A gradual change of the climate of north Bihar an its impact on the reproductive biology of swamp bird

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Abstract

Reproductive cycles of all vertebrates are governed by climates and intrinsic (or endo-crine) factors. Birds life international and IUCN program has generalized research activities all over the world in gathering information an availability of resources for human welfare. Neonate shore birds whose young are atrocious found their roots in between the floating infested weeds of hydrophytes and canopy leaves of Echornia Crassipes of selected swamp (Lal Nikunj of Madhubani shows, periodic seasonal mating in particular habitat and have impact on the reproductive biology of bird.

Keywords: Endo-crine, birds, IUCN, Bihar

Introduction

In the present study followed by lucid style elustration by micro-photographs, tables and diagram furnish information for further works. The body weight cycles of selected birds run parallel to the annual gonad development cycles the gonadal development cycle is known to be of great adaptive significance as it helps the birds to meet increased energy demand for successful breeding and related activities during breeding phase.

Most of the birds are seasonal breeders that is breeds during specific period of the year and have impact on the gradual changes in their reproductive cycle due to Kleidoscopic effect of swamp habitat and regulatory mechanism of gonadal cycle and rate of laying eggs in birds varies species to species as in some bird it develops slowly while in other rapidly.

Material and methods

Present study was done during the early March "12" to end of Oct "12"

Materials

For physico-chemical studies of selection swamp.
(A) Anemometer - For wind velocity,
(B) Measuring pole (rain-gauge):- For water level
(C) Celsius thermometer - For water temperature
(D) PH meter - For PH of water.
(E) Plankton net

Methods - related to physico-chemical analysis of swamp.

To deal with the monthly and diurnal physico-chemical factors of water and availability of zooplanktons, Macro invertebrates and Lower-vertebrates inhabiting in the Swamps sampling and its impact on the reproductive behaviour of chirugus following steps were done.

A) Wind-Velocity: It effects directly on the rainfall, water level and temperature. In the present study it was found that noon and evening hours were more wind than the morning and night hours.

Wind velocity was recorded with the help of Anemometer and velocity was recorded twice [once in the forenoon and once in the afternoon.] (Table - 1)

B) Determination of water level: It was measured by fixing a measuring pole in swamp water.

C) Water temperature: Water temperature was recorded by Celsius thermometer by
immersing its bulb in the water. Three temperatures
was taken at a time and the mean of the three was
recorded.

D) **Determination of PH of water:** It was measured by the
help of a graph PH meter. The selector knob of PH
was rinsed by the distilled water so that no foreign
element can get mixed with the water to be treated.
Now the water was taken into the rinsed beaker and
electrode was immersed into the water.
The switch was turned to a proper range and the
temperature compensator knob into the temperature of
the solution was fixed. Then PH of the water was
recorded with the help of meter scale.

E) **Determination of DO:** It was determined by Winkler's
Iodometric method.

F) **Determination of Free CO₂:** It was determined by
titrating 250ml of water sample with n/44 NaoH using 2
to 3 drops of phenolphthalein indicator till permanent
pink colour was obtained.

G) **Chloride:** It was determined by Mohris method (APHA
1976).

H) **Alkalinity:** It was determined by titrating the water
sample against and acid. Solution using methyl orange
as an indicator (APHA 1976)

I) **Zooplanktons Collection:** For collection of
zooplankton net was used. Firstly fifteen litre of water
collected in a plastic bucket and then planktons were
preserved in 5% formaldehyde.

J) **Macro-Invertebrates:** To collect macro-invertebrates
from different weeds, sampling were done by hauling
method; collected fauna were kept into glass Jars and
preserved in 5% formaldehyde solution and then sorted
out species wise.

Materials for haematological (histo) studies of selected
bird

A) **Weight and measurement of Gonads:** To examine the
seasonal changes relationship study with cyclical
phenomena were done by the ocular micrometer.

B) **Preparation of slides:** Were prepared to investigate the
seasonal histological developments and differentiation
in gonads

**Result and discussion**

**Weight & Measurement of Gonads**

Seasonal changes in gonadal weight and diameter recorded in
(Table-1), shows that the size and weight of the ovary
varies and regulated by external factors. Observation shows
that changes in environmental conditions have effect on the
growth of gonads. The role of sufficient rainfall at high
temperature, during the late summer & early monsoon
apparently shows the run off enrichment of nutrients food
resulted in great changes in gonadal weight & diameter.
Data on seasonal and diurnal variation of rainfall (18.00 mm
to 430.30 mm) along with average weight and diameter (100
mg to 730 mg & 100μm to 994 μm) of ovary shows that
physical factors of swamp have effect on the growth of
gonads (Graph-1)

**Oviduct:** Seasonal effect on marpho-histological changes in
oviduct were also noticed, during the different phases of
gonadal cycle (Table-2) Morphological changes in oviduct
was clearly divided into five regions.)

A) **Infundibulum:** A funnel shaped infundibulum shows
developed folds with mucus cells during Acceleration
and Logarithmic phases.

B) **Magnum:** Thick walled magnum having tubular glands
with ciliated surface during reproductive period that is
March to July.

C) **Isthmus:** Isthmus consist of mucosal fold and columnar
epithelium during April to June.

D) **Uterus:** Uterus was found expanded for a short period
to retain the egg during July. During this month uterine
mucosal folds were longest having apical and basal
cells.

E) **Vagina:** Which is responsible for storage of sperms had
short area with columnar ciliated cells.

All these Morphological differentiation in oviduct during
different phases of gonadal cycles are tabulated (Table-2)

<table>
<thead>
<tr>
<th>Months</th>
<th>Diurnal temperature (°C)</th>
<th>Rainfall (mm)</th>
<th>Water depth (cm)</th>
<th>Water temperature (°C)</th>
<th>Ovary weight (mg)</th>
<th>Ovary diameter (μm)</th>
<th>Oviduct (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan.</td>
<td>18</td>
<td>Dormant Phase</td>
<td>70</td>
<td>15</td>
<td>160</td>
<td>170</td>
<td>85</td>
</tr>
<tr>
<td>Feb.</td>
<td>18</td>
<td>70</td>
<td>20</td>
<td>22</td>
<td>190</td>
<td>195</td>
<td>150</td>
</tr>
<tr>
<td>March</td>
<td>25</td>
<td>75</td>
<td>23</td>
<td>25</td>
<td>400</td>
<td>680</td>
<td>2505</td>
</tr>
<tr>
<td>April</td>
<td>27.2</td>
<td>90</td>
<td>23</td>
<td>25.5</td>
<td>510</td>
<td>693</td>
<td>2800</td>
</tr>
<tr>
<td>May</td>
<td>37.8</td>
<td>70</td>
<td>25.5</td>
<td>34</td>
<td>624</td>
<td>702</td>
<td>3000</td>
</tr>
<tr>
<td>June</td>
<td>43</td>
<td>80</td>
<td>29</td>
<td>34</td>
<td>690</td>
<td>725</td>
<td>3010</td>
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<tr>
<td>July</td>
<td>40</td>
<td>170</td>
<td>27</td>
<td>29</td>
<td>510</td>
<td>994</td>
<td>3500</td>
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<tr>
<td>August</td>
<td>35</td>
<td>150</td>
<td>27</td>
<td>350</td>
<td>624</td>
<td>350</td>
<td>200</td>
</tr>
<tr>
<td>Sept.</td>
<td>28</td>
<td>152</td>
<td>20</td>
<td>750</td>
<td>690</td>
<td>244</td>
<td>90</td>
</tr>
<tr>
<td>Oct.</td>
<td>26</td>
<td>155</td>
<td>730</td>
<td>225</td>
<td>750</td>
<td>300</td>
<td>75</td>
</tr>
<tr>
<td>Nov.</td>
<td>23</td>
<td>140</td>
<td>17</td>
<td>190</td>
<td>730</td>
<td>190</td>
<td>50</td>
</tr>
<tr>
<td>Dec.</td>
<td>20</td>
<td>Dormant Phase</td>
<td>135</td>
<td>17</td>
<td>100</td>
<td>110</td>
<td>60</td>
</tr>
<tr>
<td>Phase of Cycle</td>
<td>Average No. of folds of mucosa</td>
<td>Tubular glands</td>
<td>Muscularis</td>
<td></td>
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<tr>
<td>Regression</td>
<td>10-12 gradually looses regional destination marked histological collapse with cellular debris &amp; reduced height of mucosal folds.</td>
<td>Cells non-distended, lacks cilia, gland tissues become disintegrated</td>
<td>Thick walled</td>
<td></td>
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<tr>
<td>Enhancement</td>
<td>(A) Infundibulum 10-16 folds with epithelial cells.</td>
<td>NIL</td>
<td>Comparatively thin walled</td>
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<td></td>
<td>(B) Magnum 15-25 Tubular glands with numerous secondary folds &amp; ciliated epithelial cells</td>
<td>Various dense granules</td>
<td>Do</td>
<td></td>
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<td></td>
<td>(C) Isthmus 14-16 mucosal folds with columnar epithelial cells</td>
<td>Maximum number of granules</td>
<td>Thinner muscularis</td>
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<td></td>
<td>(D) Uterus 15-20 long narrow fold with maximum number of secondary folds</td>
<td>Differentiated as large Prominent gland cells containing secretary Products</td>
<td>Do</td>
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</table>
Conclusion
The present study indicates the climatic factors viz. environmental temperature, rainfall, water temperature as positive correlation of ovary in varying degrees. The rainfall showed moderate to low degree of correlation on the gonadal development.

The gonadal development coincides with increasing rainy seasons. When temperature varied between June 43°C lead to increase in water temperature changes in development and morphological differentiation of oviduct took during different phases of gonadal cycles.

References