

## MUSSEL CULTURE BY USING DIFFERENT CULTURE METHODS & ESTIMATION OF GROWTH PARAMETERS OF LAMELLIDENS CORRIANUS FROM NANDED REGION, MAHARASHTRA

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### ABSTRACT

A culture of mussels using the different cultural systems such as Basket culture, Rack culture, and Hanging culture method. In basket culture *Lamellidens corrianus* showed a 70% survival rate, maximum length gain percentage was  $LG\% = 7.017$  minimum  $LG\% = 1.470$ . Maximum  $WG\%$  was 21.408 and minimum of 1.267. Maximum  $HG\%$  was 11.111 and minimum of 5.405. From Rack culture *Lamellidens corrianus* showed a 60% survival rate, maximum length gain percentage was 6.666 minimum 1.388. Maximum  $WG\%$  was 7.591 and minimum of 0.795. Maximum  $HG\%$  was 14.705 and minimum of 2.857. From hanging culture method *Lamellidens corrianus* showed 80% survival rate, maximum length gain percentage was 10.937 minimum 2.857. Maximum  $WG\%$  was 12.903 and minimum of 1.796.  $HG\%$  was maximum at 15.625 and 5.263. By comparing all three culture methods 80% survival rate obtained from hanging culture so it was clear that hanging culture system is the most suitable method for mussel culture.

**KEYWORDS:** *Lamellidens Corrianus, Basket Culture, Rack Culture and Hanging Culture*

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### INTRODUCTION

For the study, mussels were cultured by different methods such as basket culture, Rack culture, hanging culture in the same environmental condition (McCoy and Chongpeepien, 1988). *Lamellidens corrianus* is found important species for freshwater pearl culture. Mussels are filter feeders, feeding on plankton and suspended organic particles available in the surrounding environment. Mussels are efficient in converting plankton and organic matter to high-quality animal protein. (Sasikumar & K. S. Mohamed 2000). growth rates and flesh conditions of mussels are strongly influenced by fluctuations in environmental conditions. A close relationship between mussel growth efficiency and food availability, this indicating growth performance limits in terms of the energetic potential of food available (Fréchette & Bourget 1985; Erdemir Yiğın & Tunçer 2004; Ogilvie et al 2004; Lemaire et al 2006; Ozernyurk & Zotin 2006; Strohmeier et al 2008).

### MATERIALS & METHODS

For estimation of growth parameters, different types of culture method were used such as hanging method, cage culture, tray or rack culture (McCoy and Chongpeepien, 1988). Mussels were collected from Nanded region in January

2013 from. Kept 24 hr for acclimatization in laboratory condition and afterword they were cultured by using different culture methods and Growth, parameters were calculated by using the method described by (**Bagenal, 1978**).

### **Basket Culture**

Round basket was used for culture of mussels. 10 mussels were tagged and kept in baskets of size 12 cm diameter for one year period Jan 2013 to Dec 2013 monthly observations were recorded for the study of growth.

### **Rack Culture**

Plastic racks of 14 cm in size were used for the culture. 10 mussels of each species were tagged by using oil paint marker, kept in the rack at depth 1 m.

### **Hanging method culture**

In this method, nylon net pockets were used. For culture, two mussels of each species tied together kept in the nylon pocket in hanging condition in a water body at a depth 1 m. Plastic tags with a number were used for tagging the nylon pocket net.

Site B was selected for culture because this was under controlled condition and easy to manage. The physicochemical parameters of this site were studied and are within range, pond water is productive with an adequate quantity of phytoplankton and zooplankton. During study period depth of water is maintained up to a depth of 1 m from bottom.

### **Weight Gain Percentage (WG%)**

$$\text{Weight gain percentage} = \frac{\text{Final weight} - \text{initial weight}}{\text{Initial weight}} \times 100$$

### **Length Gain Percentage (LG%)**

$$\text{Length gain percentage} = \frac{\text{Final length} - \text{initial length}}{\text{Initial length}} \times 100$$

### **Height Gain Percentage (HG%)**

$$\text{Height gain percentage} = \frac{\text{Final height} - \text{initial height}}{\text{Initial height}} \times 100$$

### **Survival rate (SR%)**

$$\text{Survival rate} = \frac{\text{Number of mussels survived}}{\text{Total number of mussels cultured}} \times 100$$

### **Statistical Analysis**

T- Test was used to test the significant difference between sampling stations for assessing physical-chemical parameters of water. Paired T- test is used to estimate changes in the growth of mussels. It was carried out with the help of **MINITAD** software.

## RESULT & DISCUSSIONS

### RESULT OF BASKET CULTURE

In *Lamellidens corrianus* 70% survival rate was observed, the maximum length gain percentage was LG%= 7.017 and minimum LG%= 1.470. Maximum WG% was 21.408 whereas minimum WG% 1.267. Maximum HG% was 11.111 and minimum of 5.405. (Table No. 1.1).

#### Paired T-test for Length from Basket Culture of *Lamellidens Corrianus*

Paired T-test for length showed average final length is more than the average initial length. (Table No.1.2)

#### Paired T-test for Height from Basket culture of *Lamellidens Corrianus*

Paired T-test for height showed average final height is more than the average initial height. (Table No.1.3)

#### Paired T-test for Weight from Basket Culture of *Lamellidens Corrianus*

Paired T-test for weight showed the average initial and final weight of the mussels is the same. (Table No.1.4)

### RESULT OF RACK CULTURE

*Lamellidens corrianus* showed a 60% survival rate, maximum length gain percentage was LG%=6.666 and minimum LG%= 1.388. Maximum WG% was 7.591 and minimum WG% = 0.795. Maximum HG% was 14.705 and minimum HG% = 2.857. (Table No.1.5)

#### Paired T-test for Length from Rack Culture of *Lamellidens Corrianus*

Paired T-test for length showed average final length is more than the average initial length. (Table No.1.6)

#### Paired T-test for Height from Rack Culture of *Lamellidens Corrianus*

Paired T-test for height showed average final height is more than the average initial height. (Table No.1.7)

#### Paired T-test for Weight from Rack Culture of *Lamellidens Corrianus*

Paired T-test for weight showed average final weight is more than the average initial weight. (Table No.1.8)

### RESULT OF HANGING CULTURE

*Lamellidens corrianus* showed 80% survival rate, maximum length gain percentage was LG%= 10.937 minimum LG%= 2.857. Maximum WG% was 12.903 and minimum WG% = 1.796. HG% was maximum 15.625 and minimum HG% = 5.263. By comparing all three culture methods 80% survival rate obtained from hanging culture so it was clear that hanging culture system is the most suitable method for mussel culture. (Table No.1.9)

#### Paired T-test for Length from Hanging Culture of *Lamellidens Corrianus*

Paired T-test for length showed average final length is more than the average initial length. (Table No.1.10)

#### Paired T-test for Height from Hanging Culture of *Lamellidens Corrianus*

Paired T-test for height showed average final height is more than the average initial height. (Table No.1.11)

### Paired T-test for Weight from Hanging Culture of *Lamellidens Corrianus*

Paired T-test for weight showed **the** average initial and final weight of the mussels is the same. (Table No.1.12)

### DISCUSSIONS

For the study of growth site B was selected. During study period monthly physicochemical parameters were studied. Water temperature was maximum in summer and minimum in winter. Transparency level was found within the range. Due to the production of plankton, the artificial feed was not supplied during the culture period. Bore water is used so the hardness and calcium level was found the maximum. Three types of culture system were used in the same tank to maintain the same environmental condition. Rack culture and basket culture showed a 60 % survival rate, maximum survival rate 80 % was obtained in hanging culture system. Maximum WG% and HG% was observed in rack culture system as compared with other systems. Both the culture system showed a negative weight gain percentage. Loss of weight was observed during the study period. HG% was maximum in both culture systems. In our study, we found the maximum survival rate from hanging culture system compared with others because they are kept in hanging position and easily feed on plankton. In summer season they were hanged at depth 1.5 m to decrease the effect of temperature.

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**Table 1: Shows Month Wise Variations in Length, Weight and Height of *Lamellidens Corrianus* and Growth Parameters from Jan – Dec during the Year 2013 in Basket Culture**

Tag no.	Month	Initial Length (cm)	Final Length (cm)	Initial Height (cm)	Final Height (cm)	Initial Weight (cm)	Final Height (cm)	LG%	WG%	HG%
1	Jan-Sep	5.8	6.0	2.9	3.1	18.150	19.000	3.448	4.663	6.896
2	Jan-Nov	6.2	6.4	3.3	3.4	19.980	20.510	3.225	2.652	3.030
3	Jan-Dec	6.3	6.6	3.2	3.5	22.930	21.550	4.761	-6.018	9.375
4	Jan-Dec	6.5	6.7	3.5	3.8	24.460	25.210	3.076	3.066	8.571
5	Jan-July	6.8	6.9	3.5	3.7	25.500	24.110	1.470	-5.450	5.714
6	Jan-Dec	6.9	7.1	3.5	3.8	27.840	29.750	2.898	6.860	8.571
7	Jan-Dec	7.0	7.4	3.7	3.9	26.630	32.220	5.714	21.408	5.405
8	Jan-Dec	7.6	7.9	3.8	4.0	33.190	34.740	3.947	4.670	5.563
9	Jan-Dec	5.7	6.1	2.7	3.0	17.880	19.450	7.017	8.780	11.111
10	Jan-Dec	6.4	6.7	3.3	3.6	21.310	21.580	4.687	1.267	9.090

LG%- length gain percentage, WG%- weight gain percentage, HG%- height gain percentage. Survival rate (SR %) = 6

**Table 2: Shows Paired t-test for Month Wise Changes in Length of *lamellidens Corrianus* from Jan – Dec during the Year 2013 in Basket Culture**

	N	Mean	St Dev	SE Mean
Initial length (cm)	10	6.52000	0.57504	0.18184
Final length (cm)	10	6.78000	0.57889	0.18306
Difference	10	-0.260000	0.096609	0.030551

Paired T for Initial length cm - Final length (cm)

N-total number, St Dev- standard deviations, SE Mean- sample estimated mean.

**Table 3: Shows Paired t-Test for Month Wise Changes in Height of *Lamellidens Corrianus* from Jan – Dec during the Year 2013 in Basket Culture**

	N	Mean	St Dev	SE Mean
Initial height (cm)	10	3.34000	0.34059	0.10770
Final height (cm)	10	3.58000	0.33267	0.10520
Difference	10	-0.240000	0.069921	0.022111

Paired T for Initial height (cm) - Final height (cm)

N-total number, St Dev- standard deviations, SE Mean- sample estimated mean.

**Table 4: Shows Paired T-Test for Month Wise Changes in Weight of *Lamellidens Corrianus* from Jan – Dec during the Year 2013 in Basket Culture**

	N	Mean	St Dev	SE Mean
Initial weight (gm)	10	23.7870	4.7650	1.5068
Final weight (gm)	10	24.8120	5.5837	1.7657
Difference	10	-1.02500	1.96448	0.62122

Paired T for Initial weight (gm) - Final weight (gm)

N-total number, St Dev- standard deviations, SE Mean- sample estimated mean.

**Table 5: Shows Month Wise Variations in Length, Weight and Height and Growth Parameters of *Lamellidens Corrianus* from Jan – Dec during the Year 2013 in Rack Culture**

Tag no.	Month	Initial Length (cm)	Final Length (cm)	Initial Height (cm)	Final Height (cm)	Initial Weight (cm)	Final Height (cm)	LG%	WG%	HG%
1	Jan–Dec	7.5	7.7	3.8	4.0	35.200	35.480	2.666	0.795	5.263
2	Jan–Jun	7.2	7.3	3.5	3.6	30.000	29.230	1.388	-2.566	2.857
3	Jan–Dec	7.0	7.2	3.7	3.9	27.200	27.920	2.857	2.647	5.405
4	Jan–Sep	6.5	6.6	3.3	3.4	22.600	22.100	1.538	-2.212	3.030
5	Jan–Sep	6.5	6.8	3.3	3.6	21.080	22.220	4.615	5.407	9.090
6	Jan–Dec	6.0	6.4	3.2	3.5	19.100	20.550	6.666	7.591	9.375
7	Jan–Dec	6.5	6.9	3.4	3.9	25.300	27.100	6.153	7.114	14.705
8	Jan–Dec	6.0	6.4	3.2	3.5	21.270	21.200	6.666	-0.329	9.375
9	Jan–Dec	6.1	6.5	3.1	3.4	19.070	20.450	6.557	7.236	9.677
10	Jan–Dec	5.8	6.1	2.9	3.2	15.020	15.540	5.172	3.462	10.344

LG%- length gain percentage, WG%- weight gain percentage, HG%- height gain percentage. Survival rate (SR %) = 60%

**Table 6: Shows Paired T-Test for Month Wise Changes in Length of *Lamellidens Corrianus* from Jan – Dec during the Year 2013 in Rack Culture**

	N	Mean	St Dev	SE Mean
Initial length (cm)	10	6.51000	0.56657	0.17916
Final length (cm)	10	6.79000	0.49092	0.15524
Difference	10	-0.280000	0.122927	0.038873

Paired T for Initial length (cm) - Final length (cm)

N-total number, St Dev- standard deviations, SE Mean- sample estimated mean.

**Table 7: Shows Paired T-Test for Month Wise Changes in Height of *Lamellidens Corrianus* from Jan – Dec During the Year 2013 In Rack Culture**

	N	Mean	St Dev	SE Mean
Initial height (cm)	10	3.34000	0.27162	0.08589
Final height (cm)	10	3.60000	0.25820	0.08165

Difference	10	-0.260000	0.117379	0.037118
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Paired T for Initial height (cm) - Final height (cm)

N-total number, St Dev- standard deviations, SE Mean- sample estimated mean.

**Table 8: Shows Paired T-Test for Month Wise Changes in Weight of *Lamellidens Corrianus* from Jan – Dec During the Year 2013 in Rack Culture**

	N	Mean	St Dev	SE Mean
Initial weight (gm)	10	3.3400	0.2716	0.0859
Final weight (gm)	10	24.1790	5.7203	1.8089
Difference	10	-20.8390	5.4624	1.7273

Paired T for Initial weight (gm) - Final weight (gm)

N-total number, St Dev- standard deviations, SE Mean- sample estimated mean

**Table 9: Shows Month Wise Variations in Length, Weight and Height and Growth Parameters of *Lamellidens Corrianus* from Jan – Dec during the Year 2013 in Hanging Culture**

Tag no.	Month	Initial Length (cm)	Final Length (cm)	Initial Height (cm)	Final Height (cm)	Initial Weight (cm)	Final Weight (cm)	LG%	WG%	HG%
1	Jan-Dec	6.3	6.5	3.4	3.6	22.260	22.660	3.174	1.796	5.882
2	Jan-July	6.8	7.0	3.5	3.7	28.250	26.800	2.941	-5.132	5.263
3	Jan-Dec	6.7	7.0	3.5	3.8	24.880	25.930	4.477	4.220	7.894
4	Jan-Dec	6.7	7.0	3.4	3.7	29.850	29.840	4.477	3.316	8.823
5	Jan-Dec	5.7	6.1	3.1	3.5	18.770	19.350	7.017	3.090	12.903
6	Jan-Dec	6.7	7.1	3.4	3.8	23.410	23.500	5.970	0.384	11.764
7	Jan-Dec	6.4	7.1	3.2	3.7	24.800	28.000	10.937	12.903	15.625
8	Jan-Dec	6.5	7.1	3.3	3.6	27.100	28.910	9.230	6.678	9.090
9	Jan-Dec	6.8	7.1	3.5	3.8	25.000	27.100	4.411	8.4	8.571
10	Jan-July	7.0	7.2	3.2	3.4	26.330	25.300	2.857	-3.911	6.25

LG%- length gain percentage, WG%- weight gain percentage, HG%- height gain percentage. Survival rate (SR %) = 60%

**Table 10: Shows Paired T-Test for Month Wise Changes in the Length of *Lamellidens Corrianus* from Jan – Dec during the Year 2013 in Hanging Culture**

	N	Mean	St Dev	SE Mean
Initial length (cm)	10	6.56000	0.36576	0.11566
Final length (cm)	10	6.92000	0.34577	0.10934
Difference	10	-0.360000	0.171270	0.054160

Paired T for Initial length (cm) - Final length (cm)

N-total number, St Dev- standard deviations, SE Mean- sample estimated mean.

**Table 11: Shows Paired T-Test for Month Wise Changes in Height of *Lamellidens Corrianus* from Jan – Dec during the Year 2013 in Hanging Culture**

	N	Mean	St Dev	SE Mean
Initial height (cm)	10	5.48800	6.81496	2.15508
Final height (cm)	10	5.87300	7.04843	2.22891
Difference	10	-0.385000	0.253914	0.080295

Paired T for Initial height (cm) - Final height (cm)

N-total number, St Dev- standard deviations, SE Mean- sample estimated mean.

**Table 12: Shows Paired T-Test for Month Wise Changes in Weight of *Lamellidens Corrianuss* from Jan – Dec during the Year 2013 in Hanging Culture**

	N	Mean	St Dev	SE Mean
Initial weight (gm)	10	22.9270	7.5161	2.3768
Final weight (gm)	10	23.5260	7.6217	2.4102
Difference	10	-0.599000	1.417983	0.448406

Paired T for Initial weight (gm) - Final weight (gm)

N-total number, St Dev- standard deviations, SE Mean- sample estimated mean.

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