SETTLEMENT OF OYSTER SPAT, *SACCOSTREA CUCULLATA*, ON CEMENT AND BAMBOO COLLECTORS, SOUTH SULAWESI, INDONESIA

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ABSTRACT

Oyster spat of *Saccostrea cucullata* settled on two types of spat collectors were studied during the rainy season. Collectors in the form of cement blocks and bamboo rods were placed along a salinity gradient in the mouth of Lakatong river. The study showed high abundance of settling spat during the end of dry season. Spat settlement decreased gradually during the rainy season. Cement blocks were better spat collectors than bamboo rods.

INTRODUCTION

Traditional culture of *Saccosstrea cucullata* (Born, 1778) (emend. Born (1780)) takes place in the mouth of Lakatong river, South Sulawesi. The culture method is the simplest possible. Fishermen place stones along the mouth of the river. After six months they harvest the oysters attached to the stones. Collectors in the form of cement blocks and bamboo rods could be a method to help the fisherman improve the yield of oyster compared to the traditional method. Cement blocks and bamboo rods are ideal because the materials are cheap and easily available. The right spot to place the collectors in relation to salinity should be known in order to collect spat efficiently. Hence, the present experiment was carried out.

MATERIALS AND METHODS

Cement blocks measuring 90 cm in length, 10 cm in height, and 10 cm in width were employed. Bamboo rods had similar length and a diameter of 10-12 cm. Cement blocks and bamboo rods were placed at 4 stations with 3 replications of each type of collector at each station. Station 1 was located at the mouth of the river. Stations 2 to 4 were located upstreams from station 1 at a distance of 100 m between each station.

Data were collected every week for ten weeks by removing and counting the number of spat settled on the collectors. Data were analysed by variance analysis.

RESULT AND DISCUSSION

On cement block, the number of settled spat was highest at station 1. The maximum was counted in week VI (Table 1, station 1: 2444 ± 480 ind. m^{-2}) In the same week only 265 ± 22 ind. m^{-2} settled on bamboo (Table 2).

The number of spat increased from the first weeks of the study and reached a peak in week VI. In the weeks IX and X, station 4 did not have any recruitment. The same tendency was evident on bamboo rods (Tabs. 1 and 2). Settlement on the two types of substratum differed significantly in comparisons of station 1, 2, and 3 (variance analysis, $P<0.05$). At station 4 a low number of spat was found on both types of substratum from week I to week VIII but significantly more spat settled on cement blocks ($P<0.05$). At station 4, settlement on bamboo did not

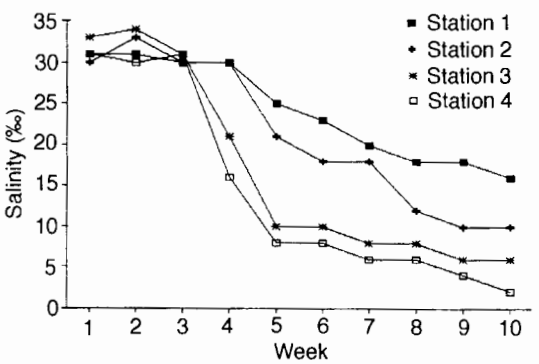

Figure 1. The salinity during the period of study (rainy season).

Table 1. Weekly settlement of oyster spat (individuals ± standard deviation m^{-2}) using cement block as a substratum. Counts from 4 stations during 10 weeks.

	Station			
Week	1	2	3	4
I	1067 ± 474	407 ± 73	104 ± 46	30 ± 23
II	1333 ± 478	630 ± 111	404 ± 47	48 ± 11
III	1578 ± 503	800 ± 104	689 ± 33	52 ± 6
IV	1878 ± 503	744 ± 136	878 ± 27	56 ± 8
V	2067 ± 574	1185 ± 105	1067 ± 25	59 ± 11
VI	2444 ± 480	1485 ± 66	1322 ± 150	67 ± 18
VII	1900 ± 508	1370 ± 149	1074 ± 148	26 ± 5
VIII	1567 ± 386	800 ± 386	567 ± 24	18 ± 5
IX	1089 ± 386	489 ± 129	282 ± 62	0 ± 0
X	552 ± 342	178 ± 45	93 ± 23	0 ± 0

Table 2. Weekly settlement of oyster spat (individuals ± standard deviation m^{-2}) using bamboo rod as a substratum. Counts from 4 stations during 10 weeks.

	Station			
Week	1	2	3	4
I	43 ± 22	33 ± 15	4 ± 3	4 ± 3
II	87 ± 32	84 ± 24	26 ± 1	10 ± 7
III	145 ± 44	110 ± 15	55 ± 7	14 ± 6
IV	222 ± 16	163 ± 10	75 ± 6	16 ± 7
V	248 ± 24	195 ± 25	122 ± 7	36 ± 2
VI	265 ± 22	206 ± 22	153 ± 12	4 ± 1
VII	212 ± 8	116 ± 7	95 ± 16	0 ± 0
VIII	141 ± 17	61 ± 7	53 ± 5	0 ± 0
IX	55 ± 7	35 ± 13	25 ± 5	0 ± 0
X	45 ± 3	22 ± 13	16 ± 3	0 ± 0

Table 3. Water parameters around the mouth of the Lakatong River.

Parameter	Station I	Station II	Station III	Station IV
Oxygen (ppm)	4.6-7.1	5.1-7.2	4.5-7.4	4.2-7.2
$C0_2$ (ppm)	7.0-12.5	6.0-12.5	6.5-14.0	6.0-15.0
pH	7.2-8.2	7.2-8.2	7.5-7.9	7.0-7.9
Temperature (°C)	26-33	26-32	26-32	26-34
Total ammonia (ppm)	0.0-0.2	0.0-0.1	0.0-0.1	0.0-0.1
Turbidity (cm)	22-38	12-33	12-33	8-29

take place from week VII until the end of the experiment. However, low settlement occurred on cement blocks at station 4 during the weeks VII to VIII.

Salinity fluctuated considerably due to the rain during the sampling period (Fig. 1). Dissolved oxygen, carbon dioxide, pH, temperature, total ammonia and turbidity were measured (Tab. 3). Turbidity displayed a trend. Water became clearer from station 1 towards station 4.

The critical parameter seems to be salinity (Fig. 1). In the oyster *Crassostrea iredalei* Faustino, 1928 the salinity for optimum spat growth was 18-35 ‰ (Angell 1986). The temperature at all stations ranged from 26-34 °C, ammonia was low, and pH 7.0-8.2. These values are within the range previously found acceptable for settlement of oyster spat (Bardach *et al.* 1972).

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