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Variation of oocytes diameter and histological changes in gonads of freshwater bivalve *corbicula striatella* duringpre and post monsoon season in Marathwada (M.S. India)

Bhosale PA

Assist. Professor in Zoology, Sundarrao More College Poladpur, Dist Raigad.(M.S.) India-402301

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ABSTRACT

Many species of bivalve molluscs abundantly found in Indian waters can sustain regularly & very productive Fisheries in India. Particularly in Maharashtra state. Indiocious *Corbicula Striatella* the gonads commonly occur among the intestinal loops in the base of the foot. Several environmental factors such as temperature, lunar periodicity, depth, mechanical factor light intensity, genetic & hormonal control. Thematuration of gonads is also dependent on the richness of food supply which dependson climate. Generally, the reproductive cycle of bivalve mollouscan population includes activation, growth and gametogenesis.
The gonad tissue was removed and processed for preparation of paraffin blocks. Dehydration of gonad was done through serial grades of ethyl alcohol while xylene was replaced by toluene during the process. The tissues were embedded in paraffin was at 580C. The sections of gonad were cut out 6 – 7 µm thickness. The histological sections of the gonad throughout the study revealed that gonad consists of numerous follicles innervated by the connective tissue and muscles. The amount of connective tissue present was found to depend upon the state of maturity of the gonads.

Keywords: *Corbicula Striatella,* Gonads, Histology, Monsoon season.

INTRODUCTION

Many species of bivalve molluscs abundantly found in Indian waters can sustain regular &very productive Fisheries in India. Particularly in Maharashtra state. Several species of commercial, important and edible bivalves like clams, oysters mussels etc. are found along the coastal areas whereas other bivalve shell fishes like mussels and clams are found both inlotic and lentic freshwater bodies. (Gabbott, 1975). Both marine & freshwater bivalve shellfishes play an important role as bio-indicators to detect various environmental fluctuations. Males and females of gonochoristic bivalves possess paired gonads, located near to the digestive gland. Two gonads are so close together that the paired condition difficult to detectin diocious *Corbicula,* the gonads commonly occur among the intestinal loops in the baseof the foot. Several

environmental factors such as temperature, lunar periodicity, depth, mechanical factors light intensity, genetic & hormonal control. (Nagabhushanam and Mane, 1975). The maturation of gonads is also dependent on the richness of food supply which depends on climate. Generally, the reproductive cycle of bivalve mollouscan population includes activation, growth and gametogenesis. Reproduction is divided into three major phases' gonad development, spawning & fertilization, development & growth. These phases functioning continually in co-ordination with seasonal environmental changes.

MATERIAL AND METHODS

The adult bivalve molluscs, *Corbicula Striatella,*with specific measurement (small, medium &large) were collected from fixed location of down steam Girna dam at Chalisgaon 45 km away from Dhule. The adult animals with 62-65 mm shell length and80-82 mm shell length were freshly collected between 3.30 – 4.30 p.m. on every full moon day of during monsoon season. Immediately after bringing to the laboratory the shells of the animals were brushed and washed with freshwater in order to remove the algal biomass, mud and other waste materials. The animals were soaked carefully and flesh of animals was fixed in Bouin's fixative for 24 hrs. The gonad tissue was then removed and processed for preparation of paraffin blocks. Dehydration of gonad was done through serial grades of ethyl alcohol while xylene was replaced by toluene during the process. The tissues were embedded in paraffin was at 58^0C. The sections of gonad were cut out 6 – 7 µm thickness. The gonads were stained with Mallory's Triple stain. All the sections were observed under the research binocular microscope and wherever necessary, measurements were made before microphotography.

RESULTS AND DISCUSSION

The thousands egg layed at a time and hatching egg bivalve male-female ratio was 1:1 and hermaphrodite mode of reproduction in *Corbicula striatella*are dioceous animal. (Bayne, 1973). There representative stages of gametogenesis maturatic, spewing and recovery proliferation of small oogonic takes place during the period from June to July; both the males and females were in maturation phase. (De-zwaan and Zandee, 1972). Partially spawhing condition was seen in females in June as soon as monsoon reaches its peak the animal receives favorable environment with plenty of food material available during June to July. The active gametogenesis slowdown in July. The germ appears to derive nourishment from failed transfer directly from the digestive glands. Therefore, the rate of nutrient mobilization& transfer for the gonad one influenced by the stage of gametogenesis. (Patil and Bal, 1967).

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The histological sections of the gonad throughout the study revealed that gonad consists of numerous follicles innervated by the connective tissue and muscles upon the amount of connective tissue present was found to depend upon the state of maturity of the ground. The follicles were mostly packed with the germ cells, nutritive cells and lipid globules with the on set of gametogenesis. The oogonia and oocytes grew and vitellogenesis took place during maturation process. Follicles show presence of a few nutritive cells and lipid globules even during maturation & presence of mature gametes. At the time of fully ripe gamete formation, measurement of the follicles enlarged and the connective tissue decreased. The wall of the follicle found to be made up of an inner with thin epithelial layer and outer muscular strands. In small sized animals (46-52 mm) oocyte diameter was found increased in post monsoon season i.e. the diameter of previtellogenic oocyte was found 76.2525 ±4.185 to 84.224 ±2.4310) and in vitellogenic oocyte it was found 82.6758 ±4.235 to 85.298 ±2.2314. In medium

sized animals (62.65 mm) the diameter of oocyte was found increased in postmonsoon. The diameter of previtellogenic oocyte was found (80.5180 ±4.259 to 89.223 ±6.840) & in vitellogenic oocyte, it was found 126.428 ±5.5180 to 136.792 ±4.496).

Table 1: Measurement of growing oocytes in small size (46 – 52 mm) *Corbicula Striatella* During monsoon. (Values in µm)

Season	Previtellogenic oocytes diameter	Vitellogenic oocytes diameter
Pre monsoon	55.297 ±4.883 to 73.142±5.1830	64.783 ±4.995 to 80.450±8.236
Post monsoon	76.2425 ±4.1813 to 84.224±2.4310	82.6728 ±4.235 to 85.298±2.231

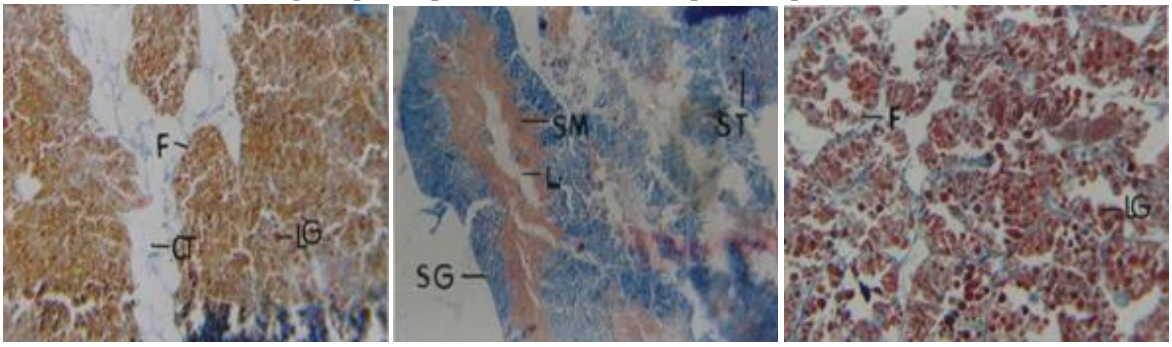
Table 2: Measurement of growing oocytes in medium size (62 – 65 mm) *Corbicula Striatella* During monsoon. (Values in µm)

Season	Previtellogenic oocytes diameter	Vitellogenic oocytes diameter
Pre monsoon	65.396 ±4.392 to 76.892±6.182	65.956 ±3.185 to 80.023±2.984
Post monsoon	80.518 ±4.259 to 89.223±6.840	126.428 ±5.518 to136.792 ±4.496

Table 3: Measurement of growing oocytes in large size *Corbicula Striatella* during Monsoon. (Values in µm)

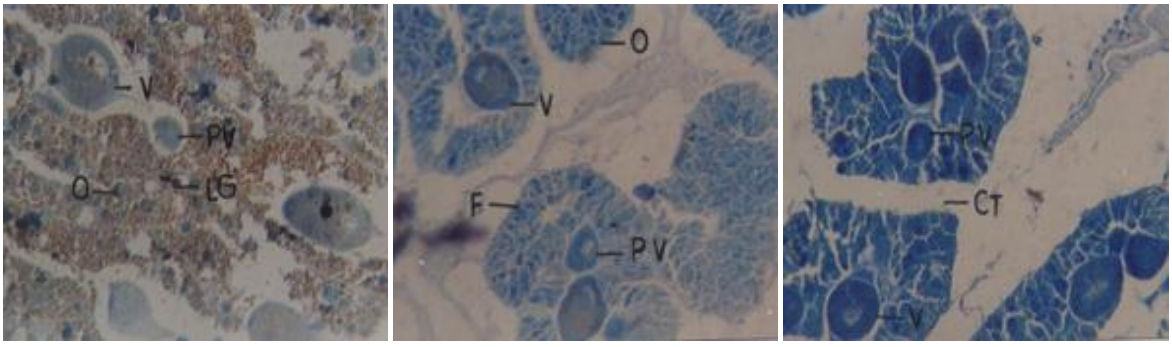
Season	Previtellogenic oocytesdiameter	Vitellogenic oocytes diameter
Pre monsoon	91.324 ±4.815 to 96.328±7.293	81.295 ±0.280 to 98.708±5.288
Post monsoon	83.183 ±2.320 to 96.243±5.985	125.189 ±6.379 to 134.184 ±2.494

Histological photo plates of variation in pre and post monsoon.



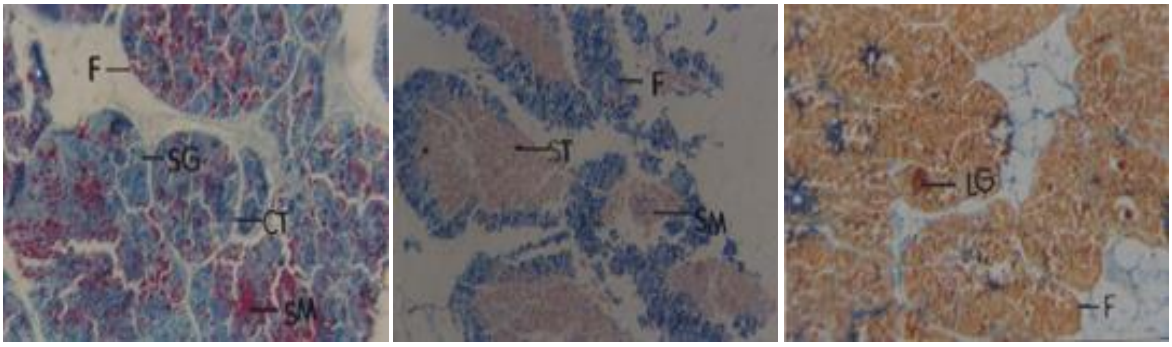
A **B** **C**

Fig. 1: Histological changes in male gonad of *Corbicula Striatella* during Premonsoon season X 200.
A = Small size; F = Follicle; SM = Sperm morule; B = Medium size; LG = Lipid globule; ST = Spermatids; C = Large Size; SG = Spermatogonia; SP = Sperms



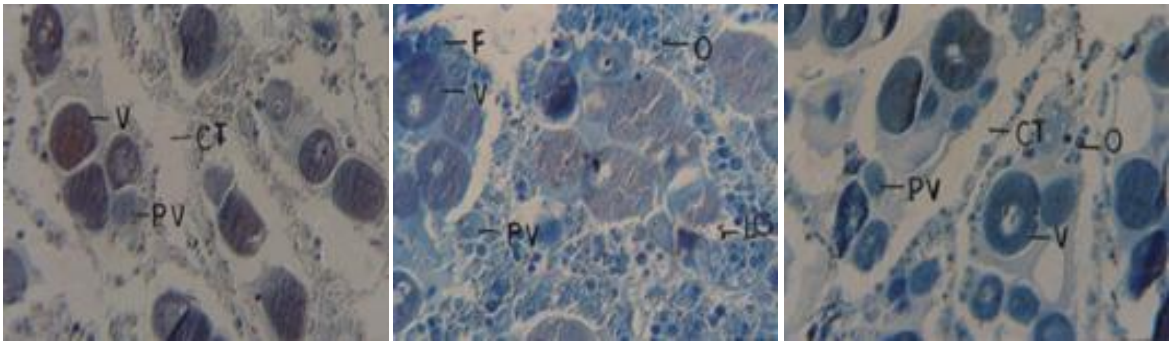
A **B** **C**

Fig. 2: Histological changes in Female gonad of *Corbicula Striatella* during pre Monsoon season X 200
A = Small size; B = Medium size; C = Large Size; F = Follicle ; O = Oogonia; Pv = Previtellogenoic oocyte; V = Vitellogenic oocyte; LG = Lipid globule



A **B** **C**

Fig. 3: Histological changes in male gonad of *Corbicula Striatella* during post Monsoon season X 200
A = Small size; B = Medium size; C = Large Size; F = Follicle; LG = Lipid globule; SG = Spermatogonia; SM = Sperm morule ; ST = Spermatids; SP = Sperms



A **B** **C**

Fig. 4: Histological changes in Female gonad of *Corbicula Striatella* during post monsoon season X 200
A = Small size; B = Medium size; C = Large Size; F = Follicle; O = Oogonia; Pv = Previtellogenoic oocyte; V = Vitellogenic oocyte; LG = Lipid globule

In Large sized animals (80 – 84 mm) the diameter of oocyte was increased in pre monsoonand post monsoon. The diameter of previtellogenic oocyte was found 91.324 ±4.815 to 96.325 ±7.293 in pre monsoon. In post monsoon it was found 83.183 ±2.320 to 96.243 ±5.985. The diameter of vitellogenic oocyte was found. (81.295 ±0.280 to 98.708 ±5.288) in pre monsoon and it was found (125.198 ±6.374 to 134.184 ±2.494 in post monsoon.

CONCLUSION

In aquatic molluscan species pre and post monsoon season are very important to the growth development and reproduction of gonadal development and histological development are good as compare to other season due to fresh water content highdemand of biological oxygen demand this very useful in tissue recover and development of the body of molluscan Species.

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