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SEASONAL VARIATION IN THE PHYSICO-CHEMICAL PROPERTIES OF RUSHIKULYA ESTUARY AND ITS EFFECT ON THE OCCURRENCE OF *CHANOS* FRY

K.C. PATNAIK* AND P.M. MISRA**
Department of Marine Science, Berhampur University, Berhampur - 760 007, Orissa

ABSTRACT

Seasonal variation in some physico-chemical properties of Rushikulya estuary was studied. The surface water temperature varied from 20 to 34.5°C, the transparency of the water from 6.3 to 12 cm, the salinity from 28.3 to 32.8‰ and the *PH* from 6.77 to 7.35. The transparency and salinity showed bimodal distribution. Occurrence of the *Chanos* fry were correlated to it.

Brackishwater fishes are regularly caught in the Rushikulya estuary. The availability of the fishes and their fry depend on the physico-chemical properties of the environment. Hence the study on the seasonal variation of the physico-chemical properties of an estuary is essential to formulate an annual trend of availability of different fishes and their larvae and fry. Milkfish, *Chanos chanos* by virtue of its quick adaptability and survival in brackishwater ponds is an important fish for culture practices among the brackishwater fishes. Besides induced breeding pisciculturists mostly depend upon the natural resources for collection of larvae and post-larvae of the milkfish. For the successful culture of this species, quantitative studies on the availability of the fry in the natural habitat is essential.

Rao (1970) studied the seasonal abundance of the larvae of *Chanos chanos* (Forskal) in the Pulicat Lake with reference to the lunar phase, the time of the day and the tide and correlated with surface salinity, surface temperature and rainfall. Basu and Pakrasi (1976) reported the occurrence of the milkfish larvae on the eastern bank of the Hooghly estuary. The intensity of larval catch was correlated with the variation of salinity, temperature, clarity and velocity of water. The present study deals with the occurrence of *Chanos chanos* (Forskal) in relation to the surface temperature, transparency, salinity and *p*H of water in the Rushikulya estuary.

Midnapore type shooting net of 1/8" mesh size (Jhingran, 1965) was used for collection of the fry once on a high tide and low tide time during each new-moon and full-moon days from October 1983 to September 1984. The samples were preserved in formalin solution (10%) and kept for future study. The number of *Chanos* fry in respect of the total fish fry was worked out in an unit effort and the percentage was determined. Surface water samples were collected to determine the salinity and *p*H. Surface temperature and transparency were measured.

Three peak occurrences of the *Chanos* fry were noted during the month of August, September and April (17.52%, 14.96% and 10.1% respectively). The lowest catch of the fry was observed in the month of December (5.66%). The surface temperature, transparency, salinity and *p*H were correlated to the occurrence of *Chanos* fry (Fig. 1). A positive correlation was observed from 20° to 31.5°C. The peak occurrence of the fry was noted in August at 31°C and in April at 31.5°C and the minimum in December at 20°C (Fig. 1b). A close relation of transparency and occurrence of *Chanos* fry was observed from 6.3 to 12 cm transparency. The highest

* Department of Zoology, Bhanja Bihar, Berhampur - 760 007, Orissa.
** Department of Marine Sciences, Bhanja Bihar, Berhampur - 760 007, Orissa.

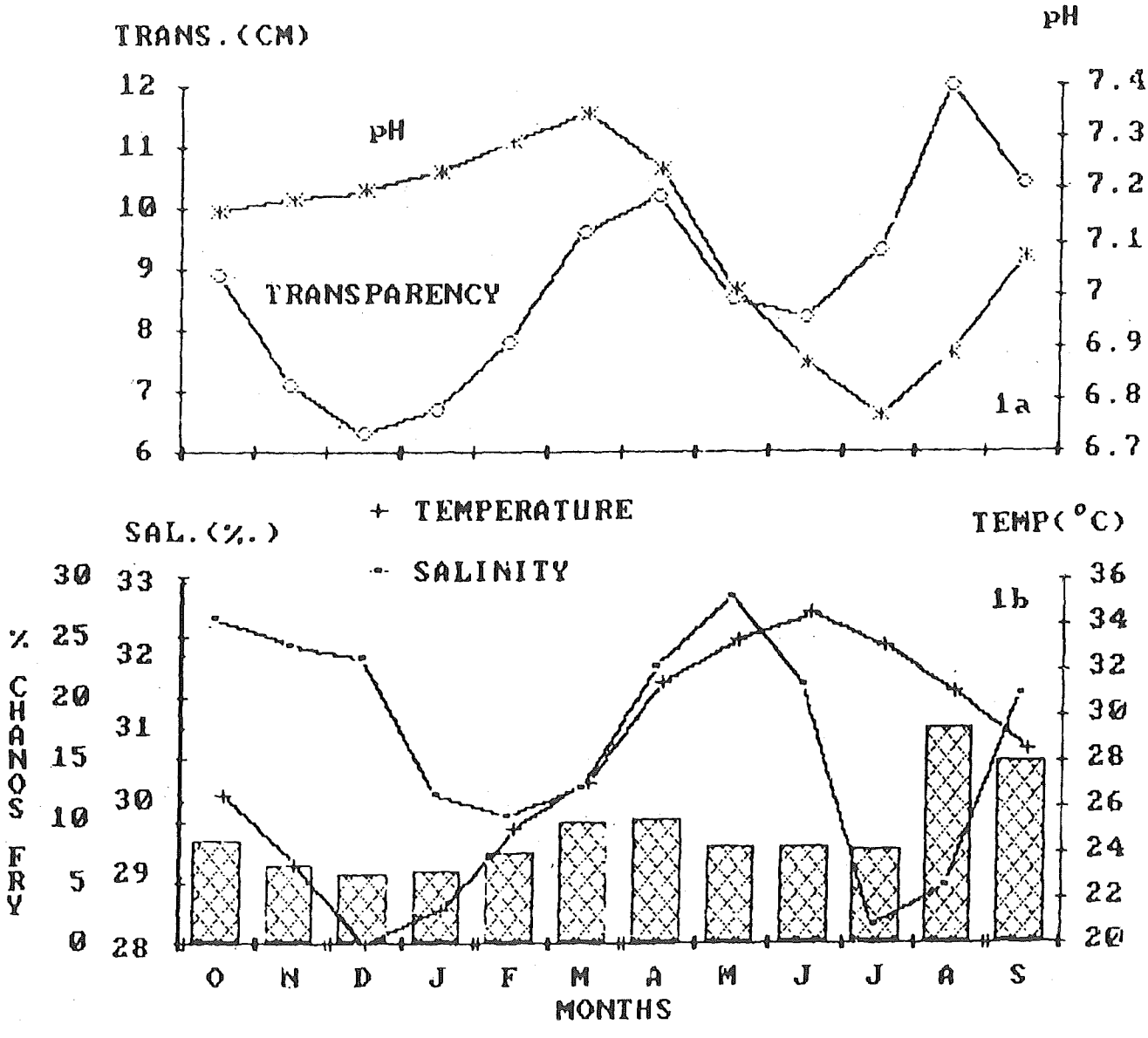

Fig. 1. *Correlation between the % of Chanos fry and temperature, transparency, salinity and PH.*

availability of the fry was noted at 12 cm in August and 10.2 cm in April and the lowest occurrence at 6.3 cm in December (Fig. 1a). The peak availability was observed when the salinity value was 28.85%° in August and 31.85%° in April and the lowest when 31.95%° in December (Fig. 1b). During the peak occurrence of fry in August the *p*H was 6.89 and in April 7.25 and the lowest was at the *p*H value of 7.2 in December (Fig. 1a).

Rao (1970) established a positive correlation of larval abundance in Pulicat lake with surface temperature at the range of 26.5 to 30.3°C. Basu and Pakrasi (1976) reported a positive relation in the abundance of *Chanos* larvae in Hooghly estuary with surface temperature at the range of 30.5 and 31.1°C. They showed that lower temperature during the day yielded more larvae than at night when the temperature was high. However, *Chanos* is known to tolerate temperature upto 40°C (Schuster, 1958). The present observation shows a positive correlation on the occurrence of *Chanos* fry with the surface water temperature at a wide range of 20 to 31.5°C which covers the range of observation of Rao (1970) and Basu and Pakrasi (1976).

A close relationship between the larval abundance and water transparency was observed by Basu and Pakrasi (1976). *Chanos* larvae occurred in waters with a transparency of 7.1 cm which was quite turbid. However,

Schuster (1958) has noted that *Chanos* larvae did not occur in silt-laiden coastal waters of deltaic regions. In the present observation a close relation was observed between the transparency range of 6.3 to 12 cm and the availability of *Chanos* fry.

Rao (1970) found the surface salinity values during peak periods of larval abundance to be 34.3 and 34.4‰. A positive relationship between salinity (34.55 and 34.59‰). and the abundance of *Chanos* larvae was noted by Basu and Pakrasi (1976). However, in the present observation the peak availability was found when the salinity value was 28.85 and 31.85‰ during the months of August and April respectively and the lowest availability when the salinity was 31.95‰ during December which show that the fry do prefer lower salinity for which they move from the sea towards the estuaries where the fresh water mixes with the sea water.

The availability of *Chanos* fry was related inversely to the *p*H of the surface water. No report is available regarding the effect of *p*H on the distribution of the *Chanos* fry.

The transparency and salinity show a bimodal distribution and the occurrence of the *Chanos* larvae also show the same trend.

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