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## **A gradual change of the climate of north Bihar and 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 hydro-phytes and canopy leaves of *Ecchornia 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

### **Introductions**

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 develop 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) Celcius 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

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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<sub>2</sub>:** It was determined by Winkler's Iodometric method.
- F) **Determination of Free CO<sub>2</sub>:** 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 tabled (Table-2)

**Table 1:** Seasonal variations in swamp physical parameter relationship with anatomical changes in gonads.

Months	Diurnal temperature (0°)	Rainfall (mm)	Water depth (cm)	Water temperature (0°)	Ovary weight (mg)	Ovary diameter (µm)	Oviduct (mg)
Jan.	18	Dormant Phase	70	15	160	170	85
Feb.	20	18	70	20	Dormant	195	150
March	25	19.3	75	22	190	680	2505
April	27.2	35.25	90	23	400	693	2800
May	37.8	42	70	25.5	Acceleration	702	3000
June	43	45	80	34	510	725	3010
July	40	430.3	170	29	624	994	3500
August	35	225.25	150	27	Logrithmic	350	200
Sept.	28	150	152	20	690	244	90
Oct.	26	27.05	155	21	Phase	300	75
Nov.	23		140	18	750	190	50
					730		
					Lag		
					300		
					Phase		
					205		
					225	100	60
Dec.	20	Dormant Phase	135	17	Dormant		
					110		
					Phase		
					100		



### 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<sup>0</sup>C lead to increase in water temperature changes in development and morphological differentiation of oviduct took during different phases of gonadal cycles.

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