

**SIZE SPECIFIC HISTOLOGICAL VARIATION IN GONADS OF
FRESHWATER BIVALVE MOLLUSC *Lamellidens marginalis* DURING
MONSOON**

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ABSTRACT

Many species of bivalve mollusks abundantly found in Indian waters can sustain regularly & very productive Fisheries in India. Particularly in Maharashtra state. In diocious *Lamellidens marginalis* 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. 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. The gonad tissue were 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: *Lamellidens marginalis*, Gonads, Histology, Monsoon)

INTRODUCTION¹⁻⁵

Many species of bivalve mollusks 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 in lotic and lentic freshwater bodies. Both marine & freshwater bivalve shellfishes play an important role as bio-indicators to detect various environmental fluctuations.

Males and females of gonochoristic bivalve's possess paired gonads, located near to the digestive gland. Two gonads are so close together that the paired condition difficult to detect. In dioecious Lamellidens, the gonads commonly occur among the intestinal loops in the base of the foot. Several environmental factors such as temperature, lunar periodicity, depth, mechanical factors light intensity, genetic & hormonal control. 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.

MATERIALS AND METHODS

The adult bivalve molluscs, *Lamellidens marginalis* with specific size (small, medium & large) were collected from fixed location of down steam of bank of Godavari river at Kaigaon 45 km away from Aurangabad. The adult animals with 62-65 mm shell length and 80-82 mm shell length were freshly collected between 3.30 – 4.30 p.m. on every full moon days 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 were 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 58⁰C. The sections of gonad were cut out 6 – 7 μ m 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

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 onset of gametogenesis. The oogonia and oocytes grew and vitellogenesis took place during maturation process. Follicles shows presence of a few nutritive cells and lipid globules even during maturation & presence of mature gametes. At the time of fully ripe gamete formation, size 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 post monsoon. 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) *Lamellidens marginalis* during monsoon. (Values in μm)

Season	Previtellogenic oocytes diameter	Vitellogenic oocytes diameter
Pre monsoon	55.297 ± 4.883 to 73.1428 ± 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) *Lamellidens marginalis* during monsoon. (Values in μm)

Seas on	Previtellogenic oocytes diameter	Vitellogecoc oocytes diameter
Pre monsoon	65.396 \pm 4.392 to 76.892 \pm 6.182	65.956 \pm 3.185 to 80.023 \pm 2.984
Post monsoon	80.518 \pm 4.259 to 89.223 \pm 6.840	126.428 \pm 5.518 to 136.792 \pm 4.496

Table 3: Measurement of growing oocytes in large size *Lamellidens marginalis* during monsoon. (Values in μm)

Seas on	Previtellogenic oocytes diameter	Call values of diameter in μm
Pre monsoon	91.324 \pm 4.815 to 96.328 \pm 7.293	81.295 \pm 0.280 to 98.708 \pm 5.288
Post monsoon	83.183 \pm 2.320 to 96.243 \pm 5.985	125.189 \pm 6.379 to 134.184 \pm 2.494



Part – 3

Size specific histological details in male gonad of *Lamellidens marginalis* during pre monsoon season X 200

A = Small size

B = Medium size

C = Large Size

F = Follicle

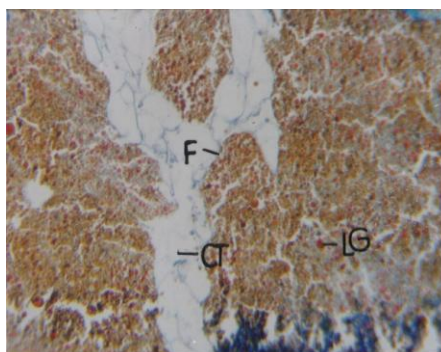
LG = Lipid globule

SG = Spermatogonia

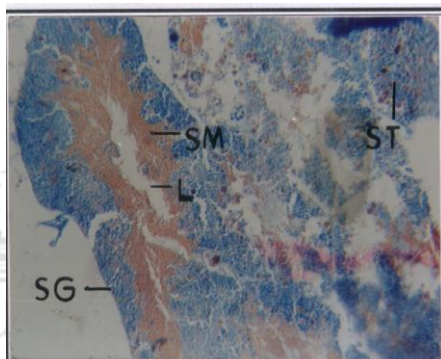
SM = Sperm morule

ST = Spermatids

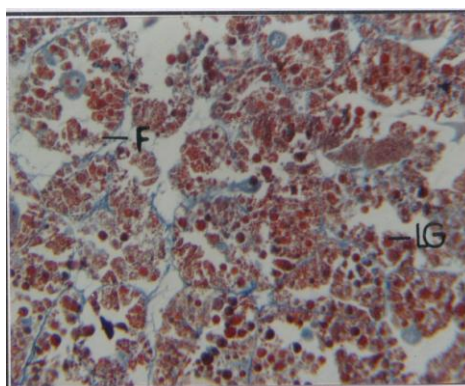
SP = Sperms



A



B

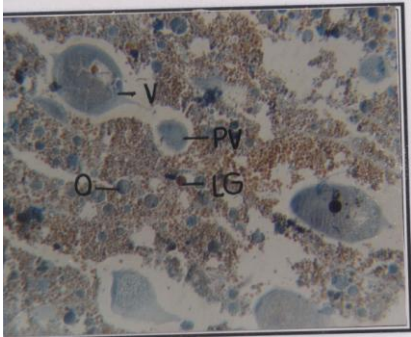


C

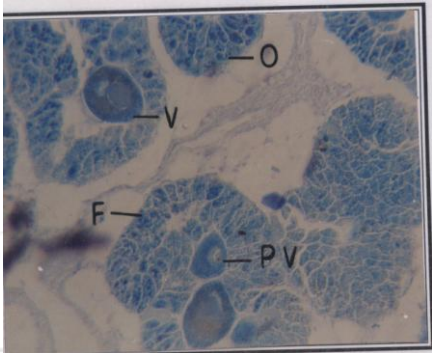
Part – 4

Size specific histological details in Female gonad of *Lamellidens marginalis* during pre monsoon season X 200

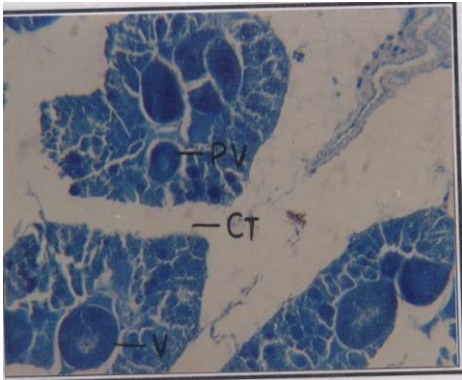
- A = Small size
- B = Medium size
- C = Large Size
- F = Follicle
- O = Oogonia
- Pv = Previtellogenic oocyte
- V = Vitellogenic oocyte
- LG= Lipid globule



A



B



C



Part – 5

Size specific histological details in male gonad of *Lamellidens marginalis* during pre monsoon season X 200

A = Small size

B = Medium size

C = Large Size

F = Follicle

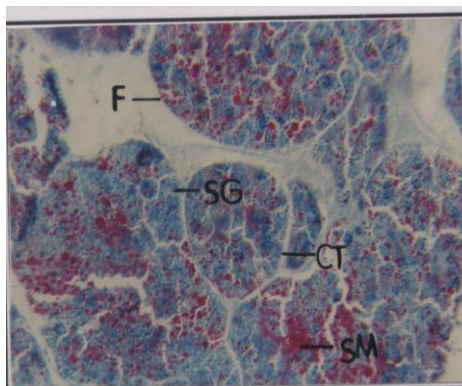
LG= Lipid globule

SG= Spermatogonia

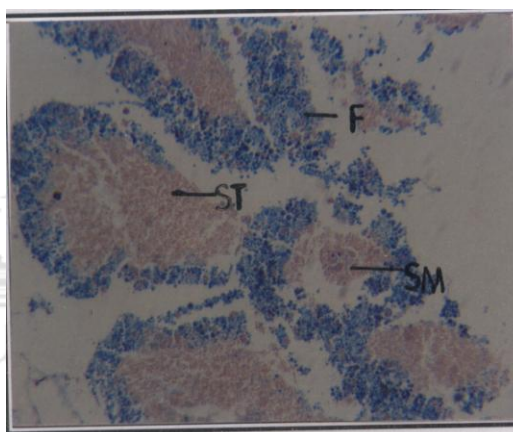
SM= Sperm morule

ST = Spermatids

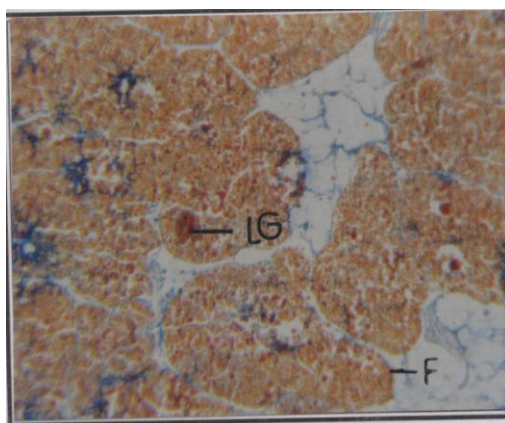
SP = Sperms



A



B



C



Part – 6

Size specific histological details in Female gonad of *Lamellidens marginalis* during pre monsoon season X 200

A = Small size

B = Medium size

C = Large Size

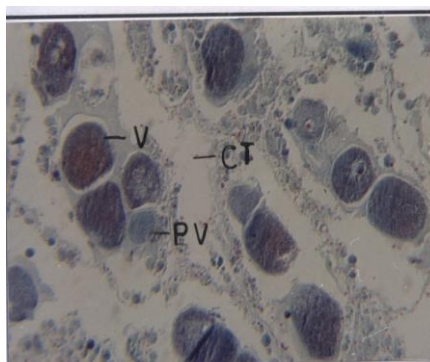
F = Follicle

O = Oogonia

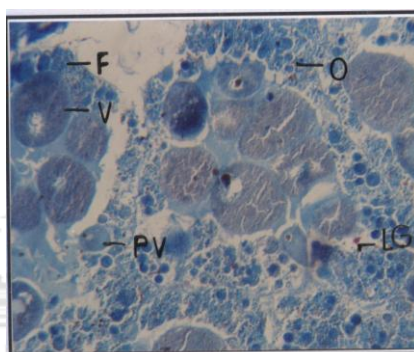
Pv = Previtellogenic oocyte

V = Vitellogenic oocyte

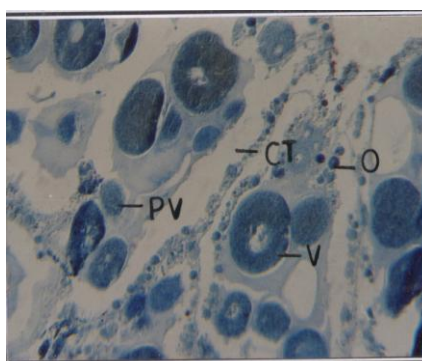
LG= Lipid globule



A



B



C

In Large sized animals (80 – 84 mm) the diameter of oocyte was increased in pre monsoon and 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 $96.243 \pm$

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.

DISCUSSION

Lamellideus marginalis is dioceous animal. The male-female ratio was 1:1 but the number of females was more in postmonsson. There representative stages cpmsosts 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. Partially spawning 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.

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