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EXPERIMENTS ON SUBMERGED RAFT FOR OPEN SEA MUSSEL CULTURE

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Submerged raft made of 10 bamboo poles fixed on a teak wood frame from which 150 ropes can be suspended in the open sea, has been found to withstand rough sea conditions. The rafts are buoyed by conical floats of oil drums. Success of this experiment will enable open sea mussel culture all the year round.

INTRODUCTION

In India mussel culture is of very recent origin. In European countries where mussel culture was started about a century ago and in Philippines where it was started more recently, Mussel farms are located in protected waters like bays and fjords. In Europe such sheltered areas are already fully utilised. Davies (1970, *Proc. of Symp. on Mollusca*, 3 : 873-884 ; M.B.A. India[1]), opined that the possibility of expanded market demand for mussel would perhaps be limited by this 'shelter' factor. He further suggested that large areas of inshore waters can grow good quantity of mussels, and if it was found that good mussels could be grown at depths below the storm water zone of the open sea it could represent a major break-through to sea farming on a vast new scale. Practical and scientific investigations on feasibility of inexpensive, indigenous infrastructure supported mussel culture in the open sea for adoption on an extensive scale by fisherfolk of coastal villages of India are engaging our attention today since enough information is available on sophisticated methods adopted by developed countries.

Experiments on open sea mussel culture by the floating raft method conducted at Kovalam, 40 km south of Madras from 1976 onwards revealed the possibility of reaping a harvest by suitably adopting the time of seeding during June, avoiding the high velocity winds of South West Monsoon and harvesting the stock during October before the commencement of North East Monsoon which often develops into severe cyclonic storms. For a successful farming operation of this kind, the rafts are to be positioned at sea throughout the year, which may result in two or three harvests, simultaneously providing natural seed from the farm area. From our experience with the surf beaten nature of this coast, exposed to variable winds and severe cyclonic storms, necessity arose to develop a very strong submersible raft with suitable buoys. Having difficulties in using conventional floating rafts with cylindrical buoys, at the suggestion of Dr. E. G. Silas, an alternate method of keeping the raft submerged with inverted conical buoys made of oil drums has been tried.

DESCRIPTION OF SUBMERSIBLE RAFT

The submersible raft consists of a nine metre square frame made of 50 to 60 cm thick teak-wood poles suitably joined at the ends by a cross halving joint with iron bolts and nylon cord lashing. (Plate I, a). Another pole at the middle of the frame acts as a rib (Plate I, b) providing the required strength. Ten bamboo poles of nine metre length are lashed to the frame with nylon cord at intervals of 0.75 m (Plate I, c). At the rate of 15 ropes of 4 metre length per bamboo pole, 150 ropes can be tied in addition to the 50 ropes which can be tied to the five teak wood poles of the frame.

The inverted conical floats are made out of 200 litre oil barrel drums, cut and reshaped into a cone (Plate I, d). The significance of this float over the conventional cylindrical buoys which exert great resistance to waves and currents is its least resistance. The apex of the cone is slightly weighted on the inner side to which an iron ring is firmly welded. This inverted conical

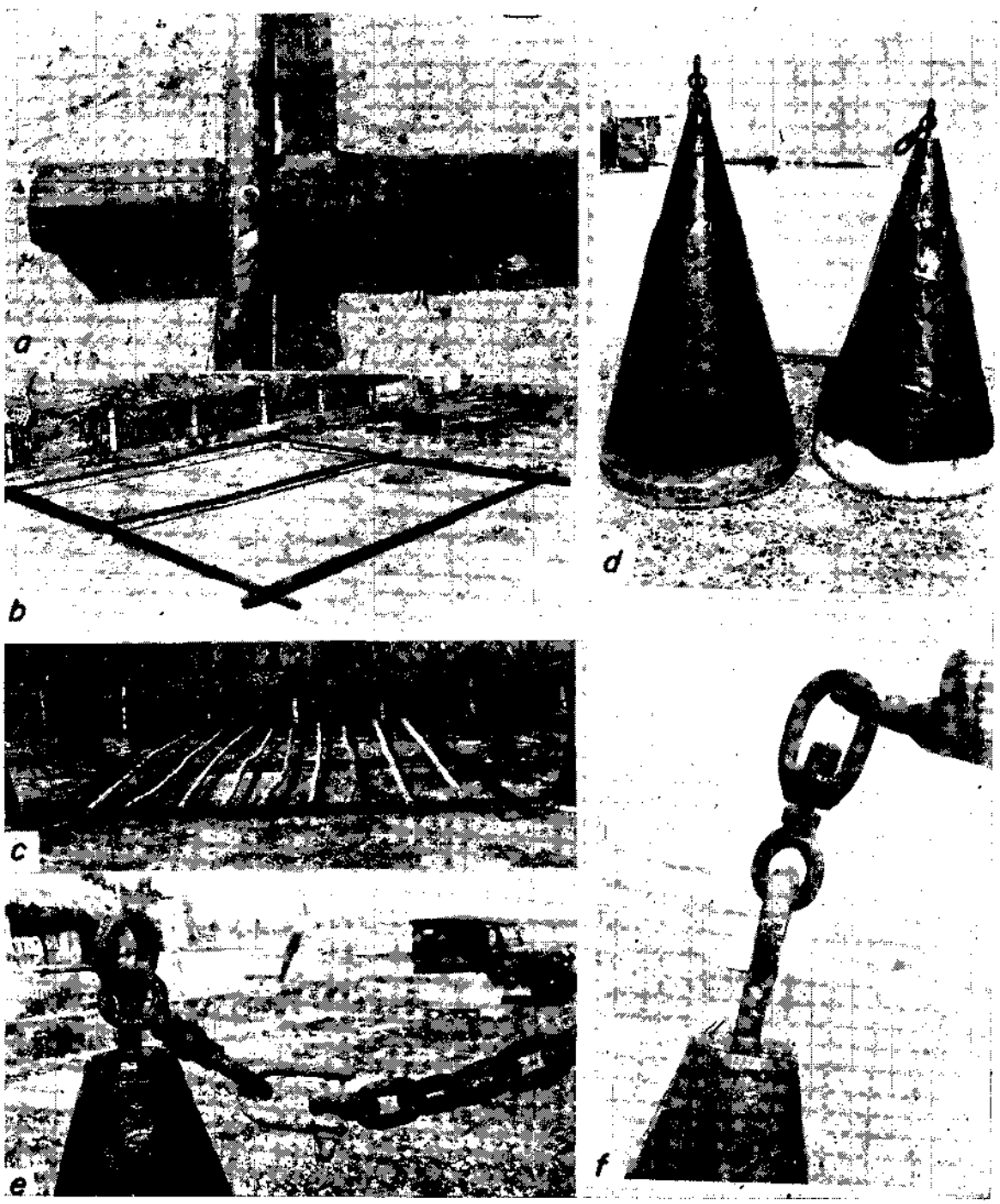

PLATE I. a. Cross halving joint with bolt used in the frame work of the raft. b. The frame. c. General view of raft showing the position of conical floats and anchors. d. Conical float. e. Swivel fixed to the conical float. f. Fixing of float chain with shackle.

buoy when put in water floats half submerged exposing the broad side above water level. To the ring in the apex, a swivel is fixed (Plate I, e) to take in the twist on the chain caused by the currents and waves. One end of the two metre long 3/8″ chain is fixed to the swivel with a ' U ' shackle (Plate I, f). The floats are given a basal anticorrosive coating of red oxide followed by an over coat of lacoloid black paint. Anchors of different types and weights can be fixed. It is found that the grapnel type anchor weighing 80 kg is ideally suited for a sandy bottom. The type of anchor and weight will depend largely on the size of the raft, the nature of the sea bottom and the strength of the current obtainable in the operational zone. Welded anchor chains of $\frac{3}{8}$″ and $\frac{1}{2}$″ thickness were tried which under very rough weather snapped off at the point of welding of the links. Therefore forged chains without joints appear to be ideally suited. Two such anchors at opposite ends for each raft are used to keep the raft in position. The length of the chain should be 4 to 6 times the depth in which the raft is to be fixed to allow for possible drift at the time of strong currents and high waves.

The raft without buoys is towed to the farm area and anchored. The raft has to be kept on the surface of the sea till seeding work is completed, for which four cylindrical 200 litre drums are lashed closely to the upper four corners of the raft. After, all the seeded ropes are in position, the cylindrical drums are replaced by the conical floats, by shackling the free end of the 2 m chain of the float to the raft. Now the raft will get submerged and only the top half of the floats will be visible above water. As the mussel grows bigger and heavier more floats are added to keep the raft at the desired depth. Normally half the conical drum should be visible above the water surface. The depth at which the raft is to be submerged is controlled by suitably varying the length of the float chain. At the time of harvesting the whole raft has to be brought up by hauling in the float chains one by one and lashing the buoys closely to the raft. Once the raft is on the water surface, a person can walk on it and remove the ropes.

With the growing awareness of large scale mussel culture and dearth of sheltered areas suitable for mussel culture, open sea mussel culture appears to be a distinct possibility in the near future. Various types of culture practices are followed the world over and the appropriate type of culture depending on peculiarities of environment has to be evolved. The submerged raft tried at Kovalam (Madras) for open sea mussel culture is only a first step in this direction, which can be further modified and perfected to suit various sea conditions obtainable in different areas.