STUDY OF INDIRECT EVIDENCES OF AVIAN FAUNA

(Field study cum training)

SUBMITTED TO

POST GRADUATE DEPARTMENT OF BIOSCIENCES

SARDAR PATEL UNIVERSITY

VALLABH VIDYANAGAR

SUBMITTED BY

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(M.Sc. Zoology- 2021)

Under the Guidance of

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Prof. Ujjval B. Trivedi

CERTIFICATE

This is to certify that

Mr. Mohit D. Patel
Mr. Darshan K. Sapariya
Miss. Khusbu Patel

have done a field training on the subject "Study of indirect evidences of Avian Fauna" conducted during January- March, 2021 out of their own enthusiasm. The data presented in this report comprises of their original observations and field work in the premises of P.G. Department of Biosciences, Jol and Bakrol area under our joint supervision.

Dr. Rupal A. Vasant **Dr. Ujjval B. Trivedi**

Date:

Place:

Introduction

Birds are fascinating creatures on this globe and their characteristic features and behavioral diversities has gained attention of many researchers and many others from various background. Several methods are in practice for the purpose of identification, diversity and density indices determination and behavioral observations. Birds are highly mobile and thus at times it becomes difficult to record the observations or photograph them and to overcome this issue, there is a conventional but yet less explored method of noticing and identifying the indirect presence of birds using their feathers, excretory material, bird songs or calls, type of preferred host plants to name a few. Apart from the direct sighting of the birds, various indirect clues can atleast provide an probable indication of the presence of particular bird species and ignite the observer for further more explorations in order to confirm the findings.

Types of indirect evidences

(A) Feathers
(B) Vocalizations (Bird calls/ songs)
(C) Excreta (Fecal matter)
(D) Host plants
(E) Foot prints (Mainly in water birds)
(F) Nesting

(A) Feathers

Feathers are the distinguished part of the birds that makes them different from other fauna. Every bird species has unique coloration of feathers.

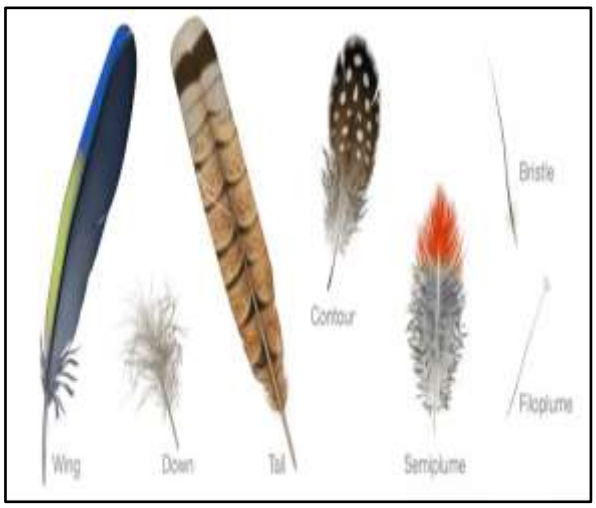


Image source: https://academy.allaboutbirds.org/feathers-article/

Wing Feather

The wing feathers are specialized for flight and are characterized by uniform windproof surface or veins on either side of the central soft that are created by an interlocking microstructure referred to as 'remiges'.

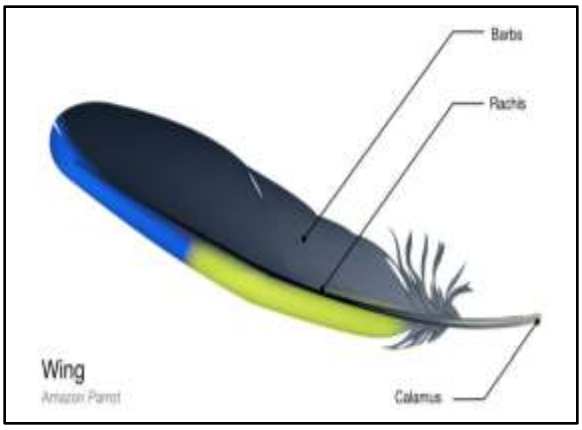


Image source: https://academy.allaboutbirds.org/feathers-article/

Tail Feathers

Tail feathers also called as rectrices formed by interlocking microstructure similar to wing feathers and arrangement appears like fan shape which support precision steering in flight.

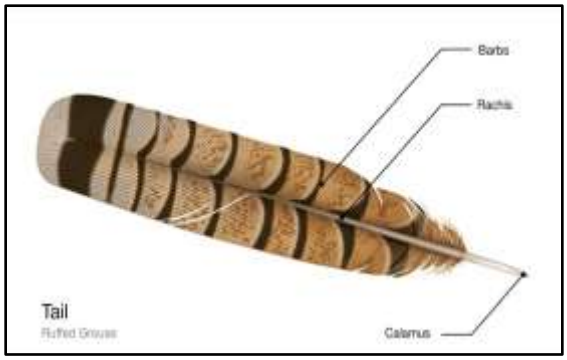


Image source: https://academy.allaboutbirds.org/feathers-article/

Contour Feathers

Contour feathers cover the body of the bird and act as insulator and provide protection from the environment besides they are responsible for beautiful colorations of bird features. It also serves as a aerodynamics devices.

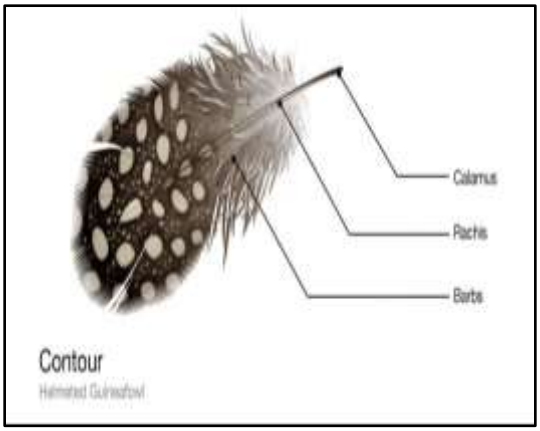


Image source: https://academy.allaboutbirds.org/feathers-article/

Semiplume Feathers

Semiplume mostly hidden beneath other feathers on the body, semiplume have a developed central rachis but no hooks on the barbules creating a fluffy insulting structure.

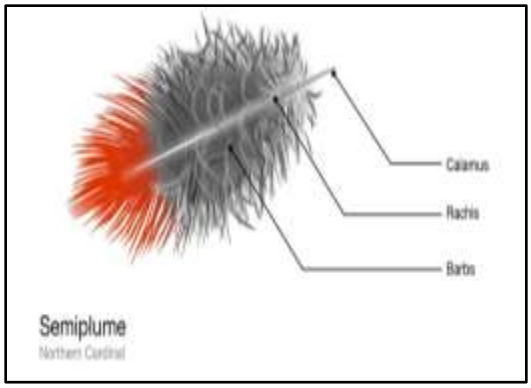


Image source: https://academy.allaboutbirds.org/feathers-article/

Down Feathers

Similar to Semiplumes with an even looser branching structure but little or no central rachis. Down feathers are relatively short and located close to the body for the heat retention purpose.

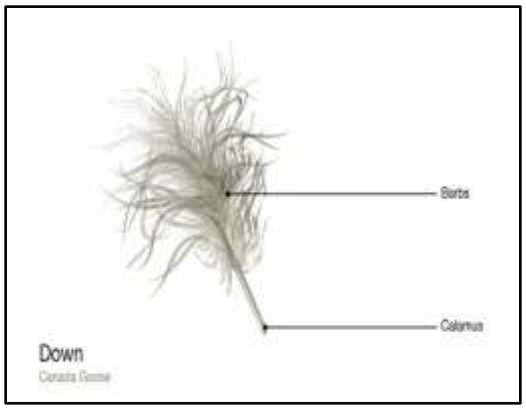


Image source: https://academy.allaboutbirds.org/feathers-article/

Filoplume Feathers

Short, simple feathers with few barbs, filoplumes functions like mammalian whiskers for orientation and positional balance.

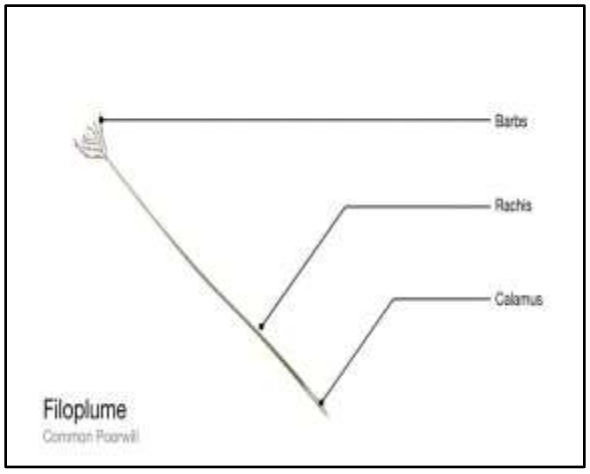


Image source: https://academy.allaboutbirds.org/feathers-article/

Bristle Feathers

Bristles are the simplest feathers with a stiff rachis that usually lacks barbs and branches. Most commonly found on the head. Bristels may protect the eyes and face of a bird.

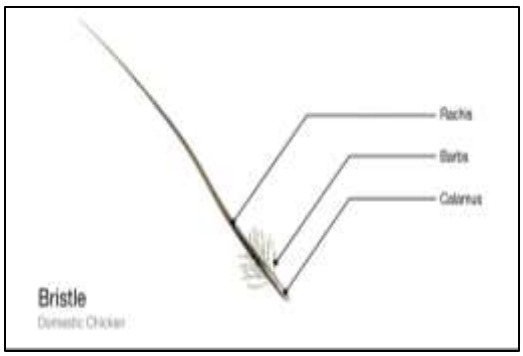


Image source: https://academy.allaboutbirds.org/feathers-article/

Vocalization (Bird calls)

Birds' vocalizations include the both bird calls and bird songs. Distinction between songs and calls can be made based on complexity, length, frequency, pitch and context. Songs are longer and more complex and are associated with the territoriality, courtship and mating behaviors whereas calls indicate alarm signal and may serve as a defense mechanism, or even for the purpose of communication. Bird calls can be analyzed through waveforms and spectrogram and acoustic measurements also serves as a tool for precise data collection though need initial investment of equipments and certain accessory devices.

Anatomy and physiology of Vocalization

The avian vocal organ is called the syrinx- a bony structure at the bottom of the trachea. The syrinx and surrounding air sac resonate to generate soundwave. Such calls are useful in identifying and locating the birds even in the dense forest areas.

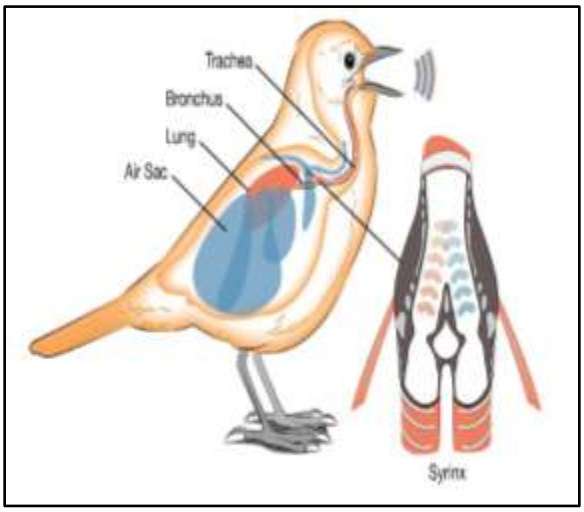


Image source : https://images.app.goo.gl/ESXiX6eUiRt1FxZG8

Excretory material

Excreta (fecal matter) can also be used as an indirect evidence for identification of birds, the type of food bird may have consumed, pattern of digestion and the digestive content can also be measured for biochemical analysis.

Host Plants

Host plants and trees always play a vital role as they provide food and shelter. There are several examples of preferential host species by certain birds and may indicate the possible presence of specific bird species.

For example, kesuda (Butea monosperma) provides nectar to many nectarivores birds like Sunbirds.

Foot prints

For the identification and assumptions of waders, foot prints may become an essential tool. As per the Foot prints one could get the information about daily migratory patterns, travel route and even one can trace them.

Nesting

Nesting is useful for identification and make an assumption about presence of certain bird species.

STUDY AREA AND COLLECTION OF EVIDENCES

Three sites were chosen in and around Vallabh Vidyanagar.

P. G. Department of Biosciences

Tadan lake, Jol

Behind Bhadiyad Pir Chilla, Bakrol

Sites were visited from 10th January, 2021 to 31st March, 2021. Fallen feathers were collected, photographed, recorded and later the host bird species was identified using appropriate references.

Steps to collect evidences

1) Sighting of evidence
2) Capturing a photograph with reference object
3) Identify using suitable resource materials

Voice of birds were collected without disturbing them from their natural habitats. BirdNet android application was used for obtaining waveforms of calls and identification of birds.

Link for that application: https://play.google.com/store/apps/details?id=de.tu_chemnitz.mi.kahst.birdnet

Analysis of Data

After collection of various on-site observations, appropriate reference methods were employed for identification and confirmation of the collected samples.

Based on the collected indirect evidences one can have assumptions for their probable presence of any given species and further verification needs to be done either by one or the other type of indirect evidence/s, comparing with available past records or even looking for e-bird type digital database. In case, it is the hitherto unexplored or first ever recorded sighting then one needs to visit the given sites multiple times with different time intervals and even can obtain seasonal data also for further details.

GLIMPSE OF OUR FIELD OBSERVATIONS:

Feathers


indian peafowl
pavo cristatus
22.565056,
72.908560
POLO
XP-1201


Rock pigeon
Columba livia
22.569827,
72.909611
POLO


POLO®
.Indian robin
(Copsychus fulicatus)
Black Drongo Dicrurus
macrocercus.
22.569551,72.909731


spotted dove
Spilopelia chinensis
22.583408,72.8814
24


Common Name : Rose ringed parakeet
Scientific name : psittacula Krameri
Location: Shastri Ground , vvn
22.553712
72.925908


Common Name: Little Egret
Scientific name: Egretta garnetta
Location: Pond Adjacent to joi village
22.584977
72.881078

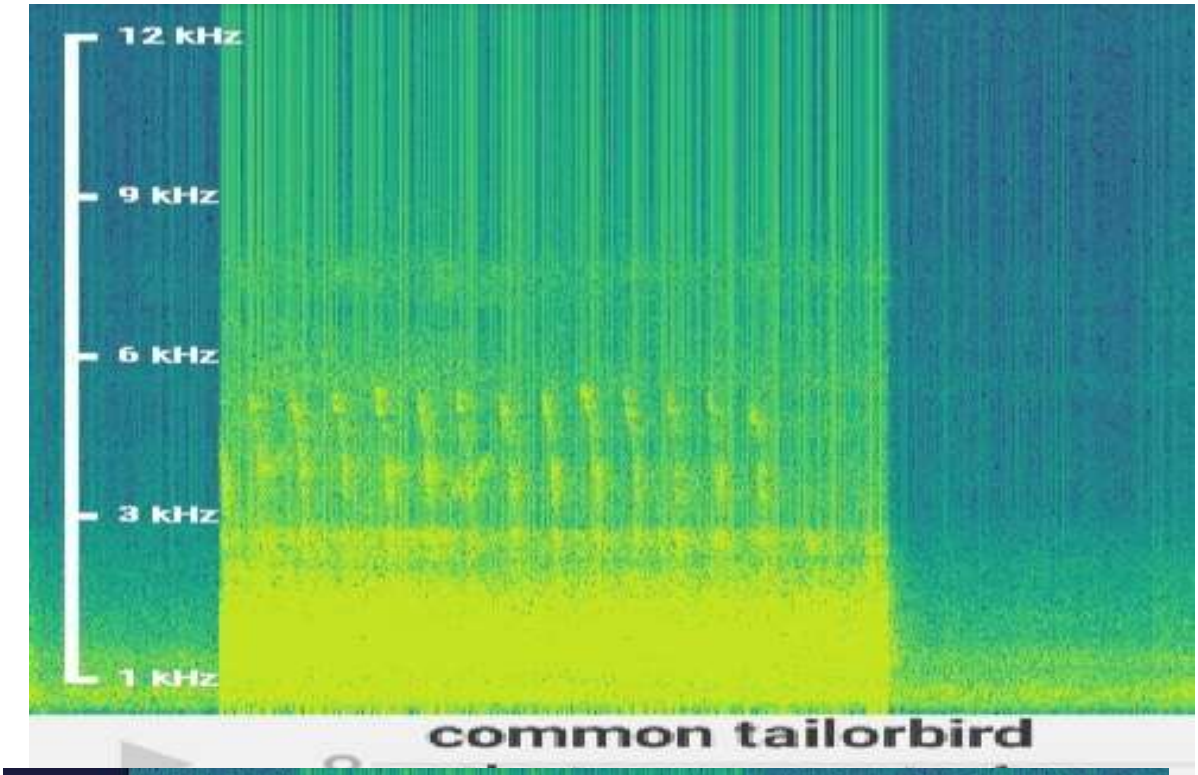

Common name : Glossy Ibis
Scientific name: Plegadis falcinellus
Location: Pond Adjacent to Jol village
22.584977
72.881078


greater coucal or crow pheasant (Centropus sinensis)
22.565144,72.908135


The Eurasian hoopoe
(Upupa epops)
22.564817,
72.906854


spotted owlet (Athene
brama)
22.583211,72.881426

Bird Voices


12 kHz
9 kHz
6 kHz
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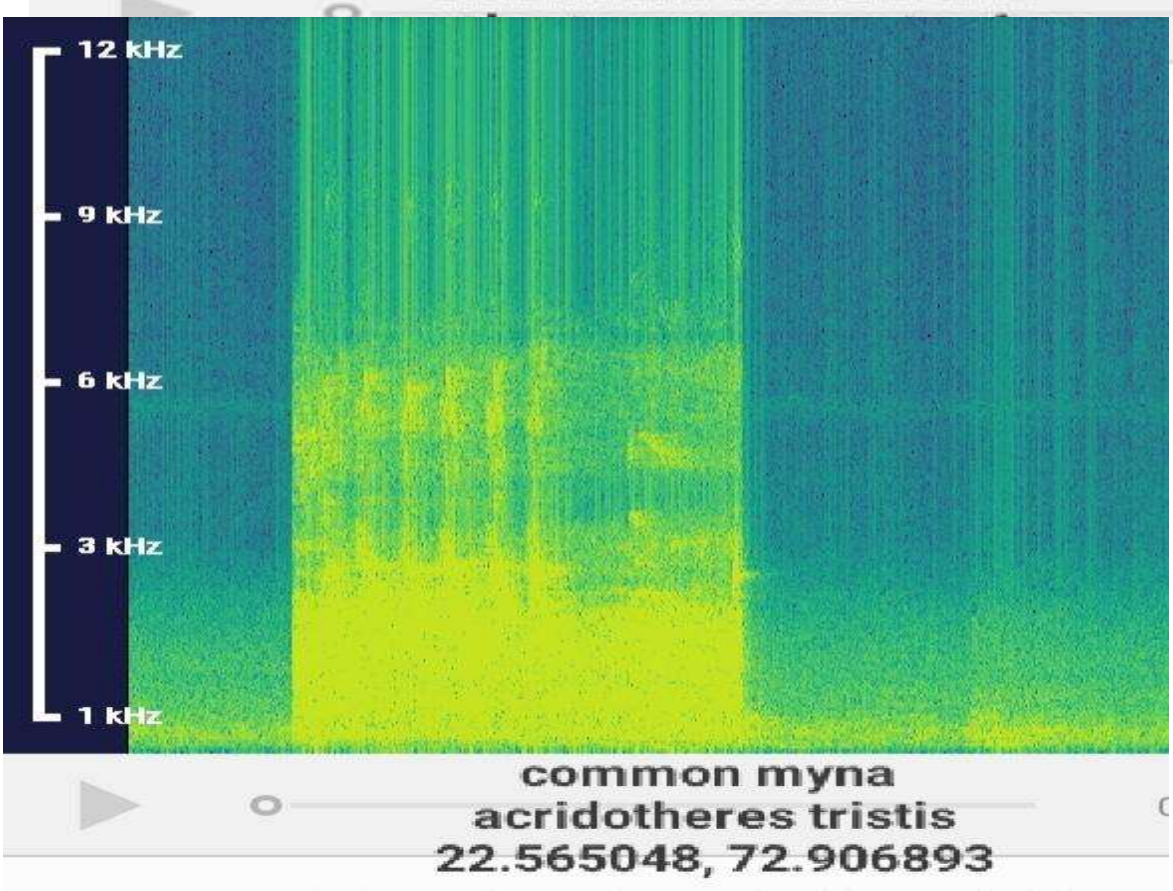
common tailorbird


12 kHz
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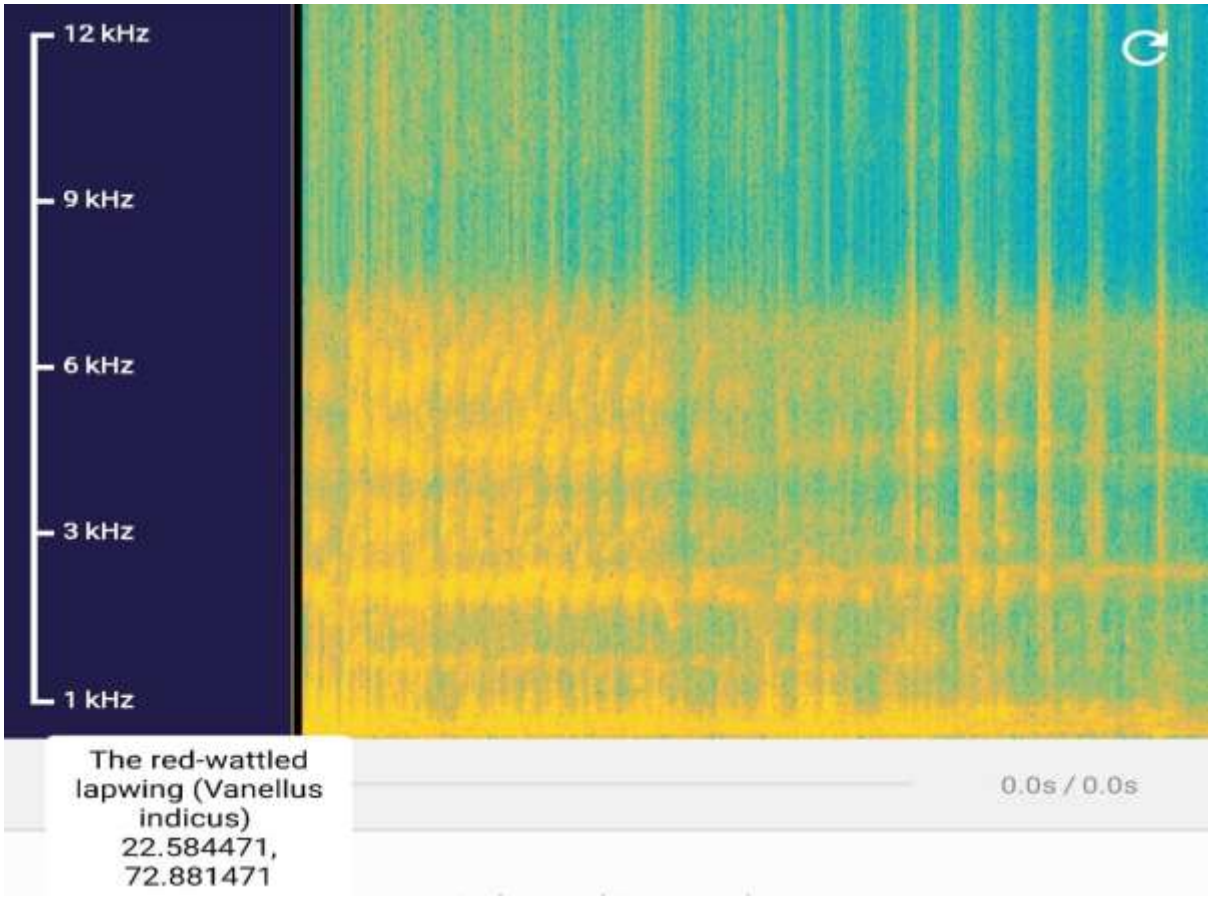
common myna
acridotheres tristis
22.565048, 72.906893


12 kHz
9 kHz
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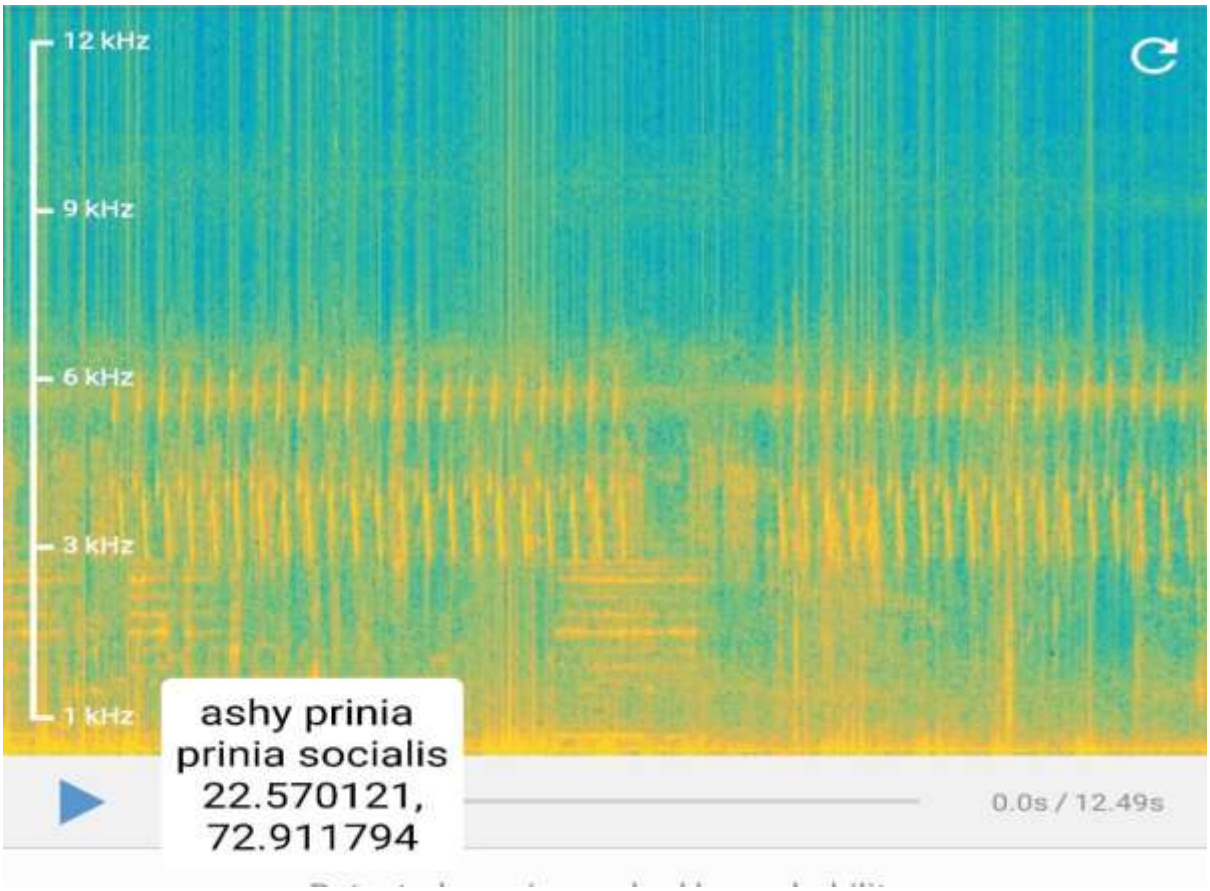
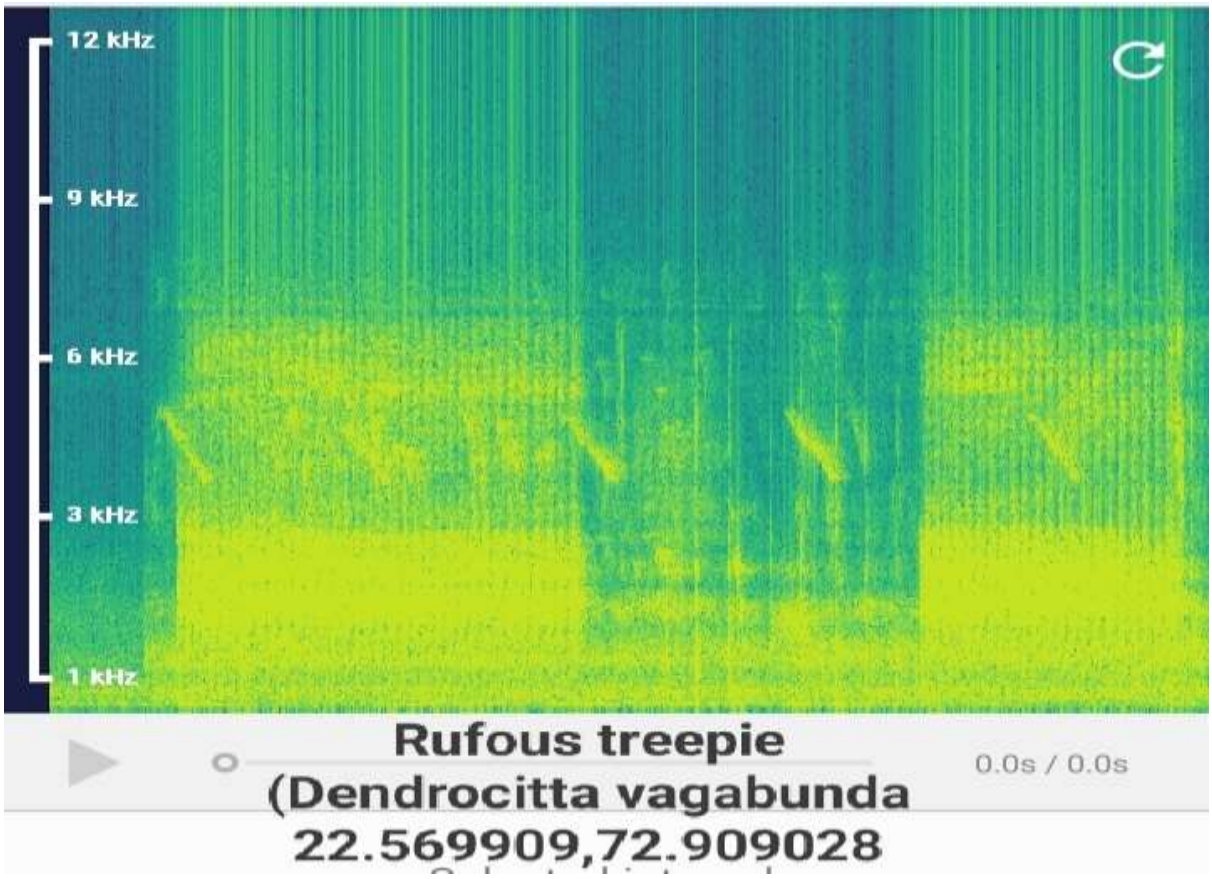
1 kHz
The red-wattled lapwing (Vanellus indicus)
22.584471, 72.881471
0.0s / 0.0s


12 kHz
9 kHz
6 kHz
3 kHz
1 kHz
ashy prinia
prinia socialis
22.570121, 72.911794
0.0s / 12.49s


12 kHz
9 kHz
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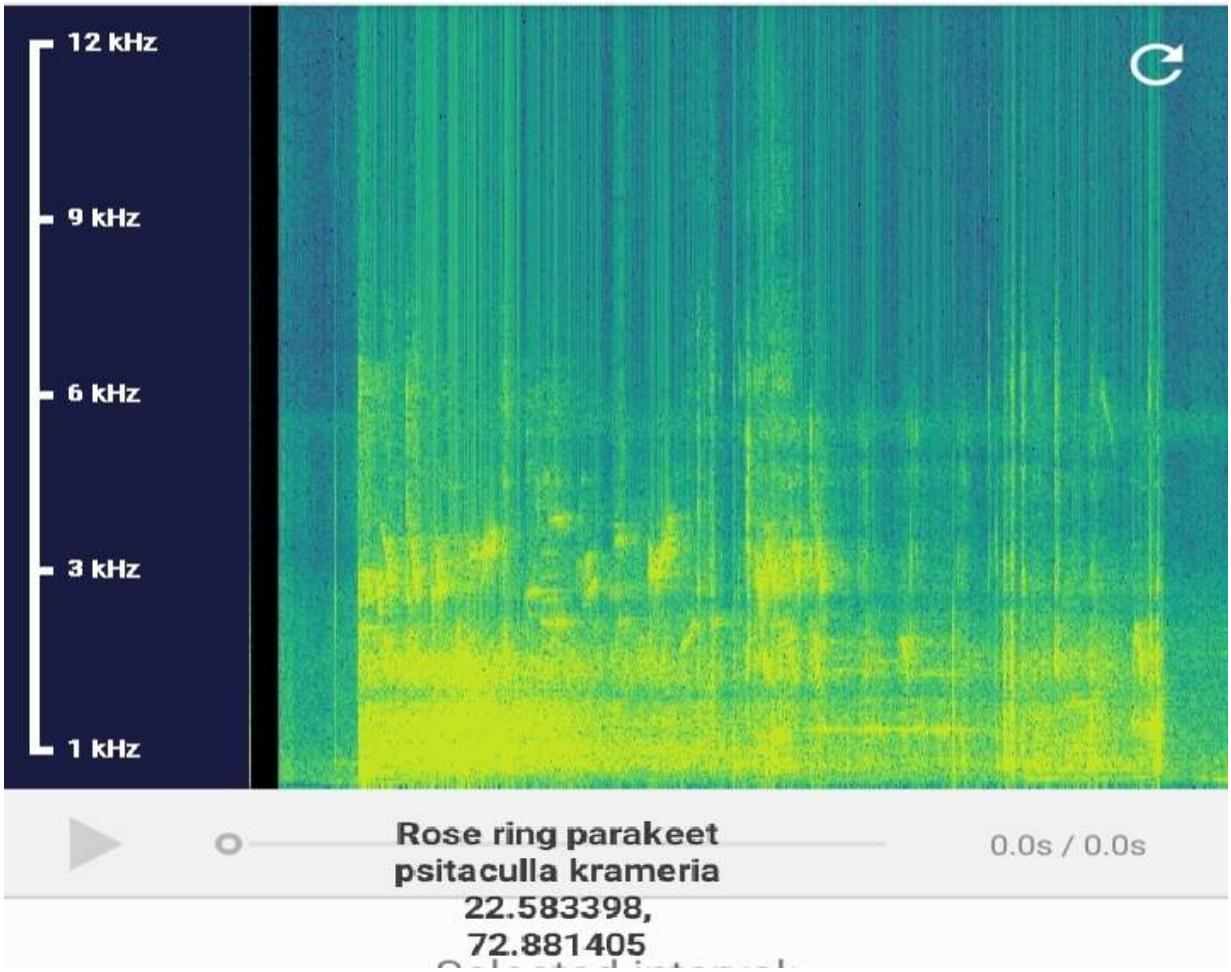
1 kHz
Rufous treepie
(Dendrocitta vagabunda
22.569909,72.909028
0.0s / 0.0s


12 kHz
9 kHz
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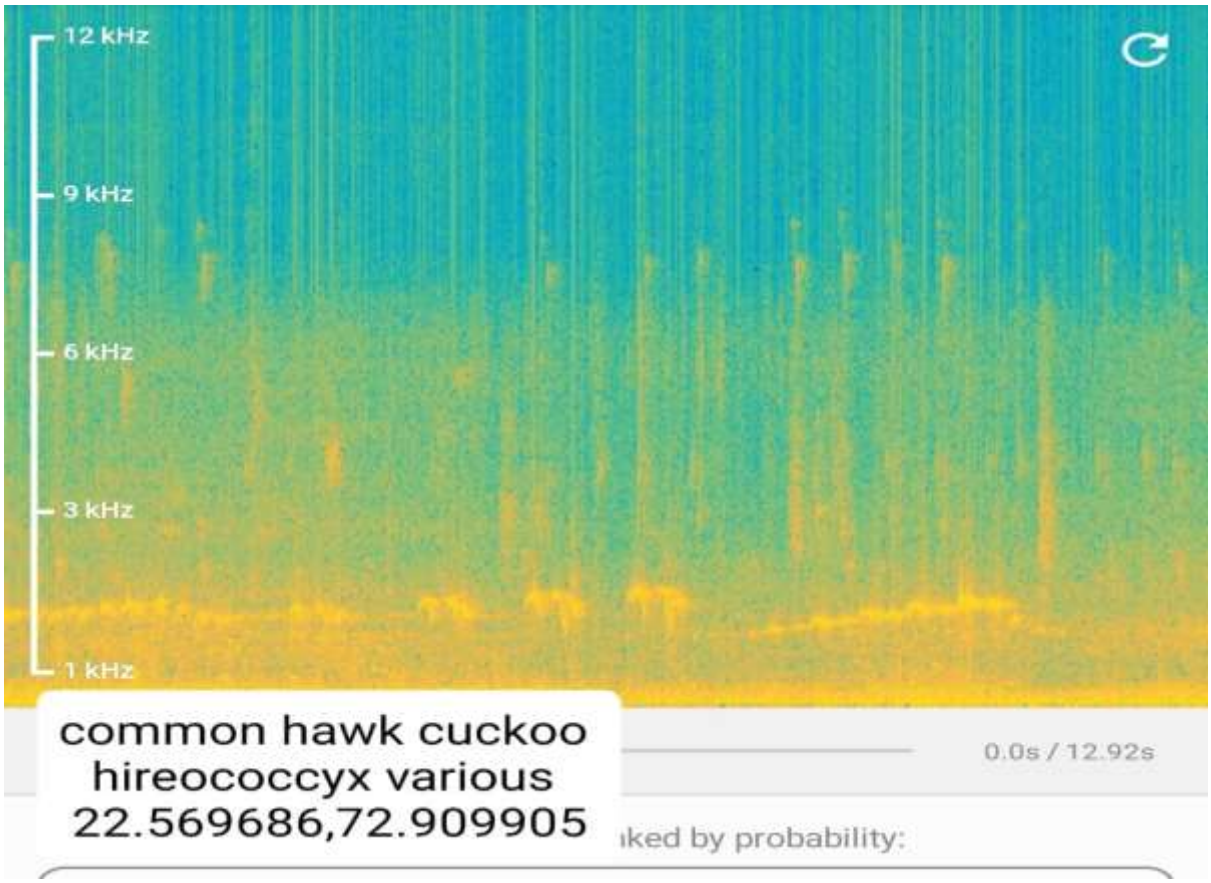
1 kHz
Rose ring parakeet
psitaculla krameria
22.583398,
72.881405
0.0s / 0.0s


12 kHz
9 kHz
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3 kHz
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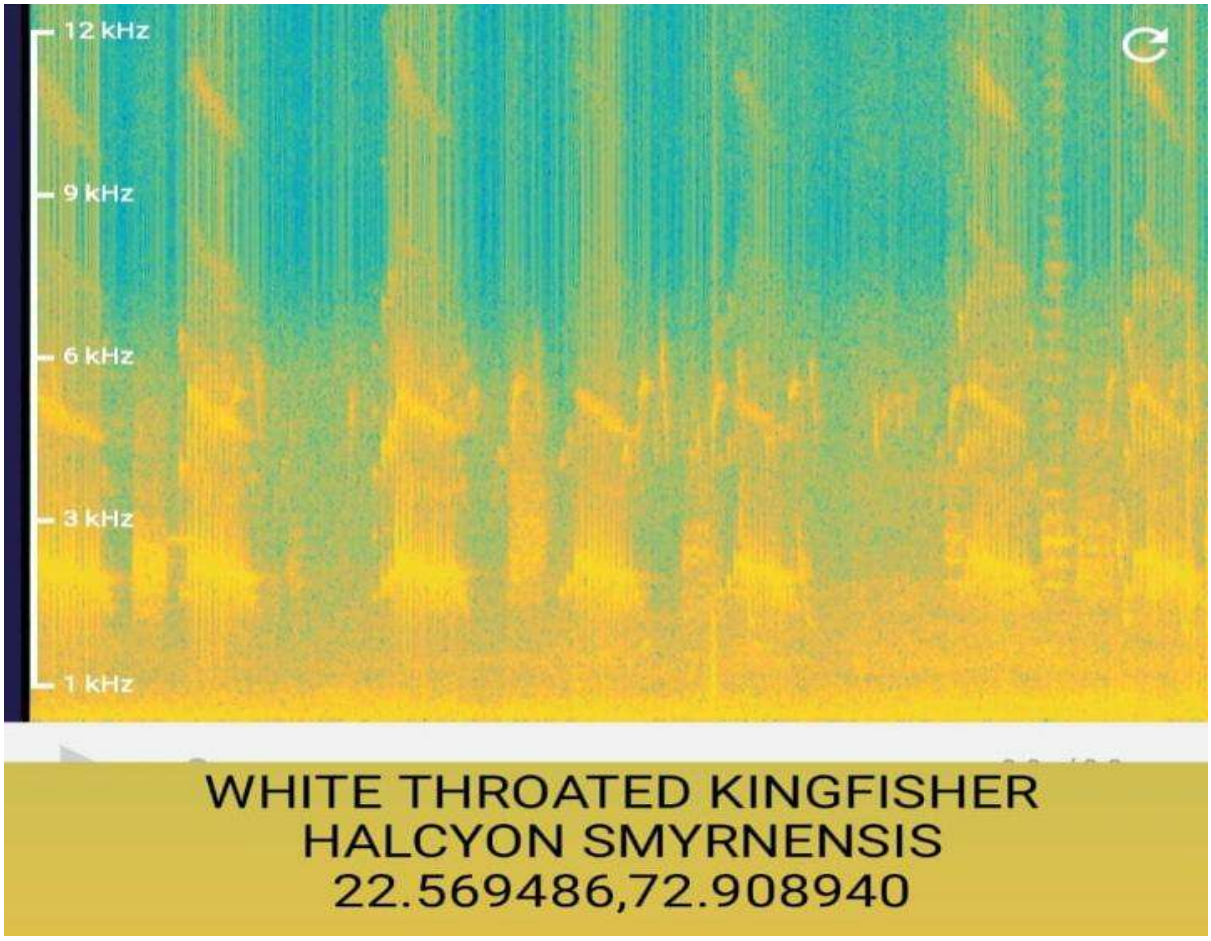
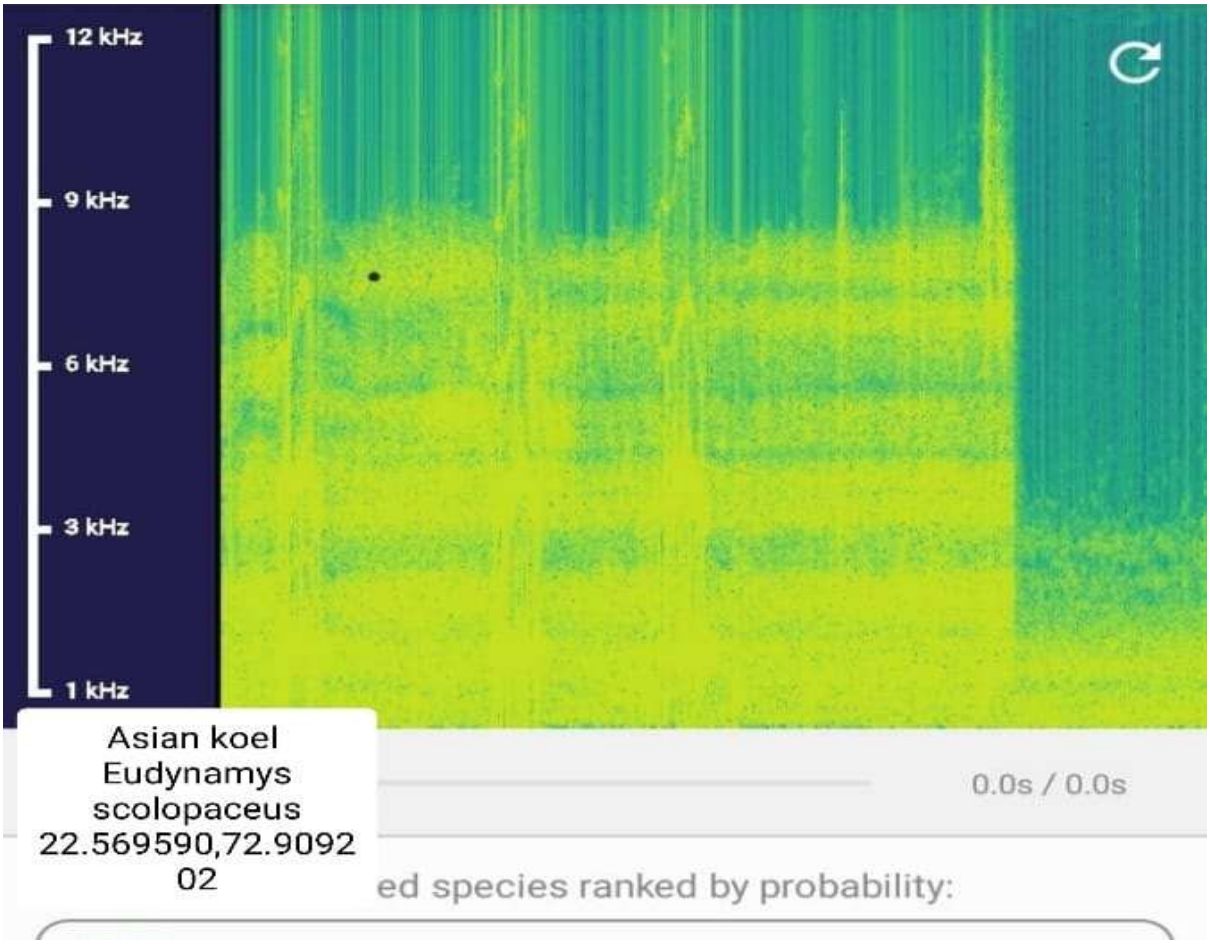
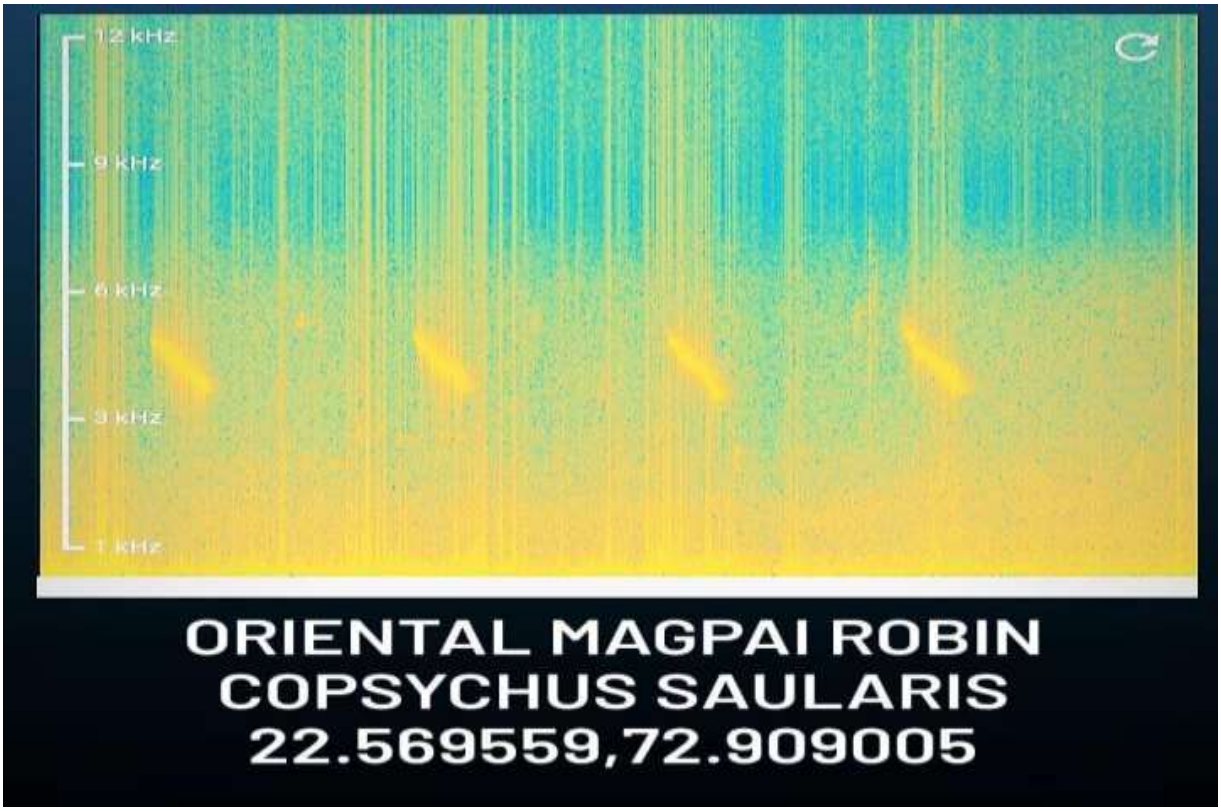
common hawk cuckoo
hireococcyx various
22.569686,72.909905
0.0s / 12.92s
iked by probability:


12 kHz
9 kHz
6 kHz
3 kHz
1 kHz
WHITE THROATED KINGFISHER
HALCYON SMYRNENSIS
22.569486,72.908940


12 kHz
9 kHz
6 kHz
3 kHz
1 kHz
Asian koel
Eudynamys
scolopaceus
22.569590,72.9092
02
0.0s / 0.0s
ed species ranked by probability:


12 kHz
9 kHz
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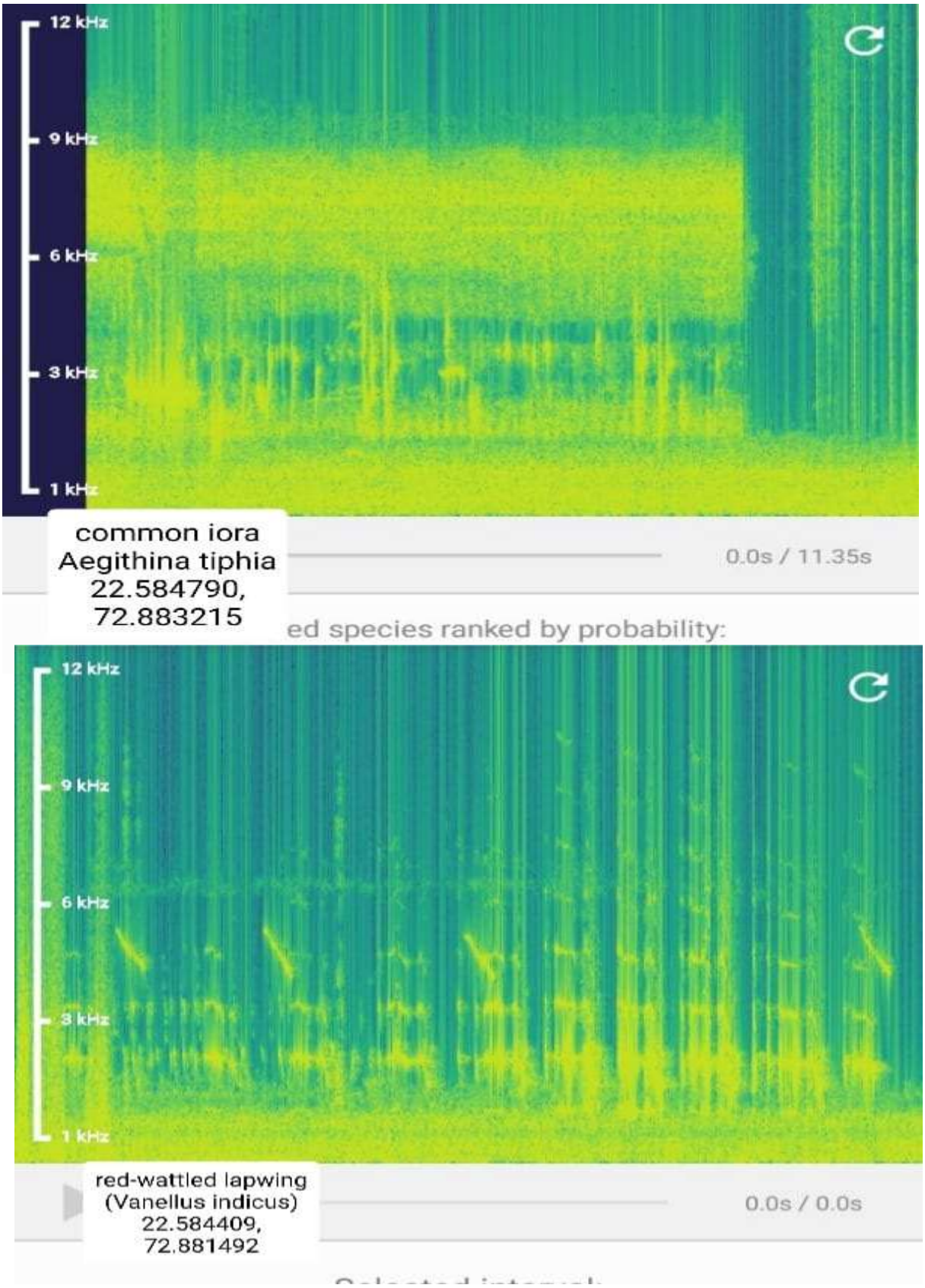
ORIENTAL MAGPAI ROBIN
COPSYCHUS SAULARIS
22.569559,72.909005


12 kHz
9 kHz
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common iora
Aegithina tiphia
22.584790,
72.883215
0.0s / 11.35s
ed species ranked by probability:
12 kHz
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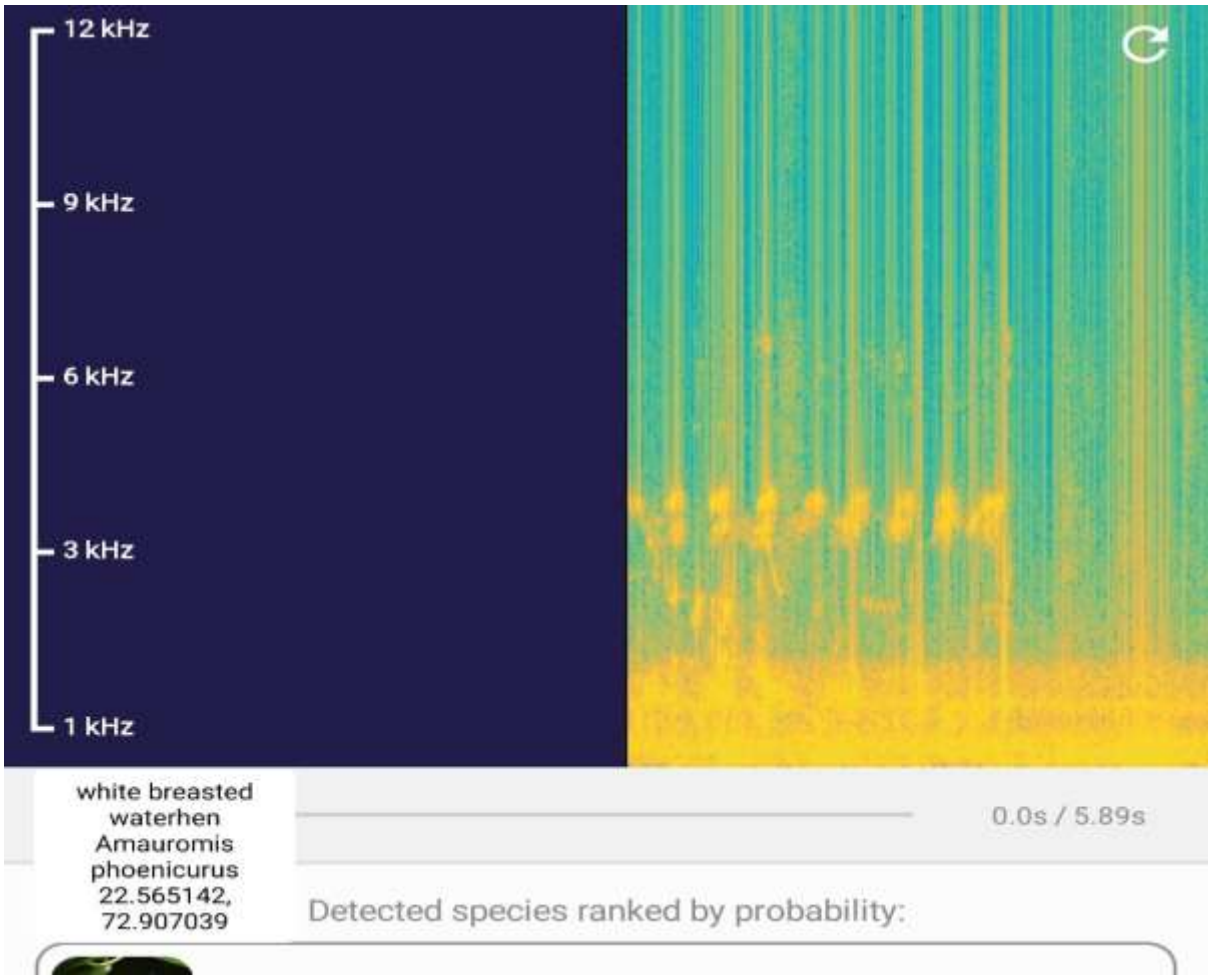
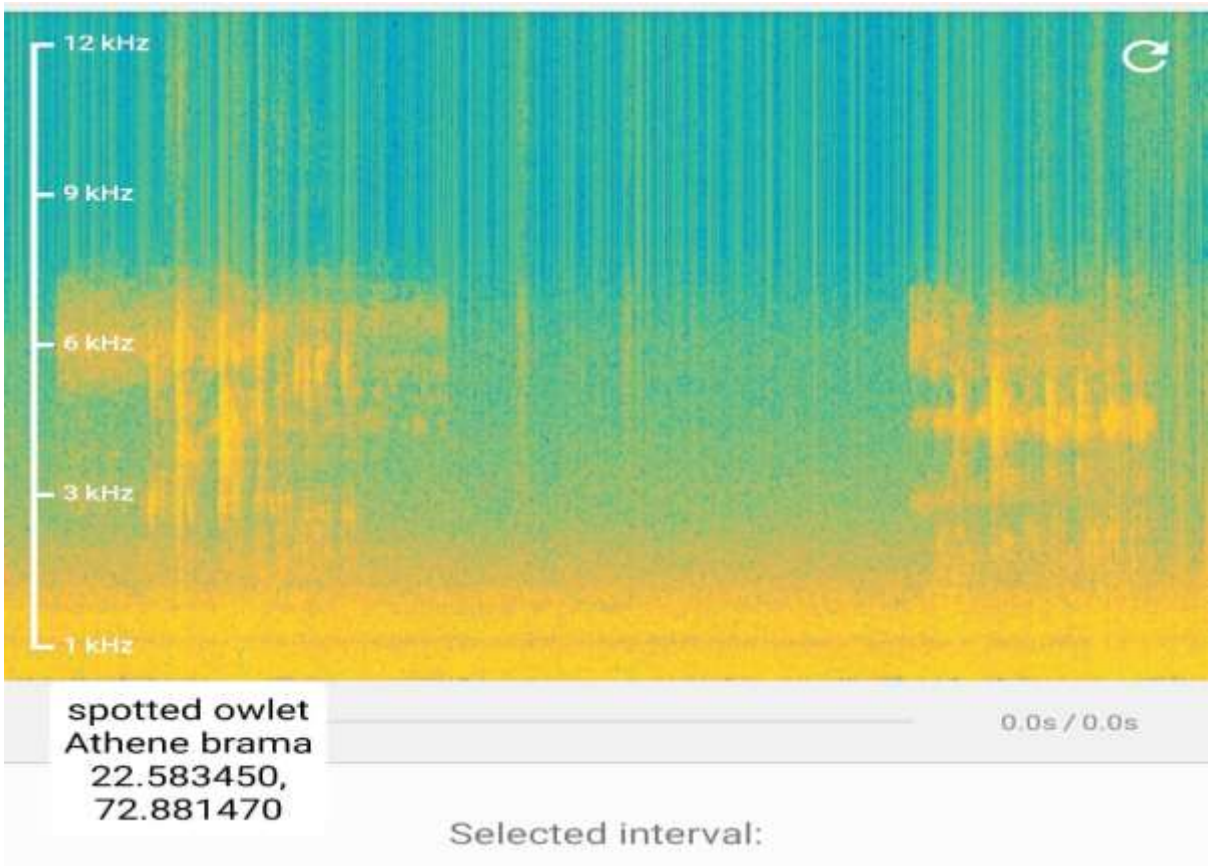
3 kHz
1 kHz
red-wattled lapwing
(Vanellus indicus)
22.584409,
72.881492
0.0s / 0.0s


12 kHz
9 kHz
6 kHz
3 kHz
1 kHz
white breasted waterhen
Amauromis phoenicurus
22.565142, 72.907039
0.0s / 5.89s
Detected species ranked by probability:


12 kHz
9 kHz
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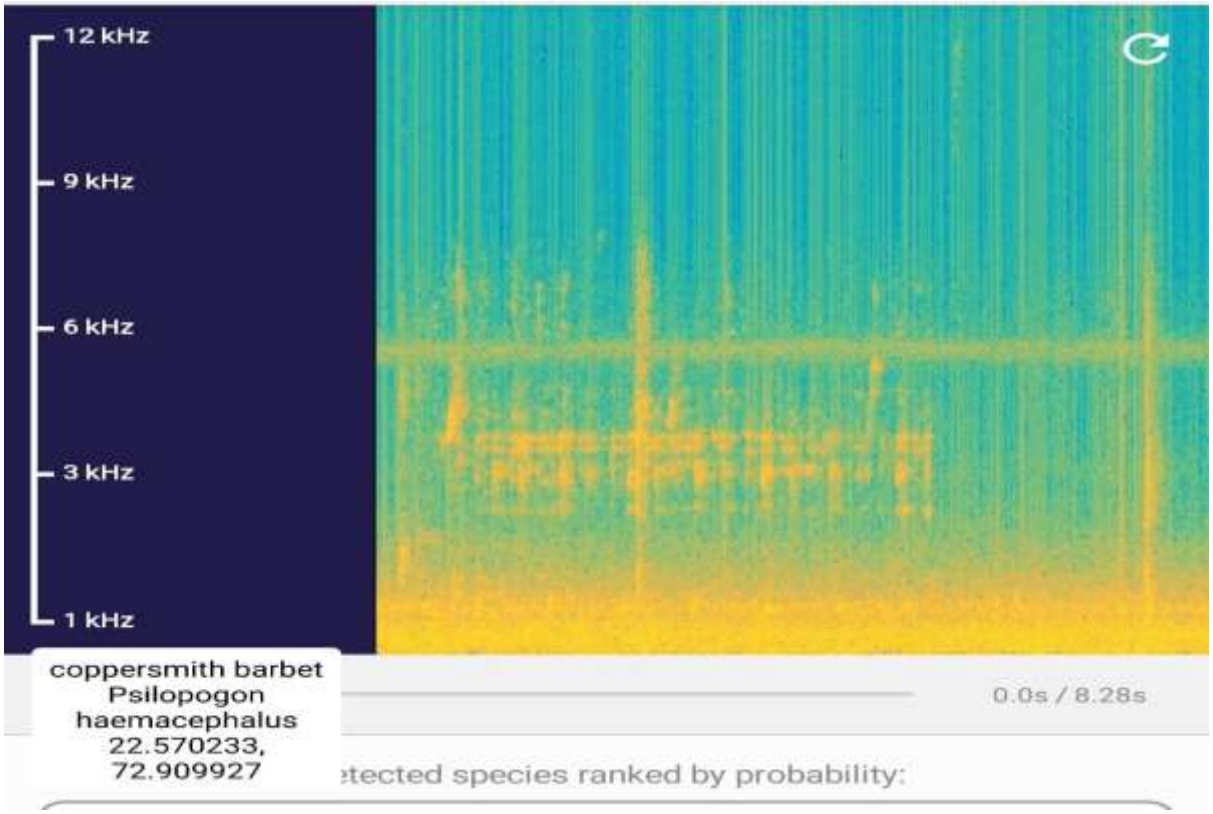
3 kHz
1 kHz
spotted owlet
Athene brama
22.583450, 72.881470
0.0s / 0.0s
Selected interval:


12 kHz
9 kHz
6 kHz
3 kHz
1 kHz
coppersmith barbet
Psilopogon
haemacephalus
22.570233,
72.909927
0.0s / 8.28s
tected species ranked by probability:

(Cavity build by Coppersmith Barbet)

Indirect evidences may serve as a valuable evidence in case of persistent explorations and continuous observations for confirmation of their probable sightings.

લિસોટા ને સાપ .... પીંછા અને પંખી....

References

1) Marian C., Boleslaw D., (2006) – Feathers: Identification for Bird Conservation. Natura Publishing House (Poland)

Web References

1) https://www.featherbase.info/en/home
2) https://www.fws.gov/lab/featheratlas/

Android applications as references

1) BirdNet
https://play.google.com/store/apps/details?id=de.tu_chemnitz.mi.kahst.birdnet

2) Feathers Gallery
https://play.google.com/store/apps/details?id=ch.gridonic.feathers