STUDIES ON THE GROWTH OF SAROTHERODON GALILEUS (LINN) IN LAKE MANZALAH - EGYPT

Nabila F. BISHARA
Institute of Oceanography and Fisheries, Alexandria (Egypt)

Summary :

1. The season of active growth : Begins at late march and extends through the summer and autumn months.

2. The body scale relationship : Is found to be a linear one. It is represented by the linear equation :

L = 18.9 + 1.1045 S
L = total length of the fish in m.m
S = total scale radius

The results show that Sarotherodon galileus in the lake attain a length of 18.9 mm before the scale appear on the fish.

3. The back calculation of the length of the fish at different ages :

The results indicate that the fish at the end of the years I,II,III,IV, & V has absolute growth of 7.7, 14.5, 19.7, 19.8 & 21.0 cm for males and 7.0,14.3,17.9,16.8,18.0 cm for females respectively.

4. Growth indices : The maximum length attained by males is 28 cm and by females in 26cm males reach the maximum length before the females.

In autumn and winter female Sarotherodon galileus reach its maximum rate of increase in fish weight per unit lengths so that the fish can face the starvation of the spawning season.

The maximum weight attained by the males in considerably greater than that of females, however, during the peak of spawning season i.e spring and summer, both sexes show a clear drop in their maximum weight;

This shows that both males and females play an important role in brooding their eggs and youngs.

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THE COASTAL LAGOONS OF THE EBRO DELTA : A PARADIGM OF THE HUMAN INFLUENCE ON THE ECOLOGY OF COASTAL LAGOONS THROUGH UNCONTROLLED AGRICULTURE SEWAGE

Francisco A. COMIN

Department of Ecology, University of Barcelona,
Diagonal 645, Barcelona (Espana)

The coastal lagoons in the Delta of the Ebro river (NE. Spain) constitute an interesting case-study as they can be considered as a paradigm of the agricultural influence on coastal aquatic ecosystems. At the beginning of the XX century rice began to be cultivated extensively in the Delta. Actually the paddy fields occupy about 40% of the Delta area (320 km^2). Every year during the period of rice cultivation, from May to October, a very dense network of channels transports the water from the river to the fields and then drains it into the lagoons or the sea. This flow does not exist during winter-early spring period because the rice fields remain dry. Then the lagoons exchange water with the sea.

This artificially controlled hydrological regime affects many aspects of the ecology of the lagoons. Salinity changes from values almost as high as that of the sea in winter-early spring to freshwater values during the mid spring-summer-autumn period. The unique exception is Buda lagoon whose lagoon area/continental drainage area is less than 1 and has an intense exchange of water with the mouth of the river and the sea.

Most of the nutrient concentration values fall into the range of 1-5 ug-at $P\text{-}PO_4^{3-}$ l^{-1} and 0-30 ug-at $N\text{-}NO_3^-$ l^{-1}. Peaks of phosphate between 5 and 60 ug-at l^{-1} are observed in October and in winter. Peaks of dissolved inorganic nitrogen vary between 30 and 100 ug-at l^{-1} and they occur in winter and spring or autumn. The lack of DIN is common during the summer. The annual cycles and the maxima show clear differences from one lagoon to another (COMIN *et al.*, in press).

Encanizada, Platjola and Olles are the most eutrophic lagoons. They do not have submerged macrophytic beds. However, phytoplankton populations are very dense and active(10^4-10^6 cells ml^{-1}, 10-450 mg C m^{-3} h^{-1}). As a contrast, in other lagoons (Tancada, Buda, Canal Vell) *Ruppia cirrhosa* and *Potamogeton pectinatus* form extensive beds, while phytoplankton is less abundant (10^3-10^5 cells ml^{-1}, 5-100 mg C m^{-3} h^{-1}).

Planktonic populations change during the year. In winter-early spring period marine and estuarine species are predominant (*Dunaliella* sp., *Pyramimonas grossi*, *Cryptomonas acuta*, *Hemiselmis rufescens*, *Pseudopedinella pyriformis*, *Eutreptiella marina*, *Calanipeda aquae-dulcis*, *Notholca* spp., *Synchaeta* spp.). For the rest of the year typical freshwater species dominate the community (*Cyclotella meneghiniana*, *Scenedesmus quadricauda*, *Coelastrum microporum*, *Phormidium tenue*, *Anabaena* spp., *Hexarthra* spp., *Brachionus calyciflorus*, *Acanthocyclops vernalis*, *Moina micrura*) (COMIN, 1984; MENENDEZ & COMIN, in press).

Salinity and nutrient levels are the main factors controlling the differences of species composition and standing stocks of the populations between different periods of the year and between lagoons. The biology of the populations in each lagoon during partial periods of the year is controlled by other factors (e.g., incident light, temperature, relative concentrations of the nutrients). Salinity, probably plays a less important role (COMIN, 1982; Menendez & COMIN, in press).

The N/P ratio changes from values higher than 16 to values lower than 16 as salinity and primary production of the phytoplankton increase during the winter-early spring period. For the rest of the year the N/P ratio remains over 16 while primary production varies in a wide range. This is in agreement with the idea that considers nitrogen the limiting nutrient in marine waters and phosphorus in freshwaters and with the expected effect on the lagoons of nitrogen rather than phosphorus enriched agricultural discharges.

In summary,.agricultural management strongly modifies the hydrological regime of the Ebro coastal lagoons. This causes a drastic change of the salinity seasonal pattern and nutrient levels, both of which in turn affect the structure, composition and production of the communities.

References

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