

**STUDIES ON SOME ASPECTS OF THE
BIOLOGY OF *LABEO PANGUSIA* AND *LABEO DERO*
FROM THE NORTH-EASTERN INDIA**

ABSTRACT

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ABSTRACT

There is a paucity of information on the biology of indigenous fishes in the highlands of the North-Eastern Hill Regions of the country. Such a knowledge, is of utmost importance not only from the academic view point, but also in its utility in increasing technological efficiencies of the fishery entrepreneurs for evolving judicious management measures. Keeping in view, the basic necessity to have a knowledge on the biology of fishes and hence, on a virtual absence of such informations, a study has been undertaken to elucidate on the biology of two Labeo species viz., Labeo pangusia (Hamilton) and Labeo dero (Hamilton) from the highlands of North-Eastern India.

The study pertains to the specimens of these fishes, collected from three different rivers viz. (i) Simsang river (near William Nagar, Meghalaya; 25°30'N latitude and 90°40'E longitude), (ii) Lubha river (near Sonapur, Meghalaya, 25°07'N latitude and 92°24'E longitude), and (iii) Madhura river (near Kumbhirgram, Assam; 24°55'N latitude and 92°56'E longitude). The collections were made during August, 1978 through November 1980 from Simsang river, while from Lubha and Madhura rivers during December 1979 to November 1980.

The results obtained during the present study has been presented in the thesis entitled, "Studies on some aspects of

the biology of Labeo pangusia and Labeo dero from the North-Eastern India". The dissertation containing 185 pages, with 35 Tables and 38 Figures, has been divided into 5 chapters. The first chapter deals with an introduction to the biological studies of fishes, followed by a short review of the available literature on the biology of the genus Labeo. This is further followed by the taxonomical status, diagnostic characters, synonyms and vernacular names of the species. In the second chapter the materials and methods adopted for the present study have been presented. This is further followed by the third chapter, dealing with the results obtained on morphometric and meristic characters, length-weight relationship, condition factor, food and feeding habits, maturity and spawning, and age and growth of L. pangusia and L. dero. The fourth chapter contains the discussion on the results obtained during the present study. In the fifth and final chapter, a summary and conclusion of the entire study have been presented, which is followed by list of literature cited in the dissertation.

The following are the important results obtained during the present investigations and embodied in the thesis.

- 1) An intra-specific variation has been observed in various morphometric characters as shown in the regression equations which may be attributed to diverse ecological and environmental conditions prevalent in the three different river systems. The various meristic counts of L. pangusia and L. dero

made during the present study did not show marked intraspecific differences. Sexual dimorphism in certain morphometric characters such as height of the pectoral fin, body depth etc. were observed in both the species.

The results of the biometric studies reveal that eye diameter shows negative allometry in both the species. The standard length in relation to total length also shows allometric growth in both the species. The growth of the head length in relation to total length is isometric in L. pangusia but the same is allometric in the case of L. dero. Again, the body depth exhibits allometric growth in L. pangusia whereas the same shows isometric growth in L. dero.

2) The length-weight regression and parabolic equations for L. pangusia and L. dero are derived to be as follows :

L. pangusia :

$$\text{LogW} = -2.0220 + 3.0066 \log L \quad (r = 0.9724)$$

$$W = 0.009506L^{3.0066}$$

L. dero :

$$\text{LogW} = -1.9409 + 2.9030 \log L \quad (r = 0.9828)$$

$$W = 0.01146L^{2.9030}$$

The regression equations of the length-weight relationship for males, females and juveniles of both the species from three different populations and different seasons (viz. summer,

monsoon and winter) have also been worked out separately.

3) Condition factor (K) of L. pangusia varied from 0.8311 to 0.9789 in the specimens from Simsang river, from 0.8047 to 1.0572 in the individuals from Lubha river and from 0.7846 to 0.9409 in the specimens from Madhura river. The ponderal index or K factor of L. dero has been found to range from 0.8585 to 0.9826 from Simsang river, from 0.8632 to 0.9775 in the individuals from Lubha river and from 0.8924 to 0.9754 in the specimens from Madhura river. Variations in the condition factor have been attributed to different factors such as environmental condition, feeding intensity and gonadal maturity.

4) The results of the food and feeding habits of L. pangusia and L. dero indicate that the basic food is detritus as well as diatoms. Large quantities of sand particles encountered in the gut contents of both the species, most probably entered in the guts while browsing in the river bed. Chlorophyceae and Myxophyceae may be considered as secondary food of both the species. It has been also observed in the present study that young fishes (fry and fingerlings of L. pangusia and L. dero) prefer more algal food than the detritus; but as the fishes grow they take more detritus. Seasonal fluctuations of the different food items in the gut contents have been observed.

G.S.I. values indicate that feeding intensity of L. pangusia and L. dero is high during March-April (pre-spawning) and again during August-September (post-spawning). During spawning period comparatively less G.S.I. values have been observed.

It has also been observed that R.L.G. values of L. pangusia and L. dero increase with the increase in the fish length. The high R.L.G. values, presence of ventral mouth and occurrence of large quantities of detritus confirm that both the species are bottom dwellers and browsing in the river bottom.

5) Maturity studies indicate that both L. pangusia and L. dero have restricted breeding season (June-July). Ova-diameter studies and K-factor also reveal that spawning occurs during June-July. The values of G.S.R. (Gonadosomatic Ratio) were found maximum during April-May and the G.S.R. abruptly fall down from June onwards indicating the beginning of the spawning.

It has been observed that 50% maturity (M_{50}) in males and females of L. pangusia were at 25.1 - 30.0 cm group. The male specimens of L. dero attain 50% maturity at 20.1 - 25.0 cm group while female specimens at 25.1 - 30.0 cm group.

The fecundity of L. pangusia has been found to range from 1,89,626 to 8,14,897 and that of L. dero from 80,627 to

2,33,205. The relative fecundity of L. pangusia has been found to vary from 105 to 546 while in L. dero, the range is between 152 and 281. The fecundity estimate suggests that both the species are highly fecund like other species of the genus Labeo.

6) It is found that rings in the scales of L. pangusia and L. dero formed mostly during May to July and the probable causative factors for ring formation are due to stress caused by gonadal maturation and retardation of feeding intensity. In both the species the growth in length attained during first year is found to be highest. The specific growth (in length) decreases gradually as the fishes grow in years.

The increment in weight was observed to be faster from 3rd/ 4th year onwards in both L. pangusia and L. dero.

The ultimate or asymptotic length (L_{∞}) of L. pangusia was found to be 65.80 cm, 68.10 cm and 61.60 cm in the individuals from Simsang, Lubha and Madhura rivers respectively. The ultimate length of L. dero was calculated to be 49.0 cm from Simsang river, 50.90 cm from Lubha river and 45.75 cm from Madhura river.

In the present study it is observed that growth rate of L. pangusia and L. dero from Lubha river is higher than those from the Simsang and Madhura rivers which may be due to better food availability in the Lubha river.