

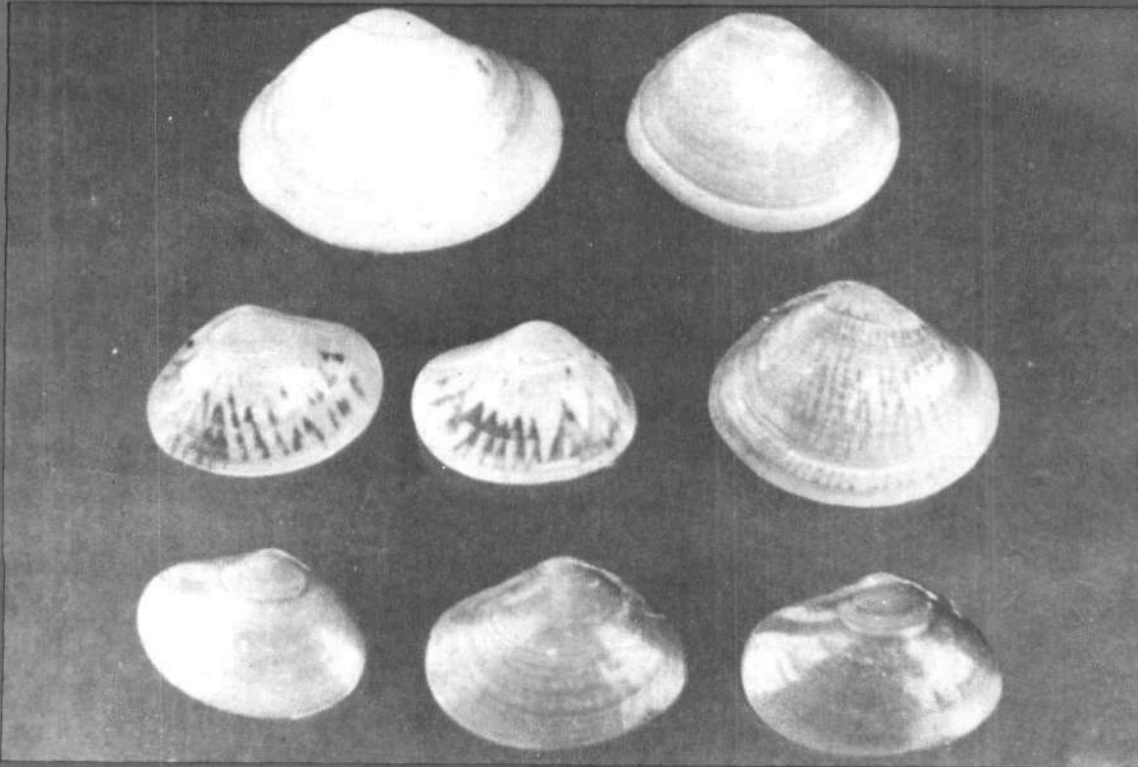


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## SEA RANCHING OF SEA CUCUMBERS\*

### Introduction

Sea ranching is resorted to when natural populations in the sea have been depleted due to overfishing. Sea cucumbers being defenceless animals offer no resistance at the time of capture and are indiscriminately fished out. They also do not make any attempts to move away like fish or prawns. This has resulted in large scale capture of sea cucumbers including small and immature forms. To check this population depletion, Government of India took a decision to ban the export of processed material which is less than 75 mm. This is the first step in the right direction. A programme on intensive seed production and sea ranching of sea cucumbers has been taken up as a joint project with MPEDA. This Project is partly funded by the MPEDA.

### Background information

In case of sea cucumbers, seed was produced only in China and Japan earlier and in recent years, also in Korea and Russia for the species *Stichopus japonicus*. Since the longevity of *S. japonicus* is more and growth rate is slow when compared to Indian species and hence is very expensive to maintain in the laboratory for long periods their seeds are only sea ranching. Normally they sea ranch the seed when it reaches a length of 20-40 mm. In India though some seed is produced in case of *Holothuria scabra* so far no sea ranching programme is undertaken due to the limited seed produced. This seed is used to conduct experiments on growth and survival of the seed.

### Sea cucumber as material for sea ranching

Sea cucumber lend themselves well for sea ranching since they immediately settle down to the bottom and also remain at the same place where they are sea ranching since sea cucumbers have limited movements. Also young forms are known to live among coral reefs for protection. This habit also helps them to survive better and contribute to the fishery.

### Selection of sea ranching site

Selection of suitable site for sea ranching is the most important for the success of the programme. Sea cucumbers being stenohaline cannot tolerate wide ranges of salinity. Therefore river mouth, estuaries and other bays where the salinity goes down below 10 ppt during the monsoon season have to be avoided. Also rocky beds have to be avoided since the sea cucumbers live on the mud or sand and fixed on the organic matter present in the same. Too much of vegetation like algal beds are also not suitable as sea ranching sites. It is best to make a survey first for natural beds and then to sea ranch the juveniles in nearby coral reefs. The most important aspect in this programme is that the area where sea cucumber is sea ranching should be a protected area and free from activities of the fishermen and fishing operations. If trawl net is operated over the area all the juveniles sea ranching will enter the net resulting in total failure of the programme. Another aspect to be borne in mind is that the area where the juveniles are left should be free from strong currents which will

\* This article is based on the work carried out by D. B. James, A. D. Gandhi and N. Palaniswami. The article was prepared and presented by D. B. James.

sweep away all the seed sea ranched. Therefore the ideal sites for sea ranching are coral reefs near natural beds where there is not much fishing. National marine park at Wondoor can be as a biological reserve for *H. scabra*.

### Effect of sea ranching

Simply dumping the seed into the sea makes the sea ranching programme meaningless. If the sea ranching is to have some effect on the populations that contribute to the fishery naturally large number, preferably millions of seed have to be sea ranched to offset the natural mortality before they reach harvestable size. The catches from the nearby areas have to be continuously monitored. If the catches significantly increase we can put it down to the success of sea ranching programme. It has to be admitted that this programme has not produced any tangible results in the Pacific.

### Feed back information essential

In order to know the success of this programme feed back information is essential. One way to do this is to first select a suitable site where natural populations are distributed. Then a survey has to be conducted with the help of divers to note the number of specimens distributed in unit areas like 100 sq. m. In this area the seed produced in the hatchery has to be sea ranched. For an area of 100 sq. m. about 300 juveniles can be sea ranched. After a period of six months the same area has to be surveyed to find out the number of large specimens. This gives an idea about the effect of sea ranching. The longevity of sea cucumbers is more and they take a long time to reach harvestable size. For example the longevity of *Holothuria scabra* is estimated to be 10 years and the species reaches harvestable size in 18 months. Sea cucumbers can also be tagged at the time of release to find out their contribution to the fishery. For tagging special tagging guns are available. The tags used for sea cucumbers are known as Dennison tags. Body sites for tagging in different species of holothurians are different. *Actinopyga echinites* can be tagged at mid-dorsal, anterior and posterior ends. *Thelenota ananas* can be tagged at either end. The tagging positions for *Holothuria nobilis* are also the same. The animals were injected with micro tags. They can later be detected only by X-ray or tag detector. Small individuals seem to lose the tags readily than the larger ones. Also it was found that tags injected near the anterior

end retained for longer period than those injected at other sites. Some of the tags are recovered after one and half years. Tagging is labourious, cumbersome and time consuming.

### Marking the animals with biological stains

If the juvenile sea cucumbers are marked with some biological stains which will remain for the rest of life without affecting the animal, this can be tried. In this way large number of juveniles can be marked at a time and this method will be best suited for sea ranching programme. By the earlier method of tagging only limited number of specimens can be marked. At present various colouring substances are marked on the ventral side of *H. scabra* which is white, to see how long they will be retained in the laboratory.

### Discussion

K. H. Mohamed: Since sea cucumber is a limited resource but in good demand, culture prospects may also be explored along with sea ranching if enough seed can be produced. Lakshadweep and Andaman & Nicobar Islands will be ideal areas for sea ranching.

T. S. Velayudhan: Have you made any survey to locate areas suited for the survival of sea cucumbers?

D. B. James: This work is under way.

### Conclusion

After the presentation of each of the papers followed by discussion on it, the Chairman invited the participants for further comments as conclusion as to how programme of sea ranching should go further.

K. H. Mohamed: apart from the groups covered already, others like mussels, seaweeds and fishes such as mullets and chanos must also be considered for sea ranching, if not in the near future.

Daniel Selvaraj: Since we are not fully sure about the prospects of sea ranching the groups of which the hatchery technology is known, it may be economical to include other groups at present.

V. Sreeramachandra Murty: First we have to make an assessment of the impact of sea ranching on the natural population, and

then only we can proceed further to make it a meaningful proposition.

K. Rengarajan: Some resource need conservation, some others need enhancement, and still others require both. We must be very clear about the objectives while embarking upon sea ranching.

D. B. S. Sehara: Economic and social aspects of sea ranching are important factors, and unless some profitability is assured, no private agency will be inclined to fund any sea ranching programme.

Winding up the seminar, the Chairman again stressed the need to have a correct perspective about the whole aspects of sea ranching and its necessity in the present national context. Repopulation of the natural habitat

necessitated either by excessive exploitation, as in the case of spiny lobster, or by devastation due to natural causes as in the case of clam which are often destroyed by freshwater run off, can be achieved by sea ranching. Apart from the groups for which we have hatchery technology, the ornamental molluscs *Trochus* and *Turbo* of Andaman Islands are promising species. A good hatchery is a prime requisite for production of seed which can be used not only for ranching but also for farming. Sea ranching becomes more important when pressure is felt for land-water bodies for farming. Scaling-up needs proper funding, for which sufficient justification and profitability have to be established and projected. The Chairman thanked all those participated in the seminar, and hoped that the interest generated by it will sustain to create more awareness and motivation.