

Cyclic Changes In the Activity of Interrenal Tissue and Gonadal Cycle in Fresh Water Fish *Channa Punctatus* (Bloch)

¹ Ranjana Kumari Singh, ² Dr. Vijay Kumar

¹² Department of Zoology

¹² Z.A Islamia Collage Siwan Bihar

Abstract: Marked seasonal variations were observed in the mean nuclear diameter (M.N.D) of interrenal tissues in different months of the year. There is a gradual increase in ovary size from Dec (0.289 Gm) to the maximum value in June (4.55Gm) in spawning season followed by gradual decline to reach the minimum value in Dec/Jan again. The MND of that period also show variation from minimum (3.26- 3.31 μm) in Dec/ Jan to maximum (4.31 \pm 0.302) μm in June.

Keywords - *Channa punctatus*, interrenal, MND, Ovary.

I. INTRODUCTION

Munshi et.al; (1979) studied cyclic activity of adrenocortical tissues (a term used after Chavin; 1966) and its relation with gonadal cycle in an air breathing fish heteropneustes fossilis (Bloch). Present article deals with cyclic gonadal activity of *channa punctatus*. There are various factors believed to be related to seasonal variations in ovary size, thyroid activity and gonadal steroids have received considerable attention. Present communication is a report on the work undertaken to find out the nature and degree of correlation between the activity of interrenal tissue and ovary size of *Channa punctatus*.

II. MATERIAL AND METHODS

Live specimens of *Channa punctatus* (Bloch) were procured from local fish market at Siwan Bihar and kept in glass aquarium (60L) in the laboratory for seven days for proper acclimatization. Specimens were fed daily with pieces of goat lever laboratory maintained specimens (weight, 45 \pm 1.5).

Fishes were collected every month and size of ovary of 6 specimens were determined. The head kidney of fishes were obtained for fixation and making serial sections of material of (6 μm) thick stained with hematoxylin and eosin. The mean nuclear diameter (MND) of 30 cells of interrenal tissues was determined every month with the help of calibrated ocular micrometer. Ovary weight of fishes were recorded 3-10 hrs. following treatment. Statistical significance of difference determined by application of student T-test at the level of 5%.

III. RESULT

Marked seasonal variations can be seen in the interrenal tissue of *Channa punctatus* during the different month of the year. In the month of December interrenal cells showed its minimum activity. The MND was observed lowest (3.28 \pm 0.141 μm). At the same time the size of ovary was lowest as (0.289 \pm 0.108 gm). In the spawning season, MND of interrenal tissue reaches highest (June: 4.82 \pm 0.157 μm). Whereas size of ovary recorded highest at 4.559 \pm 0.105 gm)

Table

N=36per each group

\pm = S.E.M, S*= Significant at P<0.05

Body Weight = 45.0 \pm 1.5 gm

MONTH	MND (μm)	Avg. Ovary Weight (Gm)
October-2007	4.37 \pm 0.234	1.142 \pm 0.413
November	3.66 \pm 0.291	0.764 \pm 0.204
December	3.28 \pm 0.141	0.289 \pm 0.108
January	3.45 \pm 0.279	0.293 \pm 0.093
February	4.07 \pm 0.279	0.305 \pm 0.142
March	4.35 \pm 0.104	0.388 \pm 0.215
April	4.54 \pm 0.316	0.624 \pm 0.351
May	4.66 \pm 0.202	1.998 \pm 0.510
June	4.82 \pm 0.157	4.559 \pm 0.104
July	4.76 \pm 0.126	3.663 \pm 0.313
August	4.59 \pm 0.309	3.532 \pm 0.392
September	4.37 \pm 0.117	3.201 \pm 0.308

IV. DISCUSSION

Though the physiological role of adrenocortical tissue during period of sexual maturation and spawning is not clearly understood but hyper and hypoactivity of this gland correspond well with breeding and non-breeding phase of *Channa punctatus*. The physiological changes that takes place during sexual maturation on pacific salmon include hyperplasia of interrenal tissues (Robertson & Wexler, 1959; Mc Bride and Overbeek, 1969). Ball (1960) observed the interrenal cells to be active during the reproductive phase of Teleost. In *Channa Punctatus* maximum and minimum Ovary weight recorder in June and December (Refer Table) respectively coincide with maximum and minimum MND of interrenal tissue. Therefore the activity of interrenal tissue seems to be closely associated with the gonadal activity.

V. CONCLUSION

The activity of Interrenal tissues showed almost parallelism with the cyclic changes in ambient water temperature, day length and gonadal cycle. The Hyper and hypoactivity of interrenal cells may probably be associated with higher and lower rate of corticosteroid production in breeding and non-breeding period respectively. Higher rate of corticosteroid production in fishes at sexual maturity have been reported by Idler et.al. , (1959), Robertson et.al. (1961) and Donaldson and Fagerlund (1968)

REFERENCES

1. Banerjee, T.K (1973): A comparative histological investigation on the interrenal gland of some Indian teleosts. *Anz.*133:2032.
2. Banerjee T.K and A Ghosh 1972: The action of reserpine on the head kidney Chromaffin cells of some teleost cytochemical Study. *Mikroskopie*, Bd, 28:1-6.
3. Chanchal, A.K; K. Prasad (1978): Studies on gonadal activities of fresh water fish. *A. testudineus*. Ph.D. thesis of Magadh University, Bodh Gaya
4. Chatterjee, C.C (1973): Human physiology, Vol.2, 8th edi. New central Book. Agency, Kolkata India.
5. Chavin, W., (1966): Adrenal histochemistry of some fresh water and Marine teleost Gen. *Comp.Endocrinol.* 6:183-194
6. Donaldson, E.M. and Fagerlund, U.H.M (1968): Changes resulting from sexual maturation, in half time ($T_{1/2}$) and volume of distribution of radioactivity after injection of C^{14} cortisol (F) into salmon. *Proc. 3rd intern. Congr. Endocrinol.*, Mexico city, 1968: *Excerpta Med. Intern. Congr.ser.* No 157, pp.139.
7. Fagerlund, U.H.M (1976). Plasma cortisol concentration in relation to stress in adult sockeye salmon during the fresh water stage of their life cycle. *Gen. comp Endocrinol.* 8. 197-207.
8. Hoar, W.S. (1958): Effect of synthetic thyroxine and gonadal steroid on the metabolism of gold fish. *Can. J.Zool* 36:113-2121.
9. Mc Bride, J.R and Van Overbeek A.P. (1969). Hypertrophy of the interrenal tissue in sexually maturing sockeye salmon (*Oncorhynchus nerka*) and the effect of gonadectomy. *J.Fish .Res.Bd.can.* 26, 2975-2985
10. Munshi, J.S.D., B.J Choubey P.K Pandey and B.N Pandey (1977). Studies on cyclic activities of adrenocortical tissues and its relation with gonadal cycle in an air breathing fish, *Heteropneustes fossilis* (Bloch) *Zool. Beitrage.* 24:437-446.
11. Pandey, B.N.; P.K. A.K. Chanchal and S.B Singh (1978): Effect of hormones and Pharmacological drugs on the blood of *A. testudineus*. *Folia. Haematol* 105; 665-671.
12. Raza Bushra; Luxmi sah and G Lakra (2000). Effect of adrenaline in the cortisol secretion in air breathing teleost *Clarias batrachus*. *Proc. Nat conf on Endocrinology. Held at Ranchi Abst. No 35. pp .35.*
13. Singh Ranjana Kumari and Vijay Kumar.2008 b Cyclic variations in the activity of adrenocortical tissues and oxygen consumption in the fresh water fish *Channa punctatus* (Bloch). *Ibid.* 7(2).
14. Singh B.R., R.N. Thakur and B.N. Yadav (1974): The inter relationship between the changes in the interrenal , gonadal and thyroid tissue of the air breathing fish *H.fossilis* B.L. at different periods of the breathing cycle. *J.Endocr.* 61 309-316