

वयं राष्ट्रे जागृयाम् पुरोहिताः



**Govt. Girls' P.G. College, Ujjain (M.P.)**

(Established in 1958)

A Centre for Excellence, "A" Graded by NAAC in Two Cycles

Affiliated to Vikram University, Ujjain



**Internal Quality Assurance Cell  
Environmental Audit of College Campus  
A Quality Initiative  
2021-22**

## **Introduction**

Rapid urbanization and economic development at local, regional and global level have led to multiple environmental and ecological crises. Environmental sustainability is becoming an increasingly important issue for the nation. Besides, most of the Sustainable Development Goals somehow aim at achieving Green Growth. Life on Land and harmony towards biodiversity are also major concern. The campus has innumerable animal species which play a vital role in maintaining the ecological balance and food chain along with clean, green environment for the students and visitors. Against this backdrop it becomes essential to adopt the policy of Green Campus for the institutes which will lead to sustainable development. It is part of Institutional Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through carbon footprint reduction measures. Green audit is a valuable means for a college to determine the floral and faunal biodiversity of campus, how and where energy or water or other resources are being used; the college can then consider how to implement changes and take conservation measures. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus, it is imperative that the Govt. Girls PG College, Ujjain evaluates its own contributions toward a sustainable future.

Environmental Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of institute. It aims to analyse environmental practices within and outside of College campus, which will have an impact on the eco-friendly atmosphere.

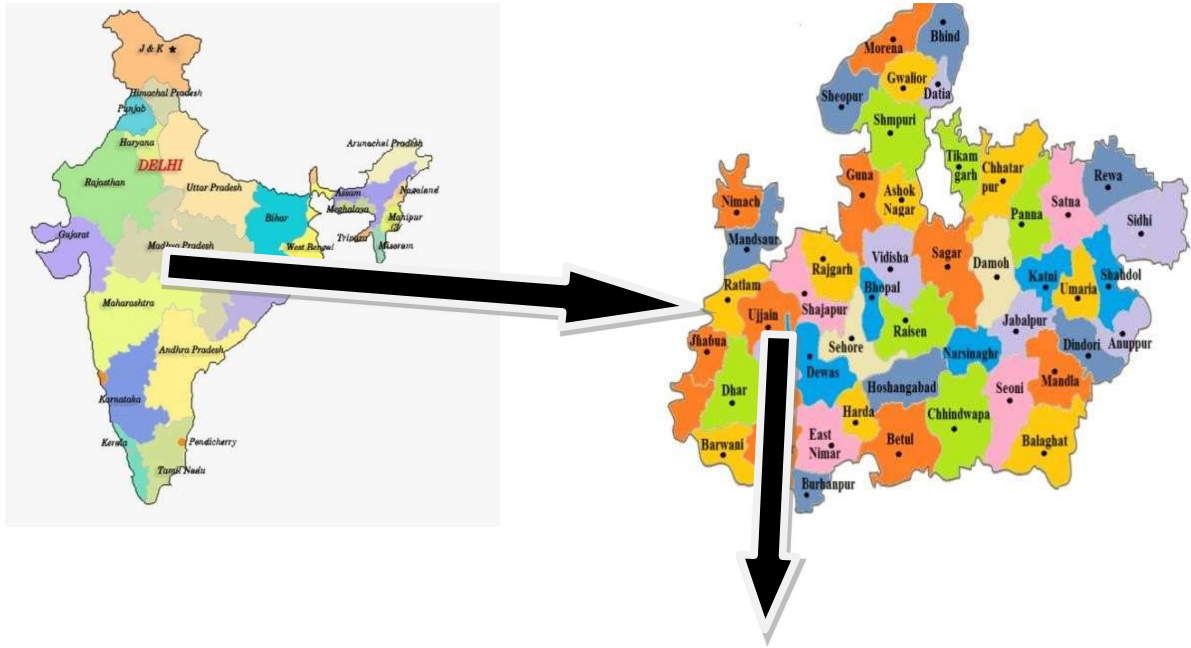
## **Climate Condition of Govt. Girls PG College, Ujjain**

The area falls under semi-temperate zone with four seasons namely-Summer, Winter, Spring and Autumn. In Ujjain the wet season is oppressive and is mostly cloudy, the dry season is mostly clear, and it is hot year around. Over the course of a year, the temperature typically varies from 52<sup>0</sup>F to 103<sup>0</sup>F and is rarely below 46<sup>0</sup>F or above 108<sup>0</sup>F.

## Drone view of College

Govt. Girls' P.G. College Ujjain is located in  $23.17^{\circ}$  N and  $75.79^{\circ}$  E. It has an average Altitude 445.55 meters (Fig- 1). Sq.m. (according to PIUPWD).

Fig. 1





# Audit of Insect Diversity in Govt. Girls' PG College, Ujjain

## **Insect Diversity in Govt. Girls PG College, Ujjain**

**Conducted by Dr. Pratibha Akhand  
Head, Zoology and Biotechnology Department  
Govt. Girls PG College, Ujjain**

Considering the sheer number of diversity of insects in India. A generous effort has been made to document the most common and rare species of insects occurring in GGPGC.

A total of 115 individual specimens were recorded during the present study belonging to 10 orders and 41 families (TABLE -1). Most of the specimens were identified up to genus or species-level. Five non-insect orders were also recorded, represented by at least 9 specimens. With respect to the present study, Lepidoptera is represented by the largest number of species, followed by Hymenoptera, Orthoptera, Coleoptera, Hemiptera, Diptera, Odonata, Montadea, Neuroptera and Blattodea. In terms of Family-level diversity Lepidoptera shows the highest diversity, followed by Coleoptera, Hemiptera, Diptera, Hymenoptera, Orthoptera, Odoneta, Neuroptera, Blattodea and Montodea (Fig.- 2).

Density-wise, the most common social insect is ants, followed by termites, and wasps. In terms of solitary insects, the most common is butterflies and moths (Lepidoptera), followed by crickets (Orthoptera), true bugs (Hemiptera), bees and true flues (Diptera), and damselflies (Odonata).

**Table 1****List of INSECTS recorded from GGPGC, Ujjain Campus**

S. NO.	ORDER	FAMILY	GENUS	BINOMIAL NAME	COMMON NAME	Occurrence STATUS
1	Lepidoptera	Papilionidae	<i>Papilio</i>	<i>Papilio polytes</i>	Common Mormon	C
2	Lepidoptera		<i>Papilio</i>	<i>Papilio demoleus demoleus</i>	Lime Butterfly	C
3	Lepidoptera		<i>Graphium</i>	<i>Graphium agammenon</i>	Tailed Jay	C
4	Lepidoptera		<i>Graphium</i>	<i>Graphium doson</i>	Common jay	C
5	Lepidoptera	Pieridae	<i>Delias</i>	<i>Delias eucharis</i>	Common Jezebel	C
6	Lepidoptera		<i>Catopsilia</i>	<i>Catopsilia ponona</i>	Common Emigrant	C
7	Lepidoptera		<i>Catopsilia</i>	<i>Catopsilia pyranthe pyranthe</i>	Mottled Emigrant	C
8	Lepidoptera		<i>Belonois</i>	<i>Belonois aurota aurota</i>	Pioneer white	C
9	Lepidoptera		<i>Ixias</i>	<i>Ixias Marianne</i>	White orange tip	C
10	Lepidoptera		<i>Ixias</i>	<i>Ixias pyrene</i>	Yellow orange tip	C
11	Lepidoptera		<i>Appias</i>	<i>Appias albino</i>	Common albatross	C
12	Lepidoptera		<i>Eurema</i>	<i>Eurema heobe</i>	Common grass yellow	C
13	Lepidoptera		<i>Eurema</i>	<i>Eurema brigitta</i>	Small grass yellow	C
14	Lepidoptera		<i>Colitis</i>	<i>Colitis eucharis</i>	Plain branded tip	C
15	Lepidoptera		<i>Pareronia</i>	<i>Pareronia ceylanica</i>	Dark wanderer	C
16	Lepidoptera	Nymphalidae	<i>Danaus</i>	<i>Danaus chrisippus</i>	Plain Tiger	R
17	Lepidoptera		<i>Trimula</i>	<i>Trimula limniace leopardus</i>	Blue Tiger	C
18	Lepidoptera		<i>Phalanta</i>	<i>Phalanta phalanta</i>	Common Leopard	C
19	Lepidoptera		<i>Euploea</i>	<i>Euploea core core</i>	Common Indian Crow	C
20	Lepidoptera		<i>Hypolimnas</i>	<i>Hypolimnas bolina</i>	Great Egg fly	C
21	Lepidoptera		<i>Melanitis</i>	<i>Melanitis leda ismene</i>	Common Evening Brown	C
22	Lepidoptera		<i>Junonia</i>	<i>Junonia atlites</i>	Grey Pansy	C
23	Lepidoptera		<i>Junonia</i>	<i>Junonia hierata</i>	Yellow pansy	C
24	Lepidoptera		<i>Junonia</i>	<i>Junonia almana almanac</i>	Peacock Pansy	C
25	Lepidoptera		<i>Junonia</i>	<i>Junonia orithya swinhoei</i>	Blue Pansy	C

26	Lepidoptera		<i>Junonia</i>	<i>Junonia lemonais vaisya</i>	Lemon Pansy	C
27	Lepidoptera		<i>Neptis</i>	<i>Neptis hylas astola</i>	Common Sailor	C
28	Lepidoptera		<i>Telchinia</i>	<i>Telchinia violae</i>		R
29	Lepidoptera		<i>Parantica</i>	<i>Parantica aglea</i>	Glossy tiger	C
30	Lepidoptera		<i>Ariadne</i>	<i>Ariadne merione</i>	Common castor	C
31	Lepidoptera		<i>Euthalia</i>	<i>Euthalia nais</i>		C
32	Lepidoptera		<i>Ypthima</i>	<i>Ypthima asterope</i>	Common three ring	C
33	Lepidoptera		<i>Castalius</i>	<i>Castalius rosimon rosimon</i>	Common Pierrot	C
34	Lepidoptera		<i>Talicauda</i>	<i>Talicauda nyseus</i>	Red Pierrot	V
35	Lepidoptera		<i>Jamides</i>	<i>Jamides celeno aelianus</i>	Common Cerulean	C
36	Lepidoptera		<i>Lampides</i>	<i>Lampides boeticus</i>	Pea blue	C
37	Lepidoptera		<i>Catochrysopus</i>	<i>Catochrysopus cnejus</i>		C
38	Lepidoptera	Lycaenidae	<i>Chilades</i>	<i>Chilades pandava</i>	Plains Cupid	C
39	Lepidoptera		<i>Pseudozeeria</i>	<i>Pseudozeeria maha</i>	Pale grass blue	C
40	Lepidoptera		<i>Freyeria</i>	<i>Freyeria patli</i>		C
41	Lepidoptera		<i>Chilades</i>	<i>Chilades parrhassius</i>	Small cupid	C
42	Lepidoptera		<i>Tarucus</i>	<i>Tarucus nara</i>	Striped pierrot	C
43	Lepidoptera		<i>Arthropala</i>	<i>Arthropala bazalus</i>	Powdered oak blue	C
44	Lepidoptera		<i>Tarucus</i>	<i>Tarucus ananda</i>		C
45	Lepidoptera		Hesperiidae	<i>Hasora</i>	<i>Hasora chromus</i>	Common Banded Awl
46	Lepidoptera	<i>Spialia</i>		<i>Spialia galba</i>	Indian skipper	C
47	Lepidoptera	<i>Sarengesa</i>		<i>Sarengesa purendra</i>	Spotted small flat	C
48	Lepidoptera	<i>Pelopidas</i>		<i>Pelopidas mathias</i>	Small blended swift	C
49	Lepidoptera	Sphingidae	<i>Agrius</i>	<i>Agrius convolvuli</i>	Convolvulus hawk moth	C
50	Lepidoptera	Noctuidae	<i>Chalciope</i>	<i>Chalciope mygdon</i>		R
51	Lepidoptera	Crambidae	<i>Antigastra</i>	<i>Antigastra catalaunalis</i>	Sesame Leaf Roller Moth	C
52	Lepidoptera		<i>Maruca</i>	<i>Maruca vitrata</i>		C
53	Coleoptera	Coccinellidae	<i>Coccinella</i>	<i>Coccinella transversalis</i>	Ladybird Beetle	C
54	Coleoptera		<i>Brumoides</i>	<i>Brumoides suturalis</i>	Ladybird Beetle	C
55	Coleoptera	Scarabaeidae	<i>Anomala</i>	<i>Anomala cf dimidiata</i>	Flower Chafer	C



56	Coleoptera	Meloidae	<i>Mylabris</i>	<i>Mylabris pustulata</i>	Blister Beetle	C
57	Coleoptera	Cerambycidae	<i>Chlorophorus</i>	<i>Chlorophorus sp.</i>	Round-necked Longhorn Beetle	C
58	Coleoptera	Buprestidae	<i>Agrilus</i>	<i>Agrilus sp.</i>	Jewel Beetle	R
59	Coleoptera		<i>Chrysocoris</i>	<i>Chrysocoris chinonsis</i>		C
60	Coleoptera	Elateridae	<i>Agrypnus</i>	<i>Agrypnus fuscipes</i>	Click Beetle	C
61	Coleoptera		<i>Lanelater</i>	<i>Lanelater sp.</i>	Click Beetle	C
62	Coleoptera	Staphylinidae			Rove Beetle	C
63	Hemiptera	Pentatomidae	<i>Erthesina</i>	<i>Erthesina fullo</i>	Stink Bug	C
64	Hemiptera		<i>Carbula</i>	<i>Carbula scutellata</i>	Shield Bug	C
65	Hemiptera		<i>Halys</i>	<i>Halys parvas</i>	Stink bug	C
66	Hemiptera	Alydidae	<i>Riptortus</i>	<i>Riptortus linearis</i>	Broad-headed Bug	C
67	Hemiptera	Coreidae	<i>Cletus</i>	<i>Cletus punctiger</i>	Leaf-footed Bug	C
68	Hemiptera	Miridae	<i>Lygus</i>	<i>Lygus sp.</i>	Leaf Bug	C
69	Hemiptera	Corixidae	<i>Corixa sp.</i>	<i>Corixa sp.</i>	Water Boatman	C
70	Hemiptera	Lygacidae	<i>Spilostethus</i>	<i>Spilostethus pandurus</i>		R
71	Diptera	Muscidae	<i>Musca</i>	<i>Musca domestica</i>	Housefly	C
72	Diptera	Sarcophagidae	<i>Sarcophaga</i>	<i>Sarcophaga sp.</i>	Flesh fly	C
73	Diptera	Syrphidae	<i>Episyrphus</i>	<i>Episyrphus sp.</i>	Hoverfly	C
74	Diptera	Drosophilidae	<i>Drosophila</i>	<i>Drosophila sp.</i>	Common fruit fly	C
75	Diptera	Culicidae	<i>Culex</i>	<i>Culex sp.</i>	Mosquito	C
76	Diptera	Psychodidae	<i>Clogmia</i>	<i>Clogmia sp.</i>	Moth fly	C
77	Hymenoptera	Formicidae	<i>Camponotus</i>	<i>Camponotus compressus</i>		C
78	Hymenoptera		<i>Technomyrmex</i>	<i>Technomyrmex albipes</i>	White-footed ghost ant	C
79	Hymenoptera		<i>Meranoplus</i>	<i>Meranoplus bicolor</i>		R
80	Hymenoptera		<i>Monomorium</i>	<i>Monomorium pharaonis</i>		C
81	Hymenoptera		<i>Tetraponera</i>	<i>Tetraponera rufonigra</i>	Arboreal Bicolour Ant	C
82	Hymenoptera		<i>Oecophylla</i>	<i>Oecophylla smaragdina</i>	Weaver Ant	C
83	Hymenoptera	Crabronidae	<i>Trypoxylon</i>	<i>Trypoxylon sp.</i>		C
84	Hymenoptera	Vespidae	<i>Ropalidia</i>	<i>Ropalidia brevita</i>	Paper wasp	C
85	Hymenoptera		<i>Ropalidia</i>	<i>Ropalidia marginata</i>	Paper wasp	C



86	Hymenoptera		<i>Vespa</i>	<i>Vespa tropica</i>	Tropical hornet	C
87	Hymenoptera		<i>Delta</i>	<i>Delta conoideum</i>	Potter wasp	C
88	Hymenoptera		<i>Ancistrocerus</i>	<i>Ancistrocerus sp.</i>	Potter wasp	R
89	Hymenoptera	Apidae	<i>Apis</i>	<i>Apis dorsata</i>	Indian honey bee	C
90	Hymenoptera		<i>Apis</i>	<i>Apis cerana</i>		C
91	Hymenoptera		<i>Apis</i>	<i>Apis florea</i>	Pygmy honey bee	C
92	Hymenoptera		<i>Xylocopa</i>	<i>Xylocopa fenestrata</i>	Carpenter bee	R
93	Orthoptera	Acrididae	<i>Phlaeoba</i>	<i>Phlaeoba infumata</i>		C
94	Orthoptera		<i>Aiolopus</i>	<i>Aiolopus thalassinus</i>		C
95	Orthoptera		<i>Spathosternum</i>	<i>Spathosternum parasiniferum</i>		C
96	Orthoptera		<i>Cyrtacanthacris</i>	<i>Cyrtacanthacris tatarica</i>		C
97	Orthoptera		<i>Gastrimargus</i>	<i>Gastrimargus africanus</i>		C
98	Orthoptera		<i>Stenocatanops</i>	<i>Stenocatanops splendens</i>		C
99	Orthoptera		<i>Acrididae</i>	<i>Acrididae exalata</i>		C
100	Orthoptera	Tettigoniidae	<i>Ducetia</i>	<i>Ducetia japonica</i>	Green katydid	C
101	Orthoptera		<i>Trigonidium</i>	<i>Trigonidium sp.</i>	Sword-tailed cricket	C
102	Orthoptera	Gryllidae	<i>Gryllodes</i>	<i>Gryllodes sigillatus</i>	Tropical house cricket	C
103	Orthoptera		<i>Loxoblemmus</i>	<i>Loxoblemmus sp.</i>		C
104	Orthoptera		<i>Acheta</i>	<i>Acheta domesticus</i>	House cricket	C
105	Odonata	Gomphidae	<i>Paragomphus</i>	<i>Paragomphus lineatus</i>	Common hooktail	C
106	Odonata	Libellulidae	<i>Bradionpyga</i>	<i>Bradionpyga geminata</i>	Granite ghost	C
107	Odonata		<i>Crocothemis</i>	<i>Crocothemis servilia</i>	Ruddy marsh skimmer	C
108	Odonata		<i>Neurothemis</i>	<i>Neurothemis intermedia</i>	Ruddy meadow skimmer	R
109	Odonata		<i>Brachythemis</i>	<i>Brachythemis contaminata</i>	Ditch jewel	R
110	Mantodea	Mantidae	<i>Statilia</i>	<i>Statilia maculata</i>	Praying mantis	C
111	Mantodea		<i>Hierodula</i>	<i>Hierodula sp.</i>	Praying mantis	C
112	Neuroptera	Chrysopidae	<i>Chrysoperla</i>	<i>Chrysoperla sp.</i>	Green lacewing	C
113	Neuroptera	Myrrenelontidae	<i>Creoleon</i>	<i>Creoleon sp.</i>		R
114	Blattodea	Tertmitidae		<i>Odontotermes bhagwati</i>	fungus-growing termites	C
115	Blattodea	Stylotermitidae		<i>Stylotermes faveolus</i>		C

Field Survey

The following section focuses on ecology of 52 members of Lepidoptera of GGPGC Ujjain (Plate1-9).

**PLATE -1**



*Papilio polytes*



*Papilio demoleus demoleus*



*Graphium agammenon*



*Graphium doson*



*Delias eucharis*



*Catopsilia ponona*

**PLATE -2**



*Catopsilia pyranthe pyranthe*



*Belonois aurota aurota*



*Ixias marianne*



*Ixias pyrene*



*Appias albino*



*Eurema heobe*



**PLATE -3**



**Eurema brigitta**



**Colitis eucharis**



**Pareronia ceylanica**



***Danaus chrisippus***



***Trimula limniace leopardus***



***Phalanta phalanta***

**PLATE -4**



*Euploea core core*



*Hypolimnas bolina*



*Melanitis leda ismene*



*Junonia atlites*



*Junonia hierata*



*Junonia almana almana*



**PLATE -5**



*Junonia orithya swinhoei*



*Junonia lemonais vaisya*



*Neptis hylas astola*



*Telchinia violae*



*Parantica aglea*



*Ariadne merione*

**PLATE -6**



**Euthalia nais**



**Ypthima asterope**



***Castalius rosimon rosimon***



***Talicada nyseus***



***Jamides celeno aelianus***



**Lampides boeticus**



**PLATE -7**



**Catochrysopterus cnejus**



**Chilades pandava**



**Pseudozeeria maha**



**Freyeria patli**



**Chilades parrhassius**



**Tarucus nara**

**PLATE -8**



***Arthropala bazalus***



***Tarucus ananda***



***Hasora chromus***



***Spialia galba***



***Sarengesa purendra***



***Pelopidas mathias***

PLATE -9



*Agrius convolvuli*



*Chalciopa mygdon*



*Antigastra catalaunalis*



*Maruca vitrata*



The following section of Audit contains photographs of 10 species of beetles belonging to 07 families recorded in GPGC (plate10-11).

**PLATE -10**



*Coccinella transversalis*



*Brumoides suturalis*



*Anomala cf dimidiata*



*Mylabris pustulata*



*Chlorophorus sp.*



*Agrilus sp.*

**PLATE -11**



*Chrysocoris chinensis*



*Agrypnus fuscipes*



*Lanelater sp.*



*Rove Beetle*

The following section of Audit contains photographs of the bugs recorded in GGPGC Ujjain ( Plate 12).

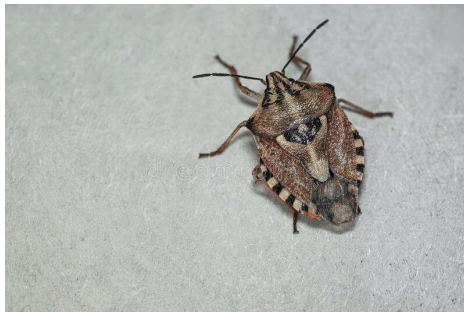
**PLATE -12**



*Erthesina fullo*



*Carbula scutellata*



*Halys parvas*



*Riptortus linearis*



*Cletus punctiger*



*Lygus sp.*





*Corixa sp.*



*Spilostethus pandurus*

The following section of Audit provides photographs of Diptera of GGPGC Ujjain (plate13).

**PLATE -13**



*Musca domestica*



*Sarcophaga sp.*



*Episyrphus sp.*



*Drosophila sp.*





*Culex sp.*



*Clogmia sp.*

In the present Audit, 16 members belonging to 04 families of **Hymenoptera** (**Humen = membrane; ptera = wings**) have been documented. The most documented diversity is made up by Formicidae, followed by Vespidae, Apidae and Carronidae. The following section focuses on ecology of 16 members of Hymenoptera of GGPGC Ujjain (Plate14-16).

**PLATE -14**



*Camponotus compressus*



*Technomyrmex albipes*



*Meranoplus bicolor*



*Monomorium pharaonis*



*Tetraponera rufonigra*



*Oecophylla smaragdina*

**PLATE -15**



*Trypoxylon* sp.



*Ropalidia brevita*



*Ropalidia marginata*



*Vespa tropica*



*Delta conoideum*



*Ancistrocerus sp.*

**PLATE -16**



*Apis dorsata*



*Apis cerana*



*Apis florea*



*Xylocopa fenestrata*



In the present Audit, 12 members have been documented belonging to 03 families of **Orthoptera** (**Ortho = straight; ptera = wings**) This section provides images for the 12 recorded in GGPGC under this study (plate17-19).

**PLATE -17**



*Phlaeoba infumata*



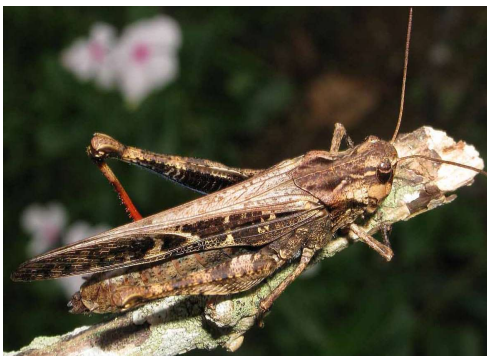
*Aiolopus thalassinus*



*Spathosternum parasiniferum*



*Cyrtacanthacris tatarica*



*Gastrimargus africanus*



*Stenocatantops splendens*

**PLATE -18**



*Acrididae exalata*



*Ducetia japonica*



*Trigonidium sp.*

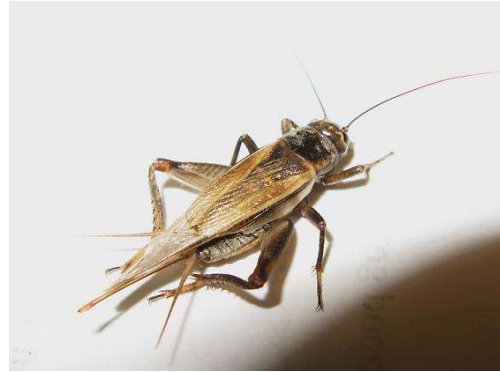


*Gryllodes sigillatus*

**PLATE -19**



*Loxoblemmus sp.*



*Acheta domesticus*

In the present Audit, 05 species belonging to 03 families of Odonates were recorded. This section provides photographs and information on 05 species recorded in the present study (plate 20)

**PLATE -20**



*Paragomphus lineatus*



*Bradionpyga geminata*





*Crocothemis servilia*



*Neurothemis intermedia*



*Brachythemis contaminata*

In the present study 02 species belonging to 02 families of Blottodea is recorded from GGPGC Ujjain.



*Statilia maculate*



*Hierodula sp.*



In the present study, 02 members have been recorded belonging individual family of **Mantodea** (**Mantis = prophet; odea = variety**) from GGPGC Ujjain.



*Chrysoperla sp.*



*Creoleon sp.*

Two families of Neuroptera (**Neuro = veined; ptera = wings**) have been identified under the present Audit represented by two individuals in GGPGC Ujjain.



*Odontotermes bhagwati*



*Stylotermes faveolus*

*Audit of  
Birds in the Campus*

## Insect Diversity in Govt. Girls PG College, Ujjain

Conducted by Dr. Saroj Ratnakar  
Assistant Professor, Zoology and Biotechnology Department  
Govt. Girls PG College, Ujjain

During the course of Audit Survey 42 bird species belonging to 8 orders and 25 families were found in and around college campus. Local Names, Birds local name, Scientific Names and their Occurrence Status are given in the Table-2:

**Table 2**

### List of BIRDS Recorded from GGPGC, Ujjain Campus

S. No.	Common Name	Local Name	Scientific Name	Occurrence Status
1.	Black Drongo	Jungle Kotwal	<i>Dicrurus macrocerius</i>	C
2.	Little Brown Dove	Chhota Fakhta	<i>Streptopelia Senegalensis</i>	C
3.	Blue Rock Pigeon	Kabutar	<i>Columba Livia</i>	C
4.	Yellow Footed Pigeon		<i>Treron phoenicoptera</i>	Uc
5.	House Sparrow	Gaurria	<i>Passer Domesticus</i>	R
6.	Red Vented Bulbul	Bulbul	<i>Pycnonotus cafer</i>	C
7.	Crow Pheasant	Jungle Kaua	<i>Centopus Sinensis</i>	R
8.	House Crow	Kawwa	<i>Corvus Splendens</i>	Uc
9.	Asian Koel	Koel	<i>Eudynamys</i>	C

			<i>Scolopaceus</i>	
10.	Common Myna	Myna	<i>Acridotheres Tristis</i>	C
11.	Grey Tit	Ramganga	<i>Parus Major</i>	R
12.	White Breasted Kingfisher	Kilkila	<i>Halcyon Smyrnensis</i>	C
13.	Small Blue Kingfisher	Kilkila	<i>Alcedo Atthis</i>	R
14.	Indian Roller	Neelkanth	<i>Coracias Gengahalensis</i>	C
15.	Asian Green Bee Eater	-	<i>Meropsorientalis</i>	Vc
16.	Jungle Babbler	Satbhai	<i>Turdoides Striatus</i>	C
17.	Oriental Magpie Robin	Daiyar	<i>Copsychus Saularis</i>	C
18.	Indian Robin	Kalchuri	<i>Saxicoloides Fulicata</i>	C
19.	Black Winged Kite		<i>Elanus Caeruleu</i>	R
20.	Brown Strike	Hariyal	<i>Lanius Cristatus</i>	R
21.	Rose Ringed Parakeet	Kandi Tota	<i>Psittaculakrameri</i>	C
22.	Common Peacock	Mayure	<i>Pavocristatus</i>	Uc
23.	White Eye Warbling	Baboon	<i>Zosterospalpebrosa</i>	C
24.	Black Redstart	Thirthira	<i>Phoenicurusochruros</i>	Vc
25.	Paradise Flycatcher	Dhudraj	<i>Terpsiphone</i>	R
26.	Cattle Egret	Bagula	<i>Babulus Ibis</i>	Vc
27.	Common Grey Hornbill	Dhanesh	<i>Ocyros Birostris</i>	Vc
28.	Common Tailor Bird	Dharji Phutki	<i>Orthotomus Sutorius</i>	Uc

C-Common, VC-very common, R-Rare, UC-Uncommon

Source: Field Survey

**Black drongo (*Dicrurus macrocerius*)**

**Status:**-Common

**Distribution:**-Throughout the Indian Union,  
Bangladesh,  
Pakistan Ceylon and Burma.

**Habits:**-A familiar bird of open country usually passed on Telegraph wires for attending on grazing cattle. It rides on the backs of grazing cattle and take toll of the insect disturbed by the animals movements through the grass. Forest fire or fired grass patches invariably attract number of dragons for the same reason. Highly beneficial to agriculture by the vast quantities of injurious insects it destroys.

**Food:**-Insects, flower nectar also regularly eaten

**Nesting season:**-April to August

**Little brown dove (Spilopelia senegalensis)**

**Status:-**Common

**Distribution:-**Throughout the Indian Union

**Habits:-**Affects dry stony scrub country with “cactus” brakes etc., in the neighbourhood of villages and cultivation, often side by side with111. Tane and confiding. Freely enters bungalows and nests on rafters and cornices.

**Food:-**Seeds and grain gleaned on the ground.

**Nesting season:-**Practically all year

## **Blue rock pigeon (Columba livia)**

**Status:-** very common

**Distribution:-** Throughout the Indian Union locally up to 13000 ft in the Himalayas. Bangladesh, Pakistan, Ceylon and Burma Resident but also partial migrant.

**Habits:-** In its perfectly wild state effects open country with cliffs and rocky hills, mostly seen in a semi domesticated condition living as a commensal of man and largely adulterated through interbreeding with fancy artificial strains. This semi feral stock has become thoroughly injured to the din and bustle of urban life is now well established in most Indian towns. Grain warehouses, railways station and old or disused building are their favourite haunts. Food:- Cereals, pulses and groundnuts.

**Nesting season:-** Undefined practically all year.





**Yellow Footed Pigeon *Treronphoenicoptera***

**Status:-** not common

**Distribution:-** Throughout the Indian Union Bangladesh, Ceylon and Burma.

**Habits:-** Gregarious and arboreal, only rarely descending to the ground. Affects well wooded country, commonly found in roadside trees, particularly banyan and people trees when in fruit, and also in gardens and groves near towns and villages. The unsuspected number that will tumble out of banyan and fly away on a shot being fired is often quite bewildering.

**Food:-** Fruits and berries

**Nesting season:-** Mainly March to June



**House Sparrow (*Passer domesticus*)**

**Status:-** Rare

**Distribution:-** Throughout the Indian Union Bangladesh, Pakistan, Ceylon and Burma worldwide. Apparently absent in the Andaman and Nicobar.

**Habits:-** A confirmed hanger-on of man, in hills and plains alike, whether in a bustling noisy city or out laying forest hamlet.

Sometimes collect in enormous flocks and does damage to



ripening crops and in market gardens. Non-breeding birds have favourite community roosts in leafy trees where large numbers for gather with much noise every evening. Chirping call notes to well-known.

**Food:**-Omnivorous, eat grain, insects, fruits buds, flower nectar and kitchen scraps.

**Nesting season:**-Practically all year the most favourite month varying with locality

**Crow Pheasant (*Centropus sinensis*)**

**Status:**- very common

**Distribution:**-Throughout the all Indian Union Bangladesh, Pakistan, Ceylon and Burma.

**Habits:**-One of the non-parasitic Cuckoo's and largely terrestrial.

Affects open forest scrub and bush country interspersed with grassland shrubbery and groves about human habitations. Stalks along the ground or climber's and hops with agility amongst branches of shrubs in search of food.

**Food:**-Caterpillars, large insects, lizards, young mice and birds eggs nestlings.

**Nesting season:**-February to September varying locally.



## **House Crow (Corvus**

**splendens) Status:-Common**

**Distribution:-** Throughout the Indian Union Bangladesh, Ceylon and Burma. Chiefly plains, but also many hill stations. Four geographical races based largely on paleness or darkness of the grey collar, palest in Sind and Kashmir, darkness in Burma.



**Habits:-**Perhaps the most familiar bird of Indian towns and villages. Lives in close association with man and obtains its livelihood from his works. Audacious, cunning and uncannily wary. A useful scavenger but also a greatbully and therefore a serious menace to defenseless ornamental bird species in urban areas. Has community roosts in selected trees or grooves where large numbers collect every night.

**Food:-** . Has no particular food preferences. Will eat almost anything, dead sewer rat, offal, carrion, kitchen scraps and refuse, locusts, termites, fruit, grain, and eggs or fledgling birds pilfered from nests.

**Nesting season:-**Principally April to June

**Koel (*Eudynamis scolopacea*)**

**Status:-**Very common

**Distribution:-**Throughout all Indian Union Bangladesh, Pakistan, Ceylon and Burma .Resident and also locally migratory.

**Habits:-**Brood-parasitic, arboreal frequents gardens, groves and open country abounding in large leafy trees.

Silent in winter, thus often overlooked and recorded as absent. Becomes increasingly noisy with the advance of the hot weather and then one of the earliest bird voice at dawn.

**Food:-**Largely fruits and berries also caterpillar and insects. Flight straight and wild with rapid wings beats.

**Nesting season:-**Mainly April to August



**Common myna (*Acridothera tristis*)**

**Status:-**Common

**Distribution:-**Throughout the Indian Union up to 9000 feet in the Himalayas in summer. Bangladesh, Pakistan, Ceylon and Burma.

**Habits:-**A confirmed associate of man, following where ever he opens up new habitations. Has a variety of sharp calls and chatter.

**Food:-**Omnivorous, eat fruits, insects, kitchen scraps. Follows the plough for earthworms etc. and attends on grazing cattle for the





grasshopper disturbed, side hopping jauntily and spring up in the year to capture them .

**Nesting season:-** April to August

**Grey tit (*Porus major*)**

**Status:-**Rare

**Distribution:-**Throughout the Indian Union Bangladesh, Pakistan, Ceylon, Burma. Plains and hills up to about 6,000 feet.

**Habits:-**Frequents well wooded localities but not dense humid forest. Singly, pairs or parties often hunting in association with other small insectivorous birds. Very active clings to spring flowering stems and tree trunks etc. upside down and in other acrobatic positions in search of food. The letter are held down underfoot and hacked open with the strong conical bill. Joyous sweeching notes utterd while moving about.

**Food:-**Insects, their eggs and larvae, flower buds, fruits, kernels of small nuts and seeds.

**Nesting season:-** February to November varying with locality



**White breasted Kingfisher (*Halcyon smyrnensis*)**

**Status:-** Common

**Distribution:-** Throughout the Indian Union, plains and lower hills. Bangladesh, Pakistan, Ceylon and Burma.

**Habits:-** The most familiar of our kingfisher and also the least dependent upon water. Seen at ponds, puddles, rain field ditches, inundated paddy fields and near the sea shore, but also in light forest at considerable distances from water. From a favourite lookout on telegraph wire or post, it pounces down on creeping prey and flies off with it to another perch nearby where the victim is battered to death and swallowed.

**Food:-** Fish, tadpoles, lizards, grasshoppers and other insects.

**Nesting season:-** Practically March to July.



**Small blue Kingfisher *Alcedo atthis***

**Status:-** Common

**Distribution:-** Throughout the Indian Union, Bangladesh, Pakistan, Ceylon & Burma.

**Habits:-** From time to time as the birds sits scanning the water from on overhanging branch, it bobs its head, turning it this side and that, and jacks its stub tail to the accompaniment of a subdued click. A sharp



chicchee, where uttered as it dashes off at top speed, low over the surface, from one corner of its beat to another. Its normal method of hunting is to drop bill foremost upon its quarry from an overhanging perch. Also perch on electric wires and trees,

**Food:-**Small fish, tadpole and aquatic insects.

**Nesting season:-**Practically March to June.

### **Indian roller (Coracias benghalensis)**

**Satatus:-**Common

**Distribution:-**Practically throughout the Indian Union from the Himalayan foothill south, Bangladesh, Pakistan, Ceylon & Burma. Resident and partial local migrant.

**Habits:-**Affects open cultivated country and light deciduous forest. From a high perch on a telegraph wire or other point of vantage it pounces upon some large insect, frog or lizards on the ground, returning with it either to the same perch or flying leisurely across to another nearby. Here the quarry is battered to death and swallowed. Highly beneficial to agriculture since it



destroys vast quantities of injurious insects. Has a variety of loud, raucous croaks and chuckles. Indulges in a spectacular courtship display, somersaulting and nosediving in the air to the accompaniment of harsh, grating screams.

**Food:**-Insects large and small.

**Nesting season:**-Chiefly March to July.

**Asian green bee eater (*Merops orientalis*)**

**Status:**-Very common

**Distribution:**-Throughout the Indian Union from about 5,000 ft in the Himalayas, Bangladesh, Pakistan, Ceylon and Burma. Resident and locally migratory.



**Habits:**-Inhabits open country, the neighbourhood of cultivation, forest bearings, follow land, gardens, golf links etc. Also partial to the zone above sandy beach along the sea coast. Launches aerial sallies after bees etc., snapping from upin its bill and circling back gracefully on outstretched motionless wings to the perch, where the quarry is battered to death and swallowed.

**Food:**-Insects, chiefly differs and Hymenoptera.

**Nesting season:**-Practically February to May.



**Jungle babbler (*Turdoides striatus*)**

Status:- uncommon

**Distribution:-**Throughout the Indian Union, Bangladesh, Pakistan, Ceylon, plains and hills up to about 5000 feet elevation.

**Habits:-**Inhabits outlying jungle, well wooded compounds, gardens and groves of trees about towns and villages.

Flocks or sisterhood hop about on the ground rummaging amongst the fallen leaves and mulch for moths and other insects. They usually form the nucleus of the mixed hunting parties of birds in forest. The flocks keeps up a constant conversational chatter and squeaking which sometimes develops into loud discordant wrangling. Sociable even while paired off and nestlings, feeding in frocks and banding together to ward off attack by predatory hawk or cat.

**Food:-**Spiders, cockroaches and other insects, and larvae, wild figs, berries, grains and nectar of flowers coral, silk cotton and other trees.

**Nesting season:-**Irregularly throughout the year.

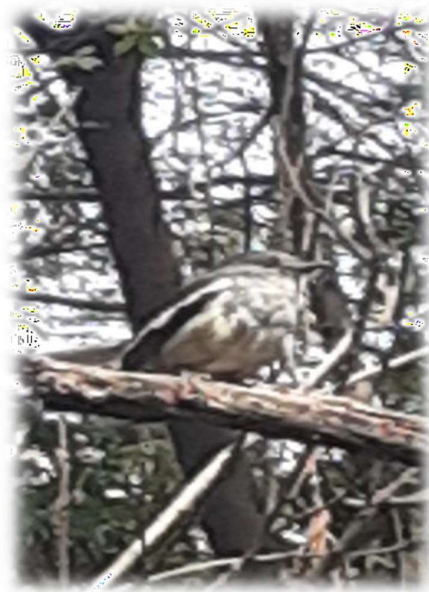


**Oriental magpie robin (*Copsychus saularis*)**

Status:-Very common

**Distribution:-**Throughout the Indian Union Bangladesh, Pakistan, Ceylon, Burma up to about 7500 fit elevation. Absent in arid areas.

**Habits:-**One of the more familiar birds about towns and villages. Shy, silent and unobtrusive during non-breeding season, then skulking in shrubbery and only uttering, plaintive *swee-ee* and harsh *chur-r*. Very good mimic of other birds calls. Breeding territories jealously guarded and intruding males defied with puffing out strutting and much show of pugnacity.



**Food:-**Insects, chiefly picked off the ground and flower nectar.

**Nesting season:-**In India April to July.

**Indian robin (*Saxicoloides fulicata*)**

**Status:-**Very common

**Distribution:-**Throughout the Indian Union, Bangladesh, Pakistan, Ceylon. Plains and hills up to about 5,000 ft.

**Habits:-**Familiar and conflicting. Frequent stony scrub country around towns and villages, commonly perching on thatched roofs of huts and entering to verandas to pickup

insects. Hops along the ground, mounting a rock, termite mound or fence post and tossing upward the jaunty cocked tail. Hen(female bird)ashy brown without the wing-patch. Male sprightly black bird with a white patch on wing and rusty red under root of cocked tail.



**Food:**-Insects and their eggs and spiders.

**Nesting season:**- April to June.

**Black winged kite *Elanus caeruleus***

**Status:**-Uncommon

**Distribution:**-Patchily throughout the Indian Union from the base of the Himalayas, Bangladesh, Pakistan, Ceylon and Burma. Resident and locally migratory.

**Habits:**-Rather crepuscular, but also active in day time. Inhabits well wooded country and cultivation also

thin that deciduous forest and grassland. Avoids dense jungle as well as arid plains. Keep to a favoured locality, perched on the same pole or tree top from day to day, whence to keep a lookout and pounce upon crawling prey. Cocks tails from time to time, jerking it up and down between the drooping wings. Also hovers in mid-air to scan the ground, and parachutes down in steps with motionless wings raised vertically above the body till when only a few feet above closes them and drops on the quarry, bearing it away in its claws.

**Food:**-Locusts, crickets, mice, lizards etc.

**Nesting season:**-Practically all year.



**Common wood Strike (*Tephrodornispon dicerianus*)**

**Status:**-Very common

**Distribution:**-Throughout the Indian Union, south of the Himalayas foothills. Bangladesh, Ceylon and Burma.

**Habits:-**Affect scrub and bush country and light deciduous forest commonly seen in gardens among roadside trees and in groves of Babool, Neem etc., around cultivation and villages. Parties hunt amongst foliage often in mixed company of other small birds and follow one another gliding from tree to tree.

**Food:-**Moths, beetles, caterpillars etc., captured in trees, occasionally in the air like a flycatcher, seldom on ground as in true shrike.

**Nesting season:-** February to September.



### **Rose ringed parakeet (*Psittacula krameri*)**

**Status:-**Common

**Distribution:-**Throughout the Indian Union from the Himalayas foothills South. Plains and locally up to 5,000 ft in the Peninsular hills. Bangladesh, Pakistan, Ceylon and Burma.

**Habits:-**One of the most familiar of Indian birds, as much at home on the countryside as within villages and towns. Often bands itself into large flocks and is highly destructive at all time to crops and orchard fruit, gnawing and wasting for more than it actually eats.

**Food:-**Berries, fruits, vegetables.





**Nesting season:**-chiefly February to April.

**Common peafowl (*Pavo cristitus*)**

**Status:**-Common

**Distribution:**-Throughout the Indian Union locally up to 5,000 ft in the Himalayas, Bangladesh and Ceylon.

**Habits:**- Inhabits dense scrub and deciduous jungle plains and foothills-preferably in the neighbourhood of rivers and streams polygamous usually parties of one with four or five hens, but seasonally of the sexes

separately. Always excessively shy and alert. Slinks away through the undergrowth on its legs and flies only when suddenly come upon or to cross a river or open river bed. Roosts at night in large trees.

**Food:**-Grains, vegetables, fruits, insects, lizards, snakes.

**Nesting season:** - January to October.

**White eye (warbling *Zosteropus palpebrosa*)**

**Status:**-Common

**Distribution:**-Throughout the Indian Union Bangladesh, Pakistan. Ceylon and Burma, excepting actual desert. Resident and locally migratory.

**Habits:**-Arboreal. Flocks of 5 to 20 or more hunt energetically among the foliage of trees and bushes for insect of



and clinging upside down and peering into likely nooks and crannies in the manner of tits. Feeble jingling conversational notes keep the member of a flock together.

**Food:-**They subsist largely on flower nectar and on the fleshy pulp of fruits and berries.

**Nesting season:-**Practically April to July.

### **Redstart (*Phoenicurus phoenicurus*)**

**Status:-** Very common

**Distribution:-**Throughout the Indian union in winter more and less, Bangladesh, Pakistan and Burma. Not Ceylon. Plains and hills.

**Habits:-**Met with between September and April around villages and cultivation, in groves of trees, stony hummocks and dry scrub jungle. Flits from perch to perch on rooftop, boulder or branch, ceaselessly shivering its tail.

**Food:-**Insects and spiders etc., usually picked off the ground. Winged insects sometimes captured in the air like a flycatcher.

**Nesting season: -** May to August.



### **Paradise flycatcher (Terpsichore paradise)**

**Status:-**Rare

**Distribution:-**Throughout the Indian union, Pakistan, Bangladesh, Ceylon and Burma. Plains and up to about 5000 ft in the Himalayas. Resident in some localities.

**Habits:-**Frequents shady groves and gardens, often about human habitations, and light deciduous jungle with bamboo-clad ravines. The agile fairy like movements of the male as he twists and turns in the air often flies, with his tail ribbon looping or trailing behind, is a spectacle of exquisite charm. Adult male silver white with metallic black crested head and two long, narrow ribbon like feathers in tail. Female chestnut above, greyish white below, very like a bulbul in overall appearance.

**Food:-**Flies gnats and other dipterous insects.

**Nesting season:-**February to July, varying locally.



**Cattle Egret (*Babulcus ibis*)**

**Status:-**Very Common

**Distribution:-** Throughout the Indian union, Pakistan, Bangladesh, Ceylon and Burma.

**Habits:-**Gregarious, mostly seen with grizing cattle, stalking energetically alongside the animals, running in and out between their legs or ridy upon their backs and lunging out to seize insects disturbed by their movements amongst the grass.Roosts at night in favourte trees.



**Food:-**Chiefly grasshoppers, bluebottle flies and other insects.

**Nesting season:-**Chiefly June to August, varying all year

**Common grey hornbill *Tockus birostris***

**Status:-**Very common

**Distribution:-**Throughout the Indian union excepting Malabar parts of Rajasthan and Assam. Absent in Bangladesh, Ceylon and Burma.

**Habits:-**Arboreal commonly met with among fig-laden banyan and peepal trees along roadsides or near villages feeding in company with green pigeon and other frugivorous birds or flying across from one tree to another in follow-





my-leader fashion. Flight typical of the hornbills laboured undulating and noisy a few rapid wing strokes followed by a dipping glide with primaries upturned.

**Food:-**Mainly fruit, but also large insects, lizards young mice.

**Nesting season:-**Practically March to June.

### **Tailorbird *Orthotonussutorinus***

**Status:-** not common

**Distribution:-**Throughout the Indian Union up to 5,000 ft in the Himalayas, Bangladesh, Pakistan, Ceylon and Burma.

**Habits:-** familiar and confiding. Equally at home in outlying scrub jungle or in gardens and shrubbery within a bustling town. Fearlessly enters in verandes of occupied bungalows, hopping amongst the trellised creepers and potted plants within a few feet of the inmates.

**Food:-**Tiny insects, their eggs and grubs, flower nectar.

**Nesting season:-** April to September



**Ticklesflowerpackers *Dicaeumerythrorhynchos***

**Status:-**Common

**Distribution:-**Throughout the Indian Union excepting the arid portions, Bangladesh, Ceylon.

**Habits:-**Affects orchards, forest plantation and groves near villages. Utters an almost incessant sharp chick-chick-chick while flying across from one mistletoe clump to another and as it hops restlessly among the parasite clusters.

**Food:-**Its staple food is the berries of the noxious plant parasites Loranthus and Viscum belonging to the mistletoe family. The ripe berries are swallowed entire and the sticky slime seeds excreted on to another branch of the same host tree or of an neighbouring one where they adhere and sprout within a few days spreading the infestation.

**Nesting season:** -Chiefly February to June.



**Redwattled lapwing (*Venellus indicus*)**

**Status:-** very common

**Distribution:-**Throughout the Indian Union up to 6000 ft in the Himalayas and peninsular hills, Bangladesh, Pakistan, Ceylon and Burma.

**Habits:-**Affects open country ploughed fields, grazing land and



margin dry beds of tanks and puddles. Also met within forest glades around rainfield depressions. Runs about in short spurts and dip forward obliquely to pick up food in the typical plover manner. Uncannily and ceaselessly vigilant, day or night and foremost to detect intrusion and raised the alarm.

**Food:**-Insects, grubs, molluscs.

**Nesting season:**-Chiefly March to August.

### **Pond heron (Ardeola grayii)**

**Status:**-Very Common

**Distribution:**-Throughout the Indian Union, Bangladesh, Ceylon and Burma.

**Habits:**-Found wherever there is water, river, jheel, roadside ditch, kutch well, or temple pond often even in the midst of populous town. Also on the seacoast on mangrove swamp, tidal mudflats etc. Its normal method of feeding is to stand

hunched up at the water's edge watching patiently for movement and jabbing at the quarry when opportunity offers. Rests in large leafy trees.

**Food:**-Frogs, fish, crabs and insects

**Nesting season:**-Chiefly May to Sept.



**White breasted water hen *Amourornis phoenicurus***

**Status:-**Uncommon

**Distribution:-**Throughout the Indian Union up to the base of Himalayas, Bangladesh, Pakistan, Burma.

**Habits:-**Affect boys ground overgrowth with angles of bushes and amorphous that's it is easy on the margin of cheese and cones under considerable effort in the monsoon when low-lying tracks become water-logged.

The stumpy tail, carried erect as the bird but stalks or skull along is constantly jacked up flashing the chestnut colour under neath into prominence. Ordinarily shy and silent, but existing noise during the rainy season when it breads.

**Food:-**Insects, worms, molluscs, grain and shoots of paddy and marsh plants.

**Nesting season.** June to October.



**Purple rumped sunbird**

*Nectarinia zeylorica*

**Status:-**Very common

**Distribution:-** Peninsular India, Ceylon, north to Bombay, east to Calcutta. In Tamil Nādu not recorded.

**Habits:-**Similar to the purple sunbirds. In quest of nectar it is responsible for cross pollinating





numbers species of flowers. In male upper parts and breast glistening metallic crimson green and purple, lower parts yellow. In female with chin greyish white and rest of lower part brighter yellow.

**Food:-**Nectar and insects.

**Nesting season:-** not well defined.

**Purple sunbird *Nectarinia asiatica***

**Status:-**Common

the Indian Union,  
Bangladesh, Pakistan,  
Ceylon and Burma.

**Habits:-**Affects gardens, groves,  
cultivated and scrubcountry as  
well as light

deciduous forest. The male is like the  
purple in breeding plumage but unglossed  
underparts, longer bill and a maroon  
band across breast. Female brown to  
olive brown above, pale dull yellow  
below.

**Food:-**Insects and spiders and very largely flower nectar. Its  
splender curved bill and tubular tongue are admirably adapted for  
probing into flower tubes and sucking the nectar, in doing



so the bird helps to cross-pollinate the blossoms.

**Nesting season:**-Elastic mostly March to May.

**White throated munia (*Lonchura malabarica*)**

**Status:**-Very Common

**Distribution:**-The drier parts of all India to about 6000 ft elevation in the Himalayas, Ceylon, Pakistan not Bangladesh, Assam or Burma.

**Habits:**-Inhabits dry, open cultivated as well as scrub and bush country and avoids the more humid tracts. Its food and call notes and general behaviour do not differ appreciably from those of other munias.

**Food:**-Chiefly grass seeds, small insects.

**Nesting season:**-Practically all year, varying locally.



**Spotted owl (*Athene***

**brama)****Status:**-Common

**Distribution:**-Throughout the Indian union, Bangladesh, Pakistan, Burma, not Ceylon.

**Habits:**-Chiefly crepuscular and nocturnal. Our commonest and most familiar owl. Affects all types of country excepting heavy forest. Particularly abundant about human



habitations. Pairs spend the daytime in some hollow in an ancient tree trunk or sitting huddled together on a secluded branch and old damaged buildings. They fly out furtively when suspicious of being observed and bob and stare at the intruder from a distance in clownish fashion.

**Food:-**Chiefly beetles and other insects also young birds and mice and lizards etc.

**Nesting season:-**Principally Nov. To April.

### **Egyptian vulture (*Neophron percnopterus*)**

**Status:-**Rare Endangered

**Distribution:-**Widely distributed across the world. They occur mainly on the dry plains and lower hills. In the Himalayas, they go up to about 6600 feet metres.

**Habits:-**Usually seen singly or in pairs, soaring in thermals along with other scavengers and birds of prey, or perched on the ground or atop a building on the ground, they walk with waddling gait. Mostly silent but make high pitched mewling or hissing notes at the nest and screeching noise when squabbling at a carcass. Young birds have been heard making a hissing croak in flight. They also hiss or growl when threatened or angry. Roost communally on large trees, buildings or on cliffs. Roost sites are usually chosen close to a dump site or other suitable foraging area. Egyptian vultures have been known to live for up to 37 years in captivity and at least 21 years in the wild.

**Food:-**Mammals' faeces, insects, carrion, vegetable matter, small animals. When at joints other vulture species at a dead



animals it tends to stay on the periphery and waits until the larger species leave.

**Threats and conservation:-**Healthy adults do not have many predators but human activities pose many threats. Collisions with power lines, hunting intention poisoning, lead accumulation from in ousting gunshot in carcasses, and pesticide accumulation take a toll on population. Population have declined in most parts of its range. In India decline has been rapid with a 35% decrease each year since 1999. In 1967-70 the area around Delhi was estimated to have 12000- 15000 of these vultures, with an average density of about 5 pairs per 10 km square. The exact cause of the decline is not known but has been looked with the use of the NSAID diclofenac, which has been known to cause death in Gyp vultures.

**Footnotes:=**Egyptian vulture is an old world vulture widely distributed in India, the Siberian Peninsula and North Africa. These majestic birds are useful scavengers and play an integral role in the ecosystem by feeding an carrion and disposing of carcasses of dead animals, thereby preventing the sprewl of infectious diseases. Despite their importance the egg. Vulture population is slowly declining due to various antropogenic pressures such as habitat loss and is listed an endangered species in the IUCN Red List 2019.

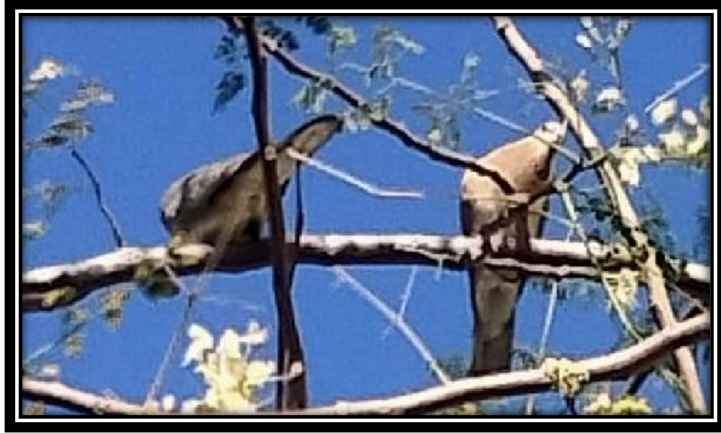


## NATURAL WEALTH OF COLLEGE CAMPUS

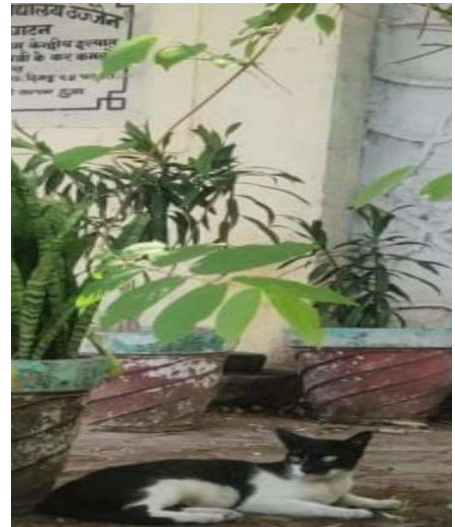




















## WATER ANALYSIS REPORT OF GOVT. GIRLS' P.G. COLLEGE, UJJAIN



Conducted by  
Ms. Sheeba Khan  
Mr. Shashwat Nigam  
Biotechnology Department



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	2. Odour	6																																																												
	3. pH	7																																																												
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<b>Appendix – I</b>	<p>Equipment, Materials and Glassware</p> <p><b>ABBREVIATIONS</b></p> <table border="1"> <thead> <tr> <th>Sr. No.</th> <th>Abbreviation</th> <th>Expanded Form</th> </tr> </thead> <tbody> <tr><td>1.</td><td>%</td><td>Percentage</td></tr> <tr><td>2.</td><td>µm</td><td>Micro meter</td></tr> <tr><td>3.</td><td>°C</td><td>Degree Celsius</td></tr> <tr><td>4.</td><td>Hr</td><td>Hour</td></tr> <tr><td>5.</td><td>L</td><td>Liter</td></tr> <tr><td>6.</td><td>min</td><td>Minutes</td></tr> <tr><td>7.</td><td>mL</td><td>Milliliter</td></tr> <tr><td>8.</td><td>mm</td><td>Millimeter</td></tr> <tr><td>9.</td><td>µL</td><td>Microliter</td></tr> <tr><td>10.</td><td>IS</td><td>Indian Standard</td></tr> <tr><td>11.</td><td>ppb</td><td>Parts per billion</td></tr> <tr><td>12.</td><td>ppm</td><td>Parts per million</td></tr> <tr><td>13.</td><td>ISO</td><td>International Organization for</td></tr> <tr><td>14.</td><td>gm</td><td>Gram</td></tr> <tr><td>15.</td><td>mg</td><td>Milligram</td></tr> <tr><td>16.</td><td>Cfu</td><td>Colony forming units</td></tr> <tr><td>17.</td><td>sp.</td><td>Species</td></tr> <tr><td>18.</td><td>µg</td><td>Microgram</td></tr> <tr><td>19.</td><td>UV</td><td>Ultra Violet</td></tr> </tbody> </table>	Sr. No.	Abbreviation	Expanded Form	1.	%	Percentage	2.	µm	Micro meter	3.	°C	Degree Celsius	4.	Hr	Hour	5.	L	Liter	6.	min	Minutes	7.	mL	Milliliter	8.	mm	Millimeter	9.	µL	Microliter	10.	IS	Indian Standard	11.	ppb	Parts per billion	12.	ppm	Parts per million	13.	ISO	International Organization for	14.	gm	Gram	15.	mg	Milligram	16.	Cfu	Colony forming units	17.	sp.	Species	18.	µg	Microgram	19.	UV	Ultra Violet	13
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# SECTION A

## PHYSICO-CHEMICAL PARAMETERS

### 1. COLOUR

Introduction:

Colour in water may be due to inorganic ions, such as iron & manganese, humus & peat materials, plankton, weeds and industrial wastes. The term 'colour' is used to mean true colour that is the colour of water from which turbidity has been removed. The term apparent colour includes not only the colour due to substances in solution, but, also that due to suspended matter. Apparent colour is determined on the original sample without filtration or centrifugation. The colour of the water is determined through visual analysis. The three samples were collected from different sources of the college. The water analyzed was the normal tap water.

Results:

The colour of the water samples was found to be-

<b>Sample 1</b>	Transparent (Clear and Colourless)
<b>Sample 2</b>	Transparent (Clear and Colourless)
<b>Sample 3</b>	Transparent (Clear and Colourless)

## 2. ODOUR

### Introduction:

Odour is recognized as a quality factor affecting acceptability of drinking water and food prepared from it, tainting of fish and other aquatic organisms & aesthetes of recreational waters. Most organic and some inorganic chemicals contribute taste or odour. These chemicals may originate from municipal and industrial waste discharges, natural sources, such as decomposition of vegetable matter or from associated microbial activity. Odour of water, though very important, cannot be determined in absolute units. Olfactory sense, which is the most sensitive means of detecting small concentrations of odoriferous substances, lacks precision and mathematical expression nevertheless a qualitative test is prescribed. In case of doubt as to the intensity or character of odour, a majority opinion of several observers should be recorded.

### Results:

The odour of the water samples was found to be-

<b>Sample 1</b>	Odourless (No specific odour)
<b>Sample 2</b>	Odourless (No specific odour)
<b>Sample 3</b>	Odourless (No specific odour)

### 3. pH

Introduction:

pH value is the logarithm of reciprocal of hydrogen ion activity in moles per liter. In water solution, variations in pH value from 7 are mainly due to hydrolysis of salts of strong bases and weak acids or vice versa. Dissolved gases such as carbon dioxide, hydrogen sulphide and ammonia also affect pH value of water. The overall pH value range of natural water is generally between 6 and 8. In case of alkaline thermal spring waters pH value may be more than 9 while for acidic thermal spring waters, the pH may be 4 or even less than 4. Industrial wastes may be strongly acidic or basic and their effect on pH value of receiving water depends on the buffering capacity of water. The pH value of water obtained in the laboratory may not be the same as that the time of collection of water samples, due to loss or absorption of gases, reactions with sediments, hydrolysis and oxidation or reduction taking place within the same sample bottle. pH value should preferably be determined at the time of collection of sample.

#### A. Colorimetric Method

**Principle** — A series of indicators and buffer solutions are used for determination of pH value by visual comparison.

## Reagents

**Indicators** - Prepare universal Indicator by dissolving 0.05 gm of methyl orange, 0.15 gm of methyl red, 0.3 gm of bromothymol blue and 0.35 gm of phenolphthalein in one liter of alcohol (66 percent). The color changes are:

pH	Color
Upto 3	Red
4	Orange Red
5	Orange
6	Yellow
7	Yellowish green
8	Greenish Blue
9	Blue
10	Violet
11	Reddish Violet

## Results:

The pH of the water samples was found to be-

<b>Sample 1</b>	8.14 (Green)
<b>Sample 2</b>	7.2 (Yellowish green)
<b>Sample 3</b>	7.7 (Yellowish)

**(Note:** *EPA* recommends that public *water* systems maintain *pH* levels of *between 6.5 and. 8.5*)



## SECTION B

### BACTERIOLOGICAL ANALYSIS

#### Test for Coliform (MPN method)

The Coliform group includes all the aerobic and facultative anaerobic gram negative, non spore forming rod shaped bacteria which ferment lactose with gas formation within 48hr at 37°C

**Principle:** Multiple tube dilution test includes presumptive, confirmed & completed tests as total independent procedures. The results are actually estimate based on certain probability formula. The most satisfactory information is obtained when the largest portion examined shows no gas in all or majority of the tubes. The Most probable number (MPN) value for a given sample is obtained by the use of MPN tables.

Culture Media:

MacConkey broth

Brilliant green bile lactose broth

Nutrient agar

MacConkey agar

Lactose broth

Procedure:

#### **Presumptive Test:**

Inoculate a series of MacConkey broth tubes with appropriate measured quantities of water to be tested. (50mL x 1, 10mL x 5, 1mL x 5 and 0.1mL x 5)



Inoculate all the tubes at 37°C for 24-48 hr.

↓  
Examine each tube at the end of  $24\pm 2$  hr for gas production and if no gas has been formed, reincubate upto 48 hr.

↓  
Record the presence or absence of the gas at each examination of the tube regardless of the amount.

↓  
The absence of gas formation at the end of  $48\pm 3$  hr in any amount in inner fermentation tube constitutes a negative test.

#### Confirmed Test:

Transfer a loopful of culture from positive tubes of Macconkey broth to Brilliant Green broth (BGB). During such transfer gently shake the tube or mix by rotating.

Incubate the inoculated tubes at  $37^{\circ}\text{C}$  for  $48\pm 3$  hr

The formation of gas in any amount in the Durham tube of BGB tube at any time within  $48\pm 3$  hr constitute a positive confirmed test.

#### Completed Test:

Streak a loopful from positive BGB tube to MacConkey agar plates. Incubate at  $37^{\circ}\text{C}$  for  $24\pm 2$  hr.

From each plate pick typical colony and inoculate in Lactose broth and Nutrient agar slants. Incubate at  $37^{\circ}\text{C}$  for 24 to 48 hr.

Pick up the strain from Nutrient agar and Gram stain. Coliform are gram negative, non-spore forming bacilli.

Observe Lactose broth for gas formation after incubation. Coliform shows gas production.

#### Special Precautions:

The concentration of nutritive ingredients in the mixture should be sufficient and as per requirements. 10 mL & above aliquots should be inoculated in double strength and 1 ml and its dilutions should be inoculated in single strength medium.

## Results:

The number of tubes giving positive reaction was recorded and MPN values were determined from MPN table. The standard deviation was calculated and shows a result of 3-2-1 (3 X 10 mL positive, 2 X 1 mL positive and 1 X 0.1 mL positive). The value recorded was 17 i.e. the water sample contains an estimated 17 coliforms per 100 ml. The above results showed that the samples collected from the college (Normal tap water) is not fit for drinking purposes as the MPN values lies much above the WHO standard value of 2.2 MPN/100 ml of water. However, the water need little purification or treatment process like Ultrafiltration, ozonolysis, UV treatment or Reverse Osmosis (RO) to reduce the MPN value to the acceptable range.

# APPENDIX I

## EQUIPMENT, MATERIAL & GLASSWARE

List of equipment/labware required for microbiological analysis is given below-

1. Biosafety Cabinet/ Laminar Air Flow Chamber
2. Membrane Filtration assembly/ apparatus with Membrane Filters with pore size 0.45  $\mu\text{m}$
3. BOD Incubators/Universal Incubator(s)
4. Autoclave(s)
5. Weighing Balance (s)
6. pH Meter(s)
7. Hot Plate/Heating Mantle(s)
8. Water bath(s)
9. Drying Oven (Hot air Oven(s)
10. UV Cabinet
11. Colony Counter
12. Microscope(s)
13. Petri plates
14. Inoculation Loop of 3 mm diameter
15. Forcep(s)
16. Inoculating Loop(s)
17. Autopipettes (100-1000  $\mu\text{l}$ , 1-10 ml)
18. Anaerobic jar(s)
19. Durahm tubes