

Biology of the mullet species occurring in the estuaries of Freetown Peninsula.

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This study embraces several aspects of the biology of the mullet species found in and around Freetown. The main objective is to find out which species of mullet will be most suitable for estuarine or freshwater pond culture. It is hoped that by the end of this study sufficient data would be available to throw light on:

1. Feeding rate and assimilation efficiency of the different mullet species.
2. Fraction of organic matter in the sand actually utilized by the fish.
3. Spawning season or seasons of the main species.
4. Rate of growth of the different species.
5. Age and size at maturity.
6. Species most tolerant to fresh water.

The main project site is a small estuary called the Black-Johnson Estuary, some five miles off York.

During the course of the investigation, other estuaries were also examined for mullet populations. These included, Aberdeen Creek, No.2 River Estuary, Jui and Hastings (especially by the New Orogu Bridge). Originally, samples were collected from Black-Johnson every week for population study, growth rate and rate of feeding. On completion of these aspects of the study, visits to the site became less frequent. Presently, the greater part of the investigation is concentrated at Aberdeen Creek, which is within easy reach and supports a much larger fish population.

It is outside the scope of this Bulletin to give the detailed methods employed in the present study. Briefly, the following data are collected on almost every sample: total length and standard length of the fish, depth of body, weight and gutted weight; and where possible, sex of the individuals and their gonad condition. A sub-sample is retained for further investigation, such as microscopic examination of the gut contents and scales. Preliminary investigations confirmed the findings of Payne(1976) that there are five species of mullets occurring around the Freetown Peninsula; - Liza falcipinnis (Cuvier and Valenciennes). Mugil cephalus ashanteensis (Bleeker), Liza dumerili hoeferi (Steindachner), Liza grandisquamis (Cuvier and Valenciennes) and Mugil curema (Cuvier and Valenciennes). Of all the species, Liza grandisquamis appears the most restricted in its distribution - occurring by and large, only in muddy areas, frequently around mangroves. This species is completely absent at Black-Johnson Estuary. The other four species occur along the Peninsula but further work is needed before a conclusive mapping of their distribution is made. Liza falcipinnis so far appears the most widely distributed.

Salinity tolerance tests reveal that M. cephalus ashanteensis and M. curema are the least tolerant to fresh water; whilst L. falcipinnis and L. dumerili hoeferi survive in fresh water. These last two species have been caught in wholly fresh water habitats on different occasions. Payne(1976) cited D.E.B. Chaytor collecting both the species from the River Taia. In 1974 and again in May 1977 Dr. Payne and I collected Liza falcipinnis from the Little Scarcies. Shoals of these species were observed in the Rokel in May this year. Experiments on the salinity tolerance are still underway.

The indications thus far show that mullets feed on every conceivable fine particles occurring in their vicinity so long as it is small enough to be ingested. There is no selection, except for that based on particle size. The major constituents of their diet however, show a clear change from detritus in the rainy season to algae (both green and blue-greens) in the dry season. It has been shown by various workers that the assimilation efficiency in mullets ranged from 45 to 52%. In the present study, L. falcipinnis has been shown to assimilate 53-56% of the organic matter ingested (c.f. 52% by A.I. Payne), for L. dumerili hoefleri it is 32-43%. Work in this area continues, but it is evident that the assimilation efficiency varies with the species.

Nothing conclusive can be said at the moment about the spawning season, until the interpretation of all the data collected is completed. There are indications that there are slight differences and considerable overlaps in the spawning seasons of the different species. For L. grandisquamis the spawning season has been tentatively fixed from August to November; for L. falcipinnis and L. dumerili it is from mid-October to early January.

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