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THE BIOLOGY AND THE FISHERY OF PONY FISHES  
IN THE BOLGODA LAGOON,  
SRI LANKA

by

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Thesis submitted in partial fulfilment of the requirements for the Degree of Master of Philosophy of the Faculty of Applied Science, University of Sri Jayewardenepura, Nugegoda, Sri Lanka.

August 1989

117287

## ABSTRACT

Biological and fisheries studies of pony fishes were carried out in the Bolgoda Lagoon (South-West coast of Sri Lanka) during a period of three years, commencing from 1984. The following aspects were included in the study: taxonomy, species composition and distribution of pony fishes caught in the lagoon and along the South-West coast extending from Puttalam to Tangalle; food and feeding habits, age and growth, reproduction and fishery of the most dominant species, Leiognathus dussumieri, in the Bolgoda Lagoon; hydrobiological parameters such as salinity, temperature, turbidity and plankton production. This last aspect was monitored throughout the investigation.

There are about 13 species of pony fishes found during the study viz; Leiognathus dussumieri, L. brevirostris, L. fasciatus, L. splendens, L. daura, L. smithursti, L. lineolatus, L. elongatus, L. bindus, Gazza minuta, G. achlamys, Secutor insidiator and S. ruconius. Based on the morphology and osteology of caudal skeletons the above species can be divided into at least two groups. L. dussumieri, L. brevirostris, G. minuta, L. fasciatus, L. smithursti, L. splendens, L. daura, S. insidiator and S. ruconius were found in the lagoon, whereas the rest of the species were found only in the sea. The most dominant species

in the lagoon is L. dussumieri forming about 78% of the pony fishes.

The most important constituents of the diet of L. dussumieri were copepods, blue-green algae, polychaetes, gastropods, invertebrate eggs, green algae, diatoms and decapods. The other species, such as L. daura, L. fasciatus, L. smithursti and L. brevirostris, too consumed the above components but their proportions were different. In Gazza minuta decapods are the dominant type, though the other constituents are also present in considerable proportions. Blue-green algae, green algae and diatoms are found to be more frequent in the food of L. dussumieri living near the head-end whereas amphipods, gastropods and polychaetes were more frequent in those fishes caught at the mouth of the lagoon. The feeding habits of the fish do not change with age except the smallest sized group (5mm - 25mm) which feed mainly on copepods, blue-green algae, green algae, eggs and nauplii. The diurnal variation of food of the fish shows that they consume more blue-green algae, green algae, diatoms, gastropods and polychaetes during day time than at night while amphipods and decapods in the diet indicate the opposite. Copepods are found uniformly in the food throughout the day. The peak feeding times occur between 2.30-6.30 p.m. and 12.30-4.30 a.m. during day time and night time respectively.



The length-weight relationship of males and females of L. dussumieri was not found to be statistically significant. The common equation estimated for both males and females was found to be different from the equation estimated for indeterminates. The growth curves of fish within different stages of maturity too do not differ from one another either in males or females. The fish attains the length of 72mm at the end of the first year, 108mm at the end of the second year and 122mm at the end of the third year. The fish has a life span of at least 3 years or more in the Bolgoda Lagoon. Maximum and minimum length recorded in the present study was 141mm and 3mm in standard length respectively.

Of the mature stages stage V and VI were not recorded during the present study because ova may be released at short intervals of time. The minimum size at first maturity for males was found to be 76mm and for females 70mm. From the studies of GSI and ova diameter it was found that this species spawns twice a year, one, during May-June and the other from November-December. Generally, females predominate over males in commercial catches. Fish caught from both traps and seines do not indicate any selection for sexes within the length groups. The fecundity of the fish was found to be  $195275 \pm 12184$ . From fecundity-standard length, fecundity-ovary weight and fecundity-fish weight relationships, it was found that the

fecundity is best related to the weight of the fish.

In the Bolgoda Lagoon the fishery for pony fishes exists throughout the year with peaks around March-June and October-December. The catch per unit effort studies indicated that its still an expanding fishery. The total production of pony fishes from this lagoon is about 5451kg/year which is about 5.25kg/ha/year.

Pony fishes are mainly caught by seines and traps in the Bolgoda Lagoon. The fishing season for pony fishes is from March to July and from October to December. The highest catch was recorded in 1985. Pony fishes comprise about 9% the total fish catch. It was evident that the catch almost always increased with the effort. Overfishing can be ruled out for pony fish in the lagoon.

The rainfall pattern of the surrounding catchment area of the Bolgoda Lagoon indicates two peak periods (April-June and October-December) and two trough periods (January-February and June-July). The salinity of the water shows an inverse relationship with the rainfall. The peak periods of salinity are during December-March and July-September and it ranges from about 9-34‰. The lagoon becomes almost freshwater during heavy rainy periods. Salinity drops below 1‰ in the lagoon except at the mouth. Bottom

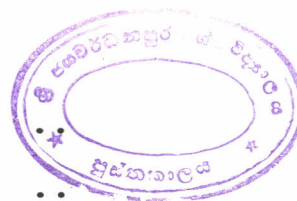


salinity was always higher than that of the surface. Temperature varies from 29°C - 34°C. Generally, bottom temperature was higher than that of the surface during January to April and vice versa from May to December. The dominant types of phytoplankton were blue-green algae, green algae and diatoms. Diatoms are more abundant near the mouth while blue-green algae and green algae are abundant towards the head-end of the lagoon. Diatom peaks are observed during the dry seasons (January-February, July-September), and algae peaks are associated with the rainy seasons. The dominant zooplankton types were copepods, nauplii and rotifers. Copepod and nauplii peaks are normally found during January-March and June-September periods. Rotifers are concentrated near the head-end. Their peak periods coincide with the rainy seasons.

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