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A STUDY OF CYCLIC CHANGES IN THE OVARY AND ITS CO-RELATION WITH PITUITARY GLAND IN *CHANNA GACHUA*.

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ABSTRACT
This paper presents cyclic changes in ovary of *Channa gachua*, Studied Histologically, through different stages, along with co-relative changes in cells of pituitary gland. Knowledge of the gonadal cycles and their functional mechanisms in fishes is of importance in the successful management of the fisheries. The present study was therefore carried out to provide information on the cyclic changes in the activity of ovary of an important food fish *Channa gachua*. Similarly cyclic changes in gonads were co-related with changes in cells of pituitary gland with reference to :- 1) Preparatory phase. 2) Pre – spawning phase. 3) Spawning phase . 4) Post – spawning phase.
Histological changes in the ovary of *Ophiocephalus punctatus* have been recorded by Belsare[1] and in *Channa gachua* Khanna and Sanwal. Similarly cyclic changes in pituitary gland are reported in *Mystus seenghala* by Prasada Rao and by Sahai in *Puntius ticto*.

KEYWORDS: Atresia, Breeding, Ovary, Pituitary, Spawning.

INTRODUCTION

Fishery resources of India are diversified in nature. Indian river contributes a vital role in fishery development and occupy significant position in socio-economic fabrics as a natural source of nutritious food, income and employment opportunities. Presently aquatic ecosystem of India is under considerable stress resulting in depletion of fish population. Proper programmes must be undertaken to increase fish population and reproductive ability of fish. To complete the task knowledge of fish reproductive biology and an understanding of endocrine mechanism related to breeding is essential. Hence during presence study cyclic changes in the ovary and pituitary gland is studied alongwith co-relation in between them.

MATERIALS AND METHODS

Channa gachua were collected from Khultabad Lake 25km away from Aurangabad. Fishes were dissected gonads and pituitary gland removed for cellular study. These tissues were fixed in Bouins fluid. The section were taken at 6µ thickness and pituitary gland was stained in Mallorys triple stain and gonads in Harris Alum Haemotoxylin and eosin.

RESULTS AND DISCUSSION

The Pituitary gland : During present study it was observed that the pituitary gland of *C. gachua*is of Platy basic type lies closely attach to the floor of in funtibulum without a definite stalk (Plate 8). Similar observations were recorded by PrasadaRao (1969) in *N nandus, M armatus and M pancalus.* Pituitary shows a clear distinction into adenohypophysis and neurohypophysis. Adenohypophysis is further divided into rostral parsdistalis (RPD), proximal pars distalis (PPD) and pars intermedia (PI).RPD, PPD are arranged in linear fashion (Plate No-8). Similar observation were recorded in *N notopterus, O bacaila, R daniconous, N botia, clarias batrachus*(Rao 1969).

In RPD during present study two cell types were observed acidophils act as somatotrops and basophils as gonadotrops. Similar observations were recorded in *Tilapia mosambia* by Leatherland*et.al* (1974). In PPD gonadotrops (basophils) are usually located but sometimes migrate to RPD at sexual maturity. Similar observations are recorded in *eel* by olivereau (1967). In *C gachua* basophils are mainly observed in ventral area of PPD. Similar observations are recorded by Sage and Bromage (1970). The neurohypophysis is spread over the dorsal surface ofadenohypophysis and maximum ramification is observed in pars intermedia (Plate no. 8). Pars intermedia in *C gachua* do not show the presence of basophils.

Ovary : Ovary mature through different stages like chromatin nucleolar stage in which the chromatin granules are observed in the oocyte, perinucleolar stage were the nucleoli are located around the periphery of the nucleus, yolk vesicles stage in which vesicles appear more towards the periphery of the oocyte and yolk globule stage in which oocyte is impregnated with yolk globules.

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During present study cyclic changes in ovary were co-related with cyclic changes in cells of pituitary gland with reference to :-

Preparatory Phase : In *Channa* preparatory phase extends from December to February. The ovaries are small thin translucent white in colour. Histologically an ovary show ovigerous lamellae with ooctyes in different stages of oogenesis like chromatin nucleolar stage in which the nucleus of each oogonium contains single nucleolus containing reticulated chromatin granules, (Plate No-1) perinucleolus stage in which the nucleus increases in size and nucleoli locate around the periphery of the nucleus and few yolk vesicles stages in which yolk vesicles are more towards the periphery of the oocyte (Plate No.2). During this phase the regranulation of basophils is accelerated with growth of oocytes.(Plate No-9).

Pre-spawning phase : In *Channa gachua* it extends from March to May. The ovary enlarges and attends maximum weight. Large number of ova are visualized to naked eyes through thin ovarian wall, the ovary is highly vascularized. The ovum shows two distinct layers outer theca and inner follicular layer (Plate No-6). The yolk stages like primary yolk globule, (Plate No-3) secondary yolk globule stags and tertiary yolk globule stages (Plate No-4) are seen. During primary yolk globule stage the yolk globule appears at periphery in the oocyte. During secondary yolk globule stage globules increase in size and number, the cytoplasm is impregnated with yolk globules. During tertiary yolk globule stage the cytoplasm is completely filled with the yolk globules of different sizes, the nucleus disintegrated and remains as a small mass. The basophils of PPD show plenty of granules in the cytoplasm (Plate-10).

Spawning phase : In *C.gaucha* it extend from June to August. During this phase the ovaries get enlarge with full of ripe ova, the ovarian walls becomes thin and transparent and the ova can be extruded by applying a gentle pressure on the abdomen. During spawing phase histologically the ovary shows maximum ripe ova. (Plate 5) and few atretic oocytes (Plate-7). The basophils show beginning of degranulation (Plate-11).

Post-spawning phase : In *C. gaucha* it is observed from September to November The ovaries becomes flaccid, shrinked and empty sacs, vascular supply is reduced. Histologically the ovary shows some unspawned ova, small immature ova and few atretic oocytes (Plate-7). Degranulation of basophils continues due to discharge of hormone in blood stream, few vacuolized basophils are also observed during this period (Plate -12). A typical teleostean, pattern spawning have been observed in *C.gachua* similar to *Ophicephalus punctat*. During present study it was observed in *C.gachua* the cycle is completed in a year as only one peak period of spawing is observed from June to August similar observations are recorded by Khanna and Sanwal in *Channa gachua*.

The gonadal cycle during present study is divided into four stages as preparatory, pre-spawning, spawning and post-spawning which is in support to earlier reports of in *Heteropneustus fossilis*. In *C.gachua* atresia have been observed in maturing and mature ova. Similar observations were recorded earlier in *Barbus luteus*.

Beach reported that the growth of ovarian follicles in *C.auratus*is related to changes in basophilic cells, similar observations are recorded during present study and hence supports above findings. Razida co-related the degranulation and granulation of basophils with reproductive behavior in *Rasbora daniconius*, similar observations were recorded in *C. gachua*. The increase in both number and size of basophilic cells indicates that the secretions of these cells are responsible for gonad development, as also reported for *Channa striatus* by Karmakar and Sircar (1983).

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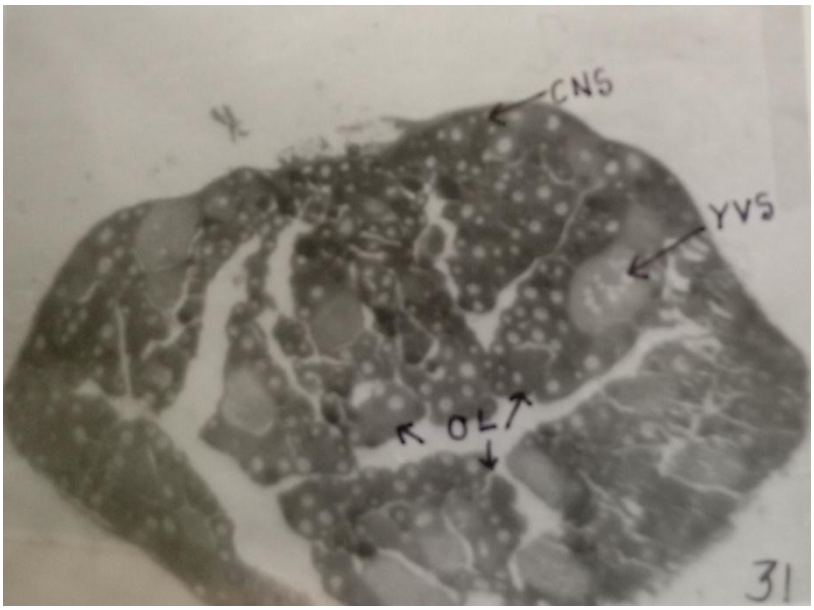

Plate No-1
T.S. of ovary (10 X) of *C gachua*showing CNS-Chromatin nucleolar stage, YVS-Yolk vesicle stage, OL-Ovigerous lamellae.

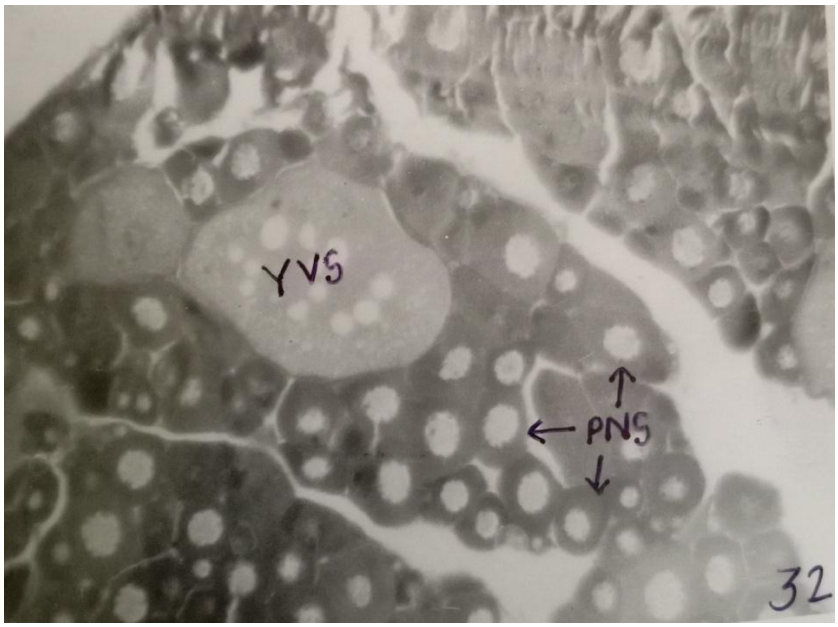

Plate No-2
T.S. of ovary (10 X) of *C gachua*showing PNS-Perinucleolar stage, YVS-Yolk vesicle stage.

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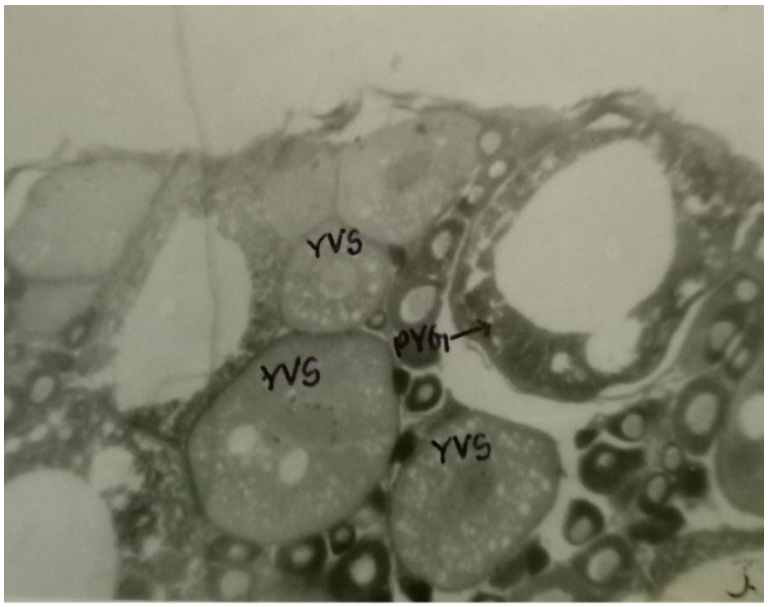

Plate No-3
T.S. of ovary (20 X) of *C gachua*showing YVS-Yolk Vesicle stage, PYG-Primary Yolk globule statge.

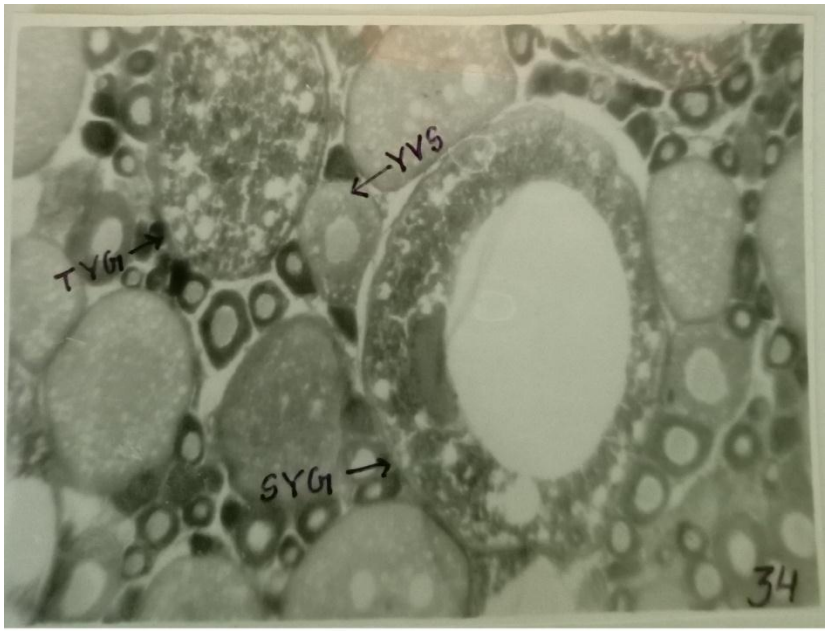

Plate No-4
T.S. of ovary (40 X) of *C gachua*showing SYG-Secondary Yolk globule statge, TYG-Tertiary yolk globule stage, YVS- Yolk vesicle stage

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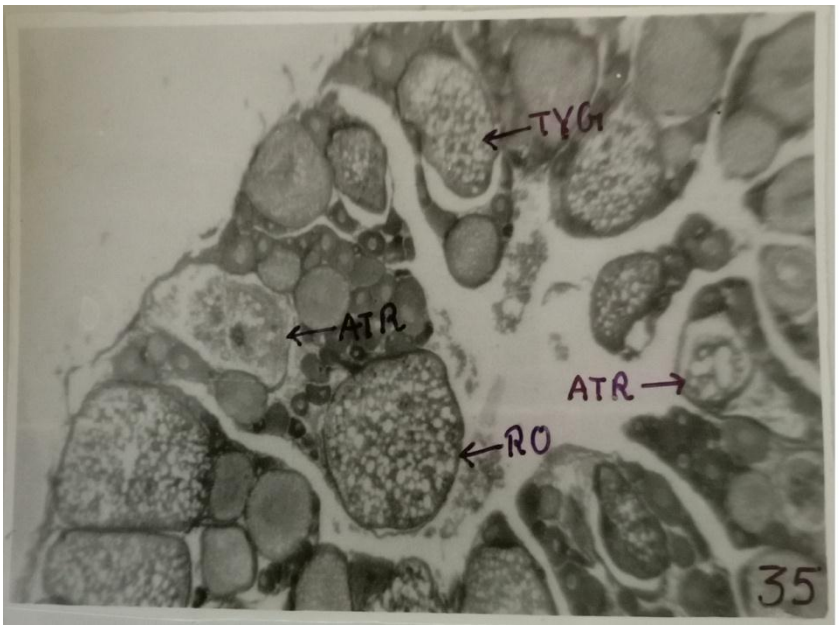

Plate No-5
T.S. of ovary (10X) of *C gachua*showing ATR-Atresia, TYG-Tertiary yolk globule stage, RO-Ripe Ovum

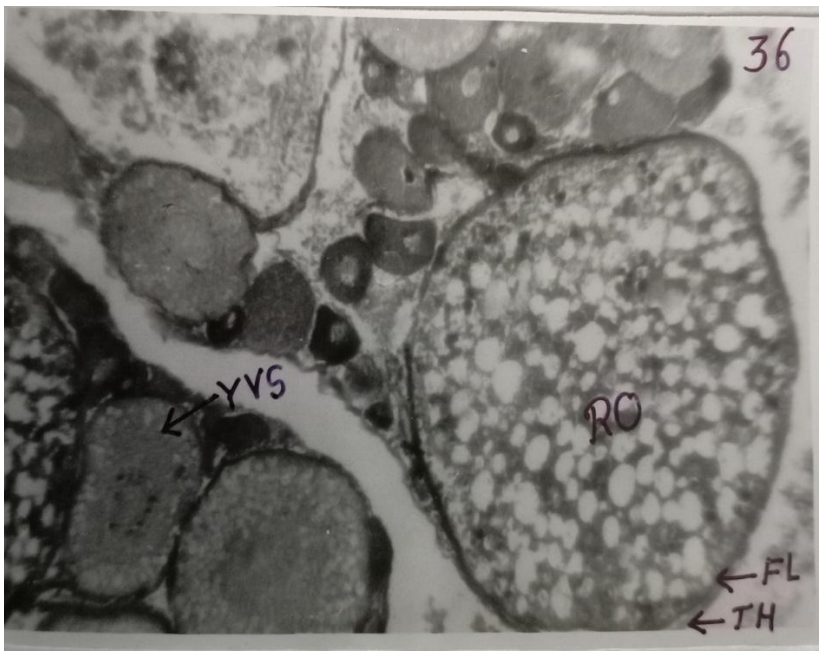

Plate No-6
T.S. of ovary (10X) of *C gachua*showing RO-Ripe Ovum, YVS-Yolk vesicle stage, TH-Theca, FL-Follicular layer

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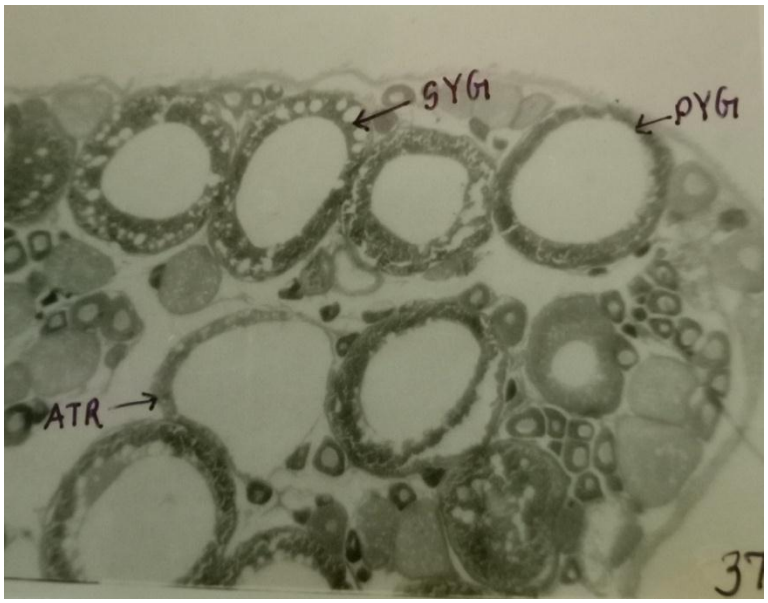

Plate No-7
T.S. of ovary (40X) of *C gachua*showing PYG-Primary yolk globule, SYG-Secondary yolk globule, ATR-Atresia

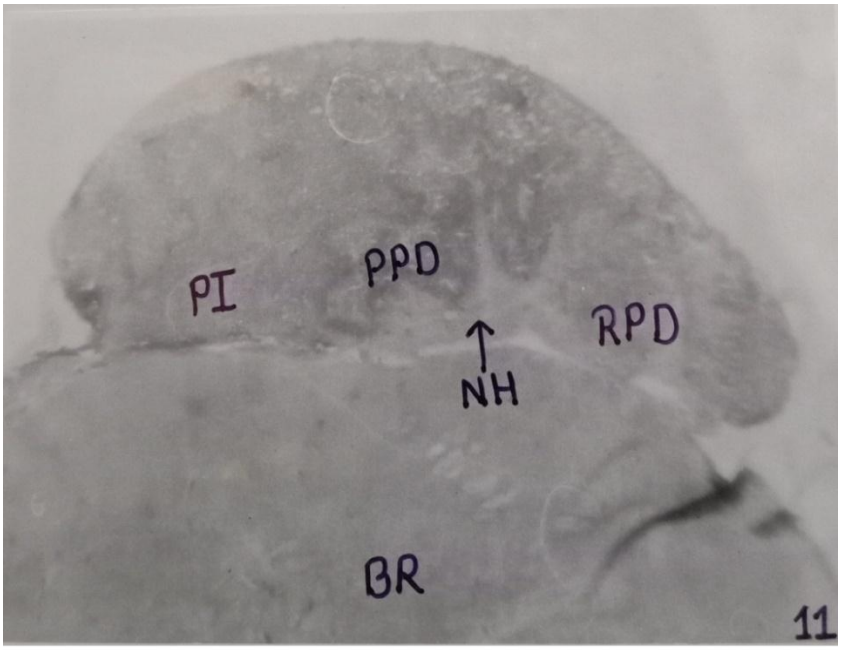

Plate No-8
T.S. of Pituitary gland (10 X) of *C gachua*showing RPD- Rostral pars distalis, PPD-proximal pars distalis, PI-pars intermedia, NH-Nerohypophysis

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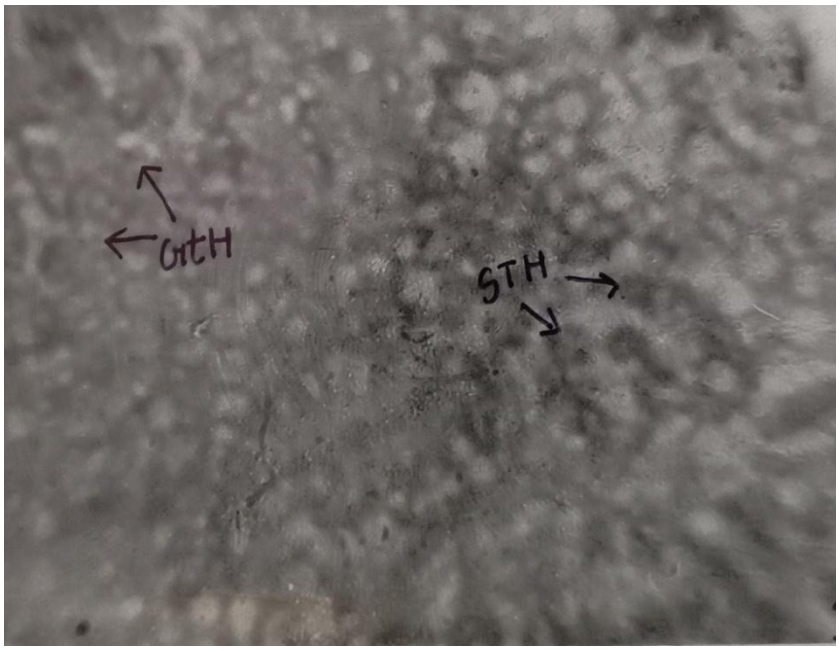

Plate No-09
T.S. of Pituitary gland (100 X) of *C gachua*with proximal pars distalis
GtH-Regranulatinggonadotrops, STH –Somatotrops

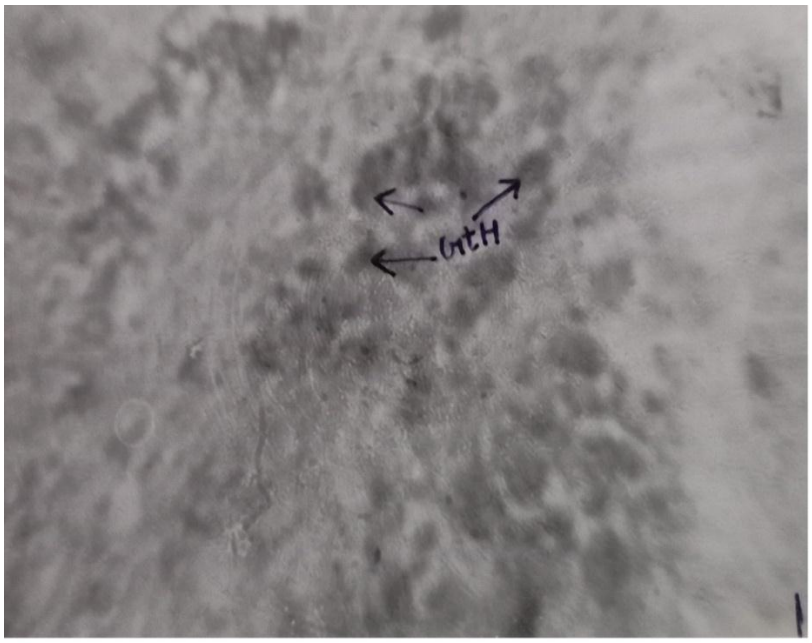

Plate No-10
T.S. of Pituitary gland (100 X) of *C gachua*with proximal pars distalis
GtH-Gonadotrops

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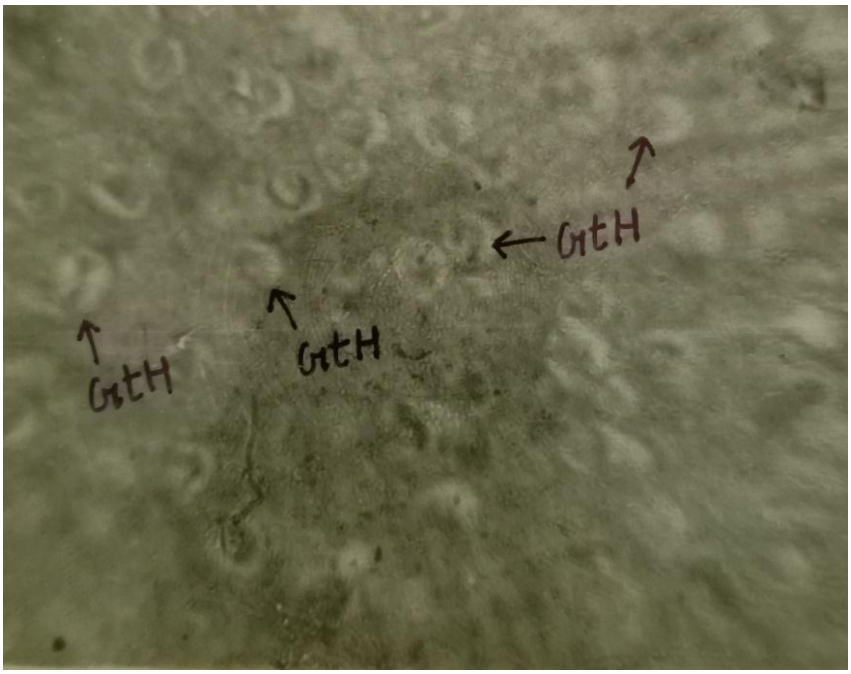

Plate No-11
T.S. of Pituitary gland (100 X) of *C gachua*with proximal pars distalis
GtH-Degranulated Gonadotrops

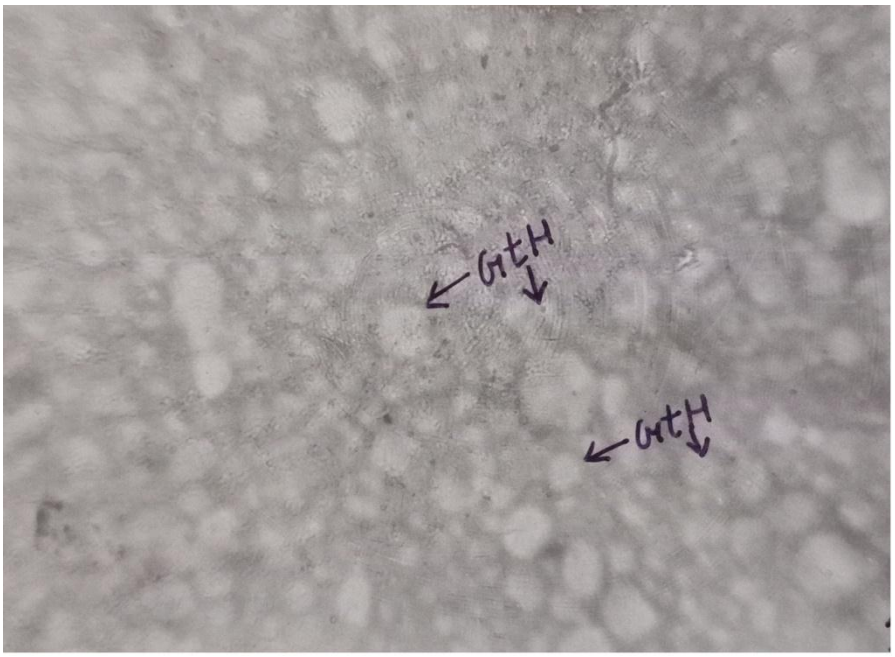

Plate No-12
T.S. of Pituitary gland (100 X) of *C gachua*with proximal pars distalis
GtH-VacuolizedGonadotrops

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