MATERIALS AND METHODS

CHAPTER – TWO

MATERIAL AND METHODS

Material

a) Selection of topic

The Krishna River bank, Krishna irrigation cannal and Sagareshwar wildlife Sanctuary in Palus Tahsil of Sangli district forms an ideal habitat both for local birds and migratory birds; however the agricultural development of grape wine yards, increase in sugarcane fields and repeated flash flooding of Krishna River have been disturbed the natural habitat of birds. An excessive use of strong pesticides on grape gardens have detrimented the birds life, therefore it is necessary to study the avian fauna in the Palus Tahsil. It is necessary to check the regular alterations in avian fauna. The second objective to study avian fauna to find out the role of birds in biological control of insect pests on sugarcane fields, betal wine yards, live stock farms and the mango gardens. More or less rare birds like hornbills, brahminy kites and storks reside in the closed campus of steel industry at Kirloskarwadi. Beside to this some local migrants in Sagareshwar Sanctuary can also enjoy the life in Krishna River basin, Krishna irrigation cannal and Takari lift irrigation cannal etc.

Recently, Yerala River and weirs on it formed the ideal marshy habitat for aquatic birds, curiously enough some distant migratory birds have also observed at Baliraja weir, Wazar weir and Nimani, Vasant tank Yerala River at the eastern border of Palus Tahsil, hence it is urge to study the local fauna of birds, aquatic birds and the migratory birds.

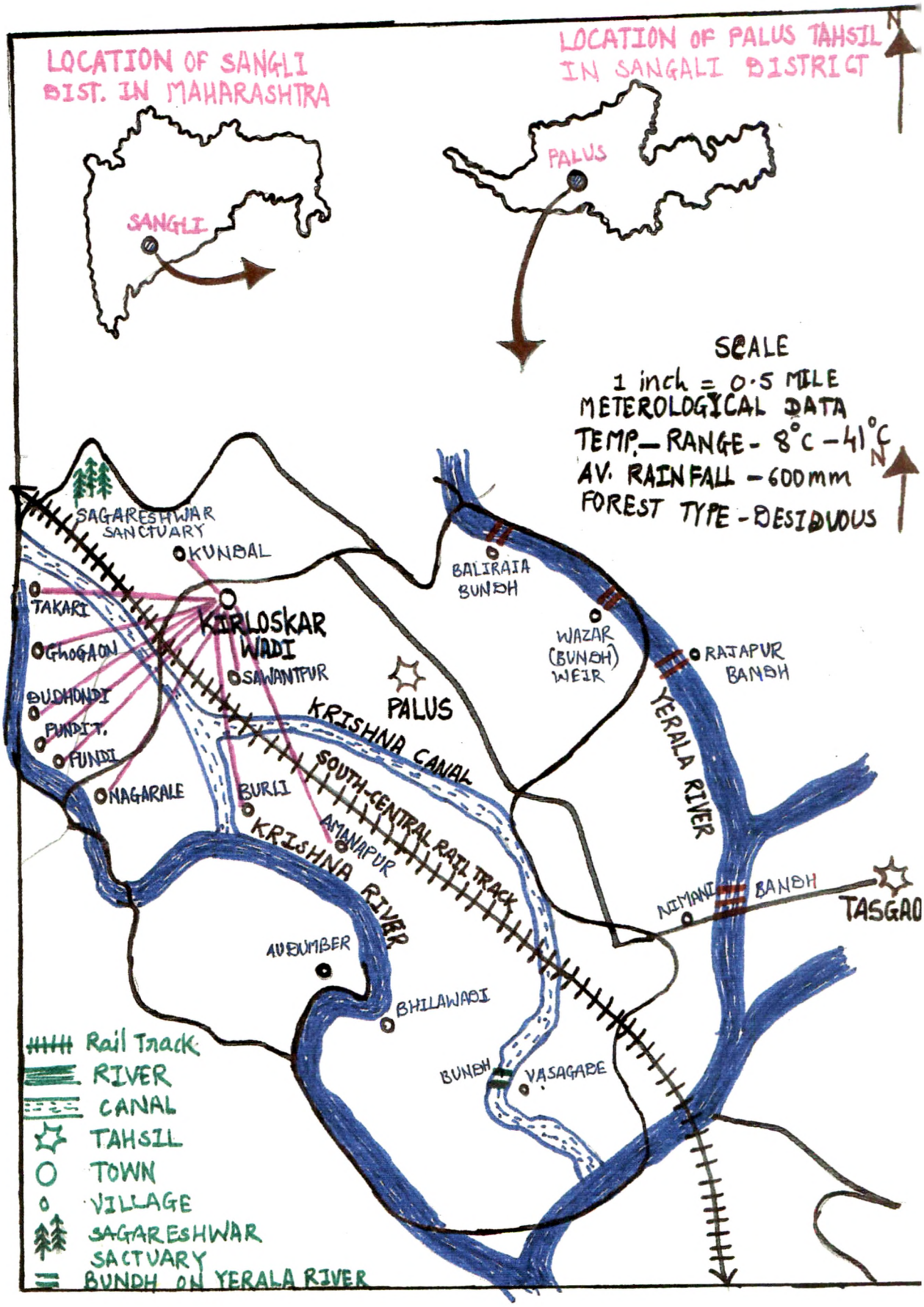
In addition to above objectives the study of breeding period of different birds, nesting sites, parental care and feeding pattern have been decided. The idea of conservation of bird is also focused in the study topic.

b) Study area

The study area is located between 17^0 9' N and 77^0 22.5' E. latitudes. The boundaries of Palus Tahsil are delimited by Krishna River segment at west side and Yerala on the east side. The Sagareshwar Sanctuary is located on the north border of Palus Tahsil or it is the border between Palus and Kadegaon Tahsil respectively. The Palus Tahsil is more or less diagonally divided by Krishna irrigation canal and with south central railway track. The Palus Tahsil is characterized by presence of local reservoirs viz; Ghogaon Lake, percolating tanks at Palus, Kundal Nala and great Kala Nala at Amnapur. The different bandhs are found on the River Krishna viz; bandh at Takari, Pundi, Nagthane, Amnapur, Burli and great doh at shri Kshetra Audumber.

The Krishna River bank is also characterized by presence of thick vegetation, loam soil and sugarcane cultivated fields. On the agricultural basis, the Palus Tahsil is also divided into west and east zones. The west zone is adopted for an intensive agricultural aspects e.g. sugarcane cultivation. The live-stock rearing farms in order the increase yield of the milk. The east part of Palus Tahsil is rather semiarid dried area and it is characterized by the presence of grape wine yards & guava gardens

The Sagareshwar wild life Sanctuary located at the north side of Palus Tahsil. It is located 7 kms away from the Kirloskarwadi. It is nothing but the extension of Mahadeo Hill range of western Ghat. About 10.87 sq. km. area is occupied by the Sagareshwar Sanctuary. The


LOCATION OF SANGLI DIST. IN MAHARASHTRA
SANGLI
LOCATION OF PALUS TAHSIL IN SANGALI DISTRICT
PALUS
N
SCALE
1 inch = 0·5 MILE
METEROLOGICAL DATA
TEMP.— RANGE - 8°C - 41°C
AV. RAINFALL - 600mm
FOREST TYPE - DESIDUOUS
SAGARESHWAR SANCTUARY
KUNDAL
TAKARI
KIRLOSKAR WADI
GHOGAON
SAWANTPUR
BUDHONDI
PUNDI T.
PUNDI
NAGARALE
BURLI
PALUS
KRISHNA CANAL
SOUTH-CENTRAL RAIL TRACK
AMANAPUR
KRISHNA RIVER
AUDUMBER
BHILAWADI
BALIRAJA BUNDH
WAZAR (BUNDH) WEIR
RAJAPUR BANDH
YERALA RIVER
NIMANI
BANDH
TASGAO
BUNDH
VASAGADE
Rail Track
RIVER
CANAL
TAHSIL
TOWN
VILLAGE
SAGARESHWAR SACTUARY
BUNDH ON YERALA RIVER

Sagareshwar hill is a type of dune hill. The Devrashtre reserve forest, Takari irrigation lift and rock clips on the south side is an important topographic features of Sagareshwar Sanctuary.

i. The segment of Krishna River basin in Palus Tahsil -

The Krishna River originates at the Mahabaleshwar, heighten hill range of WG in Satara district. It runs from Karad to Palus Tahsil and touches to the western boundary of Tahsil villages viz; Takari, Satpewadi, Ghogaon, Dudhondi, Pundi, Pundi wadi, Nagarale, Shirgaon, Walva, Nagthane bathed by the River.

Krishna River is recently flash flooded in successive years 2005-07. The sewage and industrial effluent from different sugar factories are also frequently discharged into Krishna River. The domestic washings were also dumped into River. The eco-physiological alterations in the River segment demands the new roosting sites, foraging patterns and other competitive behaviour of birds. However the upper Krishna and Warna River basin almost neglected for the study of avifauna. Therefore present investigation is undertaken.

Hydrological parameters of Krishna River had earlier reported from its upper and lower segments, River was full of phytophankton and zooplankton with abundant cat fishes. The running water habitat is quite suitable for catfishes, carps and top minnows which form the ultimate food resource for aquatic and local migrants (Brahminy Kite, White necked storks).

ii. River segment of Yerala -

The Yerala River is tributary of Krishna River. It arises from hills of Mahadeo at Shikhar Shinganapur, runs in north-south direction, bisects the Tasgaon and Palus Tahsils and ultimately joins the Krishna River at

village Padmale near Sangli. It forms parallel transect with Krishna River in Palus Tahsil. Formerly this river was seasonal and completely dried but now Yerala is rejuvenated with cyclic fresh water release from the Araphala irrigation canal, thus Yerala in Palus Tahsil becomes perennial. Already on Yerala there are different earthen or concrete bandhs for the irrigation. The earthen bandhs are forming a very good aquatic habitat for the local & migratory birds viz; Ramapur, Baliraja, Wazar, Vasagade and Nimani on Yerala.

The Yeralawadi lake itself has constructed in upper segment of Yerala which forms the secondary food source for migratory birds reported earlier at Mayani (Mote, 2006 unpublished data).

Thus, a network of fresh water reservoirs was required for both local and migratory birds. In summer, the decrease in water level increases the density of catfish, carps and minnows and it becomes a very good food resource for the migratory storks and cranes.

iii. Kirloskarwadi closed campus -

Approximately over 350 Acres, 100% secured for the bird roosting place, this place is quite near to our regional research station at Ramanandnagar and could be observed for birds at early morning and evening time till the dusky hours regularly. Kirloskarwadi was considered as a central research station and from where radially transecting roads ultimately reaching the local habitats of the birds (up to Krishna Ghats).

iv. Study points on Krishna irrigation canal -

The study of birds was regularly done on every holiday along the canal side trees, telegraphic wires, marshy places and ponds nearby. Different radiating roads from Kirloskarwadi in Palus Tahsil were

explored for the location of birds & their nests. The list of radiating roadside is given below.

1. Kirloskarwadi to Kundal - (6 km)
2. Kirloskarwadi to Takari – (10 km)
3. Kirloskarwadi to Dhdhondi – (4 km)
4. Kirloskarwadi to Pundi – (5 km)
5. Kirloskarwadi to Ghogaon – (5km)
6. Kirloskarwadi to Amnapur – (6 km)
7. Kirloskarwadi to Burli – (4km)

v. Village tanks -

The fresh water lakes viz;

A) Palus Tank -

At the northside of Palus town, temporary, dry, seasonal, two percolating tanks are present. They harbour the seasonal fauna of coots, lapwings, ducks and stilts. One more reservoir is located in the heart of Palus town. It also sustains the fauna of 10-12 ducks.

B) Ghogaon percolating tank -

It is located at foothills of the Sagareshwar, the lake is shallow, fertile and perennial. It is practically, unpolluted area, the lake is more or less full with different species of cat fishes, top minnows and filamentous algae. It forms the reliable source for the migratory birds and local birds residing in Sagareshwar Sanctuary.

vi. The study area other than the Palus Tahsil -

A) Alsand village tank

It is built up on the Yerala River. It is regularly recharged with fresh water from the Takari irrigation canal. The lake is located in between two villages of Khanapur Tahsil viz; Khambale and Alsand respectively. The area occupied by the lake is 4-6 sq. km. and recently visited by the deme of painted storks.

B) Mayani lake

Mayani is located in the south corner of Satara district. The lake had built under the rule of British Empire. Therefore it is full with sediments and becomes shallow. The surface run off the water enforce the development of submerged hydrophytes viz; *Ottolia*, *Typha latifolia*, *Hydrilla* etc.

The Mayani bird reservior is declared in 1985. It had built on three successive Nala's flowing towards west side. Recently the forest reserve is also maintained on the north side of the lake. The forest is divided by internal Malhar Peth highway. In sediment of lake the dung, pellets of sheep flocks are collected with the rainfall. It enhances the growths of the algae. The lake is quite shallow and fertile and it is also drained with narrow irrigation canal on the left side but recently the lake is eutrophied with noxious growth of *Ipomea* sp. and invaded *Prosopis juliflora*. The lakeside is also provided with tall *Eucalyptus* trees, Bunyan trees and number of *Acacia nilotica* trees where usually spoonbills, painted storks roost in the frond. Recently Forest Ministry, Govt. of India has announced the financial assistance of one crore rupees for the development of Sanctuary. Mayani is located 15^0 N and 75^0 E Latitudes. The weather is dry and warmer as recorded in the other arid zones of district.

Methods

A) Line transect method

Line transect method has been used since the early 1930s (Burnham et.al, 1980) for estimating the abundance of wildlife populations. It is not only practical and efficient, but is relatively inexpensive too. It is also applicable to monitoring round the year monitoring. Studies by Daniels (1989) in western Ghat, Katti (1989) in Dachigam, Javed (1996) in Dudwa and Shankar Raman (1996) in Mizoram have used line transects for studies on bird communities. Sathyakumar et.al (1993), Kalsi (1992), Ahmad (1995) and an ongoing study in Kedarnath by Sathyakumar (Pers. Comm.) have successfully used this method for estimating densities of pheasants in mountains terrain.

Line transect is based on the theory of walking along a predetermined route at a fixed speed to record the birds on or near the line. The method requires great care, and any line transect study should be designed in such a way that basic assumptions are not violated.

Our Palus Tahsil area was diagonally transected by south central railway track. The Palus Tahsil was also more or less diagonally transected by Krishna irrigation canal. The later transect connected the Krishna River on one side and Yerala on other. It was full with the thick vegetation of *Acacia* and abundant fish fauna on which birds could rely.

B) Point count method

Point counts are often preferred to transects where habitats are mixed together (i.e. more fine grained) and the objective is to look at the

relationship between birds and habitats. At each point there is more time to detect and identify birds. This technique is mostly preferred in scrub or woodland and not commonly used in open habitats. Where there is a marked problem of birds fleeing from the observer.

Selection of the points

A well spaced sample series of points in an area will provide more representative data than a few transects. The points to be counted should be laid out systematically or selected randomly in the study area.

Location of the points

Distance between points should be such that the detection from different points remains statistically independent (Raynolds et.al, 1980). This means the points should not be too close. The locations are as follows;

i) Dudhondi Ghat
ii) Pundi Ghat
iii) Pundiwadi Ghat
iv) Nagarale Ghat
v) Nagthane Bundh
vi) Burli Ghat
vii) Amnapur Ghat

For the study of birds, the binocular and high resolving digital camera were utilized. The observations made fortnightly. The care of birds must be taken that they were not startled at any time. For observations of birds the author was maintained a 'field log-book'. Whenever the visits were made, the observations of the birds were noted. The survey of bird population was made by frequent visits to all the cultivating fields, local tanks and Ghats on the River. General

observations of various types of birds were recorded covering variety of parameters like status, occurrence and breeding etc. Identification of different species of birds were carried out by noting down the various characters and with the help of key notes from the standard books (Ali, Salim, 2005; Chitampalli, M, 2002; Grewal, B, 1993). The main trees that cover the study area are;

i. *Aradirachta indica* A. Juss (Neem)
ii. *Acacia arabica* wild (Babhul)
iii. *Ficus religiosa* L. (Pimpal)
iv. *Delonix regia* Ref. (Gulmohar)
v. *Eugenia jambolana* Lamk (Jambul)
vi. *Ziziphus jujuba* L. (Ber)
vii. *Mangifer indica* L. (Mango)
viii. *Polyalthia longifolia* (sonn,) (drooping Ashoka)
ix. *Ficus bengalensis* L. (Baniyan)
x. *Ficus glomerata* L. (Ficus)
xi. *Tamarindus indica* L. (Tamarind)
xii. *Moringa aleifera* L. (Shevaga)
xiii. *Psidum guava* L. (Guava)
xiv. *Hibiscus rosasinsis* L. (Hibiscus)
xv. *Zea mays* L. (Maize)
xvi. *Ficus retusa* L. (Nandruk)
xvii. *Ficus carica* L. (Anjeer)
xviii. *Erythrina indica* L. (Pangara)
xix. *Butea monosperma* kuntza (Palas)
xx. *Samalis malaloarica* sc. (Kate savar)
xxi. *Artabotrys unicantus* meror (Green chapha)
xxii. *Tictona grandis* L. (Saag)
xxiii. *Eucalyptus glabalus* Labill. (Nilgiri)

xxiv. *Prospopis juliflora* D.C. (Vedi babhul/chilar)

xxv. *Sacchrum officenarum* (Sugarcane)

All of the above trees are used by the birds for roosting as well as for foraging as they are tall and leafy without thrones except Acacia. All types of bushes and thrushes were observed for the identification of the nest in the gardens and the Sagareshwar Sanctuary.

Note- author was found that the sharp thick right angled, pointed thrones could make injury to the legs while perching or landing such a birds were observed with distended leg or wing site. The *Prosopis juliflora* is most hazardous for birds either for night roosting or landing as such.