in pattern and colour. Forewings are usually greyish ochreous, flushed with pale brown, except the narrow marginal area; lines are brown, indistinct; orbicular stigma is a dark dot. On middle of costa there is a reniform grey dot, with dark brown edge and centre, joined to a brown mark. A brown band appears between outer and sub marginal lines [47]. [Credit: Department of Zoology]



50. Slant-faced Grasshopper

Scientific name: *Acrida turrita*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Orthoptera

Family: Caelifera

Spotted at: Zone 2

IUCN Status: Least Concern

Habitat: Lives on steppe-like, very dry, grassy and only sparsely grown places mostly in lower altitudes.

Description: Body green in colour; Tegmina long, narrow and pointed, extending upto abdomen when closed; Head slender, longer than the pronotum by the length of the fastigium in front of the eyes; Wings hyaline and pointed at the extremity. Insects of this genus are omnivorous and a well-known pest of many agricultural crops [48]. [Credit: Department of Zoology]



51. Lemon Emigrant Butterfly

Scientific name: *Catopsilia pomona*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Lepidoptera

Family: Pieridae

IUCN Status: Not Evaluated

Spotted at: Zone 6

Habitat: Commonly found in the lowlands, especially in the dry zone; in urban areas as well as the nature reserves.

Description: The upperside of the male is chalky-white, sometimes with a more or less broad and clearly defined basal sulphur-yellow area on both fore and hind wings. For the fore wing, the whole, or sometimes only the apical half, of the costa narrowly black. Hind wing: generally uniform, unmarked, some specimens bear minute black dots at the apices of the veins[49]. [Credit: Department of Zoology]



52. Treehopper Mimicking Fly

Scientific Name: *Cephaloconus tenebrosus*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Diptera

Family: Lauxaniidae

IUCN Status: Not Evaluated

Spotted at: Zone 5

Habitat: Usually found resting on large green leaves.

Description: They are best known for their enlarged and ornate pronotum, expanded into often fantastic shapes that enhance their camouflage or mimicry, often resembling plant thorns. Treehoppers pierce plant stems with their beaks and feed upon sap. The young can frequently be found on herbaceous shrubs and grasses, while the adults more often frequent hardwood tree species [50]. [Credit: Department of Zoology]



53. Cotton Bollworm

Scientific name: *Helicoverpa armigera*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Lepidoptera

Family: Noctuidae

IUCN Status: Not Evaluated

Spotted at: Zone 6

Habitat: Agricultural lands, commodity and horticultural crops.

Description: major polyphagous pest, Stout-bodied moth of typical noctuid appearance, with 3.5-4 cm wing span; broad across the thorax and then tapering, male usually greenish-grey and female orange-brown. Forewings have a line of seven to eight blackish spots on the margin and a broad, irregular, transverse brown band. Hindwings have yellowish margins and strongly marked veins and a dark [51]. [Credit: Department of Zoology]



54. Robber Fly

Scientific name: *Ommatius gemma*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Diptera

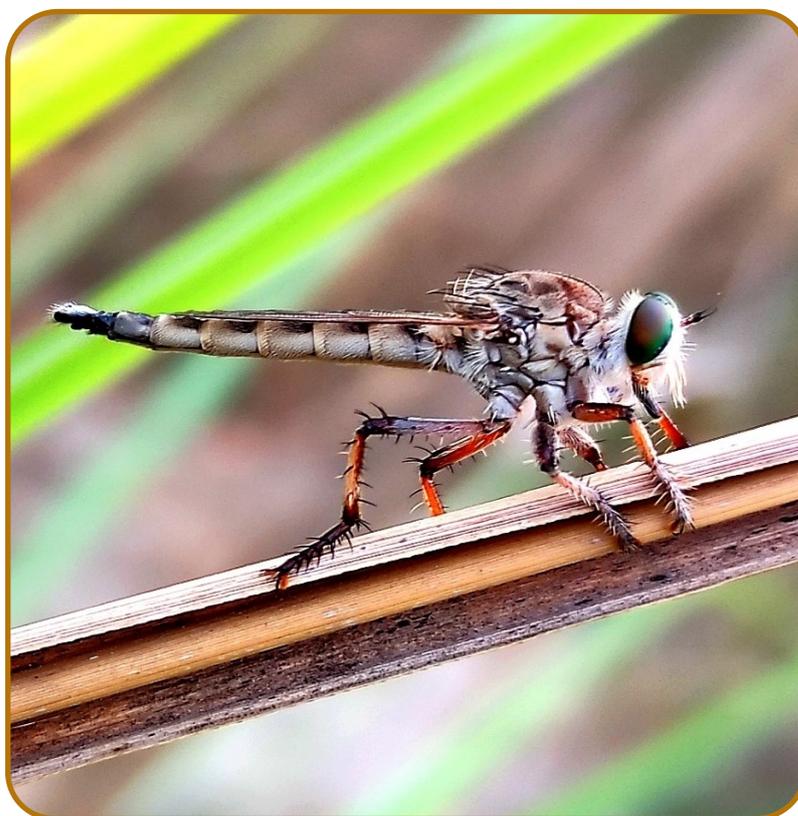
Family: Asilidae

IUCN Status: Not Evaluated

Spotted at: Zone 6

Habitat: Open meadows where it often perches on small twigs.

Description: They are medium-sized with distinctive branching, or slightly feathery antennae. They have stout, spiny legs and three simple eyes (ocelli) in a characteristic depression on the tops of their head between their two large compound eyes. They also have a usually dense moustache of stiff bristles on the face; this is called the mystax [52]. [Credit: Department of Zoology]



55. Shield Tailed Scorpion

Scientific name: *Hottentotta Birula*

Scientific classification:

Phylum: Arthropoda

Class: Arachnida

Order: Scorpiones

Family: Buthidae

IUCN Status: Not Evaluated

Spotted at: Zone 6

Habitat: semi-arid to humid, steppe, savannah and forested environments. It hides underneath stones and bark, digging shallow cavities without any tunnels.

Description: Total body length is about 50 to 90 mm. Males with flexed proximal margins of pedipalp fingers. Manus of pedipalps is also wider than female. Chelicerae are yellow and reticulated. Pedipalps are densely hirsute, whereas legs and metasoma are sparsely hirsute. Patella of pedipalps covered with short setae. Mesosoma is darker than rest of the body. The walking legs and the tip of the pedipalp pincers are bright orange-yellow to light reddish-brown in color. Telson is granulated[53]. [Credit: Department of Zoology]



56. Isturgia sp.

Scientific name: *Isturgia disputaria*

Common Name: Not available

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Lepidoptera

Family: Geometridae

IUCN Status: Not Evaluated

Spotted at: Zone 1

Habitat: Inhabits dry and warm habitats like steppes, nutrient-poor grasslands or open scrub.

Description: Palpi hairy and reaching beyond the frons. Hind tibia not dilated. Wings with evenly curved outer margin. Forewings of male usually with fovea. Vein 3 from angle of cell. Vein 7 to 9 stalked from upper angle and vein 10 absent. Vein 11 usually free. Hindwings with vein 3 from angle of cell. In the typical section of male has the branches of antennae very short [54]. [Credit: Department of Zoology]



57. Dung Beetle

Scientific name: *Gymnopleurus miliaris*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Coleoptera

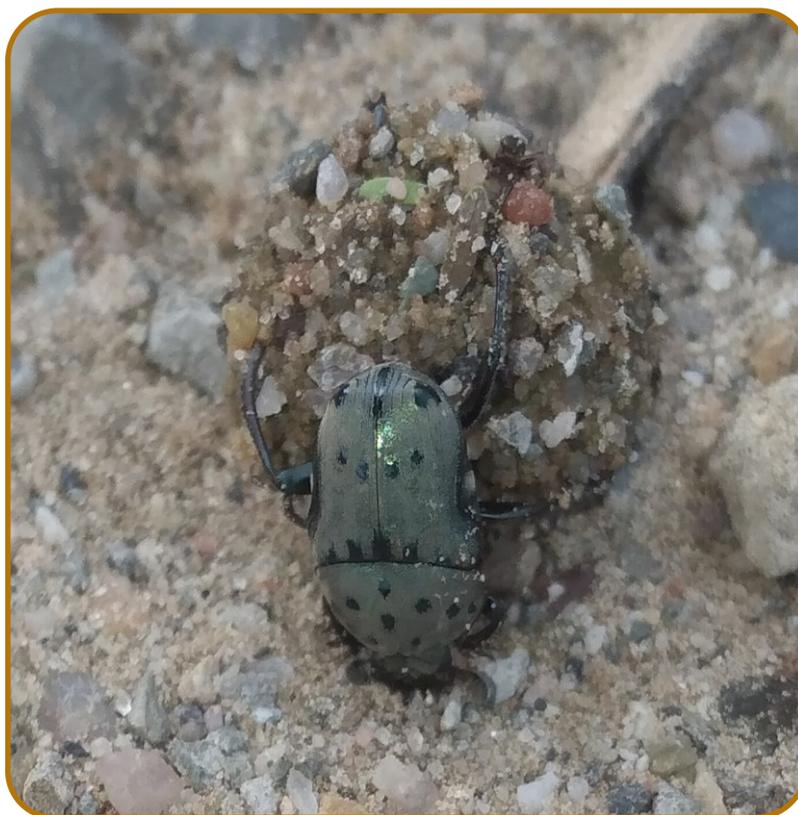
Family: Scarabaeidae

IUCN Status: Not Evaluated

Spotted at: Zone 8

Habitat: Inhabits deserts, grasslands, agricultural lands, and woodlands.

Description: This broad, less convex species has an average length of about 7.5 to 11.5 mm. Upper surface is Blue-black, dark green or coppery, the lower surface black or nearly black and the upper surface closely clothed with minute grey setae, bearing a few shining denuded patches. Front tibia armed with three strong teeth. Head densely granulate [55]. [Credit: Rashmi Rekha Panda]



58. Mupli Beetle

Scientific name: *Luprops tristis*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Coleoptera

Family: Tenebrionidae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: Rural, Agricultural, Forest, Grassland, Plantation, Garden etc.

Description: It is a plant detritus eating darkling beetle found in parts of India. The adult beetle is black and around 8 mm long. While they are usually harmless to humans, when squeezed or picked up, they produce a defensive phenolic secretion that causes skin burns. Luprops beetles have a notorious reputation since they can make life difficult when large populations invade farm houses, as reported in some parts of southern India, especially the state of Kerala [56]. [Credit: Rashmi Rekha Panda]



59. Cicada sp.

Scientific name: *Cicada sp.*

Scientific classification:

Class: Insecta

Order: Hemiptera

Family: Cicadidae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: Typically found in Mediterranean habitats, such as open woods, olive groves and garrigue.

Description: Males emit acoustic signals from the end of June until early September, perched on trunks and branches of several trees and shrubs, either alone or in a chorus of several individuals. They have prominent eyes set wide apart, short antennae, and membranous front wings. They typically live in trees, feeding on watery sap from xylem tissue, and laying their eggs in a slit in the bark [57]. [Credit: Department of Zoology]



60. Common Green Lacewing

Scientific name: *Chrysoperla carnea*

Scientific classification:

Phylum: Arthropoda

Class: Insecta

Order: Neuroptera

Family: Chrysopidae

IUCN Status: Not Evaluated

Spotted at: Zone 2

Habitat: Shrubland, Forest.

Description: Adult green lacewings are a pale green colour with long, threadlike antennae and glossy, golden, compound eyes. They have a delicate appearance and are from twelve to twenty mm long with large, membranous, pale green wings which they fold tent-wise above their abdomens. They are weak fliers and have a fluttery form of flight. They are often seen during the evenings and at night when they are attracted by lights [58]. [Credit: Department of Zoology]





Amphibians & Reptiles

“

“Reptiles and amphibians are sometimes thought of as primitive, dull and dim-witted. In fact, of course, they can be lethally fast, spectacularly beautiful, surprisingly affectionate and very sophisticated.”

- David Attenborough

”

1. Marbled Toad

Scientific name: *Duttaphrynus stomaticus*

Scientific classification:

Class: Amphibia

Order: Anura

Family: Bufonidae

IUCN Status: Least Concern

Spotted at: Zone 2

Habitat: Found in variety of habitats including; open plains, grasslands, scrubland, forest, suitable agricultural land and human habitations.

Description: Also known as the Punjab toad, Indus Valley toad, or marbled toad, is a species of toad found in Asia from eastern Iran, Pakistan, Afghanistan to Nepal, extending into Peninsular India and Bangladesh. This toad lacks cranial crests and the space between the eyes is broader than the upper eyelid. The tympanum of the ear is two-thirds the diameter of the eye. The first and second fingers are nearly equal and there is a single sub-articular tubercle. The underside is whitish with dark mottling on the throat [59]. [Credit: Department of Zoology]



2. House Lizard

Scientific name: *Hemidactylus frenatus*

Scientific classification:

Class: Reptilia

Order: Squamata

Family: Gekkonidae

IUCN Status: Least Concern

Spotted at: Zone 8

Habitat: Artificial/Terrestrial, Rocky areas. It is almost always found on building walls near artificial lighting.

Description: They measure about 75-150 mm in length, males are larger than females. It is usually grey or light brown to beige in color with greenish iridescence and a white underside. Their scales are generally uniform anteriorly, but increase in size along the back, and large spiny scales are arranged in bands around the tail. Their eyes are binocular with vertical pupils. These small geckos are non-venomous harmless [60]. [Credit: Department of Zoology]



3. Indian Chameleon

Scientific name: *Chamaeleo zeylanicus*

Scientific classification:

Class: Reptilia

Order: Squamata

Suborder: Iguania

Family: Chamaeleonidae

IUCN Status: Least Concern

Spotted at: Zone 8

Habitat: Forest, Wetlands (inland), Shrubland.

Description: Long tongue, feet that are shaped into bifid claspers, a prehensile tail, independent eye movement, and the ability to change skin colour. They move slowly with a bobbing or swaying movement and are usually arboreal. They are usually in shades of green or brown or with bands. The primary purpose of colour change is for communication with other chameleons and for controlling body temperature by changing to dark colours to absorb heat [61]. [Credit: Department of Zoology]



4. Common Sand Boa

Scientific name: *Eryx conicus*

Scientific classification:

Class: Reptilia

Order: Squamata

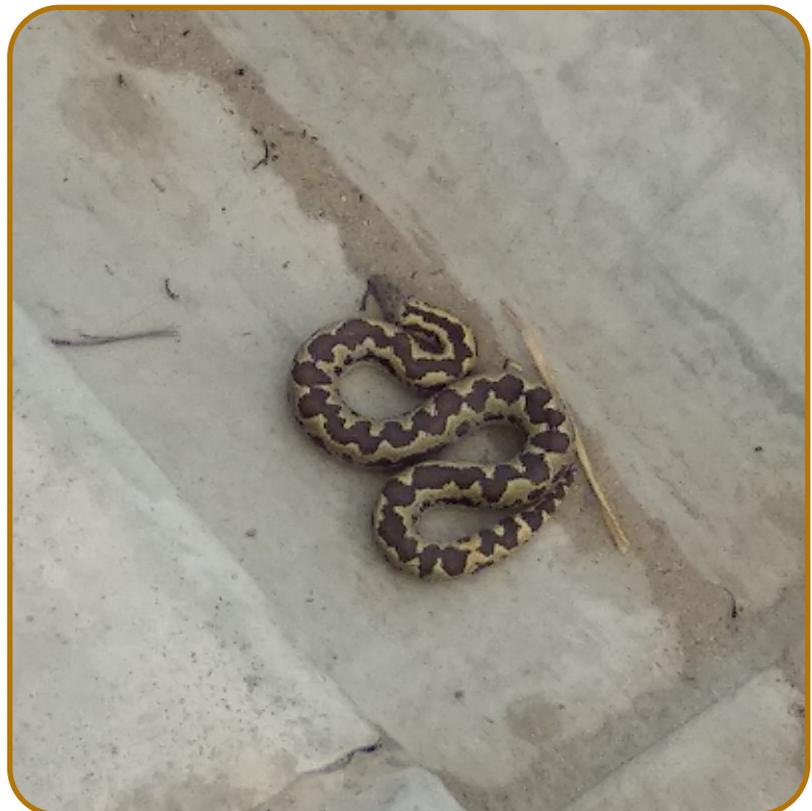
Family: Boidae

IUCN Status: Near Threatened

Spotted at: Zone 2

Habitat: Found in agricultural lands, gardens, unused lands having sandy soil, deep cracks and rat holes. Hides in cracks, mounds, rat holes, brick piles, rock piles etc.

Description: It may attain a total length of 3 feet 3 inches, which includes a tail 3 inches long. The anterior maxillary and mandibular teeth are longer than the posterior. The head is covered with small scales. The eye is small with a vertical pupil. Dorsally, the color pattern consists of a broad zigzag band or a series of dark brown blotches on a yellowish or brownish grey ground color. The belly is uniform white [62]. [Credit: Piyush R. Maharana]





Aves

“Indeed, pleasure can be derived from the most everyday birds in the most everyday surroundings and even the jaded city dwellers can regale his leisure hours without the necessary of going far afield in search of special opportunities.”

- Salim Ali

1. Common Myna

Scientific Name- *Acridotheres tristis*

Scientific classification:

Class: Aves

Order: Passeriformes

Family: Sturnidae

IUCN Status: Least Concern

Spotted at: Zone 1

Habitat: Artificial/Terrestrial, Grassland, Forests

Description: A very familiar, gregarious and noisy bird. Its plumage is predominantly dark brown, with slaty-grey head and throat. It has bright yellow legs, bill and bare skin around the eyes. The white patch on the underside of the wing is very obvious in flight, as is the white tip of the tail. It can be found in pairs or parties. Its sociability, aggression and ability to eat just about anything has made it

very successful at colonizing land before human habitation. It will eat almost any food: insects, fruit or kitchen scraps [63]. [Credit: Samir K. Beura]



2. White-eared Bulbul

Scientific name: *Pycnonotus leucotis*

Scientific classification:

Class: Aves

Order: Passeriformes

Family: Pycnonotidae

IUCN Status: Least Concern

Spotted at: Zone 1

Habitat: Savanna, Shrubland, Artificial/Terrestrial, Desert, Wetlands (inland), Forest etc.

Description: Dull gray-brown bulbul with a black head and bright white cheek patch, and yellow vent and white tail tip. A lowland species of dry forests, scrub, forest edge, parks, and gardens; song brief but pleasant and fluid. Gives low raspy “chuk” as well as mellower call notes similar to components of its song [64]. [Credit: Samir K. Beura]



3. Familiar Chat

Scientific name: *Oenanthe familiaris*

Scientific classification:

Class: Aves

Order: Passeriformes

Family: Muscicapidae

IUCN Status: Least Concern

Spotted at: Zone 1

Habitat: Shrublands, Artificial/Terrestrial, Rocky areas (eg. inland cliffs, mountain peaks), Grassland, Savanna.

Description: The familiar chat is a dumpy short-tailed bird 14–15 cm long. The adult's upperparts are a dull brown with warmer brown ear coverts behind the eye. The underparts vary from off-white to pale grey-brown, the rump and outer tail feathers are rufous with a dark brown tip. The central tail feathers are dark brown. The short straight bill and the legs and feet are black. The sexes are alike. The familiar chat has a soft "shek-shek" alarm call. The song is a warbling trill [65]. [Credit: Samir K. Beura]



4. Ashy Drongo

Scientific name: *Dicrurus leucophaeus*

Scientific classification:

Class: Aves

Order: Passeriformes

Family: Dicruridae

IUCN Status: Least Concern

Spotted at: Zone 2

Habitat: Artificial/Terrestrial, Shrubland, Savanna, Forest.

Description: The adult is mainly dark grey, and the tail is long and deeply forked, there are a number of subspecies varying in the shade of the grey plumage. Some subspecies have white markings on the head. Young birds are dull brownish grey. It is found widely distributed across South and Southeast Asia with several populations that vary in the shade of grey, migration patterns and in the size or presence of white patches around the eye [66]. [Credit: Samir K. Beura]



5. Indian Roller

Scientific name: *Coracias benghalensis*

Scientific classification:

Class: Aves

Order: Coraciiformes

Family: Coraciidae

IUCN Status: Least Concern

Spotted at: Zone 2

Habitat: Artificial/Terrestrial, Savanna, Forest

Description: It is 30–34 cm long with a wingspan of 65–74 cm and weighs 166–176 g. The face and throat are pinkish, the head and back are brown, with blue on the rump and contrasting light and dark blue on the wings and tail. The bright blue markings on the tail. The bright blue markings on the wing are prominent in flight. The sexes are similar in appearance. Two subspecies are recognized [67]. [Credit: Samir K. Beura].



6. Little Egret

Scientific name: *Egretta garzetta*

Scientific classification:

Class: Aves

Order: Pelecaniformes

Family: Ardeidae

IUCN Status:

Spotted at: Zone 6

Habitat: Grassland, Artificial/Aquatic & Marine, Marine Coastal/Supratidal, Marine Intertidal, Marine Neritic, Wetlands (inland), Forest.

Description: It is a white bird with a slender black beak, long black legs and, in the western race, yellow feet. As an aquatic bird, it feeds in shallow water and on land, consuming a variety of small creatures. It breeds colonially, often with other species of water birds, making a platform nest of sticks in a tree, bush or reed bed. A clutch of three to five bluish-green eggs is laid and incubated by both parents for about three weeks [68]. [Credit: Samir K. Beura]



7. Asian Green Bee Eater

Scientific name: *Merops orientalis*

Scientific classification:

Class: Aves

Order: Coraciiformes

Family: Meropidae

IUCN Status: Least Concern

Spotted at: Zone 7

Habitat: Artificial/Terrestrial, Desert, Wetlands (inland), Shrubland, Savanna, Forest.

Description: The Asian green bee-eater, is a near passerine bird in the bee-eater family. It is resident but prone to seasonal movements and is found widely distributed across Asia. They are mainly insect eaters and are found in grassland, thin scrub and forest often quite far from water. Several regional plumage variations are known and several subspecies have been named [69]. [Credit: Samir K. Beura]



8. Rock Pigeon

Scientific name: *Columba livia*

Scientific classification:

Class: Aves

Order: Columbiformes

Family: Columbidae

IUCN Status: Least Concern

Spotted at: Zone 8

Habitat: Artificial/Terrestrial, Caves and Subterranean Habitats (non-aquatic), Rocky areas (eg. inland cliffs, mountain peaks).

Description: It has a dark bluish-grey head, neck, and chest with glossy yellowish, greenish, and reddish-purple iridescence along its neck and wing feathers. The iris is orange, red, or golden with a paler inner ring, and the bare skin round the eye is bluish-grey [70]. [Credit: Samir K. Beura]



9. Red-Wattled Lapwing

Scientific name-*Vanellus indicus*

Scientific classification:

Class: Aves

Order: Charadriiformes

Family: Charadriidae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Artificial/Terrestrial, Wetlands (inland), Grassland.

Description: The red-wattled Lapwing is an Asian lapwing or large plover, a wader in the family Charadriidae. Like other lapwings they are ground birds that are incapable of perching. Their characteristic loud alarm calls are indicators of human or animal movements and the sounds have been variously rendered as did he do it or pity to do it leading to the colloquial name of 'did-he-do-it' bird. Usually

seen in pairs or small groups and usually not far from water they sometimes form large aggregations in the non-breeding season (winter) [71]. [Credit: Samir K. Beura]



10. Jungle Babbler

Scientific name: *Argya striata*

Class: Aves

Order: Passeriformes

Family: Leiothrichidae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Artificial/Terrestrial, Shrubland, Forest.

Description: It is non-migratory, has short rounded wings and a weak flight. Drably coloured in brownish grey with a yellow-bill. The upper parts are usually slightly darker in shade, mottling on the throat and breast. The jungle babbler has harsh nasal calls. These birds are gregarious and very social. They sometimes form the core of a mixed-species foraging flock. They feed mainly on insects, but also eat grains, nectar and berries [71]. [Credit: Samir K. Beura]



11. Black Drongo

Scientific name: *Dicrurus macrocercus*

Scientific classification:

Class: Aves

Order: Passeriformes

Family: Dicruridae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Shrubland, Grassland, Artificial/Terrestrial, Savanna

Description: It is a small Asian passerine bird of the Drongo family. It is a common resident breeder in much of tropical southern Asia from southwest Iran through India, Bangladesh and Sri Lanka east to southern China and Indonesia and accidental visitor of Japan. It is an all-black bird with a distinctive forked tail and measures 28-30 cm in length. It feeds on insects and is common in open agricultural areas, perching conspicuously on a bare perch or along power or telephone lines [72]. [Credit: Department of Zoology]



12. Eurasian Hoopoe

Scientific name: *Upupa epops*

Scientific classification:

Class: Aves

Order: Bucerotiformes

Family: Eupupidae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Artificial/Terrestrial, Grassland, Savanna

Description: It is a distinctive cinnamon coloured bird with black and white wings, a tall erectile crest, a broad white band across a black tail, and a long narrow downcurved bill. Its call is a soft "oop-oop-oop". It is native to Europe, Asia and the northern half of Africa. It is migratory in the northern part of its range. It spends most of the time on the ground probing for grubs and insects. The clutch of seven to eight eggs is laid in an existing cavity [73]. [Credit: Samir K. Beura]



13. Rose Ringed Parakeet

Scientific name: *Psittacula krameri*

Scientific classification:

Class: Aves

Order: Psittaciformes

Family: Psittaculidae

IUCN Status: Least Concern

Spotted at: Zone 5

Habitat: Artificial/Terrestrial, Wetlands (inland), Grassland, Shrub land, Savanna, Forest.

Description: A green body with a reddish beak. A long pointed tail that is more than half of the body's length. The males of this species show a dark purplish color around their necks, giving the ring-necked parakeet its name. The young birds do not show this coloring on their necks. They only acquire it once they reach sexual maturity which is about the age of three. The female birds do not have this rose colored ring around their necks [74]. [Credit: Department of Zoology]



14. Red-naped Ibis

Scientific name: *Pseudibis papillosa*

Scientific classification:

Class: Aves

Order: Pelecaniformes

Family: Threskiornithidae

IUCN Status: Least Concern

Spotted at: Zone 8

Habitat: Grassland, Artificial or Terrestrial, Wetlands (inland)

Description: This Indian Subcontinent species unlike other ibises, is not very dependent on water and is often found in dry fields a good distance away from water. It is usually seen in loose groups and can be told by the nearly all dark body with a white patch on the shoulder and a bare dark head with a patch of crimson red warty skin on the crown and nape. It has a loud call and is noisy when breeding. It builds its nest most often on the top of a large tree or palm [75]. [Credit: Department of Zoology]



15. White-throated Kingfisher

Scientific name: *Halcyon smyrnensis*

Scientific classification:

Class: Aves

Order: Coraciiformes

Family: Alcedinidae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Artificial/Aquatic & Marine, Artificial/Terrestrial, Marine Intertidal, Wetlands (inland), Forest.

Description: It is a tree kingfisher, widely distributed in Asia from the Sinai east through the Indian subcontinent to China and Indonesia. It can often be found well away from water where it feeds on a wide range of prey that includes small reptiles, amphibians, crabs, small rodents and even birds. During the breeding season they call loudly in the mornings from prominent perches including the tops of buildings in urban areas or on wires [69]. [Credit: Samir K. Beura]



16. Brown Rock Chat

Scientific name: *Oenanthe fusca*

Scientific classification:

Class: Aves

Order: Passeriformes

Family: Muscicapidae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Rocky areas (eg. inland cliffs, mountain peaks), Artificial/Terrestrial.

Description: The brown rock chat is about 17 cm long, larger than the similar-looking Indian robin. It is uniformly rufous brown with the wings and tail of a slightly darker shade. The brown on the undersides grades into a dark grey-brown vent. The beak is slender and is slightly curved at the tip. The tail is rounded. In flight, it resembles a female blue rock thrush. The sexes are indistinguishable in the field [76]. [Credit: Samir K. Beura]



17. Jacobin Cuckoo

Scientific name: *Clamator jacobinus*

Scientific classification:

Class: Aves

Order: Cuculiformes

Family: Cuculidae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Savanna, Grassland

Description: This medium-sized, slim black and white cuckoo with a crest is distinctive. The white wing patch on the black wing and the pattern make it unmistakable even in flight. They are very vocal during the breeding season. The call is a ringing series of whistling notes "piu-piu" with the calls of the nominate form more rapid and slightly Mellow [77]. [Credit: Samir K. Beura]



18. Indian Grey Hornbill

Scientific name: *Ocyrceros birostris*

Scientific classification:

Class: Aves

Order: Bucerotiformes

Family: Bucerotidae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Forest, Savanna, Artificial/Terrestrial.

Description: It is a medium-sized hornbill, measuring around 61 cm in length. The upper parts are greyish brown and there is a slight trace of a pale supercilium. The flight feathers of the wing are dark brown with a whitish tip. The tail has a white tip and a dark subterminal band. They have a red iris and the eyelids have eyelashes. The casque is short and pointed [78]. [Credit: Samir K. Beura]



19. Cattle Egret

Scientific name: *Bubulcus ibis*

Scientific classification:

Class: Aves

Order: Pelecaniformes

Family: Ardeidae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Inhabit grasslands, meadows, dry agricultural fields, floodplains, swamps, paddy-fields, marshes and mangroves.

Description: The cattle egret is a medium sized bird, measuring 45 to 55 cm in length and weighing 250 to 500 grams. The non-breeding birds have complete white plumage with yellow bill and yellow-grey legs. In the breeding season, the feathers on the head, breast, crown and back turn an orange-red. The bill, irises and legs may also turn orange red. Their vocal call is like 'rick--rack' with stress on the first syllable [79]. [Credit: Samir K. Beura]



20. Great Egret

Scientific name: *Ardea alba*

Scientific classification:

Class: Aves

Order: Pelecaniformes

Family: Ardeidae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Grassland, Wetlands (inland), Artificial/Aquatic & Marine, Marine Intertidal.

Description: Great egrets are less than 1 meter long from bill to tail, 1 meter tall, have a wingspan of 1.5 meters, and weigh about 912 to 1140 g. On average, males are larger than females. They are completely white with a long yellow bill and dark gray legs. During flight their neck is usually in an “S” shaped curve. Streams, lakes, ponds, mud flats, saltwater and freshwater marshes are inhabited by this beautiful bird [80]. [Credit: Aditya Kapoor]



21. Black-rumped Flameback

Scientific name: *Dinopium benghalense*

Scientific classification:

Class: Aves

Order: Piciformes

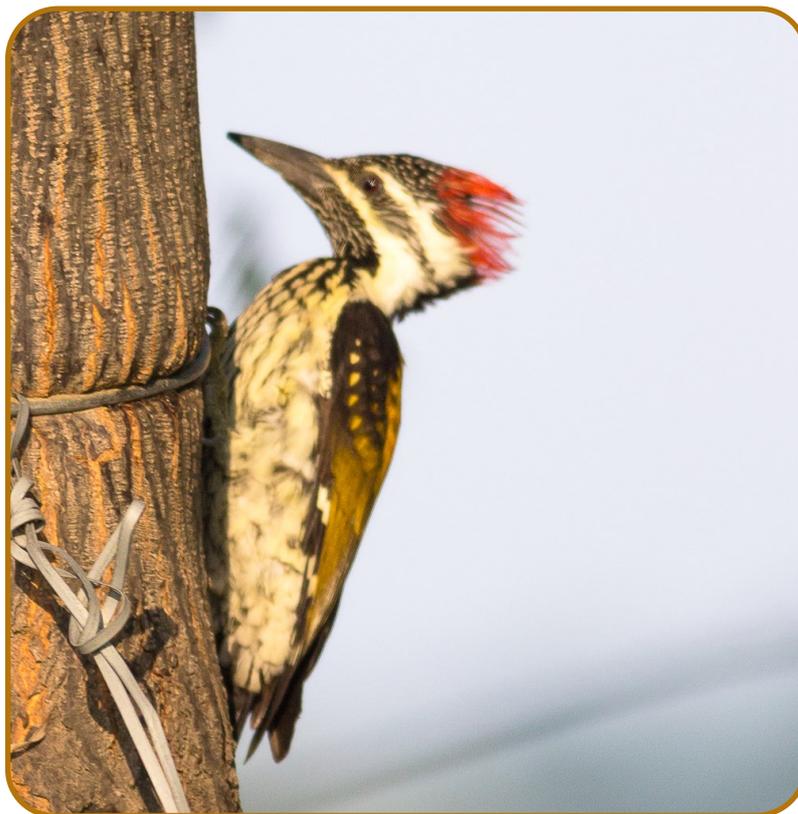
Family: Picidae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Forest,
Artificial/Terrestrial.

Description: A common, “small-billed” golden-backed woodpecker with four toes. Endemic to the Indian subcontinent and Sri Lanka. Separated from all other flamebacks except Red-backed by dark throat, lack of a contrasting black horizontal stripe below the cheek, and four toes. Separated from Red-backed by golden back and black shoulder [81].
[Credit: Aditya Kapoor]



22. Black-winged Kite

Scientific name: *Elanus caeruleus*

Scientific classification:

Class: Aves

Order: Accipitriformes

Family: Accipitridae

IUCN Status: Least Concern

Spotted at: Zone 8

Habitat: Artificial/Terrestrial,
Desert, Grassland, Shrubland,
Savanna.

Description: The black-winged kite is a small bird; the female is slightly larger than the male. The male kite measures, 30 to 35 cm in length and weighs 200 to 270 grams. The female weighs 220 to 340 grams. The wingspan is 75 to 90 cm. The kite has white, grey and blackish velvety plumage and owl-like forward-facing eyes with orange red irises. The bird is predominantly greyish white. There are blackish shoulder patches, wing tips and eye stripe [82].
[Credit: Dr. Prthvi Raj]



23. Common Wood Shrike

Scientific name: *Tephrodornis pondicerianus*

Scientific classification:

Class: Aves

Order: Passeriformes

Family: Vangidae

IUCN Status: Least Concern

Spotted at: Zone 5

Habitat: Savanna, Artificial/Terrestrial, Shrubland, Forest.

Description: A medium-sized wood shrike with grayish-brown upperparts, black facial mask, white rump, and gray tail with white outer tail feathers. Bill strongly hooked, dark grayish-brown in color. Underparts white. Bright, fast-paced song starts out with two strident “wheet” notes, followed by a descending series of shorter notes [83]. [Credit: Aditya Kapoor]



24. Common Moorhen

Scientific name: *Gallinula chloropus*

Scientific classification:

Class: Aves

Order: Gruiformes

Family: Rallidae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Artificial/Aquatic & Marine, Marine Coastal/Supratidal, Wetlands (inland)

Description: The common moorhen is a medium-sized bird with marked sexual dimorphism. The wingspan is 50 to 55 cm. These moorhens have black/dark brown plumage and white undertail. The frontal shield is red and in adults has a rounded top. The tip of the bill is yellow. They have long legs and toes which are yellow in color. Their call is a loud clucking, gargling chattering or hissing sound [84]. [Credit: Samir K. Beura]



25. Purple Sunbird

Scientific name: *Cinnyris asiaticus*

Scientific classification:

Class: Aves

Order: Passeriformes

Family: Nectariniidae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Artificial/Terrestrial, Wetlands (inland), Shrubland, Forest Gardens and cultivated areas.

Description: The breeding male is a metallic blue and purple overall with maroon feathers on the breast. The female is olive above and yellow below. The nonbreeding male of this species is primarily olive-brown with blackish upperparts and yellow underparts with blue-black band running down the throat and chest. Females can be distinguished from female Purple-rumped Sunbirds by its yellow (not grayish) throat. Seen in pairs, feeding chiefly on nectar, but they also take insects [85].

[Credit: Samir K. Beura]



26. Indian Pond Heron

Scientific name: *Ardeola grayii*

Scientific classification:

Class: Aves

Order: Pelecaniformes

Family: Ardeidae

IUCN Status: Least Concern

Spotted at: Zone 7

Habitat: They inhabit ponds, pools, marshes, rivers, streams, tidal flats, flooded grasslands, paddy fields, canals and ditches.

Description: The Indian Pond heron is a small bird, measuring 40 to 45 cm in length and weighing 230 to 275 grams. The wingspan is 75 to 90 cm. The male and female birds look alike. These heron species are stocky, with short neck. Non breeding individuals have white plumage streaked olive and brown. The legs and feet are greenish [72]. [Credit: Samir K. Beura]



27. Rufous Treepie

Scientific name: *Dendrocitta vagabunda*

Scientific classification:

Class: Aves

Order: Passeriformes

Family: Corvidae

IUCN Status: Least Concern

Spotted at: Zone 8

Habitat: It inhabits open forest consisting of scrub, plantations and gardens.

Description: A long- and stiff-tailed bird with primarily rusty-brown upperparts and dull orangish underparts. The head, mantle, and neck region are a dull, sooty black. The long-graduated tail is pale gray with a wide black terminal band. Note the conspicuous silvery-gray, white, and black patterns on the wings. The blackish-gray bill is stout with a hooked tip. The call is a loud metallic “krowwiiii kroo.” [66]. [Credit: Samir K. Beura]



28. Indian Scops-owl

Scientific name: *Otus bakkamoena*

Scientific classification:

Class: Aves

Order: Strigiformes

Family: Strigidae

IUCN Status: Least Concern

Spotted at: Zone 2

Habitat: Artificial/Terrestrial, Forest

Description: The Indian scops owl is a small 23–25 cm owl, although it is one of the largest of the scops owls. Like other scops owls, it has small head tufts, or ears. The upperparts are grey or brown, depending on the morph, with faint buff spotting. The underparts are buff with fine darker streaking. The facial disc is whitish or buff, and the eyes are orange or brown. There is a buff neckband. Sexes are similar. The flight is deeply undulating [86]. [Credit: Kumar Shubham]



29. Little Banded Goshawk

Scientific name: *Accipiter badius*

Scientific classification:

Class: Aves

Order: Accipitriformes

Family: Accipitridae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Artificial/Terrestrial, Wetlands (inland), Shrubland, Forest.

Description: The shikra is a small raptor (26–30 cm long) and like most other *Accipiter* hawks, this species has short rounded wings and a narrow and somewhat long tail. Adults are whitish on the underside with fine rufous bars while the upperparts are grey. The lower belly is less barred and the thighs are whitish. When seen from above the tail bands are faintly marked on the lateral tail feathers [87]. [Credit: Dr. Prithvi Raj]



30. Roadside Hawk

Scientific name: *Rupornis magnirostris*

Scientific classification:

Class: Aves

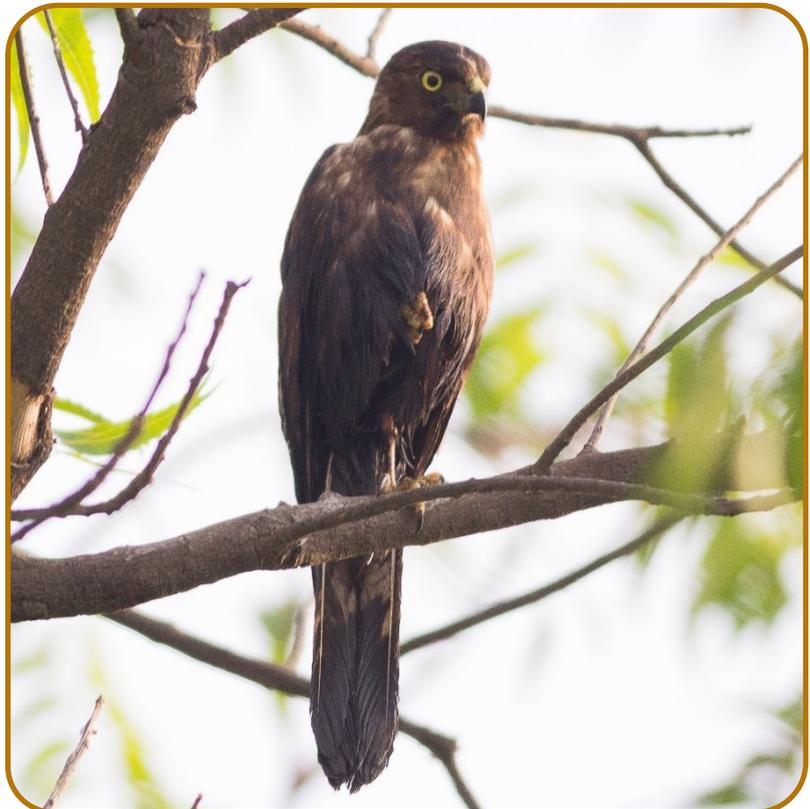
Order: Passeriformes

Family: Corvidae

IUCN Status: Least Concern

Spotted at: Zone 1

Habitat: The roadside hawk is 31-41 cm long and weighs 250-300 g. Males are about 20% smaller than females, but otherwise the sexes are similar. In most subspecies, the lower breast and underparts are barred brown and white, and the tail has four or five grey bars [88]. [Credit: Dr. Narender Kumar]



31. White Wag Tail

Scientific name: *Motacilla alba*

Scientific classification:

Class: Aves

Order: Passeriformes

Family: Motacillidae

IUCN Status: Least Concern

Spotted at: Zone 1

Habitat: Artificial/Terrestrial, Marine Intertidal, Desert, Wetlands (inland), Grassland.

Description: It is an insectivorous bird of open country, often near habitation and water. It prefers bare areas for feeding, where it can see and pursue its prey. It is a slender 16.5 to 19 cm in, with the characteristic long, constantly wagging tail of its genus. Its average weight is 25 g and the maximum lifespan in the wild is about 12 years [89]. [Credit: Samir K. Beura]



32. Cooper's Hawk

Scientific name: *Accipiter cooperii*

Scientific classification:

Class: Aves

Order: Accipitriformes

Family: Accipitridae

IUCN Status: Least Concern

Spotted at: Zone 4

Habitat: Artificial/Terrestrial, Shrubland, Forest

Description: Small to medium-sized hawk with relatively short rounded wings and rounded tail. Adults are gray above with pale orange barring below; immatures are browner and streaky. Very similar to sharp-shinned Hawk, but larger with bigger head. Also note deeper, slower wingbeats. Breeds in forested areas; more common in suburban areas than sharp-shinned hawk. Feeds mainly on birds captured in flight. Often stalks feeders in search of prey [88]. [Credit: Samir K. Beura]



33. Eurasian Collared-Dove

Scientific name: *Streptopelia decaocto*

Scientific classification:

Class: Aves

Order: Columbiformes

Family: Columbidae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Artificial/Terrestrial, Shrubland

Description: It is a medium-sized dove, with an average length of 32 cm. from tip of beak to tip of tail, with a wingspan of 47–55 cm. It is grey-buff to pinkish-grey overall, a little darker above than below, with a blue-grey underwing patch. The tail feathers are grey-buff above, and dark grey and tipped white below; the outer tail feathers are also tipped whitish above. It has a black half-collar edged with white on its nape. The short legs are red and the bill is black. The iris is red. The eye is surrounded by a small area of bare skin, which is either white or yellow [90]. [Credit: Department of Zoology]



34. European Stonechat

Scientific name: *Saxicola rubicola*

Scientific classification:

Class: Aves

Order: Passeriformes

Family: Muscicapidae

IUCN Status: Not Evaluated

Spotted at: Zone 6

Habitat: Artificial/Terrestrial, Wetlands (inland), Grassland, Shrubland, Forest

Description: The stonechat is 11.5–13 cm long and weighs 13–17 g. The summer male has black upperparts, a black head, an orange throat and breast, and a white belly and vent. It also has a white half-collar on the sides of its neck, a small white scapular patch on the wings, and a very small white patch on the rump often streaked with black. The female has brown upperparts and head, and no white neck patches, rump or belly, these areas being streaked dark brown on paler brown, the only white being the scapular patch on the wings [91]. [Credit: Dr. Narender Kumar]





Mammals

“

"Nature holds the key to our aesthetic, intellectual, cognitive and even spiritual satisfaction."

- E.O. Wilson

”

1. Three-striped Palm Squirrel

Scientific Name: *Funambulus palmarum*

Scientific classification:

Class: Mammalia

Order: Passeriformes

Family: Sciuridae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Forest, Shrubland, Grassland, Wetlands (inland), Artificial/Terrestrial.

Description: The Indian palm squirrel is a species of rodent native to India and Sri Lanka. It is about the size of a large chipmunk, with a bushy tail slightly shorter than its body. The back is a grizzled, grey-brown color with three conspicuous white stripes that run from head to tail. The two outer stripes run from the forelegs to the hind legs only. It has a creamy-white belly and a tail covered with interspersed, long, black, and white hair. The ears are small and triangular. Indian palm squirrels are busy and fairly vocal creatures, producing a cry that sounds like "chip chip chip" when danger is present [92]. [Credit: Samir K. Beura]



2. Rhesus Macaque

Scientific name: *Macaca mulatta*

Scientific classification:

Class: Mammalia

Order: Primates

Family: Cercopithecidae

IUCN Status: Least Concern

Spotted at: Zone 3

Habitat: lives in a wide range of habitats, and shows a great deal of adaptability. Some populations live in flatlands, while others, in northern India and Pakistan, live in the Himalayas at elevations up to 3,000m.

Description: These smallish monkeys have grizzled-brown fur dorsally, with the fur on the ventrum being slightly lighter in color. The hair is short on the head. The face and buttocks of adults are red [93]. [Credit: Samir K. Beura]



3. Asian Antelope

Scientific name: *Boselaphus tragocamelus*

Scientific classification:

Class: Mammalia

Order: Artiodactyla

Family: Bovidae

IUCN Status: Least Concern

Spotted at: Zone 6

Habitat: Shrubland, Artificial/Terrestrial, Grassland, Forest.

Description: Commonly known as Neelgai, the largest Asian antelope is ubiquitous across the northern Indian subcontinent. It is a sturdy thin-legged antelope, with a sloping back, a deep neck with a white patch on the throat, a short mane of hair behind and along the back ending behind the shoulder, and around two white spots each on its face, ears, cheeks, lips and chin. The ears, tipped with black, are 15–18 cm long. A column of coarse hair, known as the "pendant", around 13 cm long in males, can be observed along the dewlap ridge below the white throat patch [94]. [Credit: Samir K. Beura]



Females and juveniles are orange to tawny, males are much darker – their coat is typically bluish grey. The ventral parts, the insides of the thighs and the tail are all white. A white stripe extends from the underbelly and broadens as it approaches the rump, forming a patch lined with dark hair. Females are lighter, weighing 100–213 kg. Sexual dimorphism is prominent; the males are larger than females and differ in coloration [Credit: Dr. Prithvi Raj]



4. Indian Hare

Scientific name: *Lepus nigricollis*

Scientific classification:

Class: Mammalia

Order: Lagomorpha

Family: Leporidae

IUCN Status: Least Concern

Spotted at: Zone 1

Habitat: Introduced vegetation, Artificial/Aquatic & Marine, Artificial/Terrestrial, Desert, Wetlands (inland), Grassland, Shrubland, Forest.

Description: Commonly occurring hare in the Indian sub-continent. It is characterized by a colored patched on its nape. Face and Dorsum: Reddish brown with black hair. Underparts whitish. Ovate ears which are long and thin with venation clearly visible. Hind legs longer than forelegs. Males smaller than females. Males are

highly territorial with territory size ranging up to 100,000 sq. m (~24 acres). It is shy, crepuscular to nocturnal by activity [95]. [Credit: Samir K. Beura]



References:

1. Misra, R.M. (2013). Note on *Anthia sexguttata* Fabricus (Carabidae: Coleoptera) a new predator of *Pyrausta machaeralis* Walker and *Hyblaea puera* Cramer. *AGRIS*, 605.
2. Ahad A, Srivastava A, Mehta V (2022). Population dynamics of Rice Black Beetle, *Heteronychus lioderes* Redtenbacher under mid-hill conditions of Himachal Pradesh. *Ind. J. of Entomo.* xx:1-3.
3. Dean H.A. (1953) Long-horned beetles that attack *Citrus* in the lower Rio Grande valley of Texas. *J. Econ. Ent.* 46: 174.
4. Ghate, H.V., Jadhav S.S., Sureshan, P.M. and Sharma, R.M. (2012). Updated checklist of Indian Mantodea (insect). *Zool. Surv. India.*, 311pp
5. Sihvonen, P (2005). Phylogeny and classification of the Scopulini moths (Lepidoptera: Geometridae, Sterrhinae). *Zoological Journal of the Linnean Society. Oxford Academic*; 143:473–530.
6. Zhang Z.Q (1999). Biology and ecology of trombidid mites (Acari: Trombidioidea). *Eco. & Evo. of Acari.* Springer Netherlands. 277–89.
7. Rashmi Joshi, Gaur N (2019). First report of Blister beetle, *Mylabris pustulata* Thunberg (Meloidae: Coleoptera) in maize fields from Sarson village of Almora District, Uttarakhand (India). *J. App. & Nat. Sci. ANSF Publications* 11:752
8. Husain A, Dubey AK (2021). New Record of Green Jewel Bug *Chrysocoris stollii* (Wolf, 1801) (Hemiptera: Scutelleridae) from Chhatarpur, Madhya Pradesh (India), with its Systematic Account, Host Plants and Biological Control. *Inter. J. Glo. Sci. Res.. Enviro. & Soci. Wel. Socie.* 8.
9. Hollis D, 1971. A preliminary revision of the genus *Oxya* Audinet-Serville (Orthoptera: Acridoidea). *Bulletin of British Museum (Natural History), Entomology*, 26:267-343
10. Karthikeyani R., Kannan S (2013). A new *plexippus* spider from the western ghats , kumbakarai falls , Theni district , Tamil Nadu, Southuth India (arachnida : araneae : salticidae).
11. Jose A , Janaina DA C (2019). First record of *Uthesia pulchella* (Linnaeus, 1758) (Lepidoptera: Erebidae: Artiinae) in Brazillion amaon: implication for conservation. 91:1.
12. Barrion A, Amalin D, Casal C (1989). Morphology and cytology of the Lynx spider *Oxyopes javanus* (Thorell). *Philip. J. Sci.* 118.
13. Emerton, J.H (1902). The Common Spiders of the United States. *Nature. Spri. Sci. & Busi. Med. LLC.* 66:630–630.
14. Selhime AG (1956). *Brumus suturalis*, a Beneficial Lady Beetle. *The Florida Entomologist.* JSTOR. 39:65.
15. Iqbal J, Bhutta SA, Alqarni AS, Owayss AA, Ansari MJ (2018). Seasonal population dynamics of dusky cotton bug (*Oxycarenus spp.*) in transgenic cotton varieties under field conditions. *Sau. J. Biol. Sci. Elsevier B.V.* 25:1122–7.
16. Distant, Slaters (2019). *Journal of threatened texa.* 5:13625-13628.
17. Binoy C, Santhosh S, Nasser M (2022). Chalcidid parasitoids (Hymenoptera, Chalcididae) of *Phereoeca uterella* (Walsingham) (Lepidoptera, Tineidae): description of a new species and the male of *Epitranus uterellophagus* from southern India. *Syst Parasitol.*
18. Bohart RM, Menke AS (1976). *Sphecid wasps of the world : a generic revision.* Berkeley: Uni. Cal. Pre.



19. Özyurt N, Candan S, Suludere Z (2013). The morphology and histology of the male reproductive system in *Dolycoris baccarum* Linnaeus 1758 (Heteroptera: Pentatomidae)--light and scanning electron microscope studies. *Micron*.
20. Caleb JTD, Prajapati DA, Ali PA (2019). Redescription of *Rudakius ludhianaensis* (Tikader, 1974) (Aranei: Salticidae), with notes on its synonymy and distribution. *Arthro. Selecta. K M K Scie. Pre. Ltd.* 28:417–23.
21. Ahrens D, Liu W, Fabrizi S, Bai M (2021). Taxonomic review on the *Trioserica* Moser, 1922 species of China (Coleoptera: Scarabaeidae: Melolonthinae: Sericini). *Zootaxa*. 343–55.
22. Nadolny AA, Zamani A (2020). A new species of Wolf spiders of the genus *Lycosa* (Aranei: Lycosidae) from Iran. *Zoosystematica Rossica. Rus. Aca. Sci. Zoological Institute*. 29:205-12.
23. Venugopal AS, Thomas SK (2019). Bombardier beetles of the genus *Pheropsophus* Solier 1833 (Carabidae: Brachininae: Brachinini) from Indian subcontinent. *Zootaxa. Magnolia Press*.65–89.
24. Kapadia M, Butani P, Beria N (2006). White grub species attacking groundnut in the Saurashtra Region in Gujarat, India. *undefined*.
25. Hall FG, Jones OG, O’Haire ME, Liceaga AM (2017). Functional properties of tropical banded cricket (*Gryllodes sigillatus*) protein hydrolysates. *Food Chem*. 224:414–22.
26. Moore MR, Cave RD, Branham MA (2018). Annotated catalog and bibliography of the Cyclocephaline scarab beetles (Coleoptera, Scarabaeidae, Dynastinae, Cyclocephalini). *Zookeys. Pensoft Publishers*.101–378.
27. Patwardhan A, Parekar H (2020). Click Beetles (Coleoptera: Elateridae) of India: An Overview. *Jaya publishing house*. 25-43.
28. Hawkins R (2003). Surrey Wildlife Trust. Shieldbugs of Surrey. *Surrey Wildlife Trust*.
29. Shishodia MS, Chandra Kailash, Gupta SK (2010). An annotated checklist of Orthoptera (Insecta) from India. *Zool. Surv. India*.
30. Pathania PC, Gielis C, Das A, Chandra K (2021). Catalogue of superfamily Pterophoroidea Kuznetsov & Stekolnikov (Lepidoptera) of India. *Zootaxa. Magnolia Press*. 4915:201–36.
31. Kumar SM, Sahayaraj K (2012). Gross Morphology and Histology of Head and Salivary Apparatus of the Predatory Bug, *Rhynocoris marginatus*. *Journal of Insect Science. Oxford University Press*.
32. Hamson GF (1892). The fauna of British india, including ceylonand burxma –Moths. The authority of Secretary of state for Indian in council.
33. Girón JC, Chamorro ML (2018). Variability and distribution of the golden-headed weevil *Compsus auricephalus* (Say) (Curculionidae: Entiminae: Eustylini). *Biodiversity Data Journal. Pensoft Publishers*. 8:e55474.
34. van der Wolk FM, Koerten HK, van der Starre H (1984). The external morphology of contact-chemoreceptive hairs of flies and the motility of the tips of these hairs. *J Morphol*. 180:37–54.
35. Díez-Méndez A, García-Fraile P, Solano F, Rivas R (2019). The ant *Lasius niger* is a new source of bacterial enzymes with biotechnological potential for bleaching dye. *Sci. Rep. Nature Publishing Group*. 9:1–11.
36. Bharti H, Guénard B, Bharti M, Economo EP (2016). An updated checklist of the ants of India with their specific distributions in Indian states (Hymenoptera, Formicidae). *Zookeys. Pensoft Publishers*. 1–83.



37. Bano R, Roy S (2016). First record of *Galeodes indicus* Pocock, 1900 (Arachnida: Solifugae: Galeodidae) from Rajasthan, India. *Journal of Threatened Taxa. Wildlife Information Liaison Development Society.* 8623–5.
38. Khanna V, Yadav BE (1998). Indian Species of Genus *Scolopendra* Linn, (Chilopoda: Scolopendridae) with Description of a New Species. *Rec. Zool. Surv. India.* 116:211–20.
39. Donoughe S, Extavour CG (2016). Embryonic development of the cricket *Gryllus bimaculatus*. *Deve. Bio. Aca. Pre. Inc.* 411:140–56.
40. Senior-White, R., Aubertin, D, Smart, J. (1940). The fauna of British India including the remainder of the Oriental region. Diptera vol VI, family Calliphoridae. Today and Tomorrow Printers and Publishers, New Delhi
41. Tikader BK, Gajbe UA (1976). Studies on some spiders of the genus *Zelotes gistel* from India (family: Gnaphosidae). *Proceedings of the Indian Academy of Sciences - Section B.* Springer. 83:109–22.
42. Lalonde MML, Marcus JM (2022). A global molecular phylogeny yields insights into the dispersal and invasion history of *Junonia*, a butterfly genus with remarkable dispersal abilities. *Proc. Biol. Sci.* 289.
43. Alves SM, Bélo M (2002). Morphometric variations in the housefly, *Musca domestica* (L.) with latitude. *Genetica.* Springer. 115:243–51.
44. LeConte, J.L. (1853). Description of twenty new species of Coleoptera inhabiting the United States. *Proc. Aca. Nat. Sci. Philadelphia.* 6: 226-235.
45. Varshney ER, Smetacek P, Cotton AM, Fric ZF, Jit Gupta I, van Gasse P, et al (2015). A Synoptic Catalogue of the Butterflies of India. *Butterfly Research Centre.* 136.
46. Das S, Lushai G, Allen JA (2005). A classification of *Danaus* butterflies (Lepidoptera: Nymphalidae) based upon data from morphology and DNA. *Zoological Journal of the Linnean Society [Internet]. Oxford Academic.* 44:191–212.
47. Sachin A, Santosh M (2013). The moths (Lepidoptera: Heterocera) of northern Maharashtra: A preliminary checklist. 5: 4693-4713.
48. Willemse, C (1930). *Tijdschr. v. Entomologie* 73:49.
49. Saji, K. (2018). *Catopsilia pomona* Fabricius, 1775 – Lemon Emigrant. Kunte, K., S. Sondhi, and P. Roy (Chief Editors). *Butterflies of India*, v. 2.38. Indian Foundation for Butterflies.
50. Malloch JR (1939). LIII— The Dipterous Genus *Cephaloconus* Walker (Family Sapromyzidæ) . *Annals and Magazine of Natural History.* Informa UK Limited. 3:447–9.
51. Gujar GT, Kalia VK (2005). Hemocyte diversity of the American bollworm *Helicoverpa armigera*. *Phytoparasitica.* Priel Publishers. 33:17–27.
52. Scarbrough A (2007). New species of *Damalis* Fabricius and *Ommatius* Wiedemann (Diptera: Asilidae) from India. *Proc. Entomol. Soci. Washington.* 109:643–8.
53. Mirza Z, Ambekar M, Kulkarni N (2019). A new species of scorpion of the genus *Hottentotta Birula*, 1908 from the Western Ghats, India (Scorpiones: Buthidae). *Arachnida – Rivista Aracnologica Italiana.* XXII:2–16.
54. Komal J, Shashank PR, Sondhi S, Madan S, Sondhi Y, Meshram NM, et al (2021). Moths (Insecta: Lepidoptera) of Delhi, India: An illustrated checklist based on museum specimens and surveys. *Biodiversity Data Journal.* Pensoft Publishers. 9:1–73.



55. Veenakumari K, Veeresh GK (1996). Notes on the feeding and breeding behaviour of *Gymnopleurus gemmatus* Harold and *Gymnopleurus miliaris* (F.) (Coleoptera: Scarabaeidae). J. Bombay Nat. Hist. Soc. 93:13–9.
56. Sabu TK, Vinod K v., Jobi MC (2008). Life history, aggregation and dormancy of the rubber plantation litter beetle, *Luprops tristis*, from the rubber plantations of moist south Western Ghats. J. Inse. Sci. Library of the University of Arizona. 8.
57. Simon C, Cooley JR, Karban R, Sota T (2022). Advances in the Evolution and Ecology of 13- and 17-Year Periodical Cicadas. Ann. Revi. Entomol. Annual Reviews Inc. 67:457–82.
58. Brooks S (1994). A taxonomic review of the common green lacewing genus *Chrysoperla* (Neuroptera: Chrysopidae). undefined.
59. Lutken (1864). Some new reptiles and amphibians. Scientific notices from the Danish natural history association in Copenhagen. 2, 4:292-311.
60. Global Invasive Species Database (2022) Species profile: *Hemidactylus frenatus*.
61. Singh LAK, Acharjyo LN, Bustard HR (1984). Observations Of The Reproductive Biology Of The Indian Chameleon *Chamaeleo zeylanicus*. The journal of the Bombay Natural History Society Bombay Natural History Society. 81:86–92.
62. Whitaker, R. and Captain, A .2004. Snakes of India. The Field Guide. Draco Books.Chengalpattu, Tamil Nadu,xiv+479.
63. Avibase, (2012). Avibase - the world bird database.
64. Rajpar MN, Rajpar AH, Zakaria M (2022). Riverine forest as a significant habitat to harbor a wide range of bird species. Braz J Biol. 84.
65. Cottrell GW, Greenway JC, Mayr E, Paynter RA, Peters JL, Traylor MA (2011). Check-list of birds of the world. Check-list of birds of the world. Harvard University Press.
66. Praveen J, Jayapal R, Pittie A (2016). Checklist of the birds of India (v1.1).
67. Johansson US, Irestedt M, Qu Y, Ericson PGP (2018). Phylogenetic relationships of rollers (Coraciidae) based on complete mitochondrial genomes and fifteen nuclear genes. Mol Phylogenet Evol. 126:17–22.
68. Ruan L, Zhang Y, Zhao D, Dong Y, Mauro F (2003). [*Egretta garzetta* as a bioindicator of environmental pollution in Tai Lake region]. Ying Yong Sheng Tai Xue Bao.14:263–8.
69. Charles H, Fry K, Harris A (1992). Kingfishers, bee-eaters & rollers : a handbook. Princeton New Jersey: Princeton University Press.
70. Praveen J, Jayapal R, Pittie A (2018). Checklist of the birds of India (v2.0).
71. Ali S, 1896-1987, Ripley SD, 1913-, Dick JH, 1919-. Compact handbook of the birds of India and Pakistan. Oxford University Press.
72. Ali, Salim (1941). The book of Indian birds. Bombay. J. Bombay Nat. Hist. Soc. -Via Digital Library of India.
73. Arlettaz R, Fournier J, Zbinden N (2000). Evolution démographique (1979–1998) d'une population témoin de Huppe fasciée *Upupa epops* en Valais et stratégie de conservation ciblée. Nos Oiseaux 47: 19-27.
74. Sailaja R, Kotak VC, Sharp PJ, Schmedemann R, Haase E (1988). Environmental, dietary, and hormonal factors in the regulation of seasonal breeding in free-living female Indian rose-ringed parakeets (*Psittacula krameri*). Hormones and Behavior. 22:518–27.



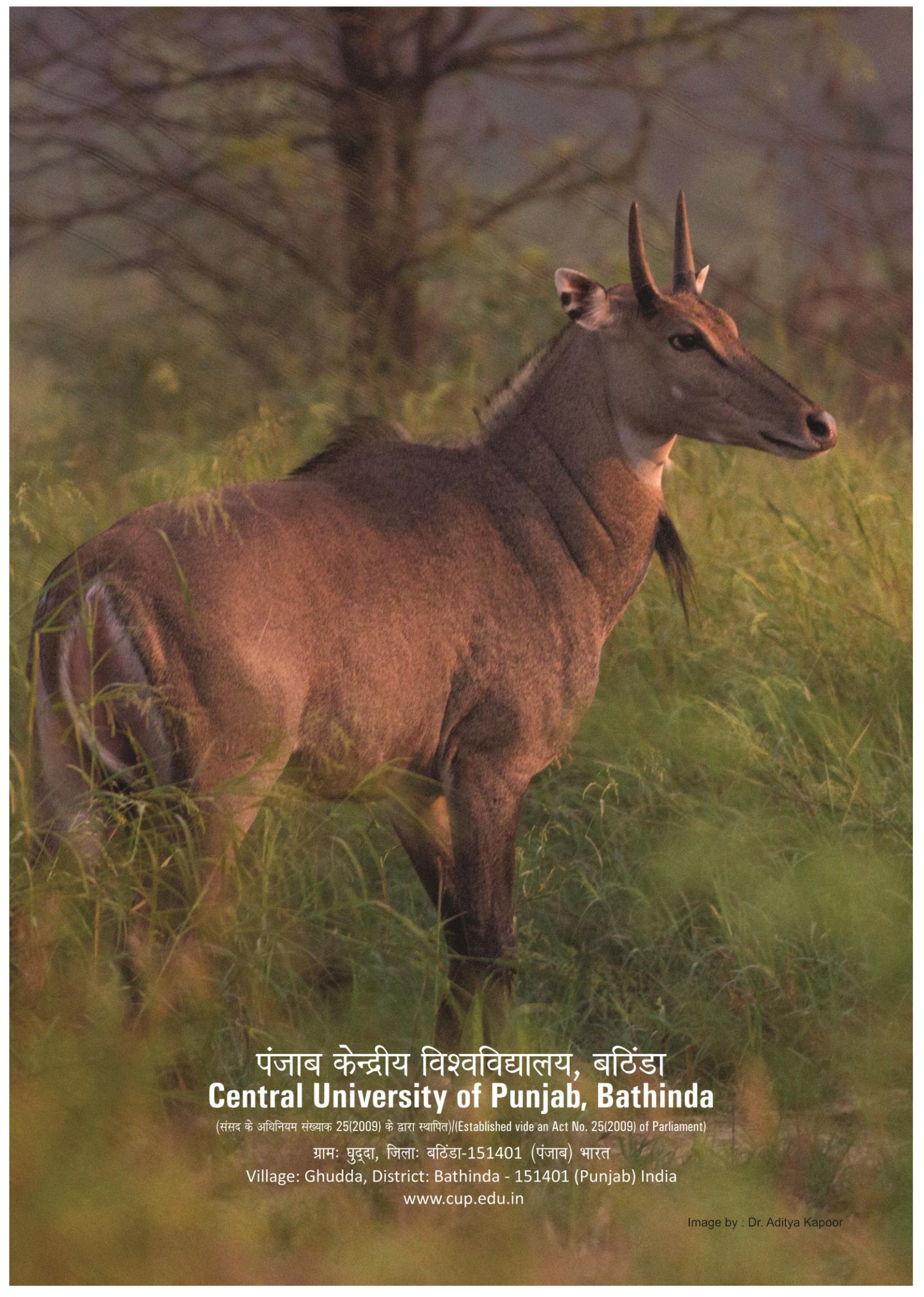
75. Khan AN (2015). Indian black ibis *Pseudibis papulosa* feeding on carrion. J. Bombay Nat. Hist. Soc. Scientific Publishers. 28.
76. Jayapal R, Rasmussen P, Jayadevan P (2019). Birds of South Asia: Additions over 'The Ripley Guide.' Indian BIRDS.15:112–6.
77. Rasmussen PC, Anderton JC, Alderfer JK, National Museum of Natural History (U.S.), Smithsonian Institution., Michigan State University (2012). Birds of South Asia : the Ripley guide. Smithsonian National Museum of Natural History.
78. Pittie A (2003). A Note on the Circumorbital Skin Colour of Indian Grey Hornbill *Ocyrceros Birostris*. The journal of the Bombay Natural History Society.100:141–2.
79. BirdLife International 2012. Bubulcus ibis. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2.
80. Jennings S, Lumpkin D, Warnock N, Condeso TE, Kelly JP (2021). Great egret (*Ardea alba*) habitat selection and foraging behavior in a temperate estuary: Comparing natural wetlands to areas with shellfish aquaculture. PLoS One. 16
81. Praveen J, Jayapal R, Pittie A (2016). Checklist of the birds of India (v1.0).
82. Ali S, Ripley S D (1987). Compact handbook of the birds of India and Pakistan together with those of Bangladesh, Nepal, Bhutan and Sri Lanka.2nd ed. Delhi: Oxford University Press.1–737.
83. Datt SA, Tuljapurkar VB, Jathar GA (2018). Checklist of the avifauna of Sagareshwar Wildlife Sanctuary, Maharashtra, India. 12368–12375.
84. Taylor, B., Christie, D.A. & Kirwan, G.M. (2018). Common Moorhen (*Gallinula chloropus*). In: del Hoyo, J., Elliott, A., Sargatal, J., Christie, D.A. & de Juana, E. (eds.). Handbook of the Birds of the World Alive. Lynx Edicions, Barcelona.
85. Abdulali, H. (1981). Checklist of the Birds of Maharashtra with Notes on their Status around Bombay, Maharashtra. J. Bombay Nat. Hist. Soc, Bombay, 16pp
86. Brazil M (2009). *Birds of East Asia: eastern China, Taiwan, Korea, Japan, eastern Russia*. Christopher Helm, London.
87. Marc, Herremans, Michel, Louette, Royal (2008). A partial post-juvenile molt and transitional plumage in the shikra (*Accipiter badius*) and grey frog hawk (*Accipiter soloensis*).
88. Ferguson-Lees James, Christie DA (2001). Raptors of the world / James Ferguson-Lees and David A. Christie ; illustrated by Kim Franklin, David Mead, and Philip Burton. Christopher Helm London, UK.
89. Wasser DE, Sherman PW (2010). Avian longevities and their interpretation under evolutionary theories of senescence. J. Zoo. John Wiley & Sons. 280:103–55.
90. Snow D, David W, Perrins CM, Robert G (1998). The birds of the western Palearctic. Concise ed. Oxford ; New York: Oxford University Press.
91. Urquhart Ewan, Bowley Adam (2002). Stonechats : a guide to the genus *Saxicola*. Christopher Helm.
92. Ellerman JR (1961). Rodentia. *The fauna of India including Pakistan, Burma and Ceylon. Mammalia*, Manager of Publications, Zoo. Sur. India, Calcutta, USA.
93. Hamada Y, Watanabe T, Chatani K, Hayakawa S, Iwamoto M (2005). Morphometrical comparison between Indian- and Chinese-derived rhesus macaques (*Macaca mulatta*). Anthropro. Sci. 113:183–8.



94. Leslie DM (2008). *Boselaphus Tragocamelus* (Artiodactyla: Bovidae). Mammalian Species. Oxford University Press (OUP). 813:1–16.

95. Suchentrunk F, Davidovic M (2004). Evaluation of the classification of Indian hares (*Lepus nigricollis*) into the genus *Indolagus* Gureev, 1953 (Leporidae, Lagomorpha). Mamm. Biol. Elsevier GmbH. 69:46–57.





पंजाब केन्द्रीय विश्वविद्यालय, बठिंडा
Central University of Punjab, Bathinda

(संसद के अधिनियम संख्याक 25(2009) के द्वारा स्थापित)/(Established vide an Act No. 25(2009) of Parliament)

ग्राम: घुद्दा, जिला: बठिंडा-151401 (पंजाब) भारत

Village: Ghudda, District: Bathinda - 151401 (Punjab) India

www.cup.edu.in

Image by : Dr. Aditya Kapoor