SEA URCHIN RESOURCES OF WALTAIR COAST

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ABSTRACT

A potential resource of the little known black sea urchin *Stomopneustes variolaris* is reported along Waltair Coast. The survey along the 30 Km coast-line revealed the presence of sea urchin, the resource of which was estimated to be over 1224 tonnes distributed at an average rate of 8.5 numbers per square metre. The concentration of sea urchins was more in the crevices of rock and sheltered areas than on the open rocky bottom. As the roe of sea urchin is a cherished delicacy and has a good export potential, the possibilities and prospects of culture of this species in suitable areas along the Indian Coast are discussed.

INTRODUCTION

THE BLACK SEA URCHIN *Stomopneustes variolaris* is one of such potential resources of food and yet little attention has been paid to this. Organised sea urchin fishery exists in several developed countries of the world particularly in U.S.A., which have developed recently a valuable export fishery. Dense populations of sea urchins are present in the coastal areas off Waltair. Apart from the possibilities of culturing this in the farms, a bright future holds for the fishery from the rocky coastal areas of our country. An attempt has been made in the present paper to estimate the sea urchin resources of the Waltair Coast.

The authors are gratefull to Dr. E. G. Silas, Director, Central Marine Fishries Research Institute, Cochin for constant encouragement during the course of this investigation. They also thank Dr. D. B. James for indentifying the sea urchin specimens and helpful suggestions.

MATERIAL AND METHODS

The area of investigation is a 30 Km long coast line between Uppada in the north to

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Gangavaram in the South. Four Centres namely Mangamaripeta, Redugullapalem, Lawson's Bay and Gangavaram were selected for observations. The study was undertaken during 1977, *i.e.* February–May and observations
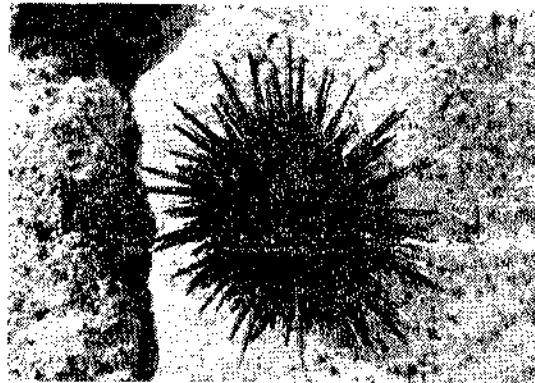

Fig. 1. Sea urchin *Stomopneustes variolaris* (Lamark).

were always made at the time of low tide. A stretch of costal intertidal area of 250 to 500 long 30 to 70 m wide was studied from each observation centre. Linear sampling has been done for every 100 m of coast line of the observed centre along 10 m wide parallel lines to the coast. Thus the average number of sea urchins found per metre square in a given area was based on 5–6 observations made in the area.

TABLE I. *Abundance of intertidal sea urchins per metre square at Mangamaripeta*

Width intervals in m	Depth (cm)	Nature of bottom	1st 100 m	2nd 100 m	3rd 100 m	4th 100 m	5th 100 m	All areas average per square metre
10	10	Sand and Rocky	NIL	4	5	NIL	NIL	1.8
20	20	Rocky	4	4	NIL	3	6	3.4
30	30	Rocky	10	9	NIL	NIL	8	5.4
40	50	Rocky	20	30	NIL	20	4	14.8
50	70	Rocky	5	5	4	16	10	8.0

Distance from the shore to the low tide mark: 10–20 m. Survey progressed from north to south along the coast line. Sampled area = 500 X 50 m. Total population = 167000.

TABLE. 2. *Abundance of intertidal sea urchins per metre square at Rendugullapalem*

Width intervals in m	Depth (cm)	Nature of bottom	1st 100 m	2nd 100 m	3rd 100m	All area average for metre square
10	20	Sanday, rocky	4	2	NIL	2.0
20	50	Rocky with ground sandy	30	25	15	23.3
30	70	Rocky with bushes	25	20	6	17.0

Distance from the shore to the low tide mark = 10. Survey progressed from north to south along the coast line. Sampled area = 300 x 30 m. Total population = 127000.

TABLE 3. *Abundance of intertidal sea urchins per metre square at Lawson's Bay*

Width intervals in m	Depth (cm)	Nature of bottom	1st 100 m	2nd 100 m	3rd 100 m	4th 100 m	5th 100 m	All area average per metre square
10	5	Sandy	1	2	NIL	NIL	NIL	0.6
20	10	Sandy	4	NIL	5	NIL	NIL	1.8
30	20	Sandy	4	10	NIL	5	NIL	3.8
40	30	Sandy	10	5	4	6	3	5.6
50	50	Size of stones big	NIL	12	NIL	14	5	6.2
60	70	Size of stones big	10	15	25	4	5	11.1
70	90	Size of	5	6	8	4	5	5.6

Distance from the shore to the low tide mark = 30. Survey progressd from north to south along the coast line. Sampled area = 500 X 70 m. Total pupulation = 177000.

RESULTS

The results of sampling along with the 10 m parallel lines to the coast in different observation centres are presented in Tables 1–4. It is seen from the Tables that the area of distribution of the sea urchins varied from place to place. In all the centres the average number of sea urchins observed per metre square increased with the depth of water in the intertidal area. Further an average of 16 sea urchins were observed per metre square at Gangavaram, 14 at Rendugullapalem followed by Mangamaripeta with 7 and Lawson's Bay with 5. The total area of the sea urchin bed under the present survey was about 12,00,000 m². An estimated total of 1224 tonnes of sea urchins were distributed at an average rate of 8.5 per metre square. Although the nature of the bottom is essentially similar in having a rocky substratum in all the centres, the terrain varied from Centre to Centre. At Lawson's Bay there was a gradual slope of the bed while it is less gradual and rugged at other places.

The more rugged the area the higher the concentration of sea urchins. Both depth and substrata appear to influence the distribution of echinoids, but they are probably only two of a complex array of factors. "Available food, predators, competition, temperature and many other factors may also influence the distribution of these animals" (Mc Cauley and Carey Jr., 1967). Our observations showed that concentration of sea urchins was more pronounced near the crevices of rocks and sheltered areas. According to Mortensen (1928) club spined urchin is mainly a littoral form. The Black Sea urchin is also a littoral form. Its availability is taken as an index for tide mark. A number of semicircular concavities in the exposed rocks of the intertidal region is a common sight during the lowest low tide. These are the abodes of the sea urchins specially carved by them for sheltered living during the highest tide. As the low tide approaches, the sea urchin population gradually moves towards the low tide area abandoning the special abodes. These appear like empty honey combs.

TABLE 4. *Abundance of intertidal sea urchins per metre square at Gangavaram*

Width inter vals in m	Depth (cm)	Nature of bottom	1st 100m	2nd 100m	3rd 100m	4th 100m	All area average per metresquare
10	5	Sandy, Rocky	4	20	15	6	11.3
20	20	Rocky	4	20	20	NIL	11.0
30	50	Rocky	30	20	25	3	19.5
40	90	Rocky	20	40	15	10	21.3

Distance from the shore to the tide mark = 10-15. Survey progressed from north to south along the coast line. Sampled area = 400 X 40m. Total population = 252000.

TABLE 5. *Data on diameter, height, weight, maturity, gonad weight and gonad index during different months*

Date	Place	Height of the test (range in mm)	Diameter of the test (range in mm)	Weight with spines (g)	Weight with -out spines (g)	Maturity	Weight of of gonad (g)	Gonad index	The mean gonad index
10-2-1977	Lawson's Bay	11-49	18-86	5.3-338.5	3.0-228.5	Mature, immature	1.0-11.0	0.5-4.3	2.55
18-4-1977	Rendu-gullapalem	17-49	31-80	21.5-274.0	12.0-196.0	Mature, immature	2.0-32.5	5.7-13.0	8.50
4-5-1977	Manga-	108	21-4-82	5.7-259.5	2.5-152.7	Immature	4.5-19.5	3.7-9.4	6.01

The sexes are separate and no sexual dimorphism exists. The gonad of sea urchin is all that is processed and eaten. Demand for sea urchin gonad is high (Dix, 1977). The gonads are loosely attached to the inner wall of the test and can be easily scraped after removing the digestive organs. They are usually eaten fresh after adding little vineger or lemon juice. Some people pour boiled water over the entire animal while others boil the entire animal before removing the gonads.

In Table 5 are given data on diameter, height, weight, maturity, gonad wieght and gonadial index. During the breeding season the gonads become larger. This is conveniently measured as a relative increase in gonadal volume or weight and is called the gonad index. The gonad index of males and females behaves similarly during the reproductive season.

Examination of specimens during February May showed that the mean gonad index

increased from 2.55 in February 1977 to 8.50 in April and then declined to 6.01 in May 1977 (Table 5).
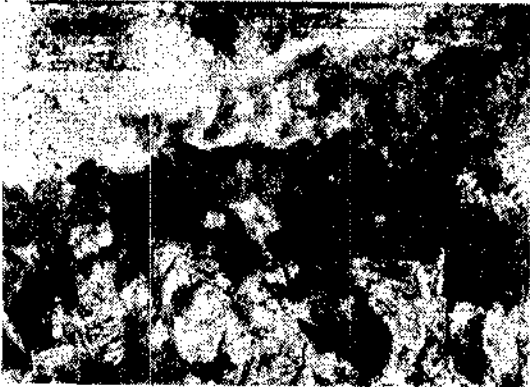

Fig. 2. The abodes of sea urchins made by them in the coastal rocks.

The Black Sea urchin may be collected from the shore at low tide. At Ohma Aomori Prefecture, they are caught in flat round baskets baited with brown algae and lowerd to the bottom. In this manner the sea urchin habitat is not disturbed or the sea bottom destroyed. They are air lifted and several collectors in the U. S. A. guarantee live delivery (Hinegardner, 1969).

The possibility of transplanting the seed urchin to adjoining rocky areas of the coast are worth exploring. Sea urchin feeds on sea weed attached to the rocks. They survive atleast a week without feeding (Osanai, 1969). In view of several advantages in handling sea urchins, commercialisation of the fishery may be easy and worth while.

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