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STUDY OF SOME REPRODUCTIVE ACTIVITIES IN *CLARIAS BATRACHUS* (LINN.)

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Abstract—Reproductive activity of a Indian cat fish; *Clarias batrachus* has been studied from the ponds located in the district of lakes, (Bhandara).

Progressive maturational changes except those depending on meiotic division occur after three months.

The spermiogenesis in male is completed at the end of three months and shows sexual readyness only of adult stage. Similarly in females although the oocytes continue to enlarge and mature ova are formed in the adult condition.

There is considerable relationship between temperature and composition of nutrient materials in the tissues of gonads and accessory reproductive organs. In the present study, Glucose, Protein, Cholesterol and Urea contents in the tissues of gonads and accessory reproductive organs increase in cold environment and decreases at higher temperatures.

INTRODUCTION

Very less information is available on temperature parameter in fishes except *Tilapia moussambica* (Allanson and Noble, 1964; Ananthakrishnan and Kuty, 1979). Each species has maximum and minimum limits of tolerance. On temperature beyond the favourable range, retardation of Physiological activities of reproduction occurs. When temperature exceeds, the optimum range, the metabolic rate increase according to' Vant Hoffs rule', The rates of chemical reaction is doubled every 10°C. Temperature tolerance as an experimental criteria for demonstration of physiological changes, has many uses and has been reported in various ways throughout the literature, (Nagabhushnam and Sarojini 1969). Thermal tolerance is best studied in the fishes amongst all the Poikilotherms (Brett, 1956, Fry, 1970), and data on the animals are Scanty.

The lethal temperatures are determined in different ways (Precht, *et al.*, 1973). Experiments in which the animals were maintained at constant temperature for a period of time, provided a more accurate determination of lethal temperature. In biological terms, reproduction is one of the most important functions to where the many other functions of the body are related. Temperature appears to be the major exgenous factor regulating gonadal cycles of animals, but little is known about the actual role of temperature in reproductive cycle. The present study on cat fish, *Clarias batrachus* is an attempt to fill the gap, in important aspect of physiology of reproduction of fishes.

MATERIAL AND METHODS

The sample of *Clarias batrachus* were collected from the ponds and total length, body weight, Stage of maturation were recorded and transported to laboratory aquarium and acclimatised to laboratory condition (APHA, AWWA, WPCF, 1975). Fishes were fed by boiled egg. dried prawns, earth worm and goat liver.

Minimum lethal temperature was determined by cooling, water in an aquria, achieved by submerging ice pockets in water with constant stirring, until all the fishes died. Experiment conducted in midwinter and in midsummer (Dec. and Apr.)

Maximum lethal temperature was determined by gradually heating the water in theramostatically controlled waterbath, until fishes died. Temperature were raised at the rate of 1° to 2°C/hour. Experiment swers conducted in winter and summer.

Experiment were conducted to asses the time course of resistance adoption. Fishes were maintained at cold and warm temperature for 8 days and fish was considered dead when response to strong mechanical stimulations, ceased.

Gonads were examined under fine research microscope by using local stains. Temperature was

recorded by using Jumo-DBI' thermoneter.

Glueose was estimated by "O" Toluidine method, described by Varley (1980). Total proteins was estimated by Biuret method described by Dumas, (1978). Free cholesterol was estimated by the method of Wybenga and Pilleggi (1979), Clin, Chem, 16,980 Urea estimation was done by Diacetyl-monoxime method described by coulame, G.G. and Favrean, L.A. (1955), Clin Chem 11, 624.

For the present estimations average of six fishes was considered in each, biochemical test in each temperature condition. All the values in biochemical estimations were expressed in mg/g wet wt.

OBSERVATIONS AND RESULTS

For temperature tolerance experiments were conducted for the determination of minimal and maximal temperatures. Normal fish at laboratory temperature showed no mortality up to 34°C and mortality sets in at 39°C and there was 100% mortality. At lower temperature mortality was noted up to 13.5°C, and at 7°C the mortality was 100%.

On warm acclimation the lethal temperature increases and showed it is 41°C and no survival at 41.5°C. On cold acclamation the lethal range was not changed and showed it is 7°C. The thermal tolerance was studied on normal fish 27.0°C to 29.5°C and the tolerance limit was 37°C, on cold acclimation this was decreased to 34°C, on warm acclimation thermal resistance increased up to 38°C. For lower temperature normal fishes (27°-29°C) should tolerate 10°C. On cold acclimation could sustain up to 5°C, showed increased cold resistance, but in warm acclimation it could sustain up to 11.5°C, showed decreased cold resistance.

Gonads

Two days old fish . Primary cells were scattered in the Gonadal tissue in a single layer (Table 1).

30 days old fish : Secondary spermatogonium distinguished by smaller size and larger nuciei. overy contains primary cells and larger secondary cells (Table 1).

60 days old fish : Formation of spermatids with reduced cytoplasm and small nuclei (Table 1).

90 days old fish : Rapid division and secondary gonia are 3 times more in number. Primary spermatocytes were reduced to less than half of preceeding stage. Spermiogenesis is first time observed in this stage (Table 1) Secondary oocytes were prominant

180 days old fish : Testis showed maturation evidenced by reduction in secondary spermatocytes and increase in spematiods and Sperms (Table 1). In overy Primary oogonia and oocytes were numerically more but some reduction in % values than preceding stage (Table 1).

Adult fish : Testis become mature organ, great depletion of spermatogonia was seen Although the

Table 1. Number of Germinal Cells From Birth To Matutity in *C. batrachus* (In Normal Environment)

		Age (Days)						
[Germinal cells numbers]		2	15	30	60	90	180	Adult
Primary cells	Male	5	18	12	7	15	8	5
	Female	-	-	17	8	26	51	20
Secondart cells	Male	-	-	24	12	59	45	8
	Female	-	-	8	17	23	60	22
Primary spermatiocyers	Male	-	-	15	41	49	56	98
Primary oocytes	Female	-	-	-	6	30	59	87
Secondary spermarocytes	Male	-	-	-	51	99	89	128
Secondary oocytes	Female	-	-	-	19	52	180	121
Spermatids	Male	-	-	-	15	49	97	163
Maruring oocytes	Female	-	-	-	-	-	-	21
Spermarozoa	Male	-	-	-	-	107	188	421
Maturing ova	Female	-	-	-	-	-	-	25

Table shows aveage values of six animals.