

संहती कार्यसाधिका । शिलं परं भूषणम्
Shetkari Shikshan Prasarak Mandal's
KRISHNA MAHAVIDYALAYA, RETHARE BK.
Shivnagar, Tal. Karad, Dist. Satara, 415 108 (M.S.). Phone : 02164-266346, Fax : 02164-266347
Email : kmr_sspm@yahoo.co.in **Website :** www.krishnamahavidyalaya.com
NAAC 'B+' Grade (CGPA 2.65)
Founder : Hon. Jaywantrao Bhosale President : Dr. Suresh Jaywantrao Bhosale
Principal : Dr. Salunkhe C. B. M.Sc., Ph. D.

Ref. No. : KMR/SR/671A/2020-21 Date : 05/04/2021

To,

The Joint Secretary,
University Grant Commission,
Bahadur Shah Zafer Marg,
New Delhil -110002.

Subject : Completion of Major Research Project awarded to Dr. Salunkhe Chandrakant Baburao

Ref. : No. F. No. 41-452/2012(SR) and your letter dated 17th July 2012

Sir,

In response to your letter referred above, please find enclosed herewith the following documents in respect of UGC funded Major Research Project entitled "Habitat Assessment of Some Wetlands from South Western Maharashtra with Special Reference to Floristic and Avian Diversity as Bio-indicators of Climate Change" in the subject of Botany undertaken by Dr Salunkhe Chandrakant Baburao of our college from 01/07/2012 from 01/07/2015

1. Audited Statement of Expenditure with item wise details.
2. Audited Utilization Certificate
3. Audited statement of expenditure on Field work
4. Assessment certificate
5. Detailed statement of expenditure on Project fellow
6. Final Report
7. Bank interest : Nil
8. HRA certificate : Not applicable
9. Refund of unspent balance : Nil

Kindly acknowledge the same and release the 2ed installment of sanctioned grant actually spent on Major Research Project in Botany.
Thanking you
Encl. As above

Yours faithfully

Dr. C. B. Salunkhe
PRINCIPAL
KRISHNA MAHAVIDYALAYA
RETHARE(BK.), TAL. KARAD, DIST. SATARA

MAJOR RESEARCH PROJECT

FINAL REPORT

HABITAT ASSESSMENT OF SOME WETLANDS FROM SOUTH WESTERN MAHARASHTRA WITH SPECIAL REFERENCE TO FLORISTIC AND AVIAN DIVERSITY AS BIO-INDICATORS OF CLIMATE CHANGE

SUBMITTED BY

DR. SALUNKHE CHANDRAKANT BABURAO

POST GRADUATE CENRE OF BOTANY,
KRISHNA MAHAVIDYALAYA, SHIVNAGAR,
RETHARE BK.- 415 108, DIST-SATARA, MS.

TO

UNIVERSITY GRANT COMMISSION

BAHADUR SHAH ZAFAR MARG

NEW DEHLI - 110002

UNIVERSITY GRANT COMMISSION

BAHADUR SHAH ZAFAR MARG

NEW DEHLI- 110002

STATEMENT OF EXPENDITURE IN RESPECT OF MAJOR RESEARCH PROJECT

1.Name of Principal Investigator : Dr. Salunkhe Chandrakant Baburao

2.Department : Department of Botany

College : Krishna Mahavidyalaya, Shivnagar, Rethare Bk.- 415 108, Dist-Satara, MS.

University : Shivaji University, Kolhapur.

3. UGC approval Letter No. and Date : No. F.41/452/2012 (SR) dated 17 July 2012

4. Title of Research Project : Habitat Assessment of Some Wetlands from South Western Maharashtra with Special Reference to Floristic and Avian Diversity as Bio-indicators of Climate Change

5. Effective Date of starting the project : 01/07/2012

6. a. Period of Expenditure : From 01/07/2012 to 01/07/2015

b. details of Expenditure :

Sr. no.	Items	Amount approved Rs.	Amount Received	Actual Expenditure Incurred Rs.
i	Books and Journals	30,000/-	30,000/-	20,632/-
ii	Equipment	1,10,000/-	1,10,000/-	1,13,063/-
iii	Contingency	40,000/-	20,000/-	17,811/-
iv	Travel/field work	1,20,000/-	60,000/-	59,191/-
v	Hiring services	----	----	----
vi	Chemicals and glassware	60,000/-	30,000/-	60,000/-
vii	Overhead	62,800/-	62,800/-	62543/-
viii	Any other items	----	----	----

Pratik Joshi & Associates ★ Chartered Accountants ★ FRN 149108W KARAD

c. Staff:

Date of appointment- **26/09/2012**

Sr. No.	Items	From	To	Amount Approved Rs.	Amount Received	Actual Expenditure Incurred Rs.
1.	Honorarium to PI	----	----	----	----	----
2	Project fellow Non –Gate/ Non –NET- Rs. 14000/-	1/10/2012	31/10/2015	5,28,000/-	2,64,000/-	4,20,000/-
	Total amount					**7,53,240/-**

1. It is certified that the appointment has been made accordance with the terms and conditions laid down by Commission.
2. If as result of check or audit objection some irregularly is noticed at later date, action will be taken to refund, adjust or regularize the objected amounts.
3. Payment@ revised rates shall be made with arrears on the availability of additional funds.
4. It is certified that the grant of Rs. 5,76,800/-(Rupees Five lakh Seventy Six thousand eight hundred Only) received from the University grant commission under the scheme of support for Major Research Project entitled "Habitat Assessment of Some Wetlands from South Western Maharashtra with Special Reference to Floristic and Avian Diversity as Bio-indicators of Climate Change" dated 17th July 2012 has been fully utilized for the purpose for which it was sanctioned and in accordance with the terms and conditions laid down by the University Grant Commission.

For Pratik Joshi & Associates
Chartered Accountants

Pratik Joshi & Associates FRN 149108W Chartered Accountants

Dr. C.B. Salunkhe
PRINCIPAL INVESTIGATOR

Dr. C.B. Salunkhe
PRINCIPAL

CA. Pratik A. Joshi
Proprietor
M. No. 188100
AUDITOR
UDIN:-
21188100AAAAFR6906
Date:- 05/04/2021

Dr. C.B. Salunkhe
PRINCIPAL
KRISHNA MAHAVIDYALAYA
RETHARE(BK.), TAL. KARAD, DIST. SATARA

CO-INVESTIGATOR

CO-INVESTIGATOR

UNIVERSITY GRANT COMMISSION

BAHADUR SHAH ZAFAR MARG

NEW DEHLI- 110002

Utilization certificate

Certified that the grant of Rs. 9,15,800/-(Rupees Nine lakh fifteen thousand eight hundred Only) sanctioned from the University Grants Commission under the scheme of support for Major research Project entitled "Habitat Assessment of Some Wetlands from South Western Maharashtra with Special Reference to Floristic and Avian Diversity as Bio-indicators of Climate Change" vide UGC letter No. F.41/452/2012 dated 17 July 2012 has been fully utilized for the purpose for which it was sanctioned and in accordance with the terms and conditions laid down by the University Grant Commission.

Actual expenditure incurred over this project from 01/07/2012 to 01/07/2015 is 7,53,240/- (Seven lakh fifty-three thousand two hundred forty Only)

For Pratik Joshi & Associates
Chartered Accountants

Pratik Joshi & Associates FRN 149108W Chartered Accountants

CA. Pratik A. Joshi
Proprietor
M. No. 188100

Dr C.B. Salunkhe
PRINCIPAL INVESTIGATOR

Dr C.B. Salunkhe
PRINCIPAL
Dr. C. B. Salunkhe
PRINCIPAL
KRISHNA MAHAVIDYALAYA
RETHARE(BK.), TAL. KARAD, DIST. SATARA

STATUTORY AUDITOR

UDIN:-
21188100AAAAFR6906
Date:- 05/04/2021

CO-INVESTIGATOR

CO-INVESTIGATOR

UNIVERSITY GRANT COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DEHLI-11002

STATEMENT OF EXPENDITURE IN RESPECT OF MAJOR RESERCH PROJECT

TRAVEL EXPENDITURE DETAILS

Sr.No.	Name	Date	Perticular	Amount
1	Dr.Chandrakant Baburao Salunkhe	2/10/2012	Shivnagar- Vadgoan	1000
2	Dr.Chandrakant Baburao Salunkhe	21/10/2012	Shivnagar-Ratnagri Pawas	1500
3	Dr.Chandrakant Baburao Salunkhe	6/11/2012	Shivnagar - Chiplun	1500
4	Raju Travel , Kolhapur	22/11/2012	Shivnagar-Ner Dam	1001
5	Dr.Chandrakant Baburao Salunkhe	16/12/2012	Shivnagar-Shirval	1500
6	Dr.Chandrakant Baburao Salunkhe	19/12/2012	Shivnagar-Radhanagri	1500
7	Dr.Chandrakant Baburao Salunkhe	23/12/2012	Shivnagar- Kagal	1000
8	Raju Travel , Kolhapur	25/12/2012	Shivnagar-Chandigad	3056
9	Dr.Chandrakant Baburao Salunkhe	2/1/2013	Shivnagar- Pachagani Mahabaleshwar	1500
10	Raju Travel , Kolhapur	6/1/2013	Shivnagar-Mahableswar	2144
11	Dr.Chandrakant Baburao Salunkhe	13/01/2013	Shivnagar- Sangli-Vita-Karad	1500
12	Dr.Chandrakant Baburao Salunkhe	20/01/2013	Shivnagar-Yeralwadi Bidal	1000
13	Raju Travel , Kolhapur	25/01/2013	Shivnagar-Ratnagri	2544
14	Raju Travel , Kolhapur	27/01/2013	Shivnagar-Sawantwadi	3664
15	Dr.Chandrakant Baburao Salunkhe	17/02/2013	Shivnagar- Vita Mayani Aadali	1500
16	Raju Travel , Kolhapur	18/02/2013	Shivnagar-Rajewadi Dam	1664
17	Raju Travel , Kolhapur	19/02/2013	Shivnagar-Dapoli	2768
18	Dr.Chandrakant Baburao Salunkhe	24/02/2013	Shivnagar-Gadhinglaj	1500
19	Dr.Chandrakant Baburao Salunkhe	10/3/2013	Shivnagar- Satara Devapur	2000
20	Dr.Chandrakant Baburao Salunkhe	17/03/2013	Shivnagar-Kagal	1000
21	Dr.Chandrakant Baburao Salunkhe	24/03/2013	Shivnagar-Shirval Phaltan	2000
22	Dr.Chandrakant Baburao Salunkhe	7/4/2013	Shivnagar-Ner	1000
23	Dr.Chandrakant Baburao Salunkhe	19/04/2013	Shivnagar-Kudal Sawantwadi	2000
24	Dr.Chandrakant Baburao Salunkhe	15/05/2013	Shivnagar-Sangmeshwar Dapoli	1850
25	Dr.Chandrakant Baburao Salunkhe	19/05/2013	Shivnagar-Rajapur Ratanagri	2500
26	Dr.Chandrakant Baburao Salunkhe	22/05/2013	Shivnagar-Sangmeshwar Dapoli	2000
27	Dr.Chandrakant Baburao Salunkhe	23/06/2013	Shivnagar-Kolhapur Chandgad	2000
28	Dr.Chandrakant Baburao Salunkhe	7/7/2013	Shivnagar-Dhom	1000
29	Dr.Chandrakant Baburao Salunkhe	23/07/2013	Shivnagar-Kanher	1000
30	Dr.Chandrakant Baburao Salunkhe	11/8/2013	Shivnagar-Urmodi	1000
31	Dr.Chandrakant Baburao Salunkhe	20/08/2013	Shivnagar-Kas Bamnoli	1000
32	Dr.Chandrakant Baburao Salunkhe	22/09/2013	Shivnagar-Vira Dharan	2000
33	Dr.Chandrakant Baburao Salunkhe	17/10/2013	Shivnagar-Lanja Dapoli Mahableshwar	3000
34	Dr.Chandrakant Baburao Salunkhe	5/1/2014	Shivnagar-Pilliv Akluj	2000
			Total	**59191**

Principal Investigater

Auditor

For Pratik Joshi & Associates
Chartered Accountants

CA. Pratik A. Joshi
Proprietor
M. No. 188100

Pratik Joshi & Associates FRN 149108W Chartered Accountants

UDIN:- 21188100AAAAFR6906
Date:- 05/04/2021

Principal

Dr. C. B. Salunkhe
PRINCIPAL
KRISHNA MAHAVIDYALAYA
RETHARE(BK.), TAL. KARAD, DIST. SATARA

Final Report Assessment / Evaluation Certificate

(Two Members Expert Committee Not Belonging to the Institute of Principal Investigator)

(to be submitted with the final report)

It is certified that the final report of Major Research Project entitled **"Habitat Assessment of Some Wetlands from South Western Maharashtra with Special Reference to Floristic and Avian Diversity as Bio-indicators of Climate Change"** by Dr. Chandrakant Baburao Salunkhe, Dept. of Botany has been assessed by the committee consisting the following members for final submission of the report to the UGC, New Delhi under the scheme of Major Research Project.

Comments/Suggestions of the Expert Committee: -

The outcome of present work highlights importance of wetland habitats from south western Maharashtra in conserving and maintaining floristic and avian diversity. In this era of environmental crises, the research work is very important in making future plan for conserving the wetland biodiversity for policymakers.

Name & Signatures of Experts with Date: -

Name of Expert	University/College name	Signature with Date
1. Dr. Ghatge Manda Manoj	Matoshri Bayabai Shripatrao Kadam Kanya Mahavidyalaya, Kadegaon Dist- Sangli, M.S.	
2. Dr. Kengar Suryakant Bapu.	Yashwantrao Chavan College of Science, Karad; Dist- Satara, M.S.	

It is certified that the final report has been uploaded on UGC-MRP portal on .....

It is also certified that final report, Executive summary of the report, Research documents, monograph academic papers provided under Major Research Project have been posted on the website of the University/College.

Dr. C. B. Salunkhe

Dr. C. B. Salunkhe
Principal
PRINCIPAL
KRISHNA MAHAVIDYALAYA
RETHARE(BK.), TAL. KARAD DIST SATARA

UNIVERSITY GRANT COMMISSION

BAHADUR SHAH ZAFAR MARG

NEW DEHLI – 11002

STATEMENT OF EXPENDITURE IN RESPECT OF MAJOR RESERCH PROJECT

RESEARCH PROJECT

PROJECT FELLOW EXPENDITURE DETAILS.

Sr.No.	Name	Date	Amount Paid
1	Shivaji Vishnu Raskar	19/01/2013	42000
2	Shivaji Vishnu Raskar	04/03/2013	14000
3	Shivaji Vishnu Raskar	16/03/2013	14000
4	Shivaji Vishnu Raskar	20/04/2013	14000
5	Shivaji Vishnu Raskar	11/05/2013	14000
6	Shivaji Vishnu Raskar	19/06/2013	14000
7	Shivaji Vishnu Raskar	18/07/2013	14000
8	Shivaji Vishnu Raskar	19/08/2013	14000
9	Shivaji Vishnu Raskar	7/09/2013	14000
10	Shivaji Vishnu Raskar	12/10/2013	14000
11	Shivaji Vishnu Raskar	28/10/2013	14000
12	Shivaji Vishnu Raskar	13/12/2013	14000
13	Shivaji Vishnu Raskar	10/01/2014	14000
14	Shivaji Vishnu Raskar	13/02/2014	14000
15	Shivaji Vishnu Raskar	20/03/2014	14000
16	Shivaji Vishnu Raskar	12/04/2014	14000
17	Shivaji Vishnu Raskar	15/05/2014	14000
18	Shivaji Vishnu Raskar	18/06/2014	14000
19	Shivaji Vishnu Raskar	7/08/2014	28000
20	Shivaji Vishnu Raskar	10/09/2014	14000
21	Shivaji Vishnu Raskar	16/10/2014	14000
22	Shivaji Vishnu Raskar	21/11/2014	14000
23	Shivaji Vishnu Raskar	13/12/2014	14000
24	Shivaji Vishnu Raskar	13/01/2015	14000
25	Shivaji Vishnu Raskar	11/03/2015	28000
26	Shivaji Vishnu Raskar	17/11/2015	14000
			420000

For Pratik Joshi & Associates
Chartered Accountants

CA. Pratik A. Joshi
Proprietor
M. No. 188100

Pratik Joshi & Associates FRN 149108W Chartered Accountants

Principal Investigater **Auditor** **Principal**

UDIN:-21188100AAAAFR6906

Date:- 05/04/2021

Dr. C. B. Salunkhe
PRINCIPAL
KRISHNA MAHAVIDYALAYA
RETHARE(BK.), TAL. KARAD, DIST. SATARA

UNIVERSITY GRANT COMMISSION

BAHADUR SHAH ZAFAR MARG

NEW DEHLI – 11002

STATEMENT OF EXPENDITURE IN RESPECT OF MAJOR RESERCH PROJECT

RESEARCH PROJECT

PROJECT FELLOW EXPENDITURE DETAILS.

Sr.No.	Name	Date	Amount Paid		
			Amount	Prof Tax	Total
1	Shivaji Vishnu Raskar	19/01/2013	42000		42000
2	Shivaji Vishnu Raskar	04/03/2013	13800	200	14000
3	Shivaji Vishnu Raskar	16/03/2013	13800	200	14000
4	Shivaji Vishnu Raskar	20/04/2013	13800	200	14000
5	Shivaji Vishnu Raskar	11/05/2013	13800	200	14000
6	Shivaji Vishnu Raskar	19/06/2013	13800	200	14000
7	Shivaji Vishnu Raskar	18/07/2013	13800	200	14000
8	Shivaji Vishnu Raskar	19/08/2013	13800	200	14000
9	Shivaji Vishnu Raskar	7/09/2013	13800	200	14000
10	Shivaji Vishnu Raskar	12/10/2013	13800	200	14000
11	Shivaji Vishnu Raskar	28/10/2013	13800	200	14000
12	Shivaji Vishnu Raskar	13/12/2013	13800	200	14000
13	Shivaji Vishnu Raskar	10/01/2014	13800	200	14000
14	Shivaji Vishnu Raskar	13/02/2014	13800	200	14000
15	Shivaji Vishnu Raskar	20/03/2014	13800	200	14000
16	Shivaji Vishnu Raskar	12/04/2014	13800	200	14000
17	Shivaji Vishnu Raskar	15/05/2014	13800	200	14000
18	Shivaji Vishnu Raskar	18/06/2014	13800	200	14000
19	Shivaji Vishnu Raskar	7/08/2014	27600	400	28000
20	Shivaji Vishnu Raskar	10/09/2014	13800	200	14000
21	Shivaji Vishnu Raskar	16/10/2014	13800	200	14000
22	Shivaji Vishnu Raskar	21/11/2014	13800	200	14000
23	Shivaji Vishnu Raskar	13/12/2014	13800	200	14000
24	Shivaji Vishnu Raskar	13/01/2015	13800	200	14000
25	Shivaji Vishnu Raskar	11/03/2015	27600	400	28000
26	Shivaji Vishnu Raskar	17/11/2015	13800	200	14000
			414600	**5400**	**420000**

For Pratik Joshi & Associates
Chartered Accountants

CA. Pratik A. Joshi
Proprietor
M. No. 188100

Pratik Joshi & Associates • FRN 149108W • Chartered Accountants

Principal Investigater **Auditor** **Principal**

UDIN:-21188100AAAAFR6906
DATE:- 05/04/2021

Dr. C. B. Salunkhe
PRINCIPAL
KRISHNA MAHAVIDYALAYA
RETHARE(BK.), TAL. KARAD, DIST. SATARA

UNIVERSITY GRANT COMMISSION

BAHADUR SAHA ZAFAR MARG

NEW DELHI-110 002

Major Research Project in Botany

(ACCESSION CERTIFICATE)

Major Research Project in Botany Sanctioned by University Grant Commission vide its sanctioned letter UGC letter No. **F.41/452/2012 (SR) dated 17 July 2012** has been utilized for purchase of books and journals and the same have been accessioned and noted in the accession Register from16672 to 16706 being maintained by college.

For Pratik Joshi & Associates
Chartered Accountants

CA. Pratik A. Joshi
Proprietor
M. No. 188100

Pratik Joshi & Associates • FRN 149108W • Chartered Accountants

PRINCIPAL

Dr. C. B. Salunkhe
PRINCIPAL
KRISHNA MAHAVIDYALAYA
RETHARE(BK.), TAL. KARAD. DIST. SATARA

AUDITOR

UDIN:- 21188100AAAAFR6906

Date:- 05/04/2021

UNIVERSITY GRANT COMMISSION

BAHADUR SAHA ZAFAR MARG

NEW DELHI-110 002

Major Research Project in Botany

(ASSET CERTIFICATE)

It is certified that inventories of permanent or semi-permanent assets created/acquired wholly or mainly out of the grant given by the university grant commission are being maintained in the prescribed from and being kept up-to date.

For Pratik Joshi & Associates
Chartered Accountants

CA. Pratik A. Joshi
Proprietor
M. No. 188100

Pratik Joshi & Associates FRN 149108W Chartered Accountants

PRINCIPAL

Dr. C. B. Salunkhe
PRINCIPAL
KRISHNA MAHAVIDYALAYA
RETHARE (BK.), TAL. KARAD, DIST. SATARA

AUDITOR

UDIN:- 21188100AAAAFR6906
Date:- 05/04/2021

Annexure – IX

UNIVERSITY GRANTS COMMISSION BAHADUR
SHAH ZAFAR MARG, NEW DELHI - 110002

PROFORMA FOR SUBMISSION OF INFORMATION AT THE TIME OF SENDING THE FINAL REPORT OF THE WORK DONE ON THE PROJECT

1. **TITLE OF THE PROJECT-** "Habitat Assessment of Some Wetlands from South Western Maharashtra with Special Reference to Floristic and Avian Diversity as Bio-indicators of Climate Change."

2. **NAME AND ADDRESS OF THE PRINCIPAL INVESTIGTOR** – Dr. Chandrakant Babruao Salunkhe,
Post Graduate center of Botany,
Krishana Mahavidyalaya, Rethare Bk. 415108.

3. **NAME AND ADDRESS OF THE INSTITUITON** - Krishana Mahavidyalaya,
Rethare Bk. - 415108., Dist-Satara, M.S.

4. **UGC APPROVAL LETTER NO. AND DATE** - F.41/452/2012 (SR) dated 17th July 2012

5. **DATE OF IMPLEMENTATION** - 01/07/2012

6. **TENURE OF THE PROJECT** - 01/07/2012 to 01/07/2015

7. **TOTAL GRANT ALLOCATED** - Rs. 950800/-

8. **TOTAL GRANT RECEIVED** - 1st Instalment- Rs. 5,76,800/-
2nd Instalment- Rs. NIL

9. **FINAL EXPENDITURE**- Rs.753240/-

10. **TITLE OF THE PROJECT**- Habitat Assessment of some wetlands from South Western Maharashtra with special Reference to Floristic and Avian Diversity as Bio-indicators of Climate Change.

11. **OBJECTIVES OF THE PROJECT**-1. To assess floristic and bird diversity of some selected Wetland habitats from South Western Maharashtra.
2. To assess their present status
3. To identify major threats to wetland habitats.

12. **WHETHER OBJECTIVES WERE ACHIEVED** - Yes

1. About 20 wetland habitats were targeted to study and assess the floristic and bird diversity of from South Western Maharashtra. The outcome of the project documentation of 263 species of flowering plants and 46 species of birds highlights the rich biodiversity wealth inhabiting the selected wetlands from different regions of South Western Maharashtra.
2. Present status assessment of wetlands indicates that these wetlands are under heavy pressure of anthropological activities
3. The activities like deforestation, overgrazing, over exploitation of forest products, forest fires, new constructions, development of roads for heavy vehicles, encroachment of forest area for agriculture purposes, disposal of medical and other wastes, and uncontrolled are the major threats to wetland habitats.

13. ACHIEVEMENTS FROM THE PROJECT –

India has a wealth of wetland ecosystems that support unique habitats with large diversity of biota representing almost all taxonomic groups. As per the National Wetland Atlas 2011, India has about 757.06 thousand wetlands with a total wetland area of 15.3 m ha, accounting for nearly 4.7% of the total geographical area of the country. Out of these, only 26 wetlands have been designated as Ramsar Sites. South Western Maharashtra region has remarkable geomorphological variations. Upon recognizing the ecological significance of the wetland habitats, an extensive and intensive survey was undertaken during 2012-2015. Floristic and avian diversity study of about 20 wetlands from this region indicates that these habitats possess rich plant biodiversity. Besides rich biodiversity very little attention has paid towards the survey of biodiversity by earlier taxonomists.

The present work on floristic and avian diversity study of 20 wetlands from South Western Maharashtra region is an outcome of floristic and avian diversity exploratory work carried out during 2012 to 2015. About 34 field visits have been made in different seasons to collect and document the diversity. The birds were observed with binoculars. The Latitude, longitudes and altitude of locations of 20 wetlands were recorded with the Global Positioning System (GPS) Garmin model e-trex. Imageries are developed with the help of Garmin software and internet. For 20 localities studied latitude, longitude and altitude were documented in tabular forms (Table 1).

In the present work, a total of 263 species, belonging to 213 genera and 64 families of dicots and monocots have been and documented from the study area. Dicotyledons are represented by 190 species belonging to 163 genera and 53 families while monocotyledons are with 73 species belonging to 50 genera and 11 families (Table No.2 and 3). The family Poaceae is dominant with maximum number of species (44) followed by Asteraceae (21 species), Fabaceae (19 species), Cyperaceae (14) Euphorbiaceae (13 species), Acanthaceae (09 species), Mimosaceae (09 species) and Amaranthaceae (07 species) (Table No. 4). Twenty-seven families were represented

each by single species. Comparative flora analysis of all 20 wetlands studied was given in tabular form which highlights floristic wealth of each wetland (Table 5).

Regarding the life forms, about 164 species are Herbs followed by trees (46), lianas (27) and shrubs (26). *Cyathocline manilaliana* an endemic threatened plant was recorded form the area.

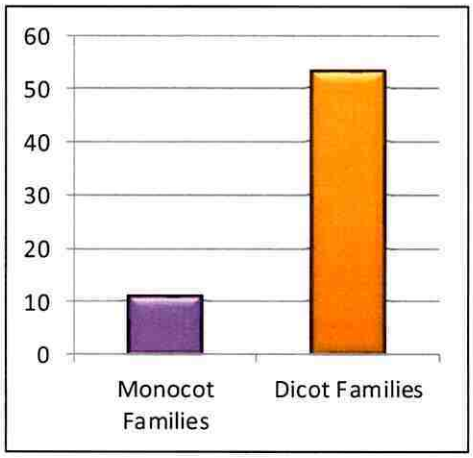
Table No. 2. Floristic diversity with number of families, genera and species:

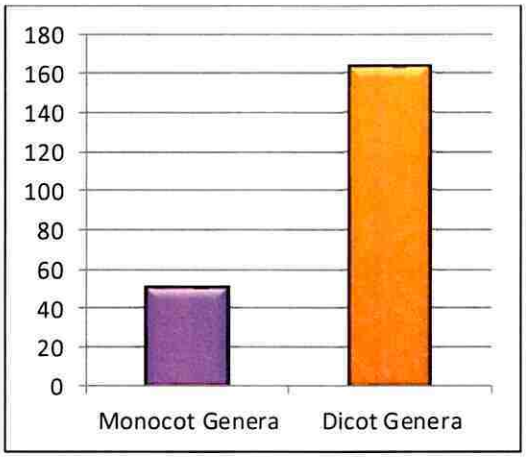
No.	Family	Genera	Species	No.	Family	Genera	Species
1.	Acanthaceae	7	9	33.	Martyniaceae	1	1
2.	Agavaceae	1	1	34.	Meliaceae	1	1
3.	Aizoaceae	1	1	35.	Menispemiaceae	2	2
4.	Amaranthaceae	7	7	36.	Mimosaceae	7	9
5.	Anacardiaceae	1	1	37.	Molluginaceae	1	1
6.	Annonaceae	2	3	38.	Moraceae	2	5
7.	Apocynaceae	4	4	39.	Myrtaceae	3	3
8.	Arecaceae	1	1	40.	Najadaceae	1	1
9.	Asclepiadaceae	4	4	41.	Nyctaginaceae	2	3
10.	Asteraceae	21	21	42.	Oleaceae	1	1
11.	Balanitaceae	1	1	43.	Orchidaceae	1	1
12.	Bignoniaceae	4	4	44.	Oxalidaceae	1	1
13.	Boraginaceae	3	3	45.	Papavaraceae	1	1
14.	Caesalpiniaceae	4	7	46.	Pedaliaceae	1	1
15.	Cannaceae	1	1	47.	Periplocaceae	2	2
16.	Capparaceae	1	2	48.	Plumbaginaceae	1	1
17.	Casuarinaceae	1	1	49.	Poaceae	31	44
18.	Cleomaceae	1	1	50.	Polygalaceae	1	2
19.	Combretaceae	1	1	51.	Portulacaceae	1	1
20.	Commelinaceae	2	3	52.	Potamogetonaceae	1	2
21.	Convolvulaceae	4	6	53.	Rhamnaceae	1	1
22.	Cucurbitaceae	2	2	54.	Rubiaceae	3	3
23.	Cyperaceae	6	14	55.	Rutaceae	4	4
24.	Elatinaceae	1	1	56.	Santalaceae	1	1
25.	Euphorbiaceae	10	13	57.	Sapindaceae	1	1
26.	Fabaceae	14	19	58.	Scrophulariaceae	7	7
27.	Gentianaceae	4	4	59.	Simaroubiaceae	1	1
28.	Hydrocharitaceae	2	2	60.	Solanaceae	1	1
29.	Liliaceae	2	2	61.	Tiliaceae	2	2
30.	Lamiaceae	4	5	62.	Typhaceae	1	1
31.	Lythraceae	2	3	63.	Verbenaceae	5	5
32.	Malvaceae	3	4	64.	Zygophyilaceae	2	2
					Total	**213**	**263**

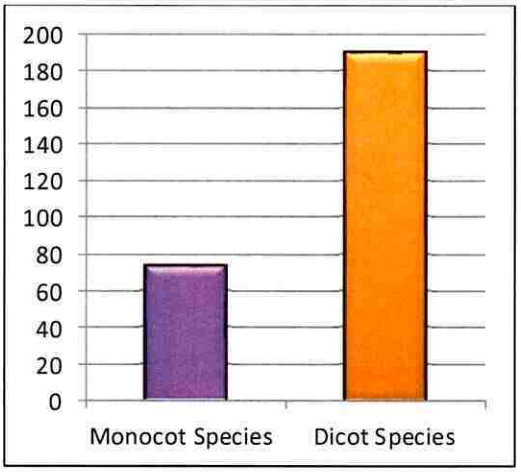
Table No. 3. Floristic diversity analysis of wetlands from study area

	Monocots	Dicots	Total
Families	11	53	64
Genera	50	163	213
Species	73	190	263

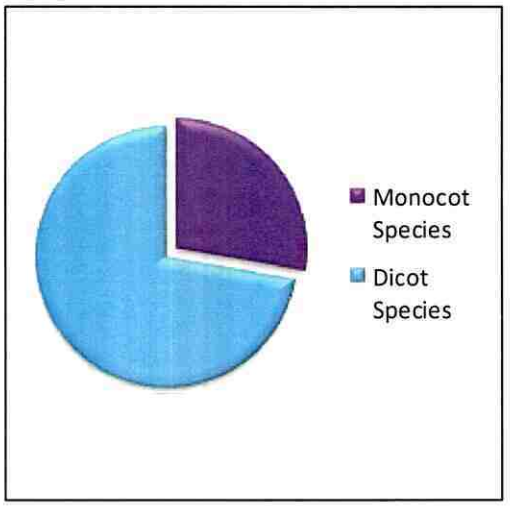
Graph No. 1. Floristic diversity analysis of wetlands from study area

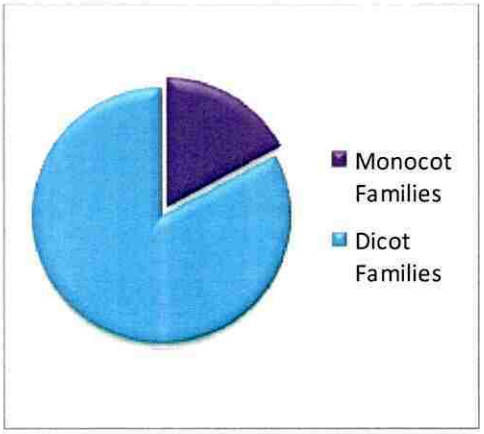






Pie diagram No. 1. Floristic diversity analysis of wetlands from study area





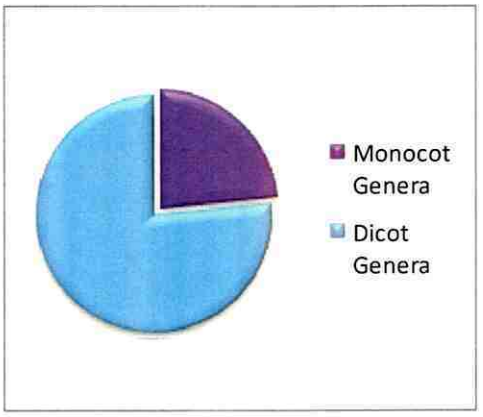
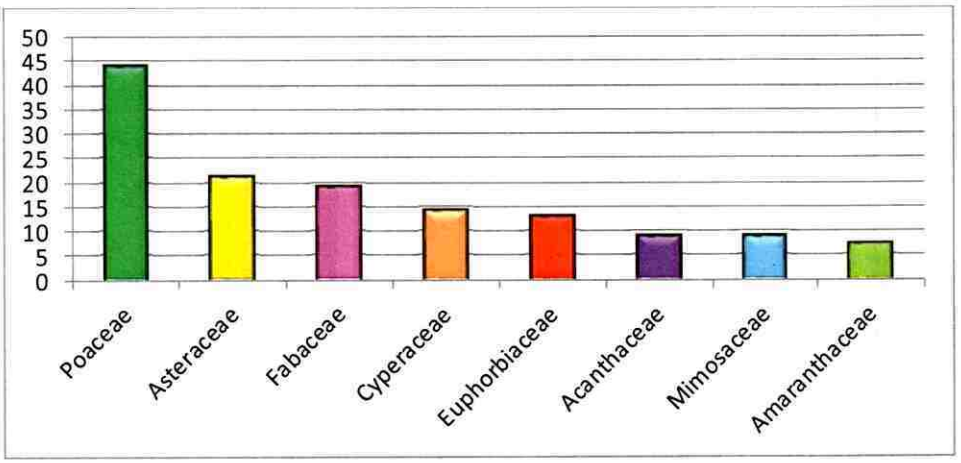


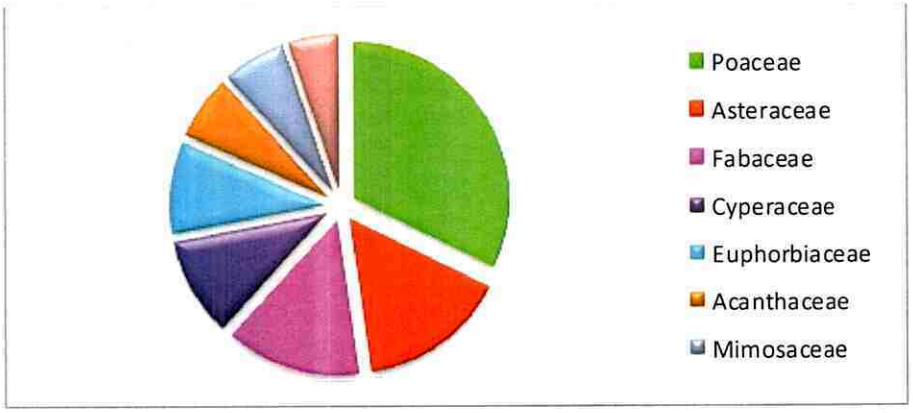
Table No. 4. Dominant families with maximum number of species:

No.	Family	No. of species
1.	Poaceae	44
2.	Asteraceae	21
3.	Fabaceae	19
4.	Cyperaceae	14
5.	Euphorbiaceae	13
6.	Acanthaceae	09
7.	Mimosaceae	09
8.	Amaranthaceae	07

Graph No. 2. Comparative account of dominant families with maximum number of species:

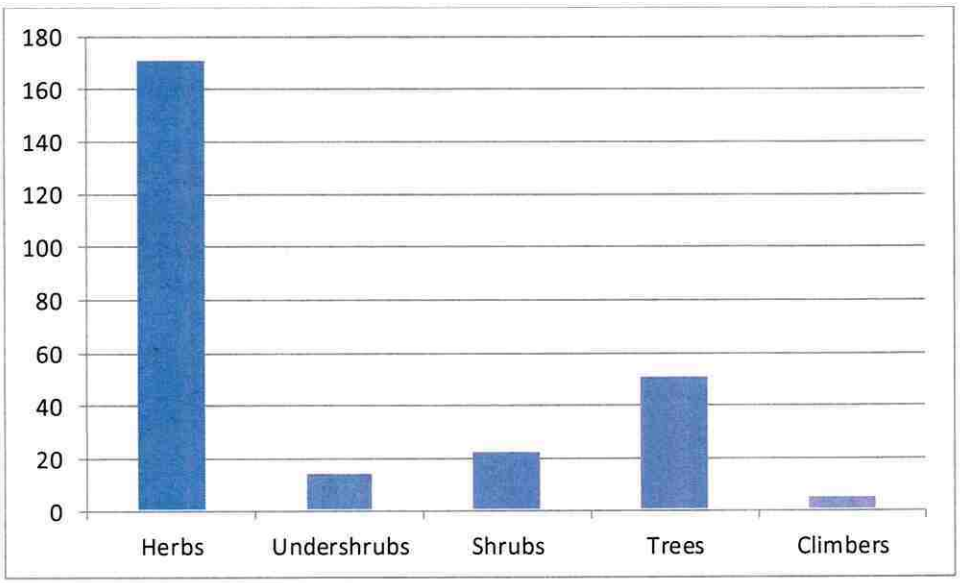


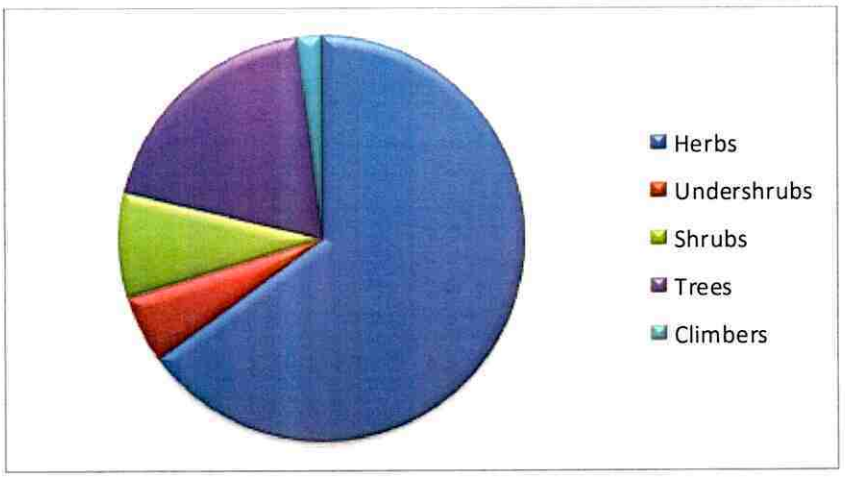
Pie diagram No. 2. Comparative account of dominant families with maximum number of species:



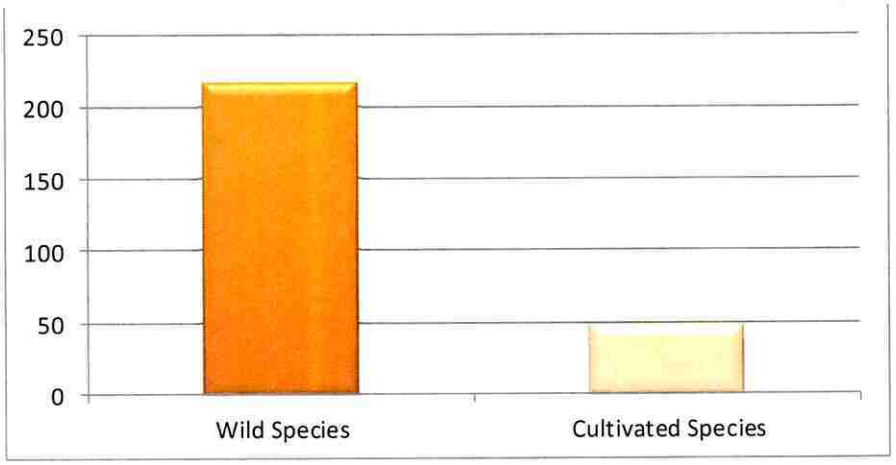
Life forms

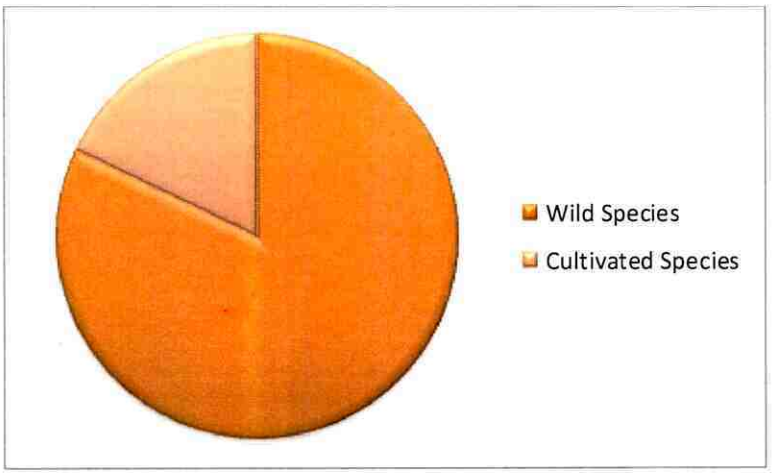
Herbs	Undershrubs	Shrubs	Trees	Climbers	Total
171	14	22	51	05	263





Wild Species	Cultivated Species	Total
216	47	263





The area around wetlands is with amphibious vegetation, while majority of wetlands are with submerged and floating hydrophytes. Most of the amphibious, submerged and floating hydrophytes flowers during winter season. The important aquatic plants like *Ottelia, Potamogeton, Vallisneria* and *Najas* act as food for migratory and Indian birds.

Terrestrial vegetation:

Number of middle-sized trees and shrubs are growing in wild and also planted around the wetlands, which are important for birds for shelter, nesting and breeding. These are *Acacia chundra, Acacia catechu, Acacia nilotica, Balanites aegyptica, Cassia auriculata, Azadirachta indica, Capparis decidua, Cassia siamea, Casurina equisetifolia, Lantana camera, Mangifera indica, Parkinsonia aculeata, Pongamia pinnata, Tamarindus indica.*

Twiners such as *Pueraria montana, Teramnus labialis, Tinospora cordifolia, Pergularia daemia, Cryptolepis buchanani, Ipomea hederifolia, Ipomea quamoclit and Wattakaka volubilis* are common in the area.

Aristida adesensionis, Eragrostis viscosa, Heteropogon contortus are some of the common grasses in the area.

Aquatic vegetation:

The common aquatic plant species are *Najas indica, Ottelia alismoides, Potamogeton nodosus, Potamogeton pectinatus and Vallisneria spiralis.* In addition to these the other plant species growing the marsh are *Alternanthera sessilis, Alternanthera tenella, Ammania baccifera, Asclepias curasavica, Bacopa monnieri, Bergia ammannioides, Canscora diffusa, Centaurium meyeri, Commelina benghalensis, Cyperus difformis, Cyperus exaltatus, Eclipta prostrata, Eleocharis geniculata, Exacum pedunculatum, Fimibristylis* sps., *Furiena wallichiana, Gnaphalium polycaulon, Hygrophilia schulli, Limnophilla heterophylla, Mimulus strictus, Paspalidium geminatum, Pennisetum hohenackeri, Phyla nodiflora, Rotala serpyllifolia, Saccharum spontaneum, Schoenoplectus lateriflorus, Typha angustifolia.*

About 46 species of waterbirds including native and migratory birds have been documented during the present work. (Plate 01-29). The variations in the bird density and the species richness were observed according to the seasonal changes. The ducks dominated in density throughout the year. Comparative bird analysis of all 20 wetlands studied was given in tabular form which highlights Avian wealth of each wetland (Table 5). The data collected represents that the present status of some wetlands is unique and heterogenous in composition. Some of the wetlands like Yeralwadi, Ner are undisturbed, but some are disturbed due to anthropological activities. Mayni bird habitat needs immediate steps for its biodiversity conservation as it is having rich diversity of flowering plant and birds.

14. **SUMMARY OF THE FINDINGS - (IN 500 WORDS)**

Wetlands provide numerous products and services to humanity like multiple uses of water services, flood control, carbon sequestration, biodiversity conservation and fisheries. They provide a refuge for migratory birds.

Urbanization influences major threat to wetlands. Pollution, poor management, demands for water, agricultural runoffs, wastewater discharges are the severe threats. Separate legal provisions for protection of water quality and protection of biodiversity of wetlands are the urgent need to save these fragile ecosystems. Besides national legislation a majority of wetlands are ignored in the policy process. It is essential to identify ecologically important and sensitive wetlands which greatly help in making conservation strategies. Regular water monitoring plan is essential to prevent them from getting polluted. It helps in maintaining their biota, hydrology and ecological integrity.

Wetlands are important bird habitats, birds utilize it for activities like feeding, breeding, nesting and rearing young ones. Mayni and Yeralwadi wetlands are the best bird habitats. Yeralwadi wetland has less urban pressure comparatively over other wetlands, and is with high avifaunal diversity. Mayani bird habitat is very much disturbed due to urbanization. Previously the bird habitat status was given on the basis of bird diversity.

Due to natural plant wealth around the wetlands the density of the terrestrial birds is more, these plantation act as a protecting shield for the aquatic birds from human activities as well as help in nesting the terrestrial and aquatic bird species. The Species diversity of all wetlands were higher during winter due to the arrival of migrant bird species.

The data collected represents that the present status of some wetlands is unique and heterogenous in composition. Some of the wetlands like Yeralwadi, Ner are undisturbed, but some are disturbed due to anthropological activities. Mayni bird habitat needs immediate steps for its biodiversity conservation as it is having rich diversity of flowering plant and birds.

Habitat utilized by the migratory birds is selective and mostly seen in undisturbed and silent areas, these birds encountered at Yeralwadi wetland which has less human pressure. Other wetlands also support residential, migratory and threatened bird species. This indicates that urban

wetlands are rich enough to attract birds and provide abundant food and safe passage for nesting, boosting and molting purpose. Avifauna also act as an environmental indicator a slightly change in environment it responds by changing diversit, yearly monitoring will also help us providing useful information of environmental change.

Documentation of flowering plants and avian diversity of these 20 wetlands will be of great significance in conservation planning, sustainable utilization of bioresources and socioeconomic development.

Wetland ecosystems are host to plant and avian species wealth and levels of endemism than nearby areas. *Cyathocline manilaliana* an endemic threatened plant was recorded form Yeralwadi and its nearby area highlights the global significance of wetland ecosystem. These ecosystems can sustain exceptional biodiversity. They are globally significant reservoirs of biodiversity, sheltering rich assemblages of species. They harbour numerous endemic and threatened species, valuable medicinal and food plants. Presently Mayni bird habitat is very much disturbed and needs immediate for its conservation.

It is hoped that present project work would be of use to researchers, policy makers, environmentalists, ecologist, foresters, agriculturists and professionals interested in the wetland natural wealth and helps in marinating conserving these gifts of nature.

15. CONTRIBUTION TO THE SOCIETY -(GIVE DETAILS)

- Wetland vegetation is very important to waterfowls. Robust marsh vegetation in documented wetlands serves as a nutrient pump within wetlands and can influence water chemistry and primary productivity.
- Aquatic plants documented during the study are also vitally important to invertebrates as nutrient sources and substrates. Generally, there are positive correlations between vegetative complexity and bird populations and between invertebrate abundance and duck populations.
- The dominant macrophyte species of documented wetalnds like *Najas indica, Ottelia alismoides, Potamogeton nodosus, Potamogeton pectinatus and Vallisneria spiralis* are the major food plants for the migratory waterfowls. Waterfowl control excess growth of these species by feeding on the young sprouts and seeds.
- Birds play critical roles in wetland systems by acting as predators and prey, provide aesthetic values for bird watchers and other nature enthusiasts. It helps in increasing tourism and economic development of the region.
- Wetland birds could be acting as dispersal agents for many wetland plants that do not use abiotic agents, such as wind for dispersal into new areas. It is very much essential to maintain the heterogeneity in vegetation to encourage the diversity of waterbirds.
- Yeralwadi and Mayni bird habitats are very valuable ecosystem. It is of international importance to protect these habitats. During development, it is important that the Ramsar

Convention principles are taken into account. The most effective measures that could be taken into account for conservation of this habitat are change in present habitat status to sanctuary, strengthening environmental awareness and education programmes, control of invasions, strengthening co-operation, strengthening the management to protect this area and ecotourism development.

16. WHETHER ANY PH.D. ENROLLED/PRODUCED OUT OF THE PROJECT- No

17. NO. OF PUBLICATIONS OUT OF THE PROJECT – 04 (PLEASE ATTACH)

Papers Published:

1. Moholkar, S.M., S.U. Shinde, R.K. Sakhare and **C.B. Salunkhe**. 2018. Preliminary Floristic Diversity survey of Mayani Bird Habitat, Maharashtra. New Inter. *Creative Res. Jour.* Vol –IV (1), 3-9.

2. Patil, S.S., S.R. Patil, **C.B. Salunkhe**, S.V.Raskar, A.U.Sutar and C.R. Patil. 2015. Wetland Avifauna of Gavase Pond of Ajara Tahsil in South Maharashtra, India. Bionano frontier Vo. 8. Online: 2220-9593.

3. Patil, S.S., **C.B. Salunkhe,** C.R. Patil and S.R. Patil 2014. Seasonal Variation in the Phytoplanktons of Mayani Freshwater Reservoir from Khatav Tahsil of Satara District, M.S., India. *Proc. Nat. Conf. Environ. Biotech.* 166-169.

4. Patil, S.S., **C.B. Salunkhe**, S.R. Patil and V.A. Jadhav. 2014. Role of Water Canals in Conservation of Avifaunal Diversity in and Karad Tahsil of Satara District, M.S., India. *In Proc. National Conference on Biodiversity Conservation for Livelihood.* Manchester: Research Jour. (Sci.) pp. 89-92.

Papers Presented:

- **Salunkhe, C.B.**, S.V. Raskar, S.M. Moholkar and S.U. Shinde. Status of some Wetlands from South Western Maharashtra-India with special reference to Floristic Diversity, Ecosystem benefits, Threats and Management strategies. 17th World Lake Conference (Lake Kasumigaura, Ibaraki, 2018), held at Tsukuba, Japan from 14-19 October, 2018.

PRINCIPAL INVESTIGATOR

PRINCIPAL

CO-INVESTIGATOR

CO-INVESTIGATOR

Table No- 5

Comparative Floristic Diversity Analysis

1. Ner - Satara 2. Andhali – Satara 3. Darjai – Satara 4. Mayni – Satara 5. Rajevadi – Satara 6. Shil - Ratnagiri 7. Kondgaon – Ratnagiri 8. Ranand - Satara 9. Pingali – Satara 10.Yeralwadi - Satara 11. Kijirne – Kolhapur 12. Dhangarmola – Kolhapur 13. Khanapur – Kolhapur 14. Ningudage – Kolhapur 15. Erandol – Kolhapur 16. Vir – Satara 17. Nimbgaon - Solapur 18. Maloli – Solapur 19. Phondshiras – Solapur 20. Kusmod-Piliv - Solapur

No.	Plant Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.	*Abutilon indicum*																				
2.	*Acacia catechu*						+	+				+				+					
3.	*Acacia chundra*																			+	+
4.	*Acacia nilotica*																				
5.	*Acalypha indica*																				
6.	*Acanthospermum hispidum*																				
7.	*Achyranthes aspera*																				
8.	*Adropogon pumilus*																			+	+
9.	*Aegle marmelos*					+								+					+		
10.	*Aerva javanica*																				
11.	*Agave sisalana*																				
12.	*Ageratum conyzoides*																				
13.	*Ailanthus excelsa*																			+	+
14.	*Albizia lebbeck*						+	+					+								
15.	*Aloe vera*				+																
16.	*Alternanthera sessilis*	+															+			+	
17.	*Alysicarpus bupleurifolius*				+					+			+				+				
18.	*Alysicarpus glumaceus*				+						+				+						

19.	*Alysicarpus hamosus*													+			+				
20.	*Alysicarpus heyneanus*				+							+									
21.	*Alysicarpus ovalifolius*					+															
22.	*Amaranthus viridis*																				
23.	*Ammannia baccifera*	+		+		+					+										
24.	*Annona reticulata*				+																
25.	*Annona squamosa*				+																
26.	*Apluda mutica*	+		+								+			+				+		
27.	*Argemone mexicana*																				
28.	*Aristida adscensionis*																				
29.	*Aristida stocksii*																				
30.	*Asclepias curassavica*	+	+	+	+				+				+	+						+	
31.	*Azadirachta indica*																				
32.	*Bacopa monnieri*	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
33.	*Balanites aegyptiaca*																				
34.	*Barleria prionitis*	+			+				+					+				+			
35.	*Bergia ammannioides*			+							+					+					
36.	*Bidens biternata*	+														+			+		
37.	*Boerhavia erecta*	+									+			+						+	+
38.	*Boerhavia repens*		+								+						+				
39.	*Bougainvillea spectabilis*				+																
40.	*Brachiaria distachya*	+	+	+	+						+						+			+	+
41.	*Brachiaria eruciformis*	+		+	+							+									
42.	*Brachiaria ramosa*																				
43.	*Callistemon citrinus*				+																
44.	*Calotropis gigantea*	+	+	+	+			+		+		+		+				+		+	+
45.	*Canna indica*				+											+					

46.	*Canscora diffusa*					+	+														
47.	*Capparis decidua*	+	+	+	+				+	+			+				+	+	+	+	+
48.	*Capparis zeylanica*	+	+	+	+	+						+								+	+
49.	*Cardiospermum helicacabum*	+				+				+				+			+				
50.	*Cassia auriculata*	+	+	+	+	+			+	+	+						+		+	+	+
51.	*Cassia siamea*			+	+						+						+	+		+	+
52.	*Cassia tora*	+		+			+				+			+			+		+		+
53.	*Cassia uniflora*	+		+		+					+			+							+
54.	*Casuarina equisetifolia*				+		+	+										+			
55.	*Catharanthus roseus*					+															
56.	*Celosia argentea*	+	+	+	+					+	+						+		+	+	+
57.	*Centaurium meyeri*	+		+			+	+					+		+			+		+	+
58.	*Chloris barbata*	+			+							+						+			
59.	*Chloris virgata*	+					+							+				+		+	
60.	*Chrozophora rottleri*	+		+			+				+										+
61.	*Chrysopogon fulvus*																	+			
62.	*Citrus aurantifolia*				+																
63.	*Cleome viscosa*	+	+	+					+					+						+	+
64.	*Coccinia grandis*				+																
65.	*Cocculus hirsutus*	+	+	+	+	+			+			+			+				+	+	
66.	*Coldenia procumbens*																	+			
67.	*Combretum latifolium*			+		+	+	+						+			+				
68.	*Commelina benghalensis*	+			+		+			+				+						+	
69.	*Convolvulus arvensis*	+		+			+			+						+			+		
70.	*Corchorus aestuans*	+					+	+											+		+
71.	*Crotalaria hebecarpa*			+							+					+					

72.	*Croton bonplandianus*	+	+	+	+	+													+	+
73.	*Cryptolepis buchananii*	+		+	+				+							+			+		+
74.	*Cryptostegia grandiflora*			+			+					+	+				+			+	
75.	*Cyanotis cristata*		+		+					+			+				+			+	
76.	*Cyanotis fasciculata*			+		+				+				+							+
77.	*Cynodon barberi*		+	+	+				+			+			+			+			
78.	*Cynodon dactylon*	+	+	+	+			+			+			+			+		+		
79.	*Cyperus difformis*		+						+				+			+		+			
80.	*Cyperus exaltatus*			+				+		+				+			+			+	
81.	*Cyperus rotundus*	+	+		+		+				+		+		+		+		+	+	
82.	*Cythocline manilaliana*		+	+	+															+	
83.	*Dactyloctenium aegyptium*	+			+				+			+				+			+		
84.	*Dactyloctenium aristatum*				+				+					+				+			
85.	*Dalbergia sissoo*	+			+						+									+	+
86.	*Delonix regia*				+																
87.	*Desmodium triflorum*					+	+								+		+				
88.	*Dichanthium annulatum*		+						+						+					+	
89.	*Dichanthium caricosum*			+			+				+					+				+	
90.	*Dichanthium foveolatum*		+																		
91.	*Dichanthium pertusum*				+														+		+
92.	*Dicoma tomentosa*				+		+														
93.	*Digera muricata*			+		+							+							+	
94.	*Digitaria ciliaris*		+				+				+				+			+	+		
95.	*Dinebra retroflexa*		+		+					+			+				+			+	
96.	*Diplocyclos palmatus*		+			+	+				+						+			+	+
97.	*Dipteracanthus patulus*			+									+								
98.	*Dipteracanthus prostratus*				+										+						

99.	*Dolichandrone falcata*																				
100.	*Duranta erecta*				+																
101.	*Echinochloa crusgalli*		+			+	+														
102.	*Echinops echinatus*	+	+	+	+					+			+					+		+	+
103.	*Eclipta prostrata*	+		+	+	+	+	+		+	+		+	+	+		+		+		+
104.	*Eleocharis atropurpurea*																			+	
105.	*Eleocharis geniculata*																				
106.	*Eleusine indica*	+		+				+					+	+					+	+	
107.	*Emblica officinalis*	+	+	+			+						+		+	+	+	+	+	+	
108.	*Eragrostis gangetica*	+											+	+							
109.	*Eragrostis japonica*	+		+	+	+	+	+	+									+	+	+	
110.	*Eragrostis minor*																				
111.	*Eragrostis tenella*					+									+			+	+	+	
112.	*Eragrostis viscosa*	+	+	+					+				+		+			+	+	+	
113.	*Erythrina suberosa*	+		+			+		+				+		+			+	+		
114.	*Eucalyptus globulus*	+		+			+		+						+			+	+		
115.	*Euphorbia geniculata*	+	+		+		+						+		+			+		+	
116.	*Euphorbia heyneana*																				
117.	*Euphorbia hirta*	+		+					+				+		+			+			
118.	*Euphorbia pulcherrima*																				
119.	*Evolvulus alsinoides*	+			+				+				+		+			+			
120.	*Exacum pedunculatum*																+				
121.	*Fagonia schweinfurthii*						+		+					+							
122.	*Ficus amplissima*	+		+					+					+				+	+		
123.	*Ficus benghalensis*		+										+	+			+		+		
124.	*Ficus racemosa*	+					+						+						+		
125.	*Ficus religiosa*						+		+					+							

126.	*Fimbristylis bis-umbellata*		+										+					+			
127.	*Fimbristylis complanata*		+										+					+			
128.	*Fimbristylis cymosa*						+	+													
129.	*Fimbristylis ovata*						+	+								+					
130.	*Fimbristylis woodrowii*		+										+					+			
131.	*Fuirena wallichiana*						+	+													
132.	*Glinus lotoides*																				
133.	*Gliricidia sepium*	+		+										+			+	+		+	+
134.	*Glossocardia bosvallea*	+	+	+						+									+	+	+
135.	*Gnaphalium polycaulon*				+	+															
136.	*Grangea maderaspatana*																				
137.	*Hedyotis aspera*	+			+									+						+	+
138.	*Heliotropium supinum*				+	+					+			+							
139.	*Heteropogon contortus*	+	+	+	+	+	+					+		+		+	+			+	+
140.	*Hygrophila schulli*	+	+		+							+								+	+
141.	*Indigofera cordifolia*				+		+		+		+				+						
142.	*Indigofera linifolia*				+	+	+				+				+						
143.	*Ipomoea carnea*	+		+		+	+											+		+	+
144.	*Ipomoea hederifolia*					+					+				+						
145.	*Ipomoea quamoclit*		+	+	+															+	+
146.	*Iseilema anthephoroides*																				
147.	*Iseilema laxum*																				
148.	*Jacaranda acutifolia*				+																
149.	*Jatropha curcas*	+	+	+																	
150.	*Justicia adhatoda*				+																
151.	*Kyllinga tenuifolia*		+				+	+						+						+	
152.	*Lagascea mollis*	+	+	+	+				+											+	+

153.	*Laggera aurita*																				
154.	*Lantana camara*	+			+		+		+				+			+			+	+	
155.	*Launaea procumbens*		+		+										+					+	
156.	*Lavandula bipinnata*				+																
157.	*Leonotis nepetiifolia*			+																+	
158.	*Lepidagathis cristata*					+	+														
159.	*Leucaena siliqua*		+		+												+			+	
160.	*Leucas aspera*	+	+	+																	
161.	*Leucas longifolia*																				
162.	*Limnophila heterophylla*		+				+					+			+						
163.	*Limonia acidissima*				+																
164.	*Lophopogon tridentatus*	+	+	+	+				+		+			+		+			+	+	+
165.	*Mangifera indica*		+		+	+	+						+			+					
166.	*Martynia annua*	+	+	+	+														+	+	
167.	*Melanocenchris jacquemonti*			+	+														+	+	+
168.	*Microchloa Indica*																				
169.	*Mimosa hamata*			+	+																
170.	*Mimulus strictus*						+				+			+				+			
171.	*Morinda citrifolia*				+																
172.	*Morus alba*				+					+						+					
173.	*Murraya koenigii*				+						+						+				
174.	*Najas indica*	+	+	+						+				+					+		
175.	*Nerium indicum*				+																
176.	*Nyctanthes arbor-tristis*				+																
177.	*Ocimum americanum*		+	+	+														+	+	
178.	*Oropetium roxburghianum*																				

179.	*Ottelia alismoides*	+		+	+				+			+	+				+		+	+	
180.	*Oxalis corniculata*	+		+	+						+				+			+			
181.	*Parkia biglandulosa*				+																
182.	*Parkinsonia aculeata*	+		+	+												+		+		
183.	*Parthenium hysterophorus*	+	+	+	+			+	+	+	+	+	+	+	+		+	+	+	+	+
184.	*Paspalidium flavidum*			+				+				+			+	+					
185.	*Paspalidium geminatum*				+				+					+					+	+	+
186.	*Pennisetum hohenackeri*		+			+	+					+							+		
187.	*Pennisetum pedicellatum*												+			+	+			+	
188.	*Pentanema indicum*	+	+	+	+				+				+			+		+			
189.	*Pentatropis capensis*		+		+							+				+			+	+	
190.	*Peristrophe paniculata*	+	+	+	+			+				+					+		+		+
191.	*Phoenix sylvestris*																				
192.	*Phyla nodiflora*	+	+	+	+		+	+		+		+		+		+	+		+	+	+
193.	*Phyllanthus amarus*		+				+				+				+			+		+	
194.	*Pithecellobium dulce*		+	+				+										+			
195.	*Plumbago zeylanica*		+		+									+							
196.	*Plumeria alba*				+																
197.	*Polyalthia longifolia*				+														+		
198.	*Polygala arvensis*	+	+	+	+				+			+				+		+		+	+
199.	*Polygala erioptera*			+			+			+				+				+		+	
200.	*Pongamia pinnata*		+		+			+			+			+			+		+		+
201.	*Portulaca olaracea*	+	+	+	+					+		+			+			+		+	
202.	*Potamogeton nodosus*	+	+	+	+							+				+		+		+	
203.	*Potamogeton pectinatus*	+		+																	
204.	*Prosopis julifera*	+	+	+	+						+			+		+		+		+	+
205.	*Pseudarthria viscida*		+		+				+		+				+				+		

206.	*Pueraria montana*				+								+								
207.	*Pulicaria wightiana*	+	+	+					+							+		+		+	
208.	*Pupalia lappacea*			+																	
209.	*Rhynchelytrum repens*			+			+					+					+				
210.	*Ricinus communis*	+	+																		
211.	*Rivea hypocrateriformis*								+					+				+			
212.	*Rotala floribunda*	+	+	+	+						+						+			+	+
213.	*Rotala serpyllifolia*					+	+						+								
214.	*Rungia elegans*			+	+	+										+			+		
215.	*Rungia repens*		+		+				+						+				+		
216.	*Russelia equisetiformis*				+																
217.	*Saccharum spontaneum*	+	+	+			+			+		+			+				+	+	
218.	*Santalum album*		+		+																
219.	*Schoenoplectus lateriflorus*					+	+								+			+			
220.	*Schoenoplectus maritimus*			+		+	+					+									
221.	*Scilla hyacinthina*	+	+							+					+		+				
222.	*Securinega virosa*			+				+						+						+	
223.	*Sesamum laciniatum*	+	+							+				+						+	+
224.	*Setaria pumila*				+			+				+				+					
225.	*Sida acuta*	+	+	+									+				+		+		
226.	*Sida rhombifolia*			+							+						+			+	
227.	*Solanum virginianum*	+	+	+	+						+			+							
228.	*Sopubia delphinifolia*			+		+	+				+								+		
229.	*Spermacoce ocymoides*		+			+	+								+			+			
230.	*Sporobolus indicus*	+	+		+						+									+	
231.	*Striga densiflora*	+				+	+								+						
232.	*Stylosanthes fruticosa*		+	+								+				+			+		

233.	*Swertia minor*			+	+										+			+	+		
234.	*Synedrella vialis*	+		+					+		+			+							
235.	*Syzygium cumini*		+		+										+					+	
236.	*Tabebuia argentea*				+	+															
237.	*Tamarindus indica*		+							+					+			+	+		
238.	*Tecoma stans*	+	+	+	+					+			+								
239.	*Tectona grandis*					+	+					+						+	+		
240.	*Tephrosia tinctoria*		+		+				+					+							
241.	*Teramnus labialis*			+								+							+	+	
242.	*Thespesia populnea*				+																
243.	*Tinospora cordifolia*	+	+	+	+						+								+		
244.	*Tragia plukenetii*		+	+	+																
245.	*Tragus roxburghii*	+	+	+	+								+			+			+	+	+
246.	*Trianthema portulacastrum*	+	+	+	+						+			+				+	+		+
247.	*Tribulus terrestris*	+		+	+					+			+			+					
248.	*Trichodesma indicum*																				
249.	*Tricholepis glaberrima*	+		+	+					+			+				+		+		
250.	*Tridax procumbens*	+	+	+	+						+			+				+			
251.	*Trigonella occulta*	+	+	+				+							+			+			+
252.	*Tripogon jacquemontii*	+	+	+	+					+				+			+				
253.	*Triumfetta rhomboidea*		+	+					+				+			+			+	+	
254.	*Typha angustifolia*	+	+	+	+	+	+		+			+		+		+		+	+		
255.	*Vallaris solanacea*		+	+	+																
256.	*Vallisneria spiralis*		+		+						+						+			+	
257.	*Verbascum chinese*	+				+					+				+				+		
258.	*Vernonia cinerea*				+							+				+					+
259.	*Vitex negundo*			+				+					+					+		+	

260.	*Wattakaka volubilis*		+			+			+			+					+			+	
261.	*Xanthium indicum*			+			+						+				+		+		
262.	*Zeuxine strateumatica*				+						+										
263.	*Ziziphus rotundifolia*		+		+				+				+			+		+		+	
	Total	**95**	**94**	**106**	**125**	**43**	**56**	**28**	**42**	**31**	**46**	**35**	**41**	**47**	**41**	**34**	**44**	**54**	**64**	**82**	**49**

Table No 6

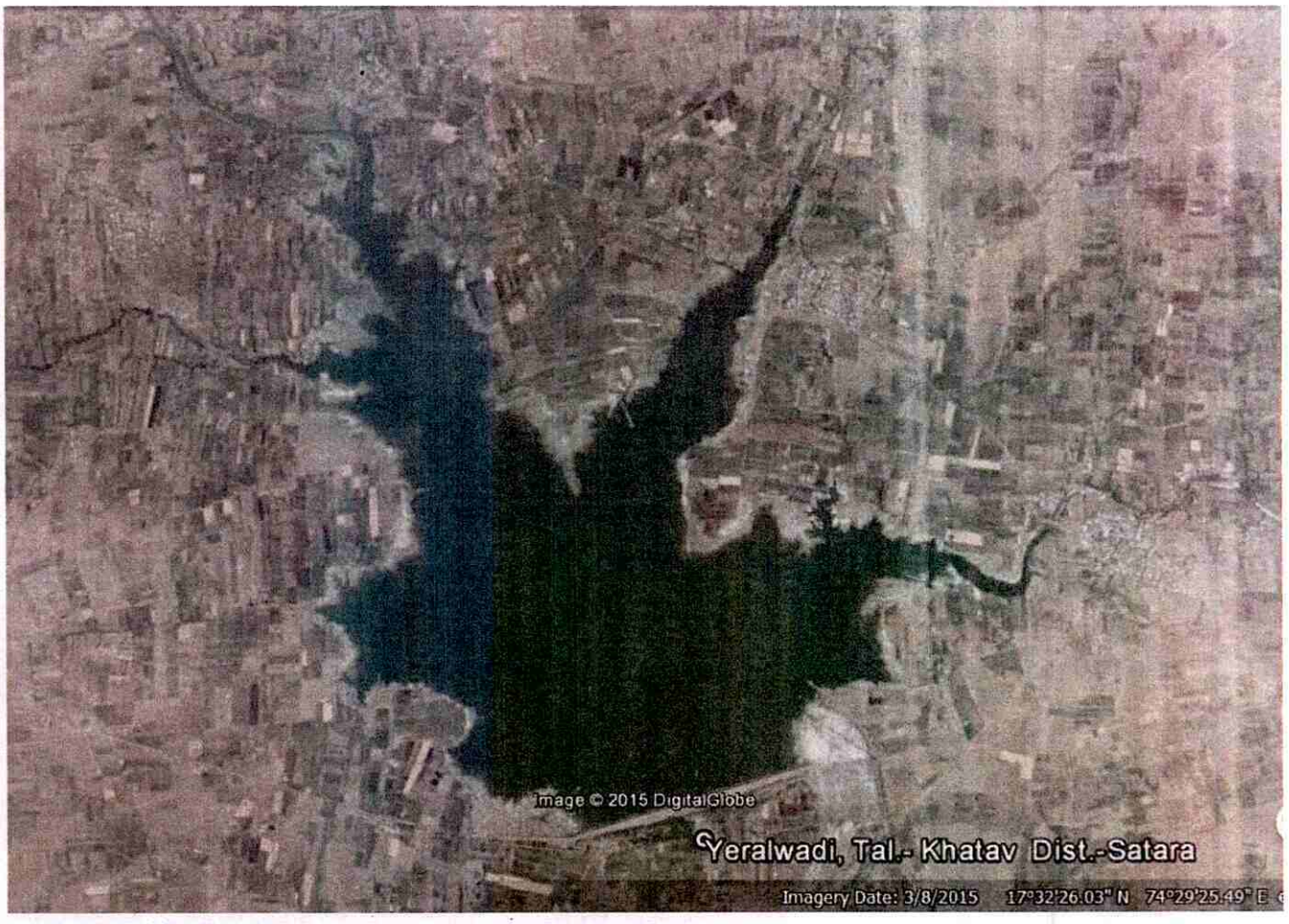
Comparative Avi Faunal Diversity Analysis

1. Ner - Satara 2. Andhali – Satara 3. Darjai – Satara 4. Mayni – Satara 5. Rajevadi – Satara 6. Shil - Ratnagiri 7. Kondgaon – Ratnagiri 8. Ranand - Satara 9. Pingali – Satara 10. Yeralwadi - Satara 11. Kijirne – Kolhapur 12. Dhangarmola – Kolhapur 13. Khanapur – Kolhapur 14. Ningudage – Kolhapur 15. Erandol– Kolhapur 16. Vir – Satara 17. Nimbgaon - Solapur 18. Maloli – Solapur 19. Phondshiras – Solapur 20. Kusmod-Piliv - Solapur

No.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1.	*Accipiter nisus* (H)	+		+	+	+			+	+		+		+	+	+	+	+	+	+	+
2.	*Adrea cinnamomea* (H)		+		+	+	+	+		+	+		+	+		+		+		+	
3.	*Alcedo atthis* (K)	+	+	+	+		+	+		+	+	+		+		+		+		+	
4.	*Amaurornis phoenicurus* (P)		+		+		+	+		+			+		+		+			+	
5.	*Anas poecilorhyncha* (F)	+		+			+			+			+			+			+		+
6.	*Anastomus oscitans* (B)		+		+		+		+		+	+		+		+		+	+	+	+
7.	*Aquila rapx* (F)			+		+		+			+		+		+		+	+		+	
8.	*Ardea alba* (L)	+		+			+		+	+	+		+		+		+		+		
9.	*Ardea purpurea* (L)		+		+		+		+		+	+		+		+		+		+	
10.	*Ardea schistacea* (H)	+		+		+		+			+			+			+		+		
11.	*Ardeola grayii* (S)		+		+		+		+	+		+		+	+	+		+		+	
12.	*Bubulcus ibis* (B)	+		+		+	+		+		+		+		+		+		+		+
13.	*Buteo buteo* (L)		+				+			+		+		+			+			+	
14.	*Butoridess triatus* (H)			+		+			+				+		+			+		+	
15.	*Ceryle rudis* (R)		+			+	+		+		+			+		+		+		+	

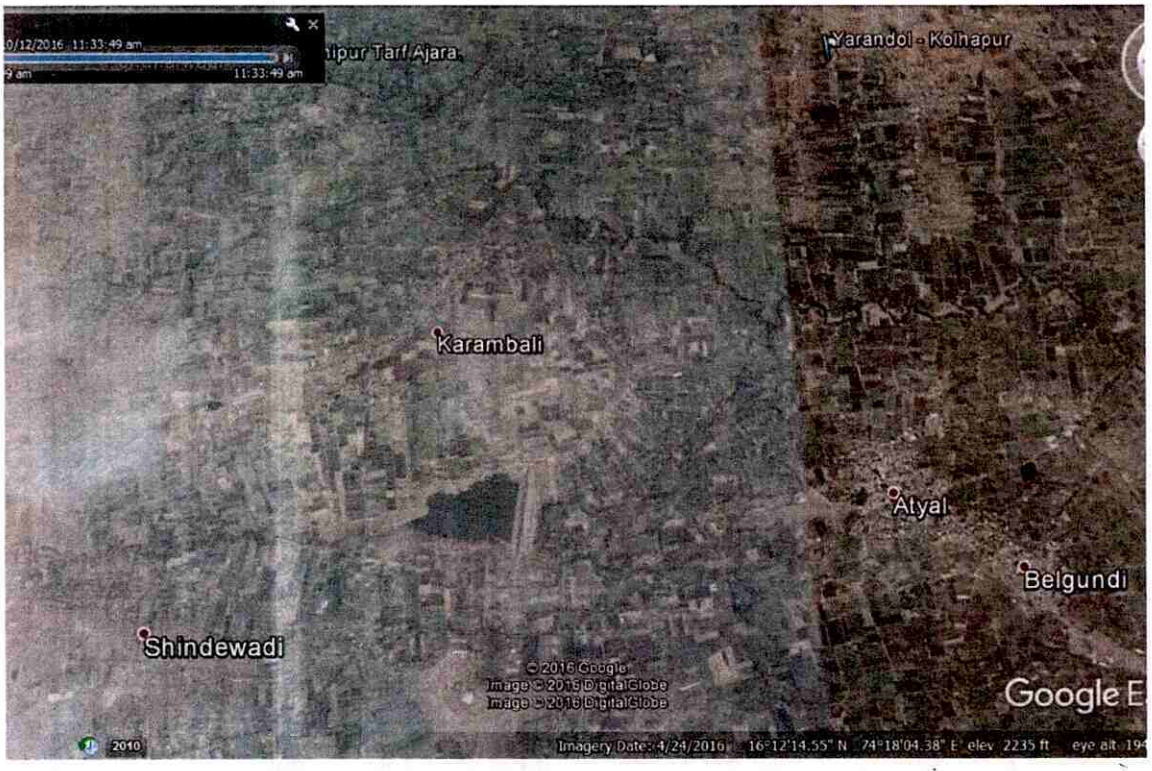
16.	*Charadrius dubius* (L)			+		+		+			+		+		+		+		+		
17.	*Ciconia episcopus* (B)		+		+			+		+		+			+		+		+		+
18.	*Copsychus saularis* (L)	+		+		+			+		+			+		+		+		+	
19.	*Egretta garzetta* (L)		+		+		+			+			+		+		+		+		+
20.	*Elanus caeruleus* (L)	+		+		+			+			+		+		+		+			+
21.	*Halcyon smyrnensis* (B)		+		+			+			+		+		+		+		+	+	
22.	*Haliastur Indus* (B)	+		+		+			+	+		+		+		+		+		+	
23.	Hemantopus hemantopus (L)		+		+			+			+			+		+		+		+	
24.	*Merops orientalis* (J)	+		+		+			+			+			+		+		+		+
25.	*Milvus migrans govinda* (S)	+		+	+		+			+			+			+		+		+	+
26.	*Motacilla flava* (B)		+			+			+		+		+		+		+		+		
27.	*Motacilla moderaspatensis* (S)	+		+			+			+		+		+		+		+		+	
28.	*Myceteria leucocephala* (P)		+		+	+		+			+		+		+		+		+		+
29.	*Mycteria leucocephala* (P)	+		+			+			+		+		+		+		+		+	
30.	*Nectarinia asiatica* (L)		+		+		+		+		+		+		+		+		+		+
31.	*Phalacrocorax carbo* (S)	+			+		+			+		+		+		+		+		+	
32.	*Phalacrocorax niger* (V)		+		+		+		+		+		+		+		+				+
33.	*Platalea leucorodia* (T)			+				+			+			+			+		+		+
34.	*Podiceps ruficollis* (L)	+		+		+			+			+		+		+		+		+	
35.	*Porphyrio poliocephalus* (L)		+		+			+		+			+		+		+		+		+
36.	*Pseudibis papillosa* (T)	+		+		+			+		+	+			+		+			+	+
37.	*Saxicola caprata* (L)	+		+		+		+		+			+		+	+	+	+			+
38.	*Strptopelia chnensis* (G)		+		+		+		+		+		+		+		+		+		

39.	*Strptopelia decacto* (G)	+		+		+		+		+	+			+		+		+		+	
40.	*Strptopelia tranquebarica* (H)		+		+		+		+		+	+	+		+		+		+		+
41.	*Tadorna ferruginea* (P)	+		+	+	+				+				+				+		+	
42.	*Threskiornis aethiopica* (L)		+		+		+		+		+	+			+		+		+		+
43.	*Tringa glareola*	+		+	+	+				+			+			+		+		+	
44.	*Upupa epops* (L)		+		+			+			+			+					+		
45.	*Vanellus indicus* (B)	+		+		+			+		+	+			+		+	+			+
46.	*Zosterops palpebrosa* (H)		+		+			+			+		+			+			+		+
47	*Ardeola grayii*	+	+		+			+				+			+		+	+			+
	Total	**22**	**23**	**24**	**25**	**21**	**21**	**17**	**21**	**20**	**26**	**19**	**21**	**21**	**24**	**21**	**23**	**24**	**21**	**21**	**22**


Image © 2015 DigitalGlobe
Yeralwadi, Tal.- Khatav Dist.-Satara
Imagery Date: 3/8/2015 17°32'26.03" N 74°29'25.49" E


Andhali, Tal.-
Image © 2015 CNES / Astrium
Imagery Date: 12/20/2013 17°45'34.34" N 74°28'55.17" E


Vir, Tal.- Khandala, Dist.- Satara
Nhavi
Tondal
Shirwal
Taparewadi
Palshi
Dhangarwadi
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Image © 2016 DigitalGlobe
Google E
Imagery Date: 4/27/2016 18°08'27.06" N 74°00'34.32" E elev 1933 ft


Yarandol - Kolhapur
Karambali
Atyal
Belgundi
Shindewadi
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Google E
2010
Imagery Date: 4/24/2016 16°12'14.55" N 74°18'04.38" E elev 2235 ft


Pingali, Tal.-Man Dist.-Satara
Image © 2015 CNES / Astrium
Imagery Date: 12/20/2013 17°41'16.77" N 74°32'10.24" E


Rajevadi
Image © 2015 DigitalGlobe
Image © 2015 CNES / Astrium
Imagery Date: 1/16/2015 17°35'59.81" N 74°51'17.06" E

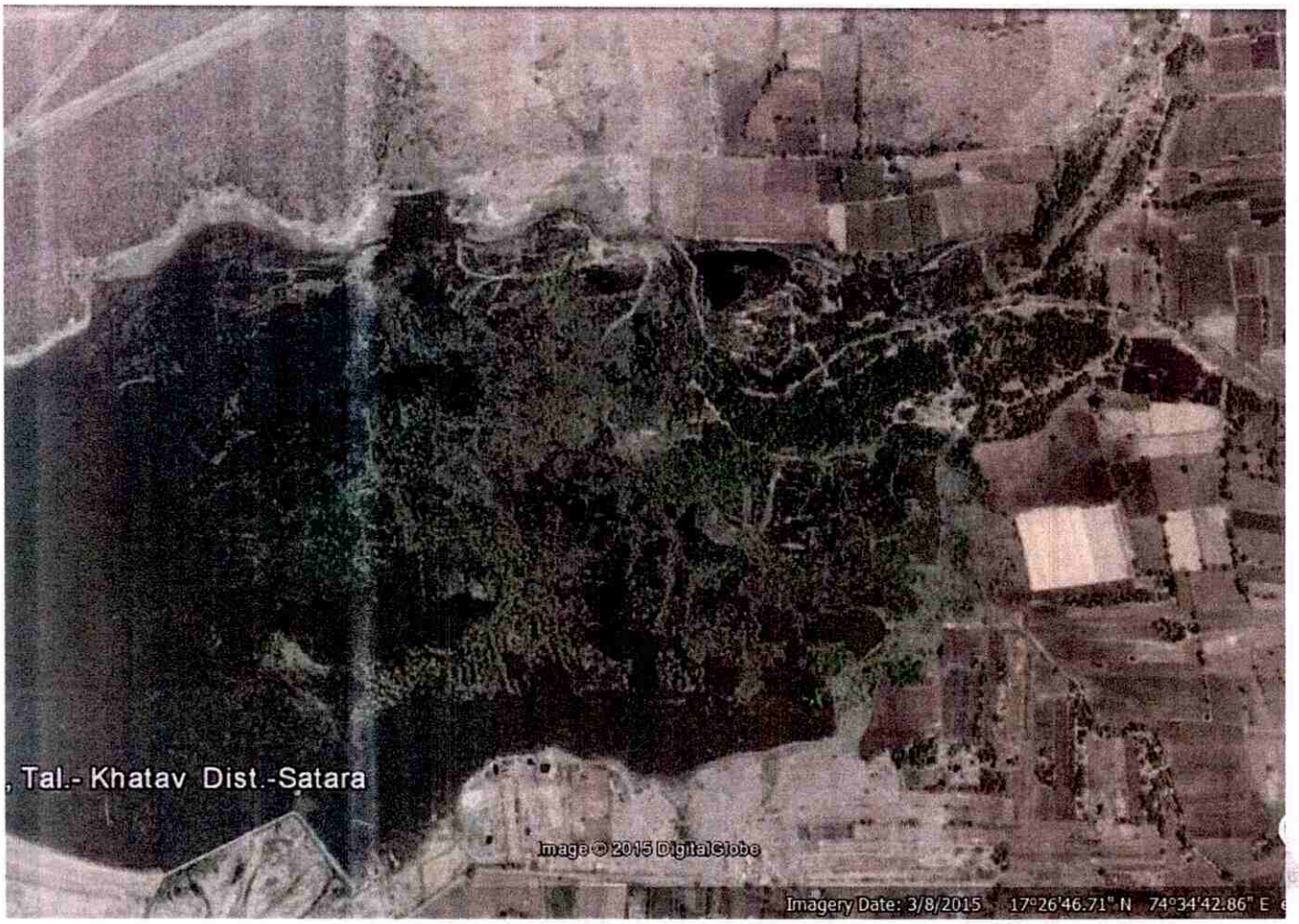
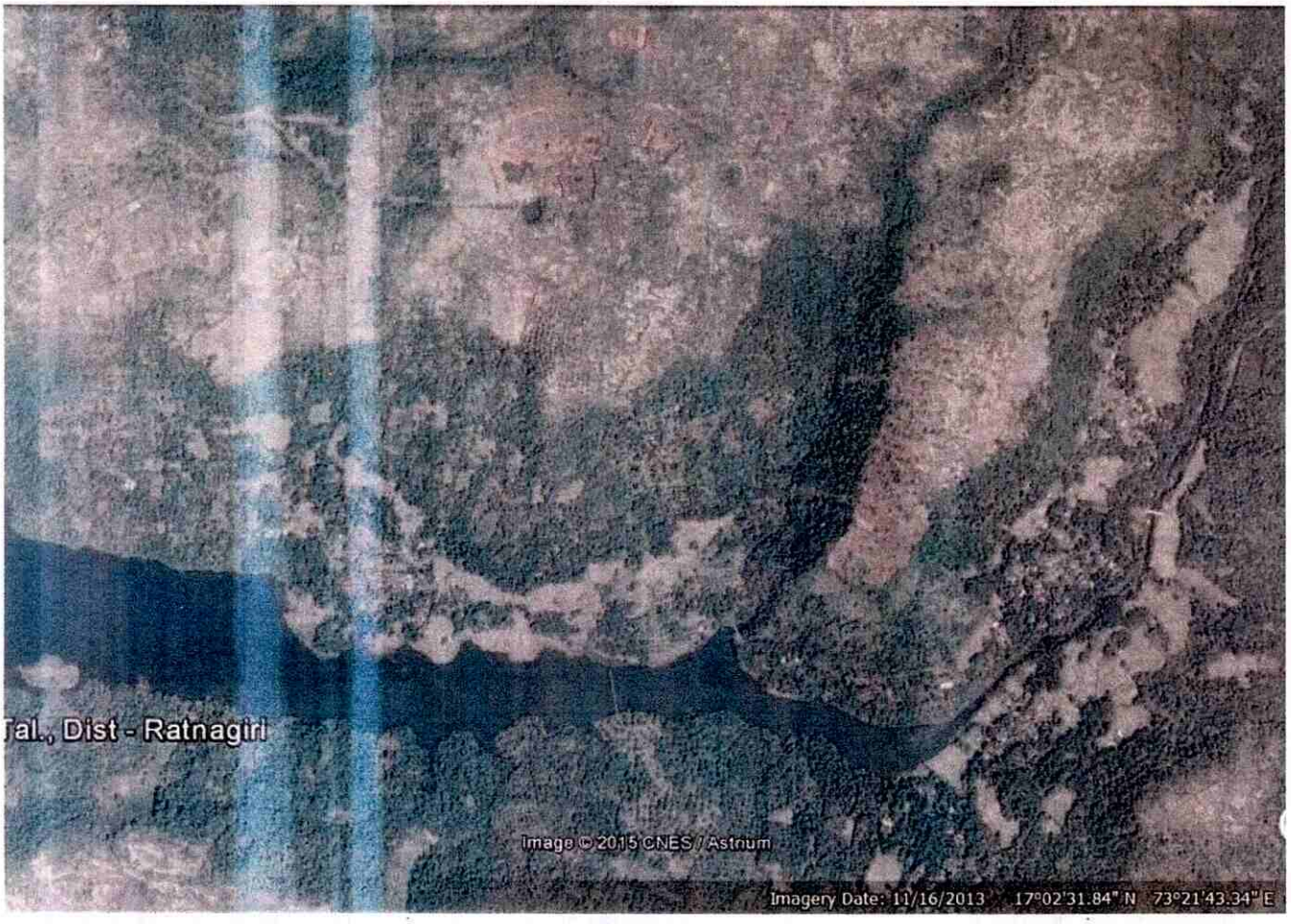

, Tal.- Khatav Dist.-Satara
Image © 2015 DigitalGlobe
Imagery Date: 3/8/2015 17°26'46.71" N 74°34'42.86" E

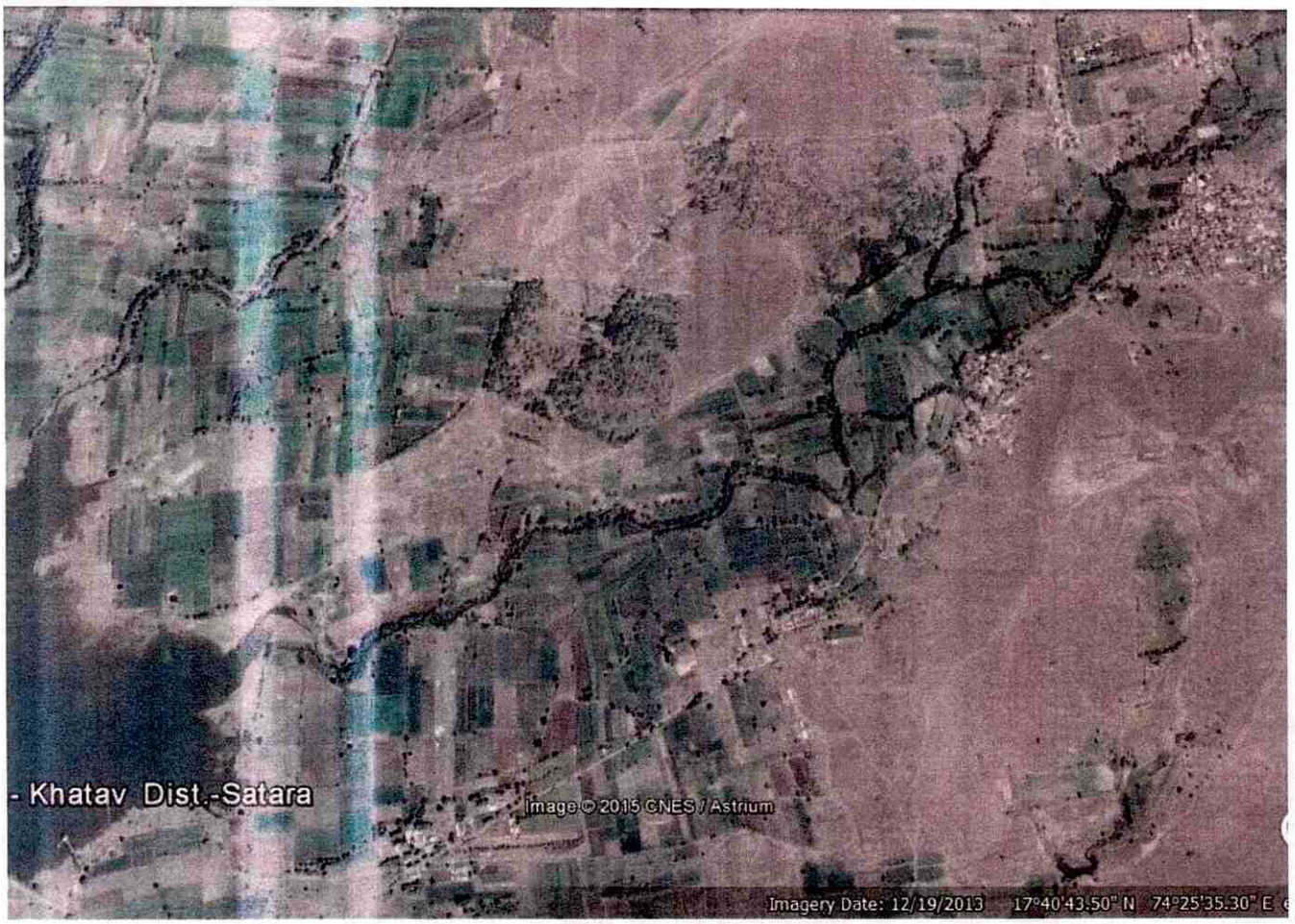

Image © 2015 CNES / Astrium
Ner, Tal.- Khatav Dist.-Satara
Imagery Date: 12/19/2013 17°45'26.26" N 74°18'27.37" E


Dhangarmola - Kolhapur
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Imagery Date: 1/2/2016 16°14'30.60" N 74°15'41.14" E elev 2257 ft eye alt


Khanapur - Kolhapur
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Google E
2010
Imagery Date: 4/24/2016 16°10'49.48" N 74°20'12.06" E elev 2076 ft eye alt


Ranand, Tal.-Man Dist.-Satara
Image © 2015 CNES / Astrium
Imagery Date: 12/20/2013 17°44'26.45" N 74°37'37.68" E


Tal., Dist - Ratnagiri
Image © 2015 CNES / Astrium
Imagery Date: 11/16/2013 17°02'31.84" N 73°21'43.34" E


- Khatav Dist.-Satara
Image © 2015 CNES / Astrium
Imagery Date: 12/19/2013 17°40'43.50" N 74°25'35.30" E


Kondgaon, Tal.- Sangmeshwar Dist.- Ratnagiri
Image © 2015 DigitalGlobe
Imagery Date: 12/4/2014 16°59'55.94" N 73°41'48.34" E


Nimbgaon - Solapur
Chandapuri
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Imagery Date: 5/22/2016
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Phondsiras - Solapur
Natepute
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Maloli - Solapur
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2011
Imagery Date: 5/22/2016


Nigudage - Kolhapur
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Imagery Date: 12/22/2013


Gavase, Tal.- Ajara Dist.- Kolhapur
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2006
Imagery Date: 1/9/2016 16°17'41.00" N 74°16'56.00" E elev 2138 ft


Kusmond- pliv - Solapur
Image © 2016 CNES / Astrium
© 2016 Google
Google E
2007
Imagery Date: 5/22/2016 17°41'10.15" N 75°00'08.95" E elev 1715 ft

PLATE I



Abutilon indicum



Ageratum conyzoides



Argemone mexicana



Ammannia baccifera



Bidens biternata



Croton bonplandianus



Cryptolepis buchananii



Centaurium meyeri



Canscora diffusa

PLATE II



Calotropis gigantea



Capparis zeylanica



Corchorus aestuans



Cleome viscosa



Cyanotis fasciculata



Diplocyclos palmatus



Echinops echinatus



Eclipta prostrata



Exacum pedunculatum

PLATE III



Kyllinga tenuifolia



Lavandula bipinnata



Pentanema indicum



Pulicaria wightiana



Rotala serpyllifolia



Sopubia delphinifolia



Syzygium cumini



Tamarindus indica



Tridax procumbens

PLATE 1

WHITE-NECKED STORK *Ciconia episcopus* (B)



PLATE 2

PAINTED STORK *Mycteria leucocephala* (P)

SPOON BILL *Platalea leucorodia* (T)



PLATE 3

OPENBILL STORK *Anastomus oscitans* (B)





PLATE 4

WHITE IBIS *Threskiornis aethiopica* (L)



PLATE 5

LITTLE GREB CARMORANT *Phalacrocorax niger* (V)









INDIAN BLACK IBIS *Pseudibis papillosa* (T)





INDIAN RIVER TERN *Sterna aurantia* (G)



PLATE 6

SPOTBILL DUCK *Anas poecilorhyncha* (F)

BRAHMINY DUCK / RUDDY SHELDUCK *Tadorna ferruginea* (P)



PLATE 7

EASTERN PURPLE HERON *Ardea purpurea* (L)



PLATE 8

SMALL BLUE KINGFISHER *Alcedo atthis* (K)



PLATE 9

LESSER PIED KINGFISHER *Ceryle rudis* (R)

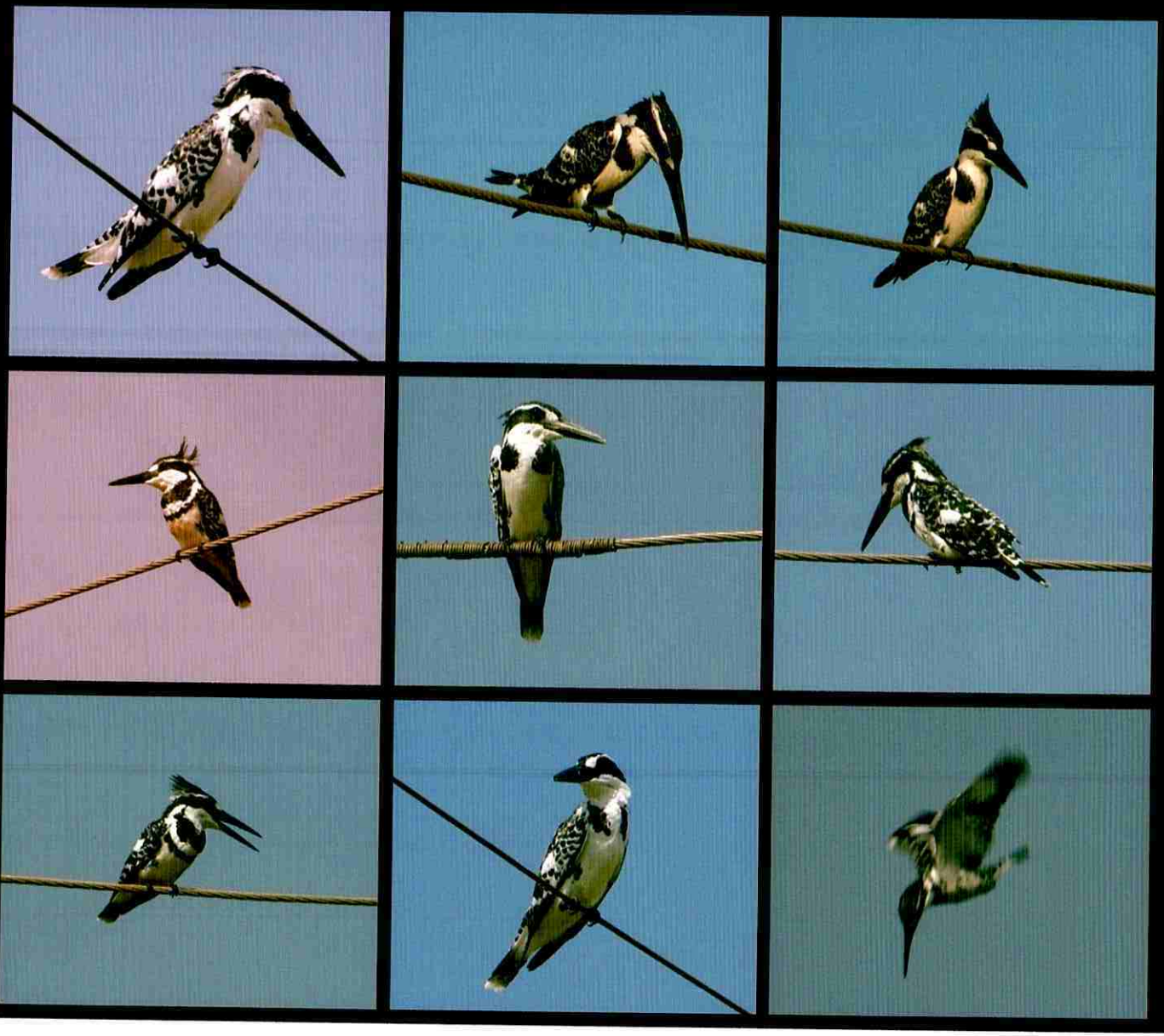


PLATE 10

WHITE BREASTED KINGFISHER *Halcyon smyrnensis* (B)

PURPLE BACKED / STORK BILLED KINGFISHER *Pelargopsis erithaca* (L)



PLATE 11

CATTLE EGRET *Bubulcus ibis* (B)






INDIAN REEF HERON *Ardea schistacea* (H)




GREY HERON *Egretta gularis* (H)




PLATE 12

LITTLE EGRET *Egretta garzetta* (L)







LARGE EGRET / GREAT WHITE HERON *Ardea alba* (L)

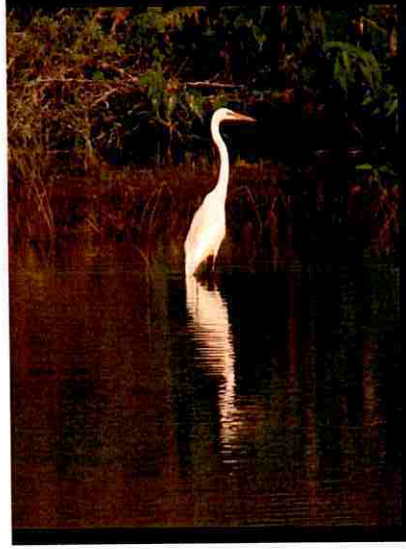






PLATE 13

POND HERON / PADDY BIRD *Ardeola grayii* **(S)**



PLATE 14

POND HERON / PADDY BIRD *Ardeola grayii* **(S)**



PLATE 15

WHITE BREASTED WATER HEN *Amaurornis phoenicurus* (P)

PURPLE MOORHEN *Porphyrio poliocephalus* (L)



PLATE 16

BLACK WINGED STILT *Hemantopus hemantopus* (L)

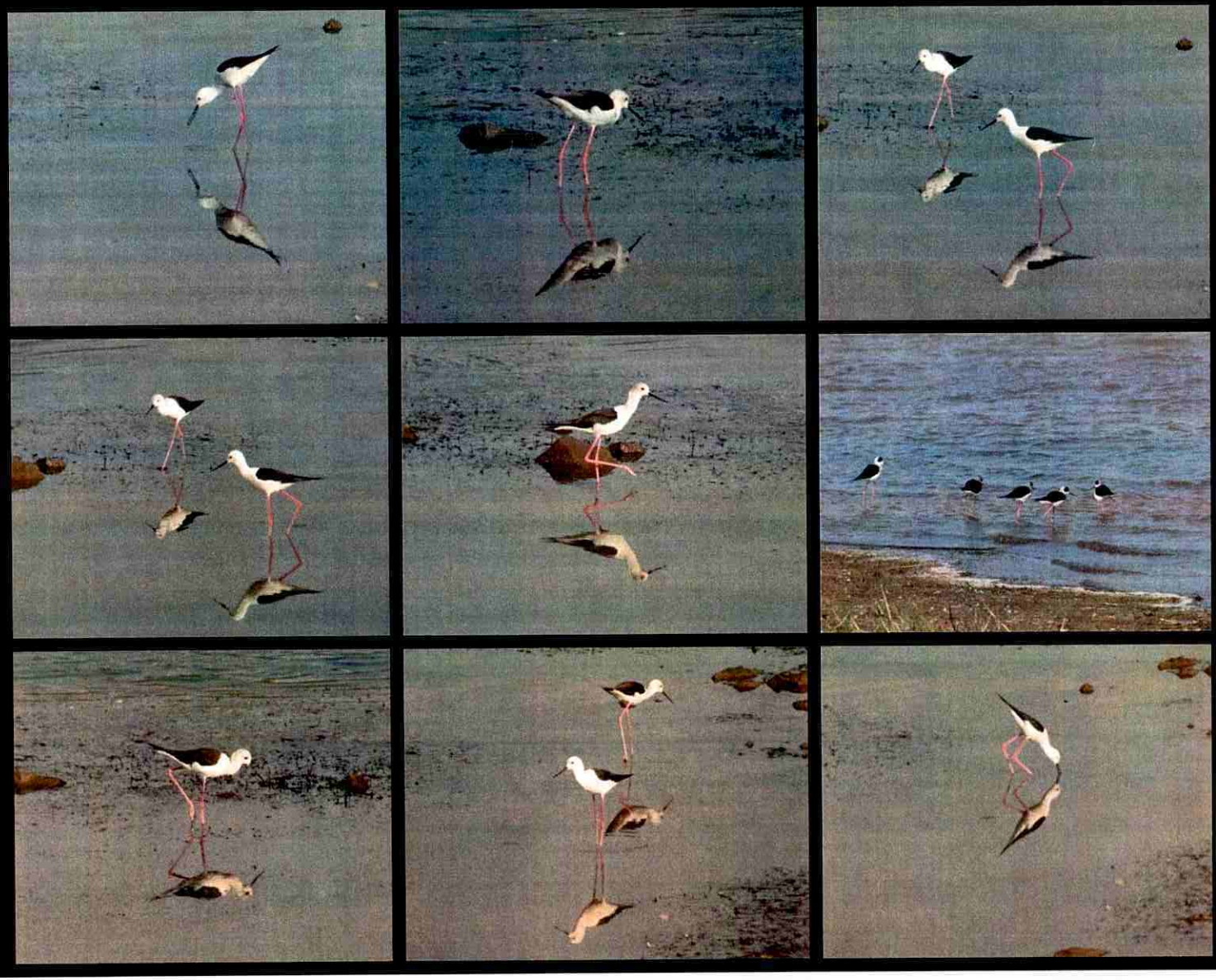


PLATE 17

INDIAN LITTLE RINGED PLOVER *Charadrius dubius* (L)



PLATE 18

COMMON SAND PIPPER *Tringa hypoleucos* (L)

SPOTTED SAND PIPER *Tringa glareola* (L)



PLATE 19

RED WATTLED LAPWING *Vanellus indicus* (B)

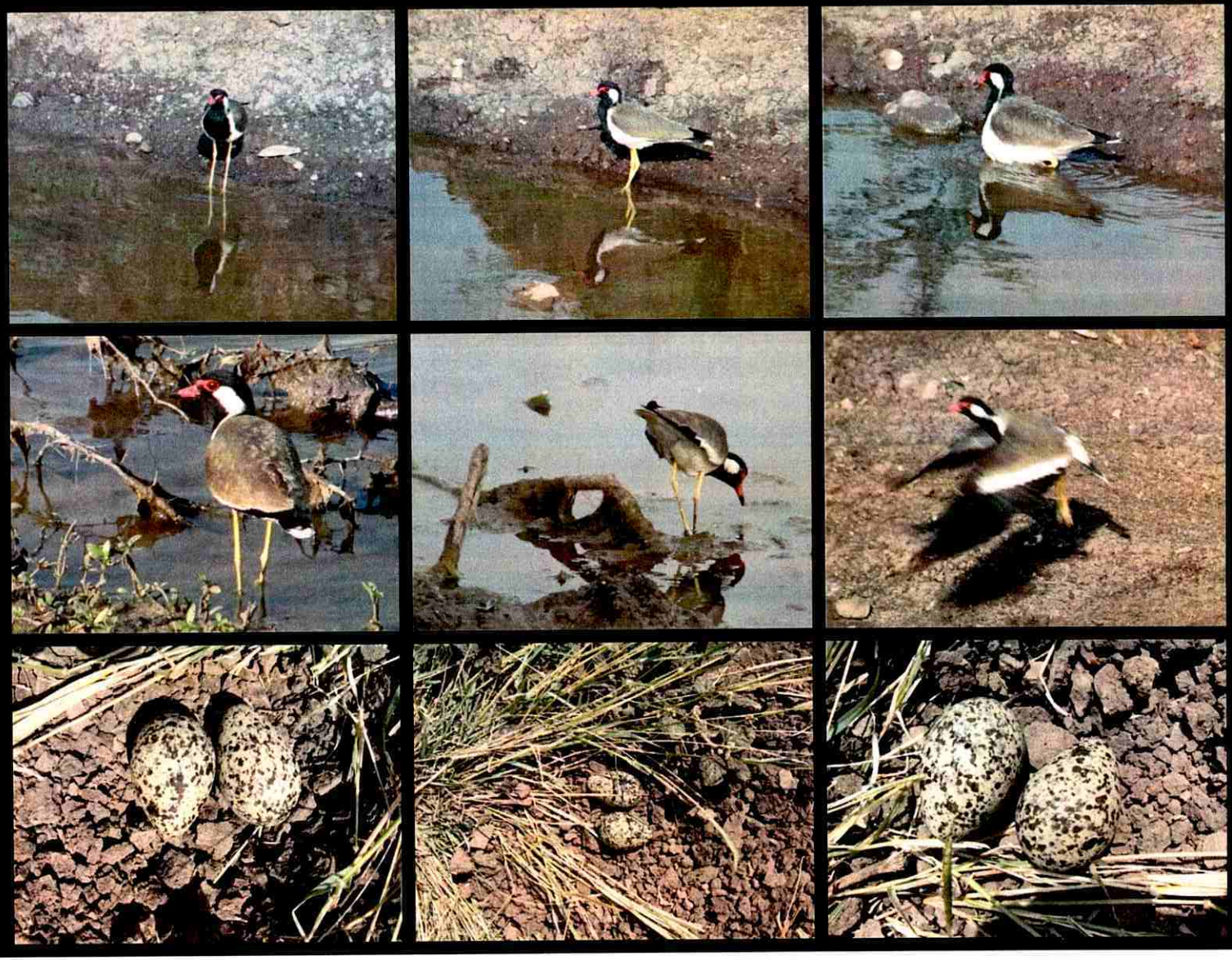


PLATE 20

CREMSON BRESTED BARBET / COPPERSMITH *Megalaiama haemacephala* (L)

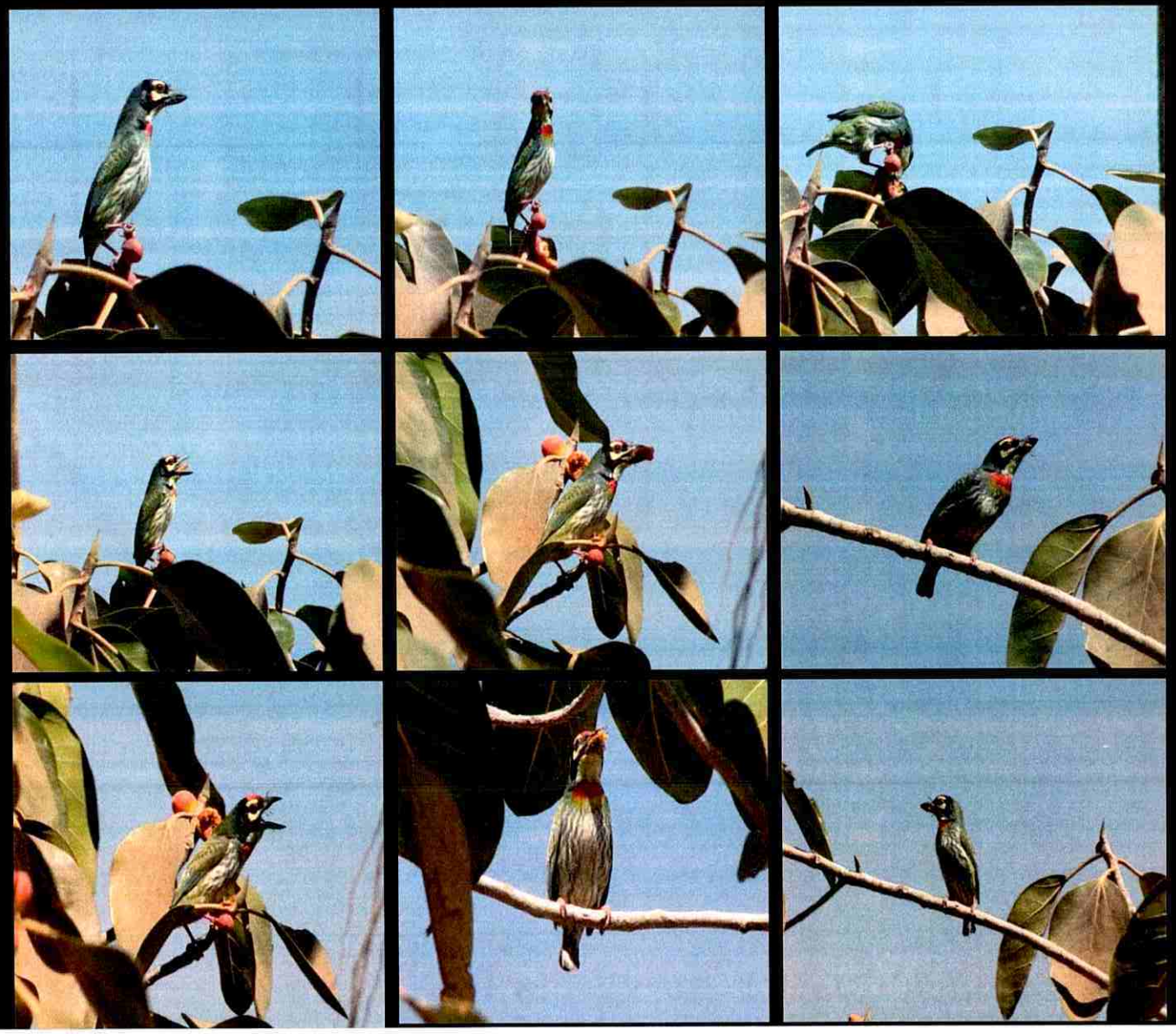


PLATE 21

BLACK WINGED KITE *Elanus caeruleus* (L)

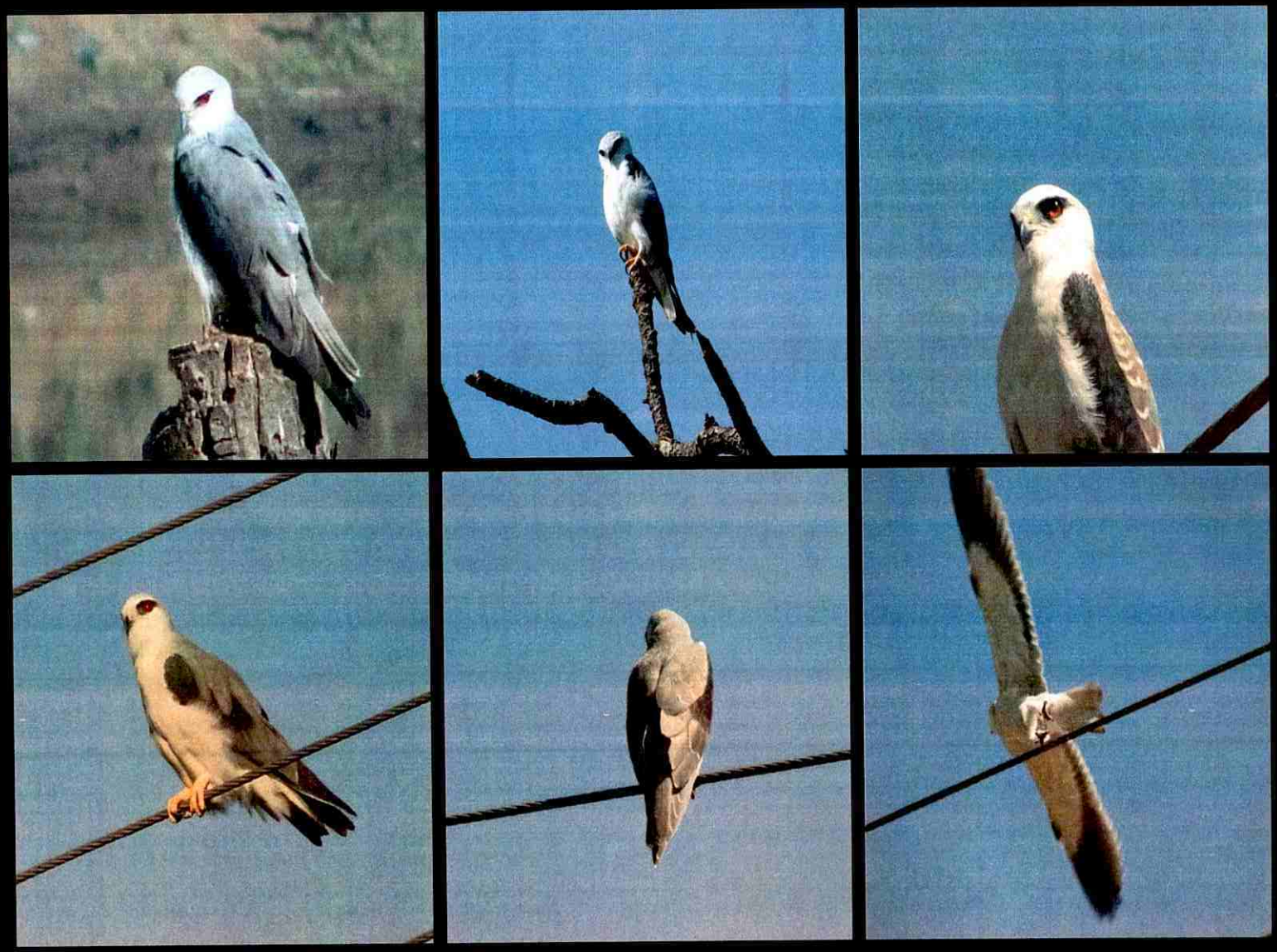


PLATE 22

BLOSSOM HEADED PARAKEET *Psittacula cyanocephala* (L)

ROSE RINGED PARAKEET *Psittacula krameri* (B)

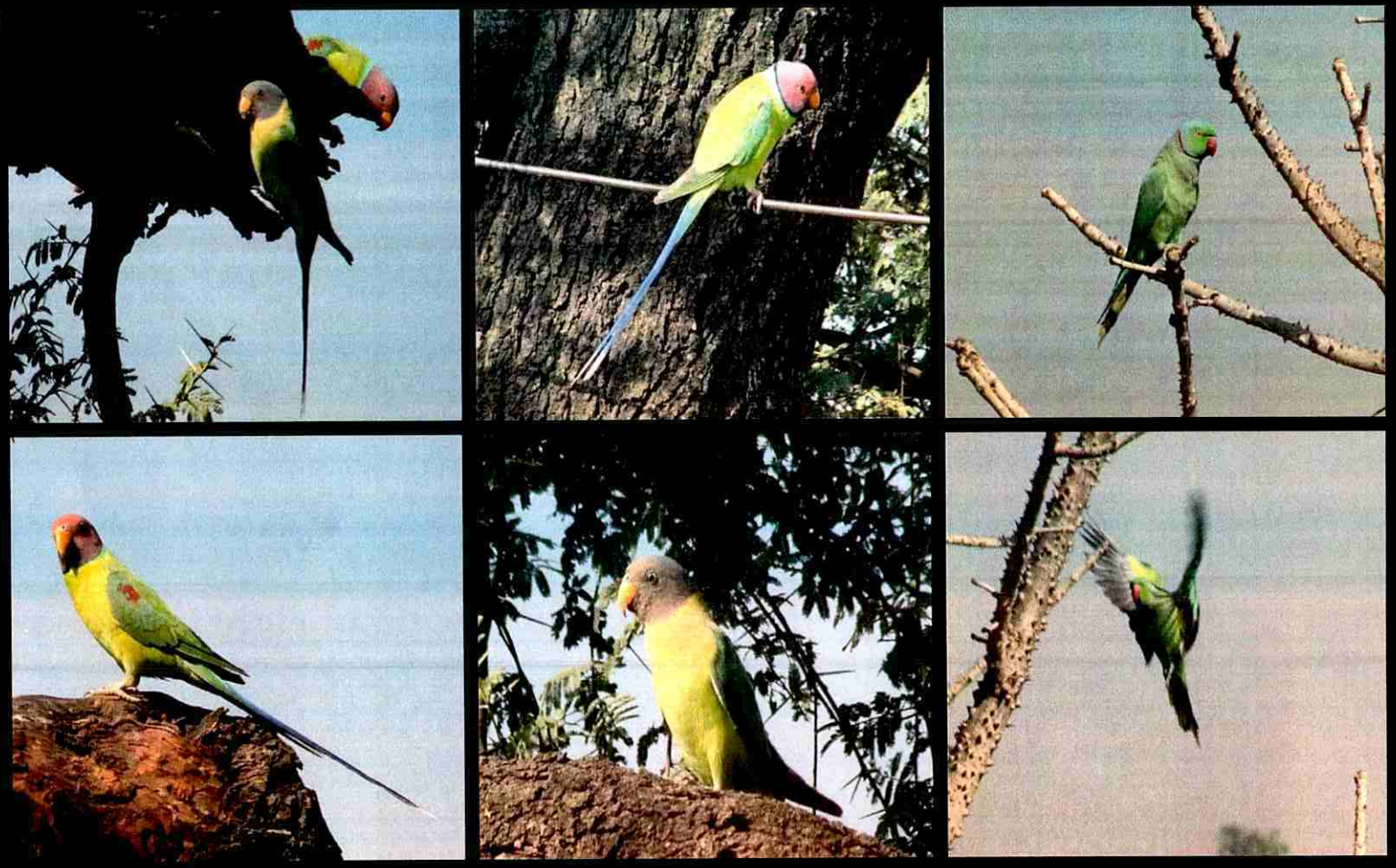


PLATE 23

GREEN BEE EATER / FLY CATCHER *Merops orientalis* (J)

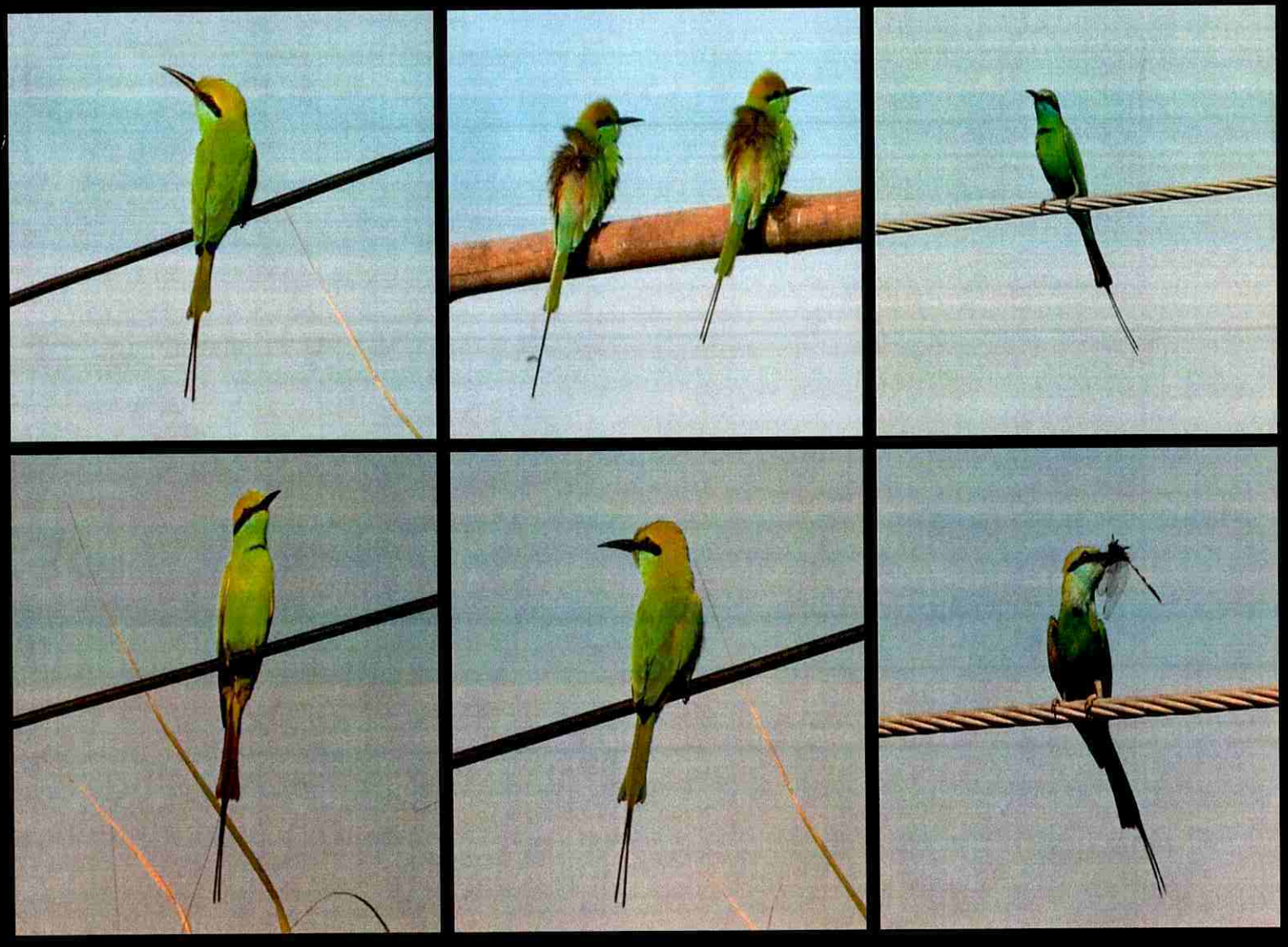
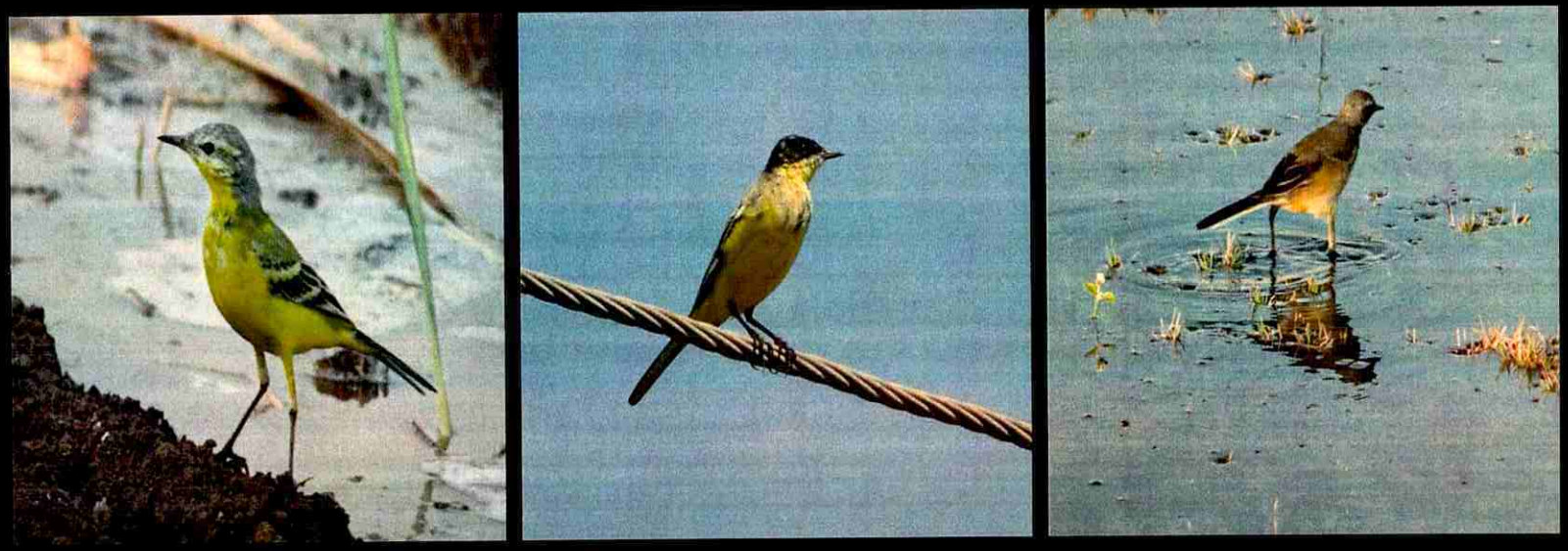


PLATE 24

YELLOW WAGTAIL *Motacilla flava* (B)



GREY WAGTAIL *Motacilla gorufera* (L)
WHITE BROWED WAGTAIL *Motacilla moderaspatensis* (S)



PLATE 25

RUFOUS BACKED SHRIKE *Lanius schach* (V)

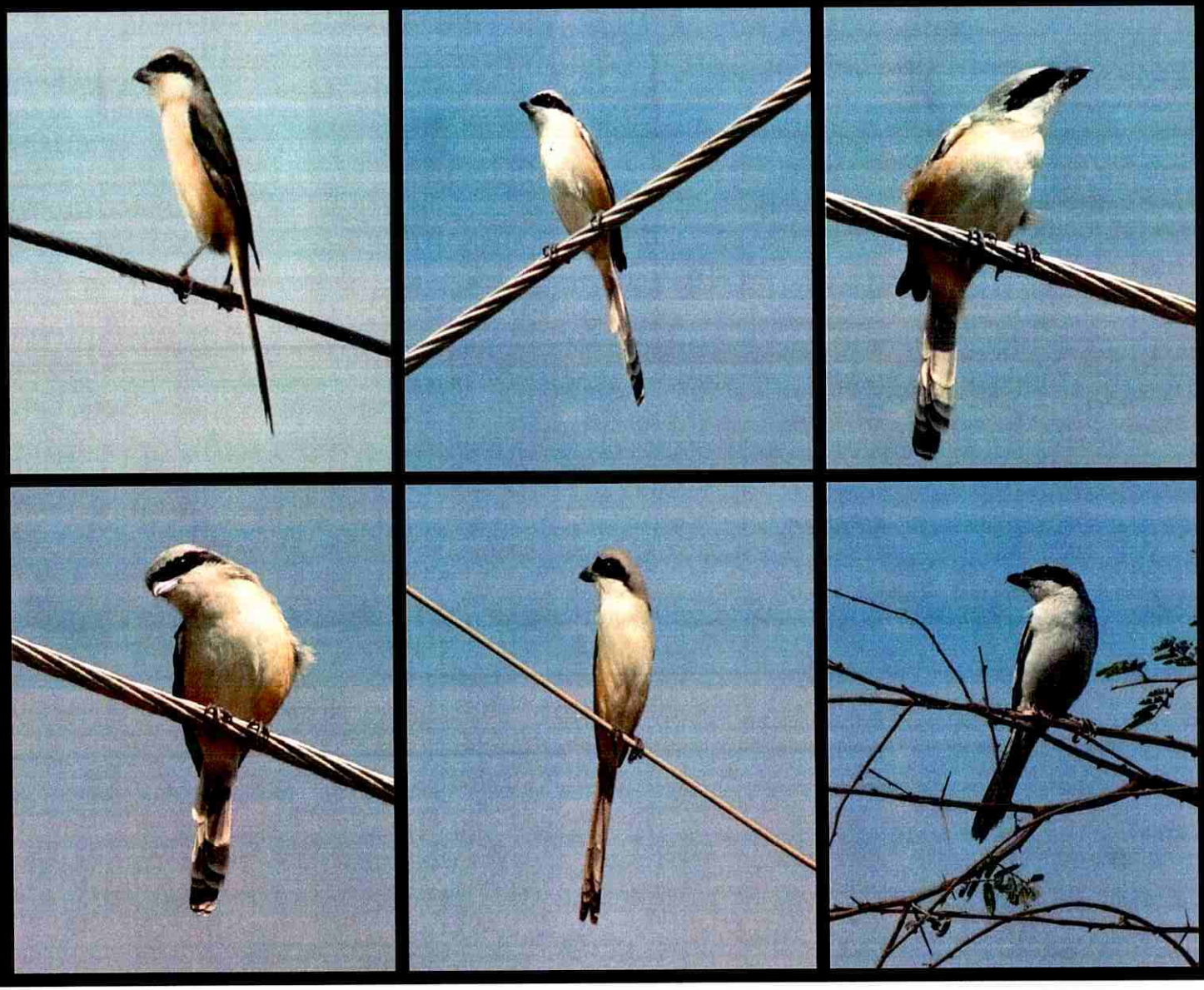


PLATE 26

WHITE RUMPED PALM SWIFT *Chaetura sylvatica* (T)

WIRE TAILED SWALLOW *Hirundo filifera* (L)

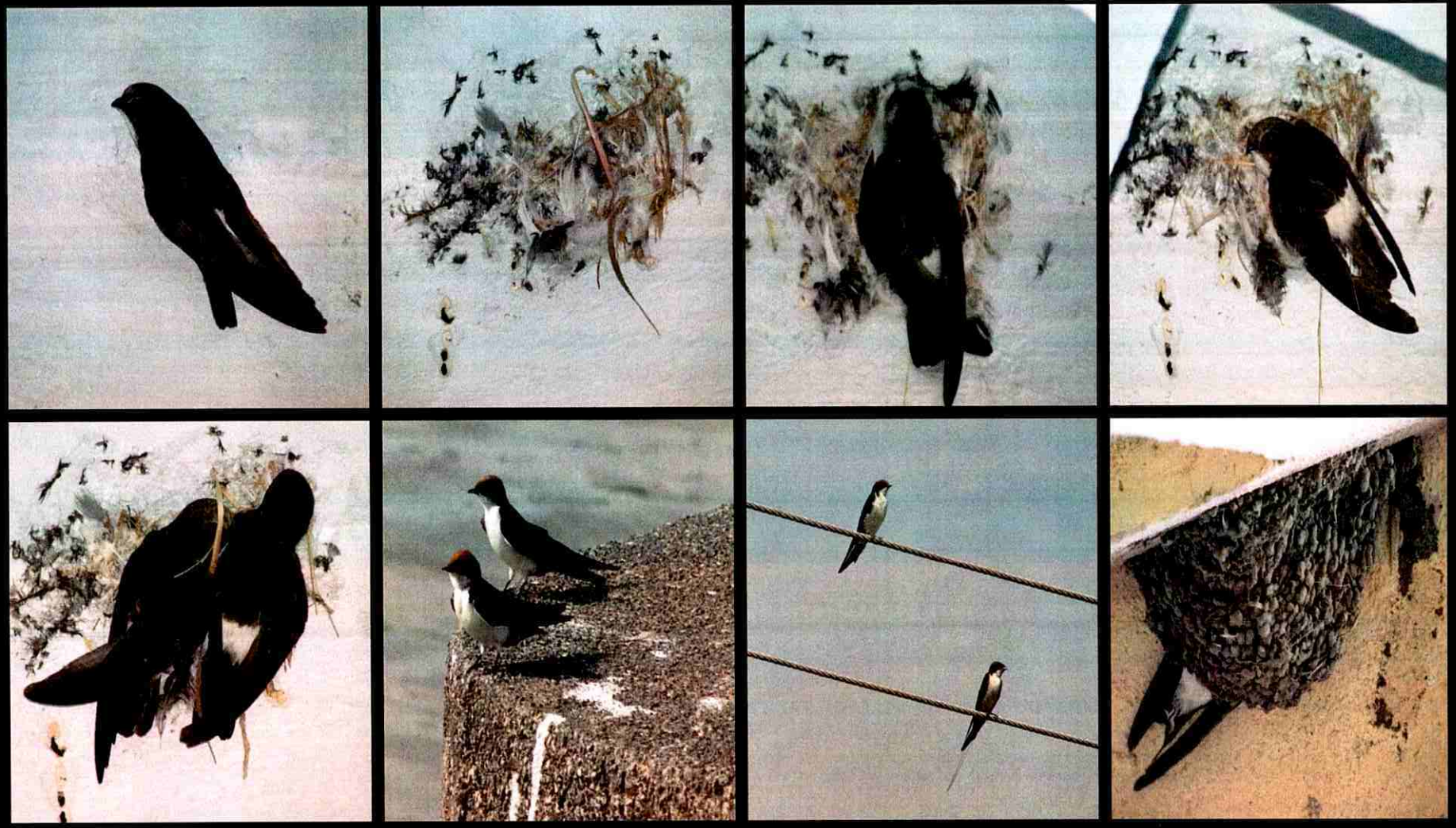


PLATE 27

PIED BUSHCHAT *Saxicola caprata* (L)

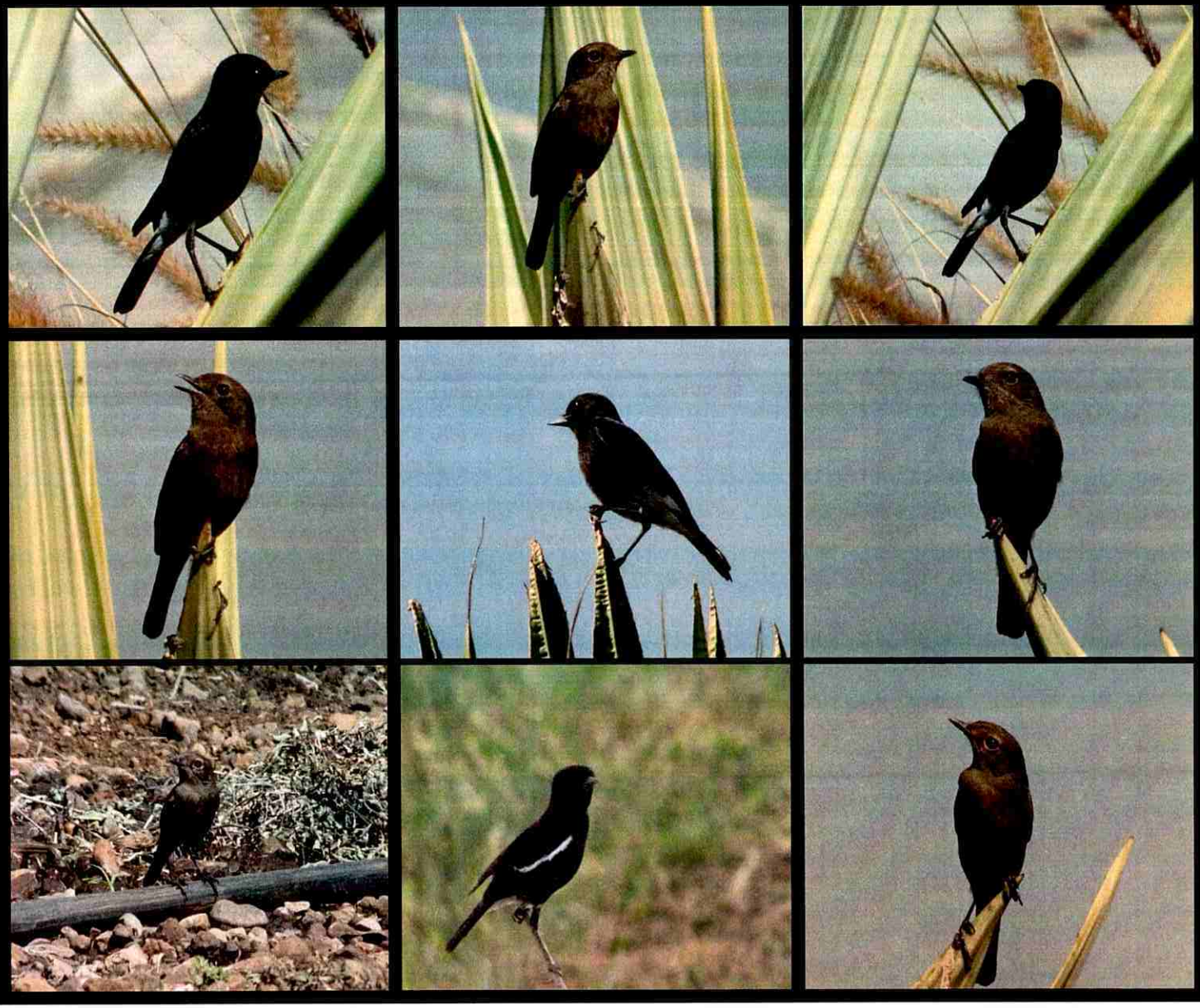


PLATE 28

BRAHMINY KITE
Haliastur indus (B)



PARIAH KITE
Milvus migrans (S)



SPOTTED MUNIA
Louchura punctulata



INDIAN SPARROW HAWK
Accipiter nisus (H)



INDIAN ROLLE R / BLUE JAY
Coracias benghalensis (L)



HOOPOE *Upupa epops* (L)



PLATE 29

INDIAN ROBIN
Saxicoloides fulicatus



INDIAN MAGPIE ROBIN
Copsychus saularis (L)



RED TURTLE DOVE
Streptopelia tranquebarica



FAN TAIL FLY CATCHER
Rhipidura albicollis



GOLDEN ORRIOR
Oriolus oriolus (S)



CROW PHEASENT
Centropus sinensis



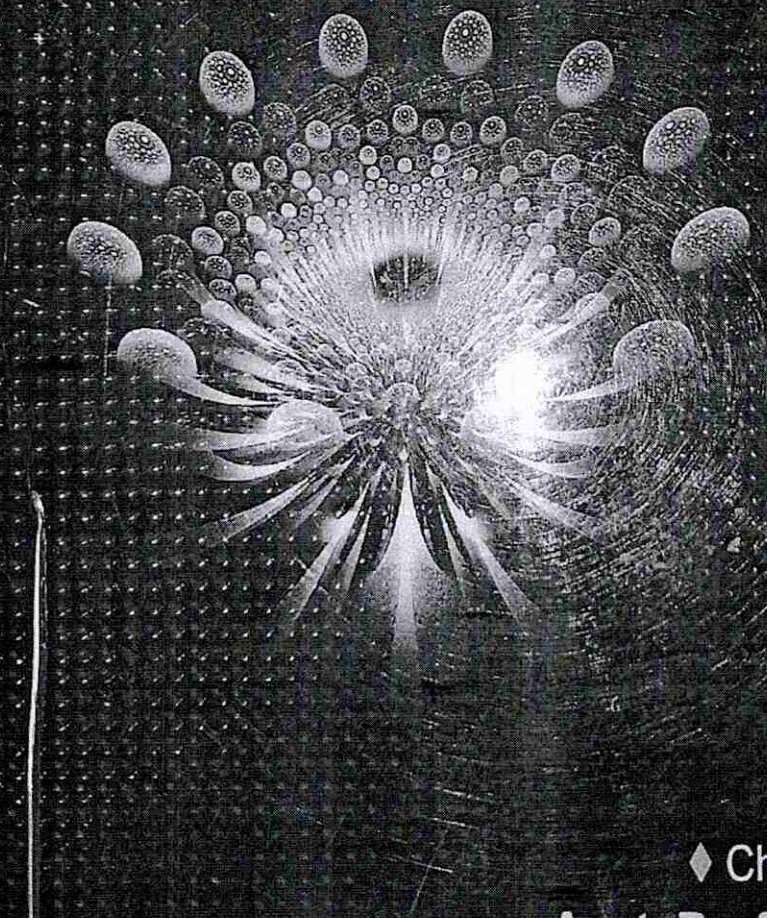
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ORIGINAL ARTICLE

Preliminary Floristic Diversity Survey of Mayani Bird Habitat, Maharashtra

S.M.Moholkar, S.U. Shinde[1], R.K.Sakhare[2], C.B. Salunkhe[3]
Raja ShripatraoBhagwantraoMahavidyalaya, Aundh-415510, M.S.
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The Convention on Wetlands of International Importance especially as Waterfowl Habitat was adopted at Ramsar in 1971(www.ramsar.org). Wetlands play an important role in maintaining ecological balance through their biotic and abiotic components.These are important ecosystems and forms life support systems for flora, fauna and fisheries. Mayani Bird Habitat is located near Mayani village in Satara district of Maharashtra state. The habitat is full of aquatic and marshy plants. Every year several migratory birds visit this area. Upon recognizing the ecological significance of the habitat, an extensive survey was undertaken to document floristic diversity of the habitat.

Introduction

Wetlands are the most productive ecosystems in the world. The Convention was focused at the fundamental ecological functions of wetlands as regulators of water regimes and the value of wetlands in economic, cultural, scientific, and recreational terms.Wetlands play an important role in maintaining ecological balance through their biotic and abiotic components. Wetlands are not just a source of water, but a haven for a wide variety of species. These are important ecosystems and forms life support systems for flora, fauna and fisheries. Wetlands have become key sites for the maintenance of biodiversity. The most visible support for biodiversity is in the number and species diversity of birds.Wetlands are key components in ecosystems, providing many services such as reducing erosion by potentially decreasing floodwater velocity and volume, improving water quality by removing nutrients and absorbing sediment loads,acting as nutrient sources for fish and other aquatic organisms and providing habitat for a variety of wildlife, such as waterfowl, amphibians, and insects. Wetlands are of great economic values and have played key role in the evolution of human settlements. The aquatic plants are used by man and animalsby various ways as vegetables, green manure and as a food for fishes and birds.

Wetland biodiversity is endangered due to devastating habitat loss, human intervention, agricultural expansion, invasive species, climate change and lack of research data to improve management practices. It is estimated that approximately 86,00,000 sq. km (around 6.4% of the earth's surface), an area somewhat larger than Europe, is covered by wetlands. India has a wide array of inland wetland ecosystems that harbor a rich biological diversity. India is having 58.4 million ha area covered by wetlands (Anonymous, 1993).These wetlands plays significant role in protecting and conserving

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biological resources occurred in them. They also plays an important role in shoreline, bank stabilization, recreation, tourism, water transport and provides habitat for fisheries, water plants, animals, native and migratory birds.In spite of number of important functions performed by wetlands, they are continuously destroyed all over the world. India has already lost over 80% of its fresh water wetlands. There is an urgent need to conserve the wetlands and their biodiversity.

The Mayni Bird habitat is important for wintering and breeding of migratorybirds. The dam is full of aquatic and marshy plants. Several migratory birds like Flamingo, Brahmini duck, Marsh harrier, Coot, White Ibis, Painted stork and resident birds are seen in the area. But it needs a stable ecosystem provided by other fauna and flora. It is essential to understand the importance and value of Mayni Bird Habitat. It can be done by monitoring and assessing the baseline biodiversity especially plants and birds. It will help to make recommendations for upgrading its status to Bird Sanctuary. At present, the biodiversity of Mayni Bird Habitat is threatened by poaching, cutting of trees, land reclamation, clearing of natural vegetation, pollution, eutrophication, the spread of several invasive alien species and unmanaged domestic animals. Thus there is an urgent need to survey and assess the present status of floristic diversity of this important wetland. In present, investigation, attempts have been made to survey and enumerate the flowering plants of Mayni bird Habitat.

Review of previous work

The importance of wetlands has been recognized throughout the world (Anonymous, 1993). RAMSAR convention held in 1971 is called Convention of Wetlands of International importance. Large numbers of people depend on wetland plants. Inspite of the importance of wetlands, they are continuously destroyed all over the world. U.S.A. has lost some 54% of its wetland. New Zealand has lost over 50% of its natural wetlands and many parts of Europe have lost nearly all natural wetlands. According to McNeely (1992) tropical countries like Cameroon, Bangla Desh, India, Thailand and Vietnam have lost 80% of their fresh water wetlands.

India has about 4.1 million ha.Networkof wetlands (Srivastava,2003). The biodiversity value and high biological productivity of wetlands are well recognized (Venu, 1999).Biswas and Calder (1955)described 115 species including lower groups for the wetlands of British India and Burma. Subramanyam (1962) has made major contribution to the wealth of aquatic plants of India by providing key for identification of aquatic flowering plants. CDK Cook et.al (1974) has made taxonomic overview of fresh water aquatic plants. The Indian subcontinent harbors about 470 aquatic species of flowering plants (Gopal, 1990). CDK Cook (1996) in his book has recorded 485 species of aquatic and semiaquatic flowering plants with key for identification, description and illustration. Several reviews and project reports on many important wetlands are carried out by different workers such as Mukherjee (1975), Gopal (1990) and Kaul (1995). Number of workers such as Mirashi (1954, 1957),Patnaik (1956),Chavan and Sabnis (1961), Vyas (1964),Majumdar (1965), Gupta (1965),Sahai (1968),Kaushik (1969),Manilal and Shivrajan (1978), Karthikeyan et.al. (1982) have contributed to the aquatic plant diversity of India. A directory of Asian wetland (Scot, 1989),Indian Wetlands, Handbook of Wetland Management (Gopal, 1995)are the important sources of information on wetlands of national importance.

Theodore Cooke published 'The Flora of the Presidency of Bombay' (1901 -1908) covering plants of Sind,Gujrat, Maharahstra and North Karnataka.Botanical Survey of India, Western Circle, Pune made significant contributions to the floristic studies on

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Maharashtra by publishing number of research papers and floristic accounts of many districts. After floristic survey of many districts, BSI has published a floristic account of Monocotyledones (Sharma et al., 1996) and Dicotyledones of Maharashtra State in two volumes (Singh and Karthikeyan, 2000; Singh et al., 2001). Other very important recent publications on floristic diversity of Maharashtra include 'Flora of Kolhapur district' (Yadav and Sardesai, 2002). Karthikeyan et.al. (1982) recorded 279 aquatic plants from Maharashtra. Gaikwadet. al (2004) have recorded 303 aquatic and semiaquatic species of flowering plants from South Western Maharashtra. Patil (1991) reported just 13 speciesbelonging to 13 genera of 11 families for Mayni Bird habitat and its surrounding area. After a detailed literature survey on floristic diversity of Mayni Bird habitat, it was found that the floristic diversity of the habitat was not documented.

STUDY AREA:

Mayni Bird habitat is situated near Mayni village in eastern part of KhatavTaluka in Satara district of Maharashtra state. It is located between 17^0 26'01'' to 17^0 27' 21'' N latitudes and 74^0 33' 48'' to 74^0 35' 31'' E longitudes (Map–1 and 2). Mayni dam is constructed in 1876 on Chand river. The dam was mainly constructed for agricultural purpose. The agricultural land under the irrigation of Mayni dam is about 215 ha. and no water is utilized for drinking purpose. Upon recognizing the ecological significance of this Habitat, the Government of Maharashtra declared 432.21 ha area as a sanctuary in 1982, including 89.06 ha. Bird Habitat area and its adjoining 208.47 ha. area belongs to State Irrigation Department and 134.68 ha. private land. But now the present status of this area is Bird habitat. The density of forest cover is less than 0.40.

Geology:

Geological formation is Horizontal stratified Basalt mesas upland deccan plateau. The average height ranges between 700 to 705 meters above mean sea level. The nearby area is covered by small hills. Due to hilly ranges the dam is covered with networks of rivulets running from Vikhale, Kankatre, Kaledhon, Hiwarwadi, Dhokalwadi, Pachwad and Bhikawadi.

Hydrology:

Networks of rivulets running from Vikhale, Kankatre, Kaledhon, Hiwarwadi, Dhokalwadi, Pachwad and Bhikawadi are the main water source which releases water into dam. Due to heavy silt deposition the water depth of the dam was decreased by 20 fts.

Vegetation:

The vegetation of study area is open scrub and mixed forest. The area around dam is with amphibious vegetation, while dam is with full of submerged and floating hydrophytes. Most of the amphibious, submerged and floating hydrophytes flowers during winter season. The important aquatic plants like *Ottelia, Potamogeton, Vallisneria* and *Najas* act as food for migratory and Indian birds.

Terrestrial vegetation:

Number of middle sized trees and shrubs are growing in wild and also planted around the dam, which are important for birds for shelter, nesting and breeding. These are *Acacia chundra, Acacia catechu, Acacia nilotica, Balanites aegyptica, Cassia auriculata, Azadirachta indica, Capparis decidua, Cassia siamea, Casurina equisetifolia, Lantana camera, Mangifera indica, Parkinsonia aculeata, Pongamia pinnata,Tamarindus indica.*

Twiners such as *Pueraria montana, Teramnus labialis,Tinospora cordifolia, Pergularia daemia, Cryptolepis buchanani, Ipomea hederifolia, Ipomea quamoclit and Wattakaka volubilis* are common in the area.

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Aristidaadesensionis, Eragrostisviscosa, Heteropogoncontortus are some of the common grasses in the area.

Aquatic vegetation:

The common aquatic plant species are*Najasindica, Ottelioalismoides, Potamogetonnodosus, Potamogetonpectinatus and Vallisneriaspiralis*. In addition to these the other plant species growing the marsh are *Alternantheraasessilis, Alternantheratenella, Ammaniabaccifera, Asclepiascurasavica, Bacopamonnieri,Bergiaammannioides, Canscoradiffusa, Centauriummeyeri, Commelinabenghalensis, Cyperusdifformis, Cyperusexaltatus, Eclipta prostrata, Eleocharisgeniculata,Exacumpedunculatum, Fimibristylisps.,Furienawallichiana,Gnaphaliumpolycaulon, Hygrophiliaschulli, Limnophillaheterophylla, Mimulusstrictus, Paspalidiumgeminatum, Pennisetumhohenackeri, Phyla nodiflora, Rotalaserpyllifolia,Saccharumspontaneum, Schoenoplectuslateriflorus,Typhaangustifolia.*

Materials and Methods

The present work is an outcome of extensive and intensive field visits in the region for 2006 to 2016. During collection special attention was paid to collectthe specimens, data on habit, habitat, month of flowering and fruiting, ecological and field observations on each species noted in the field itself. Specimens were processed for herbarium by usual method (Rao& Sharma,1990) and herbarium specimens are deposited in the Hebarium of Department of Botany,Raja ShripatraoBhagwantraoMahavidylaya, Aundh. Most of the specimens and field identifications were confirmed satisfactorily with the help of available literature such as floras, monographs, research articles. The identifications were confirmed by matching specimens with aunthentically identifiedspecimensdeposited in the Hebarium of Deparment of Botany ShivajiUniversity,Kolhapur.

Floristic analysis:

In present work a total of 235 species belonging to 184 genera and 58 families of flowering plants have been recorded for the Mayani Bird habitat. Of these 235 species 164 are dicotyledons belonging to 138 genera of 47 families and 71 species are monocotyledons belonging to 46 genera of 11 families.

Table No.1.1 The details families, genera and species

Groups	Families	Genera	Species
Dicots	47	138	164
Monocots	11	46	71
Total	**58**	**184**	**235**

Table No. 1.2. Ten largest families with maximum no. of genera

Family	No of genera
Poaceae	28
Asteraceae	20
Fabaceae	11
Euphorbiaceae	09
Cyperaceae	07

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Scrophulariaceae	07
Asclepiadaceae	05
Mimosaceae	05
Caesalpiniaceae	04
Lamiaceae	04

Table No. 1.3. Five largest genera with maximum no. of species

Genus	No of species
Fimbrystylis	7
Eragrostis	5
Alysicarpus	5
Euphorbia	5
Acacia	3

DISCUSSION AND CONCLUSIONS:

Vegetation is very important to waterfowls. Robust marsh vegetation serves as a nutrient pump within wetlands and can influence water chemistry and primary productivity. Generally, there are positive correlations between vegetative complexity and bird populations and between invertebrate abundance and duck populations. The major factor responsible for the occurrence of waterfowl in MayaniBird Habitat is due to the diversity and density of macrophytes because most of the migratory waterfowl wintering in this habitat are herbivores. The dominant macrophyte species of Mayani Bird habitat are*Najasindica, Otteliaalismoides. Potamogetonnodosus. Potamogetonpectinatus and Vallisneriaspiralis.* These are the major food plants for the migratory waterfowls. Waterfowl control excess growth of these species by feeding on the young sprouts and seeds.Birds play critical roles in wetland systems by acting as predators and prey, provide aesthetic values for bird watchers and other nature enthusiasts. Wetland birds could be acting as dispersal agents for many wetland plants that do not use abiotic agents, such as wind for dispersal into new areas.

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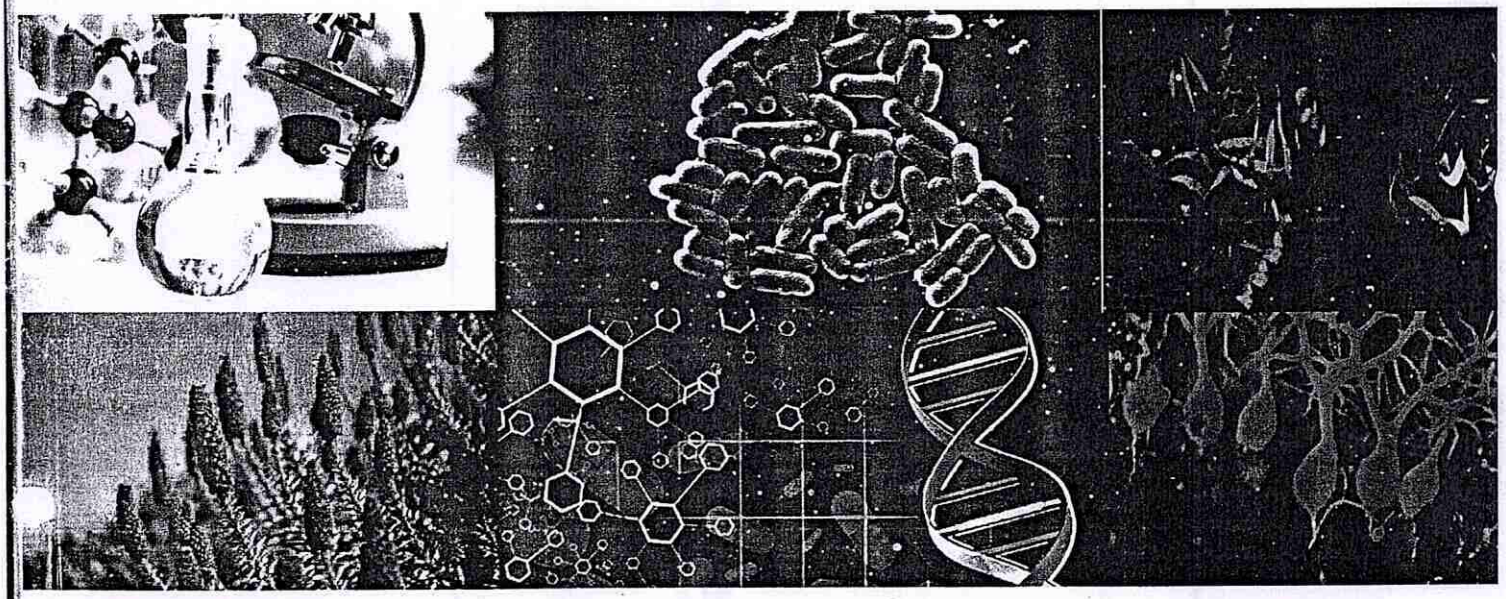
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WETLAND AVIFAUNA OF GAVASE POND OF AJARA TAHASIL IN SOUTH WESTERN MAHARASHTRA, INDIA

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ABSRACT:

Wetlands are one of the most productive ecosystems and severely affected on habitats. The Gavase wetland is situated south-west of Ajara Tahsil in Kolhapur district of South Western Maharashtra. It lies between N- 16°05'761" latitude and E- 74°07'596" longitude. The wetland harbour large number of birds during 2009 - 2011. The wetland is surveyed to document avian diversity. In our survey, we identified and listed 52- bird species from the study site. They belonged to 12- orders and 20- families. Among these 11- are migratory and 41- are native birds. Gavase wetland covers an area of 15. 2 hector. Even though it is smaller wetland is very important in conservation of biodiversity especially the water birds. Receiving an annual rainfall of about 800 mm with June to August being rainy months. Average annual minimum and maximum temperature are recorded as 18° C and 41° respectively. The water birds are specific in their choice of wetlands. This often strongly associated with prey distribution and abundance. This preliminary survey of avifaunal diversity of Gavase wetland will help in facilitate conservation strategy and management plan as this is the key component in ecosystem.

Keywords : Gavase wetland, Avian Diversity,Ajara tahasil

INTRODUCTION :

Water is a basic and primary need of all vital processes and it is now well established that the life first arose in aquatic environment. Ever since the pre-historic times man has been intimately associated with water and it has been continuously proved by the evidences of past civilization that all historic human settlements were around inland fresh water resources. These wetlands are traditional zones that occupy intermediate position between dry land and open water (Vachnth et. al. 2012). This wetland is rich in flora and fauna. The birds are one of the important biotic factors which prefer to live near these wetlands. However, the bird community in Gavase pond have not been explored and documented in the past. Considering this we have extensive surveys were conducted throughout year (2009- 11) to document the birds of the area. Gavase pond (N- 16°05'761" latitude and E- 74°07'596" longitude.) is one of the small natural, perennial wetland situated in Gavase village in Ajara tahsil of Kolhapur District, Maharashtra. It occupies 15.2 ha. area, receiving an annual rainfall of about 700mm and rich in biodiversity. The population of Gavase is 6,500 and people depending upon this pond for their domestic needs like cloth washing, domestic animal drinking and washing purpose.

MATERIALS AND METHODS :

Different species of birds have been cited and identified with the help of pair of Canon 7×40 and 20 x 50 power field binoculars. The frequent visits are made throughout year to observe the local and migratory birds to the study site. They were identified with the help of standard literature and field guides on the basis of their special features (R. Grimmett et. al. 1998, Salim Ali and Dillon, 1995 and Kukudolkar, 2011). Photographs of different bird species were taken by using Canon 1100 D camera with 18- 55 mm and 55- 250 mm lenses for confirmation of species.

RESULT AND DISCUSSION :

During the period of study (2009- 2011).Out of 79- Families of avifauna present in the Indian subcontinent, 20- Families were observed at study site. Total of 52- Species of birds have been

recorded in the Gavase pond. They belonged to 12- Orders and 20- Families. 1- belonged from Podicipitiformes, 2- belonged from Pelecaniformes, 17- belonged from Ciconiiformes, 2- belonged from Anseriformes, 6- belonged from Falconiformes, 3- belonged from Gruiformes, 4- belonged from Charadriiformes, 3- belonged from Columbiformes, 5- belonged from Coraciformes, 7- Species belonged from Passeriformes, 1- Species belonged from Psittaciformes and 1- Species belonged from Cuculiformes (Table No. 1). Among these 11- species are migratory and 41- species are native birds. The highest number of birds observed from the order Cicconiformes and lowest from order- Podicipediformes. The water birds are specific in their choice of wetlands. This often strongly associated with prey distribution and abundance (Kelsey & Hassal 1989). Water birds mainly feeds on benthic invertebrates (Van da kam et. al. 2004) which shows wide variations in the density and diversity between seasons and hence the variations in the prey population dynamics should influence the bird populations.

Physico-chemical parameters of Gajargaon pond, show monthly variations from Feb. 2009 to Jan. 2010. The air temperature ranges from 18^0 C to 40^0 C. Water temperature ranges from 13^0 C to 22^0 C. Both air temperature and water temperature are important which determines the distribution of different life forms. In this study it has been found that air and water temperatures go more or less parallel, proving the fact that the atmospheric temperature governs water temperature (Welch, 1952 and Yadav, 2003). The pH values ranges from 6.6 to 7.8. It was minimum in the month of Jul., Aug. and maximum in the month of May. Krishna Ram H. et. al. (2007) showed similar range of pH. Higher values were recorded during summer which may be due to high growth rate of algal population utilizes CO_2 through photosynthetic activity (Powar and Sonawane, 2012). The free CO_2 concentration ranges from 4.4 mg/ lit. to 8.8 mg/lit. The values don't show much variation throughout the year.

The total hardness value ranges from 52 mg/ lit. to 130 mg/ lit. It was minimum in the month of October and maximum in the month of April and May. Synudeen Sahib (2011) has recorded similar range of total hardness showing higher in summer and lower in rainy season. Calcium ion concentration values ranges between 12.03 mg/ lit. to 32.08 mg/ lit. The calcium was minimum during November and maximum during April and May. Hulyal et. al. (2011) has given similar findings from Almatti reservoir, Karnataka and recorded maximum during summer. Magnesium ion concentration ranges from 6.5 mg/ lit. to 21.75 mg/ lit. Magnesium is often associated with calcium in all kinds of water but its concentration remains generally lower than the calcium (Venkatsubramani and Meenambal, 2007).

The total alkalinity values range between 19 mg/ lit. to 52 mg/ lit. it was minimum in the month of October while maximum during April and May. According to Jackson (1961), alkalinity below 50 mg/ lit. indicates low photosynthetic rate.The chloride values range between 31.24 mg/ lit. to 142 mg/ lit. It was minimum in the month of July and August while maximum during April and May. Nikam et. al. (2011) reported similar values of chloride from Jangamahatti Dam, Maharashtra. High Chloride value may be due to organic wastes of animal origin and domestic washes. The higher values of chlorides during summer months may be associated with reduced water level.

Dissolved oxygen values range between 4- 4.5 mg/ lit to 7 mg/ lit. being minimum during summer months and maximum during winter months. The main source of D. O. is from atmosphere and by photosynthesis through aquatic flora. Similar trend is shown by Ohal et. al. (2011). Biological Oxygen Demand value ranges between 0.8 mg/ lit. to 3.6 mg/ lit. Sayeswar et. al. (2011) shown nearby values in present investigation.

Table No. 1: Systematic List of Bird Species Observed in and around Gavase Pond

Sr. No.	Common Name	Scientific Name	Order	Family	Status
1	Dabchick/ Little Greb	Podiceps ruficollis (L)	Podicipitiformes	Podicipedidae	C
2	Little Carmorant	Phalacrocorax niger (V)	Pelecaniformes	Phalacrocoracidae	VC
3	Large Carmorent	Phalacrocorax carbo (S)	Pelecaniformes	Phalacrocoracidae	VR
4	Pond Heron	Ardeola grayii (S)	Ciconiiformes	Ardeidae	VC
5	Little Egret	Egretta garzetta (L)	Ciconiiformes	Ardeidae	C

Sr. No.	Common Name	Scientific Name	Order	Family	Status
6	Indian Reef Heron	Ardea schistacea (H)	Ciconiiformes	Ardeidae	Ra
7	Eastern Purple Heron	Ardea purpurea (L)	Ciconiiformes	Ardeidae	VR
8	Large Egret	Ardea albus (L)	Ciconiiformes	Ardeidae	Ra
9	Painted Stork	Mycteria leucocephala (P)	Ciconiiformes	Ciconiidae	Ra
10	Open bill Stork	Anastomus oscitans (B)	Ciconiiformes	Ciconiidae	VR
11	White Necked Stork	Ciconia episcopus (B)	Ciconiiformes	Ciconiidae	Ra
12	Painted Stork	Myceteria leucocephala (P)	Ciconiiformes	Ciconiidae	Ra
13	White Ibis	Threskiornis aethiopica (L)	Ciconiiformes	Threskiornithidae	VR
14	Indian Black Ibis	Pseudibis papillosa (T)	Ciconiiformes	Threskiornithidae	Ra
15	Spoonbill	Platalea leucorodia (T)	Ciconiiformes	Threskiomithidae	VR
16	Cattle Egret	Bubulcus ibis (B)	Ciconiiformes	Ardeidae	Ra
17	Little Green Heron	Butoridess triatus (H)	Ciconiiformes	Ardeidae	VR
18	Chestnut Bittern	Adrea cinnamomea (H)	Ciconiiformes	Ardeidae	VR
19	River Tern	Sterna aurantia (G)	Ciconiiformes	Laridae	Ra
20	Common Snipe	Gallinago gallinago (L)	Ciconiiformes	Scolopacidae	VR
21	Spotbilled Duck	Anas poecilorhyncha (F)	Aneseriformes	Anatidae	C
22	Ruddy Shelduck (Brahminy Duck)	Tadorna ferruginea (P)	Aneseriformes	Anatidae	VR
23	Pariah kite	Milvus migrans govinda (S)	Falconiformes	Accipitridae	C
24	Indian Sparrow Hawk	Accipiter nisus (H)	Falconiformes	Accipitridae	C
25	Blackwinged Kite	Elanus caeruleus (L)	Falconiformes	Accipitridae	C
26	Brahminy Kite	Haliastur Indus (B)	Falconiformes	Accipitridae	Ra
27	Tawny Eagle	Aquila rapx (F)	Falconiformes	Accipitridae	VR
28	Buzzard	Buteo buteo (L)	Falconiformes	Accipitridae	UC
29	White breasted Water hen	Amauromis phoenicurus (P)	Gruiformes	Rallidae	C
30	Purple Moorhen	Porphyrio poliocephalus (L)	Gruiformes	Rallidae	C
31	Common Coot	Fulica atra (L)	Guriformes	Rallidae	Ra
32	Spotted Sandpiper	Tringa glareola (L)	Charadriiformes	Jacanidae	Ra
33	Red wattled lapwing	Vanellus indicus (B)	Charadriiformes	Jacanidae	UC
34	Indian little Ringed Plover	Charadrius dubius (L)	Charadriiformes	Jacanidae	VR
35	Black winged Stilt	Hemantopus hemantopus (L)	Charadriiformes	Jacanidae	UC
36	Indian Ring Dove	Strptopelia decacto (G)	Columbiformes	Columbidae	C
37	Indian Spotted Dove	Strptopelia chnensis (G)	Columbiformes	Columbidae	UC

Sr. No.	Common Name	Scientific Name	Order	Family	Status
38	Indian Red Turtle Dove	Strptopelia tranquebarica (H)	Columbiformes	Columbidae	C
39	White breasted Kingfisher	Halcyon smyrnensis (B)	Coraciiformes	Alcedinidae	C
40	Small Blue Kingfisher	Alcedo atthis (K)	Coraciiformes	Alcedinidae	VC
41	Lesser Pied Kingfisher	Ceryle rudis (R)	Coraciiformes	Alcedinidae	C
42	Green Bee Eater	Merops orientalis (J)	Coraciiformes	Alcedinidae	C
43	Hoopoes	Upupa epops (L)	Coraciiformes	Upupidae	VC
44	Magpie Robin	Copsychus saularis (L)	Passeriformes	Muscicapidae	C
45	White- eye	Zosterops palpebrosa (H)	Passeriformes	Zosteropidae	UC
46	Yellow Wagtail	Motacilla flava (B)	Passeriformes	Motacillidae	C
47	White browed Wagtail	Motacilla moderaspatensis (S)	Passeriformes	Motacillidae	C
48	Pied Bush Chat	Saxicola caprata (L)	Passeriformes	Turdinae	C
49	Purple Sunbird	Nectarinia asiatica (L)	Passeriformes	Nectariniidae	C
50	Common Iora	Aegithina tiphia (L)	Passeriformes	Corvidae	Ra
51	Rose Ringed Parakeet	Psittacula krameri (S)	Psittaciformes	Psittacidae	C
52	Indian Cuckoo	Cuculus micropterus (G)	Cuculiformes	Cuculidae	Ra

Following abbreviations are used :
Ra- Rare, VR- Very Rare, VC- Very Common, C- Common, UC- Uncommon.

CONCLUSION :

Even though it is smaller wetland, is very important in conservation of biodiversity especially water birds. The water birds are very specific in their choice of wetland/s. This often strongly associated with prey distribution and abundance. The preliminary survey of Avifaunal diversity of Gajargaon wetland will help in facilitate conservation strategy and management plan as this is the key components of ecosystem.

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Role of Water Canals in Conservation of Avifaunal Diversity In and Around of Karad Tahasil of Satara District, M.S, India

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ABSTRACT:

Karad Tahasil is the part of Satara district of Maharashtra state, India. Geographically it lies in between N 72°22'01" latitude and E 17°37'29" longitude. It occupies in and around total an area of 42.0 sq. Kilometers. Receiving an annual rainfall of about 700 - 800 mm. It is surrounded by two major rivers (Krishna and Koyana), on it built number of small dams. Also present number of water canal network for agriculture. Most of the land is irrigated surrounded by trees. The water canal are the rich source of food includes fishes, crabs, prawns, mollusc and aquatic plants so birds gets plenty of food, shelter/ hiding place and breeding grounds. The water canals are surveyed to document avian diversity. Total 84- Species of birds recorded from the study site during year 2011- 12. Among these 14- birds are migratory and 70- are native birds of 18- Orders and 40- Families. Results revealed that smaller wetlands- water canals are very important in conservation of biodiversity especially for water birds. The preliminary survey of Avifauna will help in facilitate conservation strategy and management plan as these are the key components of ecosystem.

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Key words: Avifaunal diversity, Water canals, Conservation

INTRODUCTION:

Wetlands includes rivers, lakes, reservoirs and their water canals are the most precious life-sustaining water resources. Water is a basic and primary need of all vital processes and it is now well established that the life first arise in aquatic environment. Ever since the pre-historic times man has been intimately associated with water and it has been continuously proved by the evidences of past civilization that all historic human settlements were around inland fresh water resources. These wetlands are traditional zones that occupy intermediate position between dry land and open water (Vachnth et. al. 2012). These wetlands are rich in flora and fauna and birds are one of the important biotic factors which prefer to live near these wetlands.

MATERIALS AND METHODS:

The frequent visits are made throughout year to observe the local and migratory birds at the study site. Different species of birds have been cited and identified with the help of pair of Canon 7×40 and 20 x 50 power field binoculars. They were identified with the help of standard literature and field guides on the basis of their special features (R. Grimmett *et. al.* 1998, Salim Ali and Dillon, 1995 and Kukudolkar, 2011). Photographs of different bird species were taken by using Canon 1100 D camera with 18- 55 mm and 55- 250 mm lenses for confirmation of species.

RESULT AND DISCUSSION:

During the period of study (July 2011 - June 2012), Out of 79- Families of avifauna present in the Indian subcontinent, 40- Families were observed at study site. Total of 84- Species of birds have been recorded in and around water canals of Krishna and koyana rivers. They belonged to 18- Orders and 40- Families. 1- belonged to **Podicipediformes**, 2- belonged to **Pelecaniformes**, 15- belonged to **Cicconiformes**, 4- belonged to **Anseriformes**, 7- belonged to **Falconiformes**, 2- beloged to **Galliformes**, 3- belonged to **Gruiformes**, 5- belonged to **Charadriiformes**, 4- belonged from **Columbiformes**, 3- belonged to **Psittaciformes** , 2- belonged to **Cuculiformes**, 2- belonged to **Strigiformes** , 8- belonged to **Coraciiformes**, 2- belonged to **Apodiformes**, 1- belonged from **Piciformes** , 1- belonged from **Cuculiformes**, 1- belonged from **Caprimulgiformes** and 21- Species belonged to **Passeriformes** (Table No. 1). Among these 14- species are migratory and 70- species birds are native. The water birds are specific in their choice of wetlands. This often strongly associated with prey distribution and abundance (Kelsey & Hassal 1989). Water birds mainly feeds on benthic invertebrates (Van da kam et. al. 2004) which shows wide variations in the density and diversity between seasons and hence the variations in the prey population dynamics should influence the bird populations.

Physico-chemical parameters of water canals of Krishna and Koyana rivers, show monthly variations from July 2011 to June 2012. The air temperature ranges from 23° C to 35°C and that of water ranges from 20°C to 29° C. Both air

temperature and water temperature are important which determines the distribution of different life forms. In this study it has been found that air and water temperatures go more or less parallel, proving the fact that the atmospheric temperature governs water temperature (Welch, 1952 and Yadav, 2003). The pH values ranges from 7.96 to 8.85. It was minimum in the month of Jul., Aug. and maximum in the month of May. Krishna Ram H. et. al. (2007) showed similar range of pH. Higher values were recorded during summer which may be due to high growth rate of algal population utilizes CO_2 through photosynthetic activity (Powar and Sonawane, 2012).

Table No. 1: Systemic list of bird species observed during the year July 2011- June 2012 in and around water canals of Krishna and Koyana rivers, according to their taxonomical group

1	Little Greb/ Dabchick	*Podiceps ruficollis (S)*	Podicipitiformes	Podicipedidae	C
2	Little Carmorant	*Phalacrocorax niger (V)*	Pelecaniformes	Phalacrocoracidae	VC
3	Large Carmorent	*Phalacrocorax carbo (S)*	Pelecaniformes	Phalacrocoracidae	VR
4	Pond Heron / Paddybrd	*Ardeola grayii (S)*	Ciconiiformes	Ardeidae	VC
5	Little Egret	*Egretta garzetta (L)*	Ciconiiformes	Ardeidae	C
6	Indian Reef Heron	*Egretta gularis (H)*	Ciconiiformes	Ardeidae	Ra
7	Eastern Purple Heron	*Ardea purpurea (M)*	Ciconiiformes	Ardeidae	VR
8	Large Egret/Great White	*Ardea alba (L)*	Ciconiiformes	Ardeidae	Ra
9	Cattle Egret	*Bubulcus ibis (B)*	Ciconiiformes	Ardeidae	Ra
10	Little Green Heron	*Butorides striatus (H)*	Ciconiiformes	Ardeidae	VR
11	Chestnut Bittern	*Ioxbrychus cinnamomeus (G)*	Ciconiiformes	Ardeidae	VR
12	Painted Stork	*Mycteria leucocephala (P)*	Ciconiiformes	Ciconiidae	Ra
13	Openbill Stork	*Anastomus oscitans (B)*	Ciconiiformes	Ciconiidae	VR
14	White Necked Stork	*Ciconia episcopus (B)*	Ciconiiformes	Ciconiidae	Ra
15	Painted Stork	*Myceteria leucocephala (P)*	Ciconiiformes	Ciconiidae	Ra
16	White Ibis	*Threskiornis aethiopica (L)*	Ciconiiformes	Threskiornithidae	VR
17	Indian Black Ibis	*Pseudibis papillosa (T)*	Ciconiiformes	Threskiornithidae	Ra
18	Spoonbill	*Platalea leucorodia (T)*	Ciconiiformes	Threskiornithidae	VR
19	Spotbill Duck	*Anas poecilorhyncha (F)*	Aneseriformes	Anatidae	C
20	Ruddy Shelduck /	*Tadorna ferruginea (P)*	Aneseriformes	Anatidae	VR
21	Common Teal	*Anus crecca (L)*	Aneseriformes	Anatidae	UC
22	Pintail	*Anus acuta (L)*	Aneseriformes	Anatidae	UC
23	Pariah kite	*Milvus migrans (S)*	Falconiformes	Accipitridae	C
24	Indian Sparrow Hawk	*Accipiter nisus (H)*	Falconiformes	Accipitridae	C
25	Blackwinged Kite	*Elanus caeruleus (L)*	Falconiformes	Accipitridae	C
26	Brahminy Kite	*Haliastur Indus (B)*	Falconiformes	Accipitridae	Ra
27	Tawny Eagle	*Aquila rapx (F)*	Falconiformes	Accipitridae	VR
28	Buzzard	*Buteo buteo japonicas (T)*	Falconiformes	Accipitridae	UC
29	Short Toad Eagle	*Circaetus gallicus (G)*	Falconiformes	Accipitridae	UC
30	Grey Quail	*Coturnix coturnix (L)*	Galliformes	Phasianidae	VC
31	Indian Peafowl	*Pavocristatus (L)*	Galliformes	Phasianidae	C
32	White breasted Water hen	*Amaurornis phoenicurus (P)*	Gruiformes	Rallidae	C
33	Purple Moorhen	*Porphyrio poliocephalus (L)*	Gruiformes	Rallidae	Ra
34	Coot	*Fulica atra (L)*	Gruiformes	Rallidae	VC
35	Spotted Sandpiper	Tringa glareola (L)	Charadriiformes	Charadriidae	Ra
36	Redwattled lapwing	*Vanellus indicus (B)*	Charadriiformes	Charadriidae	UC

37	Indian little Ringed Plover	*Charadrius dubius (L)*	Charadriiformes	Charadriidae	VR
38	Blackwinged Stilt	*Hemantopus hemantopus (L)*	Charadriiformes	Charadriidae	UC
39	Indian River Tern	*Sterna aurantia (G)*	Charadiiformes	Laridae	UC
40	Blue Rock Pigeon	*Columba livia (H)*	Columbiformes	Columbidae	VC
41	Indian Ring Dove	*Strptopelia decacto (F)*	Columbiformes	Columbidae	C
42	Indian Spotted Dove	*Strptopelia chinensis (G)*	Columbiformes	Columbidae	UN
43	Indian Red Turtle Dove	*Strptopelia tranquebarica (H)*	Columbiformes	Columbidae	C
44	Roseringed Parakeet	*Psittacula krameri (B)*	Psittaciformes	Psittacidae	C
45	Southern Blossom Headed	*Psittacula cyanocephala (L)*	Psittaciformes	Psittacidae	Ra
46	Indian Lorikeet	*Loriculus vernalis (S)*	Psittaciformes	Psittacidae	VR
47	Common Crow-Pheasent	*Centropus sinensis (S)*	Cuculiformes	Cuculidae	C
48	Indian Cuckoo	*Cuculus micropterus (G)*	Cuculiformes	Cuculidae	VR
49	Indian Barn Owl	*Tyto alba (H)*	Strigiformes	Strigidae	VR
50	Western Spotted Owl	*Otus spilocephalus (H)*	Strigiformes	Strigidae	VR
51	White breasted Kingfisher	*Halcyon smyrnensis (B)*	Coraciiformes	Alcedinidae	VC
52	Small Blue Kingfisher	*Alcedo atthis (G)*	Coraciiformes	Alcedinidae	UC
53	Pied Kingfisher	*Ceryle lugubris (H)*	Coraciiformes	Alcedinidae	VC
54	Stork Billed Kingfisher	*Pelargopsis (L)*	Coraciiformes	Alcedinidae	VR
55	Green Bee Eater	*Merops orientalis (J)*	Coraciiformes	Meropidae	VC
56	Hoopoe	*Upupa epops (L)*	Coraciiformes	Upupidae	VC
57	Indian Roller/ Blue Jay	*Coracias benghalensis (L)*	Coraciiformes	Coraciidae	UN
58	Grey Hornbill	*Tockus birostris (S)*	Coraciiformes	Bucerotidae	UC
59	Palm Swift	*Cypsiurus parvus (G)*	Apodiformes	Apodae	C
60	House Swift	*Apus affinis (A)*	Apodiformes	Apodae	C
61	Crimsonbreasted Barbet/	*Megalaiama haemacephala (L)*	Piciformes	Capitonidae	UC
62	Indian Koel	*Eudynamys scolopacea (L)*	Cuculiformes	Cuculidae	C
63	Indian Little Nightjar	*Caprimulgus indicus (L)*	Caprimulgiformes	Caprimulgidae	VR
64	Magpie Robin	*Copsychus saularis (L)*	Passeriformes	Muscicapidae	C
65	Tickells Babbler	*Trichastoma tickelli (S)*	Passeriformes	Muscicapidae	C
66	White- eye	*Zosterops palpebrosa (H)*	Passeriformes	Zosteropidae	UC
67	Yellow Wagtail	*Motacilla flava (B)*	Passeriformes	Motacillidae	C
68	White browed Wagtail	*Motacilla moderaspatensis (S)*	Passeriformes	Motacillidae	C
69	Pied Bush Chat	*Saxicola caprata (L)*	Passeriformes	Turdinae	C
70	Purple Sunbird	*Nectarinia asiatica (L)*	Passeriformes	Nectariniidae	C
71	Singing Bush Lark	*Mirafra javanica (B)*	Passeriformes	Alaudidae	UC
72	Indian Wire Tailed Swal-	*Hirundo smithii (S)*	Passeriformes	Hirundinidae	VC
73	Rufous Backed Shrike	*Lanius schach (V)*	Passeriformes	Laniidae	C
74	Oranged Billed Jungle	*Acridotheres javanicus (B)*	Passeriformes	Sturnidae	C
75	Indian Jungle Crow	*Corvus macrorhynchos (S)*	Passeriformes	Corvidae	VC
76	House Crow	*Corvus splendens (S)*	Passeriformes	Corvidae	VC
77	Peninsular Scarlet Minivet	*Pericrocotus flammeus (F)*	Passeriformes	Campephagidae	C
78	Common Iora	*Aegithina tiphia (L)*	Passeriformes	Irenidae	UC
79	Redvented Bulbul	*Pycnonotus cafer (L)*	Passeriformes	Pycnonotidea	VC
80	Red Whiskered Bulbul	*Pycnonotus Jocosus (B)*	Passeriformes	Pycnonotidea	VC

81	Indian Golden Oriole	*Oriolus oriolus (S)*	Passeriformes	Oriolidae	Ra
82	Black Drongo/King crow	*Dicrurus adsimilis (V)*	Passeriformes	Dicruridae	C
83	Black Headed/ Brahminy	*Sturnus pagodarum (G)*	Passeriformes	Sturnidae	C
84	Indian Myna	*Acridotheres tritis (L)*	Passeriformes	Sturnidae	VC

Gmail **Chandrakant Salunkhe <chandrakantsalunkhe62@gmail.com>**

[WLC17] Result Notification

1 message

Secretariat of WLC17 (Registration) <wlc17-reg@c-linkage.co.jp> Fri, Jun 29, 2018 at 1:00 PM
To: chandrakantsalunkhe62@gmail.com
Cc: wlc17-reg@c-linkage.co.jp

Dear Chandrakant Baburao Salunkhe,

Thank you for your paper submission for Technical Sessions in the 17th World Lake Conference.

On behalf of the WLC17 Technical Sessions Steering Committee, we are pleased to inform you that your paper has been accepted as an oral presentation at the 17th World Lake Conference held on 15 – 19 October 2018, Tsukuba, Japan.

The WLC17 Technical Sessions Steering Committee was extremely pleased with over 450 abstract submissions from around the world. The committee have selected a diverse range of exciting and stimulating papers to fill the two days of sessions, poster and oral presentations. Each abstract was blind reviewed by 2 independent reviewers.

Please note the session and the presentation style are decided by the committee.

Your paper has been accepted as follows:

Submission No.: C000487

Presentation style: Oral

Session Title: Technical Session 1: Biodiversity and Biological Resources

Session Date: October 16

Presentation Title: Status of some Wetlands from South Western Maharashtra-India with special reference to Floristic and Avian Diversity, Ecosystem benefits, Threats and Management strategies

Language in Presentation: English

*Please check the presentation number which is different from "Submission No." at the official website.

*If you would like to change the language in Presentation, please notify the Secretariat via email by July 16.

You will need to register for the Conference to confirm your participation; early bird registration is available until July 16, 2018, but you are asked to complete your registration as well as the payment.

If the completion is not confirmed, your abstract will be withdrawn.

If you need VISA to enter Japan, please keep the deadline for VISA application:

August 20, 23:59 (Japan Time).

You will find the general overview of the program during the Conference on the official website. Please note that the program is subject to change. More information and guidelines for presentations will also be available on the website around July.

[Official Website]: http://www.wlc17ibaraki.jp/en/index.html

Please inform us immediately if you will not be attending via return email (wlc17-reg@c-linkage.co.jp) by July 16, 2018, so that we can offer the opportunity to another presenter.

Should you have any inquiries, please contact the Registration Office below.

We look forward to welcoming you to WLC17 in Tsukuba, Japan.

Regards

The WLC17 Technical Sessions Steering Committee

[Contact]

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17th World Lake Conference Registration Office

(Lake Kasumigaura, Ibaraki, Japan 2018)

c/o Convention Linkage, Inc.

2 Sanbancho, Chiyoda-ku, Tokyo, 102-0075 JAPAN

TEL:+81-3-3263-8695 FAX:+81-3-3263-8693

Mail:wlc17-reg@c-linkage.co.jp

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If you have completed your registration but did not plan to attend the Student Conference on October 14, or did not plan to attend the excursion, please modify your registration information.

[VISA]

If you need VISA to enter Japan, please keep the deadline for VISA application:

August 20, 23:59 (Japan Time).

[Accommodation]

Accommodation fee: Exemption (organizer will pay for accommodation)

Period: Check-In Oct. 13, Check-Out Oct. 19 (6 nights with breakfast)

Accommodation:

Hotel Grand Shinonome (488-1 Onozaki, Tsukuba, Ibaraki 305-0034, Japan) or

Daiwa Roynet Hotel Tsukuba (1-5-7 Azuma, Tsukuba, Ibaraki 305-0031, Japan)

[Financial Support Payment Schedule]

1) Travel expenses based on the list of "basic international airfare by country" (will be sent in next week) will be transferred to the applicable participant's designated bank account after the conference (after they return home) by the end of this year.

The bank account information will be required by filling a sheet which will be sent in next week and send it to the Registration Office. The bank charge for transfer will be borne by the organizer.

* We do not make prepayment or payment on site at the venue, Tsukuba International Congress Center.

2) If by any chance as of October, you plan to leave your registered country to study abroad at universities or for any other reason, please notify the Registration Office immediately.

[NOTICE]

We will appreciate your cooperation when we check your passport at the registration desk on Oct. 14 and after you return home in order to confirm that you came from your registered country and returned. (Please send the scanned copy of the passport page stamped by immigration to confirm your immigration record of your country.)

If we cannot confirm the fact that you surely returned home, please note that we may not be able to pay for the travel expenses.

Should you have any inquiries, please contact us at any time.

Best regards,

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