Our Heritage

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Size Specific Variations in the Ratio of Oxygen Consumption and Ammonia Excretion in Freshwater Bivalve Mollusc L. Corrianus from Pravarasangam at Nevasa During Monsoon

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Abstract

Several species of bivalves molluscs, inhabit in the India waters can sustain regular and very productive fisheries in India. The coastal area of our Maharashtra state are also widely exploited for commercially important bivalve shell fishers like oysters, mussels and clams and they are marketed owing to their high edibility value. The rate of oxygen consumption was determined by alkaline-iodide-azide method of wrinkle's modified technique. The rate of oxygen consumption of individual animal was determined in a specially prepared brown coloured respiratory jars of 500 ml capacity. The jars were fitted with rubber cork having an inlet and outlet of glass tubes connected with rubber tubes and clips.

Key words – bivalves, oxygen consumption, ammonia excretion.

INTRODUCTION -

The oysters, mussels, calms, cockeles I and abalones are the food molluscs which are produced through aquaculture, in several parts of the world. Among these commercially exploited molluscs, oysters, cockeles and scallops are found in various zones of marine waters, whereas mussels and clams inhabit the freshwater environment. Both these molluscs play an important role as Bio-indicator or Bio-detectors to various environmental fluctuations and aquatic characteristics changes due to natural and man made calamities.

Several species of bivalves molluscs, inhabit in the India waters can sustain regular and very productive fisheries in India. The coastal area of our Maharashtra state are also widely exploited for commercially important bivalve shell fishers like oysters, mussels and clams and they are marketed owing to their high edibility value.

On the other hand mussels from the freshwater area comparatively less exploited in the state., but the flesh of the species is considered as a food for the local people due to the state, but the flesh of the species is considered as a food for the local people due to the protein value and cheap food

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resource. The flesh of the mussels also widely used as a bitin fishing operations. By removing the organic material, bivalves can significantly reduced turbidity and total Biological Oxygen Demand (BOD) of habitat. Bivalves serve as ecologically important sink especially for calcium, phosphate and nitrates (Ca, P and N). juvenile bivalves serve as major food resource for many fishes, birds and mammals hence they become a important component of lower level of food chain in aquatic ecosystem. Freshwater bivalve molluscs are filter-feeders or collector filters capable of collecting and filtering huge volume of water and able to detoxifying hazardous substances in some aquatic system. They are potentially major consumers of phytoplankton maintained productivity. Apart from these from shells of bivalve molluscs are used for preparation of toys, ornamentation, utility-articles, and in paint and cement industries. They are used for pearl-formation.

***L.*Corrianus** are abundantly found in the Godavari river at Pravarasangam (Newasa) in Variable sizes. In the view to popularize the research work on this species and to bring to the notive of those concerned in the cultural aspects of the shell fishes in Maharashtra State the present study was undertaken.

MATERIALS AND METHODS -

The adult bivalve molluscs, Lamellidens Corrianus with specific size were collected from pravarasangam near Newasa. The animals with 45-47 mm shell length, 52-55 mm shell length and 60-63 mm shell length were collected. Immediately after bringing to the laboratory, the shells of animals were brushed and washed with freshwater in order to remove the algal biomass mud and other waste materials. The cleaned animals were then allowed for defection or depuration for 2-3 hrs. in the laboratory conditions under constant aeration. The physicochemical characteristics of water in different seasons were determined periodically. The temperature pH, hardness and dissolved oxygen contents were determined time to time.

The rate of oxygen consumption was determined by alkaline-iodide-azide method of wrinkle's modified technique. The rate of oxygen consumption of individual animal was determined in a specially prepared brown coloured respiratory jars of 500 ml capacity. The jars were fitted with rubber cork having an inlet and outlet of glass tubes connected with rubber tubes and clips.

Individual animal was placed in each jar and constant flow of water was given through the inlet to over through the outlet for 2.0 minutes without disturbing the animal and slowly the flow of the water was shut down. After 1 hr. water from the respiratory jar was carefully siphoned out in a stoppered reagent bottle of 300 ml capacity and oxygen consumed by each animal was then calculated and expressed as oxygen mg/lit/hr. allowed. O_2/lit/hr.

Then the animals were allowed to remain in the jars for two hrs. After this period water from individual jar was drawn (50 ml) for determination. The rate of ammonia excretion was

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measured according to phenatohypochlorite method of Solarzano (1969). Ever time 4 animals of each group were used and mean of duplicate water samples were estimated for each group. Statistical analysis was done to express final data. The atomic equivalent values of oxygen and nitrogen were calculated on the basis values of oxygen for the same individual finally the O:N ratio was established.

RESULT -

The physicochemical characteristics of the water of the habitat temperature; pH, Dissolved oxygen contents and hardness in terms of carbonate were measured during monsoon season.

Physicochemical characteristics of the water during monsoon season

Month	Temp. in ^{o}C	PH	Hardness in ppm	Oxygen Consumption in mg/lit.
July	25.5-27.5	7.57-7.77	125-128	6.274-6.454
August	28.5-29.0	7.80-7.85	126-129	6.1713-6.543a

Table. 1

Size specific variation in the rate of oxygen consumption and ammonia excretion in L. Corrianus during full moon day of July in monsoon.

Size of animals	Animal Numbers	Weight of animal in gms	Oxygen consumption (mg/lit/hr/gm body weight)	Ammonia excretion (m_9NH_4-N/h)
Small 45-47 mm in shell length	1 2 3 4	8.010 8.160 7.950 7.890	y=0.4237 +0.02625 -	0.0056 0.007 0.007 0.006 y= 0.064 + 0.00071 -
Medium 52-55 mm in shell length	1 2 3 4	11.00 10.990 11.120 10.990	0.3076 0.3079 0.3639 0.4077 Y =0.7467 + 0.04848 -	0.007 0.014 0.014 0.021 Y= 0.014 + 0.0057 -

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Large 60-63 MM in Shell length	1 2 3 4	20.910 20.120 19.540 18.133	0.2830 0.2942 0.3029 0.2479	0.028 0.021 0.028 0.035 Y= 0.028 + 0.0057 -

Table. 2

Size specific variation in the rate of oxygen consumption and ammonia excretion in L. Corrianus during month of August in monsoon.

Size of animals	Animal Numbers	Weight of animal in gms	Oxygen consumption (mg/lit/hr/gm body weight)	Ammonia excretion (m_9NH_4-N/h)
Small 46-52 mm in shell length	1 2 3 4	8.100 8.650 8.000 8.990	0.4245 0.4069 0.4230 0.3911 y=0.4133 +0.01568 -	0.007 0.007 0.009 0.007 y= 0.0075 + 0.001 -
Medium 52-55 mm in shell length	1 2 3 4	12.790 12.110 11.460 12.250	0.3966 0.4188 0.3531 0.4140 Y =0.3956 + 0.02991 -	0.028 0.028 0.035 0.021 Y= 0.028 + 0.00571 -
Large 45-47 mm in Shell length	1 2 3 4	20.950 20.00 21.010 20.750	0.2825 0.2959 0.2818 0.2854 Y= 0.2864 + 0.0652 -	0.042 0.049 0.042 0.035 Y= 0.042 + 0.0057 -

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Fig. 1

Rate of Oxygen Consumption During month of July in monsoon

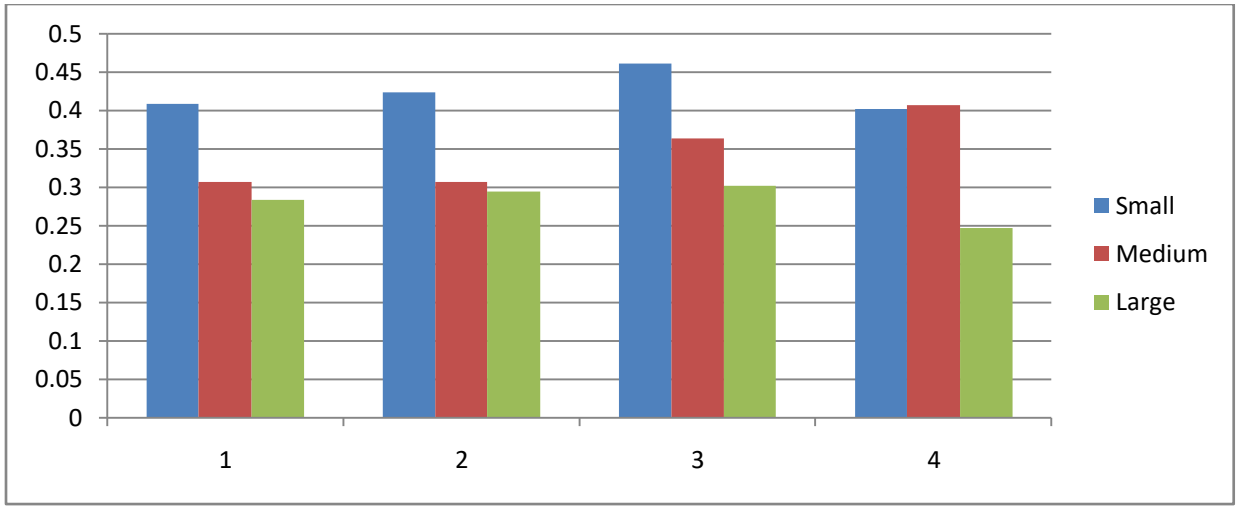
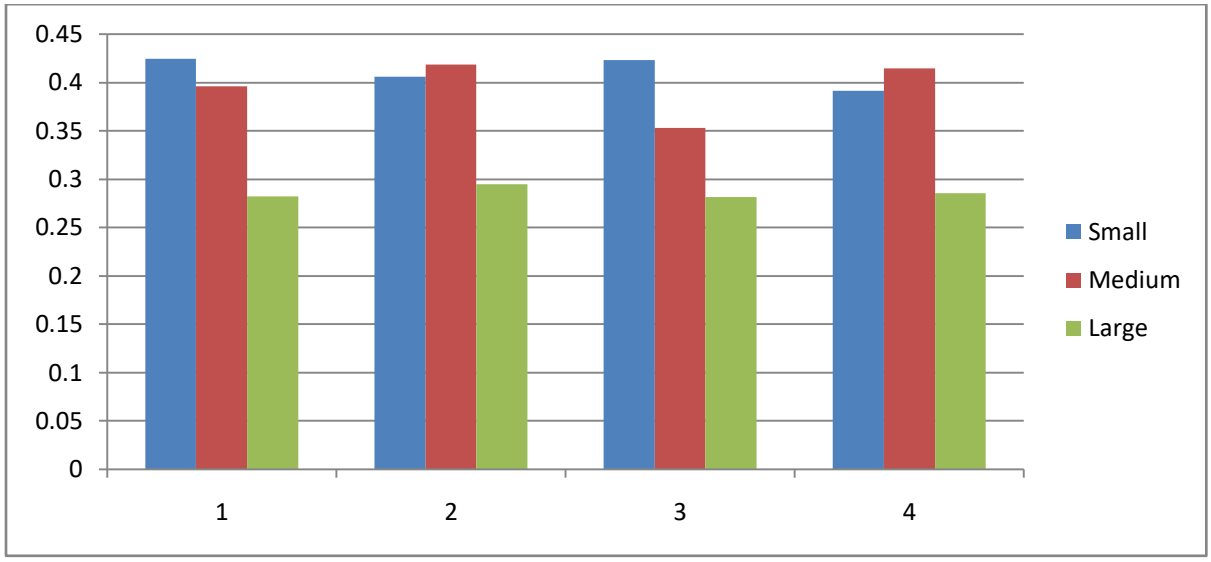


Fig. 2

Rate of Oxygen Consumption During month of August in monsoon



DISCUSSION -

- Environmental fluctuation cause stress to the aquatic organism changes its metabolic activity.

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- The pH of water is controlled by calcium, carbonates and bicarbonates.
- Hardness of water also depends upon the rainfall.
- The seasonal study shows weight specific oxygen consumption i.e. increases oxygen consumption when the body weight decreased.
- Large sized animals is more reliant on protein catabolism resulted in higher ammonia excretion.

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