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## SOME HYDROGRAPHICAL FEATURES OF A BRINE SHRIMP ECOSYSTEM AT TUTICORIN

### ABSTRACT

The fluctuations in salinity, dissolved oxygen and pH in a natural ecosystem of the brine shrimp *Artemia salina* at Tuticorin salt pan area were studied for a period of seventeen months from November 1984 to March 1986 and the cyst production was observed to take place when the level of salinity and dissolved oxygen ranged between 104 and 138 ppt and 0.5 and 2.1 ml/l respectively.

EVERSINCE it was first reported by Seale (1933) that the freshly hatched nauplii of the brine shrimp *Artemia salina* are the most suitable

food for the fish fry, there has been a growing demand for the cysts of the brine shrimp. As the production of the cysts under controlled

condition has not been accomplished on a commercial basis, the cysts produced in the natural environment continue to be the main source of supply to the fish and shrimp hatchery operations (Sorgeloos, 1979). The natural populations of brine shrimp thrive well in salt lakes particularly in salt pan areas (Tunsutapanich, 1982; Sorgeloos and Kulasekarapandian, 1984). As solar salt pans are spread over a vast area around Tuticorin,

shrimp was noticed. When first located on 2nd November 1984, it was observed that large quantity of cysts washed ashore on all the sides of the pond. On the same day cysts weighing 100 grams (dry weight) were collected from the pond. The pond served as a storage facility for the waste brine let out from the surrounding salt pans. It was more or less rectangular in shape and occupied an area of 0.2 hectare with an average water depth of 0.75 metre.

TABLE 1. Salinity, oxygen and pH observed in a natural ecosystem of brine shrimp at Tuticorin

| Month        | Salinity (ppt) |     | Oxygen (ml/l) |     | pH  |     |
|--------------|----------------|-----|---------------|-----|-----|-----|
|              | Min            | Max | Min           | Max | Min | Max |
| November '84 | 46             | 105 | 1.6           | 3.5 | 7.6 | 8.8 |
| December     | 83             | 94  | 2.2           | 3.2 | 7.7 | 8.0 |
| January '85  | 90             | 91  | 2.4           | 2.7 | 7.7 | 8.1 |
| February     | 87             | 92  | 2.1           | 3.0 | 8.2 | 8.3 |
| March        | 85             | 96  | 2.5           | 3.2 | 8.3 | 8.5 |
| April        | 63             | 86  | 1.6           | 3.3 | 7.6 | 8.6 |
| May          | 85             | 95  | 2.1           | 2.9 | 7.5 | 9.0 |
| June         | 117            | 138 | 1.1           | 1.9 | 7.5 | 8.1 |
| July         | 113            | 118 | 1.1           | 2.1 | 7.6 | 7.8 |
| August       | 106            | 108 | 0.6           | 0.9 | 7.8 | 8.5 |
| September    | 104            | 108 | 0.5           | 1.0 | 7.8 | 8.0 |
| October      | 98             | 110 | 1.0           | 1.4 | 8.0 | 8.0 |
| November     | 40             | 48  | 1.9           | 3.0 | 7.5 | 8.5 |
| December     | 41             | 55  | 1.2           | 3.1 | 8.0 | 8.5 |
| January '86  | 72             | 83  | 1.8           | 2.8 | 8.0 | 8.5 |
| February     | 80             | 82  | 1.8           | 2.2 | 8.0 | 8.5 |
| March        | 84             | 104 | 0.8           | 0.9 | 8.0 | 8.5 |

the brine shrimp population has been found to occur in certain areas with varying intensities. During the course of a survey of the salt pan areas of Tuticorin for the collection of cysts of *Artemia* for prawn hatchery, a pond in the salt pan area of Karapad near the Field Laboratory of CMFRI, which was found to be inhabited by the natural population of the brine

As environmental factors play an important role in the mode of reproduction of the animal (either oviparity or ovoviviparity), some hydrographical features namely salinity, dissolved oxygen and pH of pond water for a period of seventeen months from November 1984 to March 1986 were studied in order to

understand the fluctuations in the hydrographical features and their effect on the production of cysts. The cysts were either scooped with a dip net having a mesh size of  $40 \mu$  or were collected from the shore after they were washed to the sides of the pond. After the collection they were purified, dried and preserved following the methods suggested by Sorgeloos and Kulasekarapandian (1984). As the cysts collected from the pond on different dates were in small quantities they were pooled together after drying.

The data on the hydrographical features observed during different months are given in Table 1. The salinity during the entire period of observation ranged between 46 and 138 ppt. From July to September the salinity was above 100 ppt, the range being 117 - 138, 113 - 118, 106 - 108 and 104 - 108 ppt for June, July, August and September respectively. The low salinity of 40 to 55 ppt was recorded in November and December 1985 following intermittent heavy rain. The level of dissolved oxygen ranged between 0.5 and 3.5 ml/l during the entire period of observation. From June to September during which period the salinity was above 100 ppt, the amount of dissolved oxygen was between 0.5 and 2.1 ml/l. Unlike the inverse relationship observed between the salinity and dissolved oxygen no such relationship could be noticed between the salinity and pH. During the entire period of observation the pH ranged between 7.5 and 9.0.

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During November and December 1985 large number of nauplii and juveniles of the brine shrimp were found swarming in the pond in several places. This increase in the biomass of the brine shrimp was possibly due to the hatching of the cysts under low saline conditions (40 to 55 ppt). It has been reported by Sorgeloos (1979) that the cysts will remain in dormant stage and will hatch out only when the salinity drops below 70 ppt. The salinity has remained well above 80 ppt for a period of five months from May to September and the cysts produced by the animals during these months would have been washed and accumulated on the sides of the pond without undergoing the process of hydration. It was during the month of September that good quantity of cysts weighing 100 grams (dry weight) were collected from the pond. The cysts that were left out in the pond would have hatched out subsequently during November and December. Sorgeloos and Kulasekarapandian (1984) have reported that cysts are produced mostly at salinity beyond 150 ppt. But in the present investigation though the salinity has remained well below this level, cyst production has taken place. Thus it appears that the level of salinity required for cyst production may vary from strain to strain.

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### A SPINY LOBSTER *PANULIRUS ORNATUS* WITH ANTENNULE-LIKE OUTGROWTH IN THE PLACE OF EYESTALK

## ABSTRACT

The note reports on the collection of a female specimen of the spiny lobster *Panulirus ornatus* (Fabricius) with antennule-like outgrowth in the place of one of the eyestalks.

*PANULIRUS ORNATUS* (FABRICIUS) is one of the commercially important species of spiny lobsters in the southeast coast of India. Along with *P. homarus* it constitutes a good fishery in certain places in the Gulf of Mannar. Kayalpattinam is one of such places where there is round the year fishery for these two species at varying intensities. During the course of regular observations on the lobster fishery at Kayalpattinam, a single specimen of *P. ornatus* with an antennule-like outgrowth in the place of its right eyestalk, was observed. The lobster which was a female measured a total length of 167 mm with a carapace length of 65 mm. The length of the outgrowth was 36 mm (Fig. 1). The specimen was collected from the gill net catches of lobsters landed at Kayalpattinam on 28th August 1985. On the day of the collection of the specimen, 35 numbers of *P. ornatus* were landed at the centre. The size of the lobsters landed on that day ranged between 134 and 322 mm in total length in the case of male and between 164 and 252 mm in the case of female.

The development of antennule-like structure in the place of eyestalk of the lobster *P. japonicus* has been reported earlier by Yosii from the wild and Radhakrishnan and Vijayakumaran (1984). On the otherhand, Radhakrishnan and Vijayakumaran observed the



Fig. 1. *Panulirus ornatus* with antennule-like outgrowth in the place of right eyestalk