NEW ZEALAND MARINE DEPARTMENT

FISHERIES TECHNICAL REPORT

NO. 78

EXPERIMENTAL ROCK OYSTER SPAT COLLECTION AT EXTREME LOW WATER LEVELS AND THE USE OF LIGHTLY SETTLED COLLECTORS FOR A SECOND SEASON

J.P.C. GREENWAY

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SUMMARY

Commercial sized bundles of asbestos cement spat collectors were set out during the summer 1969/70 at Jackson's Bay, Mahurangi. One group of collectors was laid at approximate mean low water springs. Some of these collectors were moved to just below mean tide level at approximately monthly intervals.

Differences in the amount of survival and settlement occurred between the battens transferred from one level to a higher level.

A second group of collectors consisting of previous seasons (68/69) poorly settled collectors, previous seasons collectors scraped clean and new collectors were laid at approximate mean low-water neap.

No appreciable difference in spat numbers was found between these collectors.

INTRODUCTION

There is evidence (Greenway 1969) which suggests that the densest rock oyster settlement occurs at lower tide levels. However, setting out and servicing collectors at very low levels is restricted by the short time of exposure. Mr G.D. Waugh (pers. comm.) has reported that high mortality occurs at lower tide levels. It was decided therefore to set collectors at the low tide level to find out if this would be of advantage. Some collectors would be removed to high tide level to find out if this resulted in lower mortality than a collection left at the low level.

Settlement at Mahurangi during 1968/69 was poor and a large number of poorly-spatted asbestos cement battens were not sold to oyster farmers. It was not known if advantage could be gained by simply carrying on the battens to 1969/70 or whether they should first be scraped and cleaned. Gregarious behaviour has been demonstrated in the European flat oyster, Ostrea edulis (Cole, H.A. Knight Jones, E.W. 1949). If a similar gregarious tendency exists in Crassostrea glomerata then the presence of rock oysters on spat collectors might enhance oversettlement.

Two small-scale experiments were therefore set up to answer these two questions. These experiments are reported separately.

A. EXPERIMENTAL SPAT COLLECTION ON THE LOWER SHORE

METHODS

Standard four feet long by two inch wide, asbestos cement battens, made into commercial-pattern bundles of 32 battens each, were made up of 8 horizontal rows of 4 battens spaced ½" apart. Vertical spacing between rows was also ½".

Eight bundles of new battens were set at mean low water spring tide level on 12 December 1969.

A pair of the bundles were moved to just below mean tide level at approximately monthly intervals. All the battens were removed from the shore on 8 May 1970.

The numbers of spat visible to the unaided eye were recorded. Only spat greater than about 1.5 mm would be seen. The presence of spat of a flat oyster (Ostrea sp.) made positive identification of small specimens difficult. Differences between Ostrea and Crassostrea were pointed out by Dr Dinamani of Fisheries Research Division of Marine Department who also supplied identified samples. Nevertheless, the results should be treated with some reserve.

RESULTS

The experiment covered a period of 146 days. Table 1 sets out the results obtained. Unfortunately, one of the bundles (marked by * in Table 1) was damaged before the count of dead oysters was completed. The number of dead oysters for this batten was estimated from the proportion alive:dead oysters on the other batten of the pair.

Differences between upper and under-surfaces of the battens was striking. Spat numbers on upper surfaces were less than a tenth of those on under surfaces. The bottom row of battens collected less spat than other rows and there were more dead oysters on the lower row (Table 2).

DISCUSSION

Table 1 shows that the numbers of surviving rock oyster spat was highest on those bundles which spent only 40 and 70 days at the lower level.

The number of living spat per batten (82-111) is comparatively high. On the nearby Marine Department's spat catching farm where spat collectors were set at mean low water neap, living spat

counts in July 1970 (Curtin 1971) ranged from 896 to 3650 per bundle (28-114 mean 57) per tide level. The low figures for total settlement on the collectors which were at the lower level throughout the period is no doubt due to oysters being covered by other existing animals. The abundance and cover of calcareous tube-worms, and sea-squirts was related to the length of the time spent at the lower level. Rock oyster mortality was also high on those bundles which were longest of the lower tide level.

The mortality on the pair of bundles left at the lower level for only 40 days was much lower than on the other bundles.

CONCLUSIONS

The experiment's small scale precludes definite conclusion, but it does indicate that some increased spat settlement may be gained by placing battens at mean low water spring tide for a period during December-January. However, the double handling and extra racks involved in transferring to subsequent higher level, together with attendant risks of increased breakage would probably more than cancel out any advantage.

If collectors are left at the lower level, mortality is high and smothering by encrusting organisms is likely.

B. THE USE OF LIGHTLY SETTLED COLLECTORS FOR A SECOND SEASON

METHODS

Fibrolite battens were made up into spat collectors as described on page 1. Two bundles were made up from new battens, two bundles from battens which had been set out to collect spat the previous year and subsequently scraped clean, two bundles were made from battens set out the previous year and which each bore 10 living rock oysters.

These bundles were set out on 12 December 1969 just below mean low water neap tide level and were lifted for examination on 8 May 1970. Spat visible to the unaided eye (see p. 2) were counted. Dead spat, Ostrea sp. spat and unidentified spat were recorded separately from rock oyster spat.

The results are shown in Table 2. Table 2 lists the counts of spat on only the under surface of the collectors. Settlement on the upper surface was generally less than 1/10th of that on the under surface. The lowest level of the bundle caught less spat than the other levels and spat mortality was higher at this lowest level.

There was no marked difference in numbers of rock oyster spat on the different types of collectors. Numbers of spat were similar to those on the Marine Department spat catching station nearby. Although the number of Ostrea spat, and dead and unidentified spat were higher on the new battens than on the previous seasons battens, but most of this difference is due to large numbers on one of the pair of new collectors. Due to the smallness of the sample size it cannot be concluded that new battens attract more Ostrea spat.

CONCLUSIONS

The presence of rock oysters on spat collectors does not necessarily increase the settlement in subsequent seasons.

Laborious breaking up and cleaning of previous years lightly caught collectors is not likely to enhance spat collection. Provided they are not unduly encrusted with barnacles, serpulids, ascidians or mud they can be represented the following season with as much confidence as new battens.

ACKNOWLEDGEMENTS

Dr D. Eggleston made helpful suggestions on presentation of the data.

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TABLE 1 NO ROCK OYSTER (ON TOP AND BOTTOM SURFACES) COLLECTORS SET AT M.L.W.S. AND MOVED TO M.T.L. AT INTERVALS

	NO. DAYS AT		NO. OYSTERS/BUNDLE				NO. OYSTERS BATTEN		
	MIWS	M.T.L.	Live	Dead	Total	% Dead	Live	Dead	Total
1			3677	411					
2	40	106	3044	172	7304	8	105	9	114
1			3180	2220					
2	70	76	3956	1463	10819	34	111	51	168
1			311	2914					
2	97	49	2434	2765	11224	51	86	88	174
1			2372	1220					
2	146	0	2886	1483*	7961	34	82	42	124

* Proportionate estimate (see p. 2)

TABLE 2 NUMBER OF SPAT ON UNDER SURFACE OF BATTENS IN EACH LEVEL OF BUNDLES OF OLD, SCRAPED CLEAN BATTENS; OLD BATTENS WITH TEN 1 YEAR OLD OYSTERS, NEW BATTENS. COUNTS FROM EACH OF THE PAIR OF BUNDLES (a and b) ARE RECORDED SEPARATELY.

Battens		Old Cleaned		Old with Oysters		New	
Oysters		Live Rock	Dead & Flat	Live Rock	Dead & Flat	Live Rock	Dead & Flat
Level in Bundle							
1	a	253	58	324	4	178	40
(Top)	b	285	14	304	12	357	42
2	a	233	67	288	4	253	53
	b	246	12	301	4	320	31
3	a	297	11	301	2	229	60
	b	279	25	282	12	251	33
4	a	321	3	323	3	210	75
	b	314	23	270	10	292	30
5	a	316	19	347	6	208	65
	b	324	29	289	12	303	28
6	a	338	5	313	3	241	78
	b	332	54	327	17	292	14
7	a	358	6	279	12	261	115
	b	356	26	310	19	373	31
8	a	36	11	92	42	107	138
(Bottom)	b	70	19	69	59	149	61
All	a	2152	180	2267	76	1687	624
	b	2206	202	2152	145	2337	270
Total a & b		4358	382	4419	221	4024	894
Average/batten		68	6	69	3	63	14
% of total dead		8		4		18	

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