ABSTRACT

Hydrobiological characteristics of the river Brahmaputra were analysed on monthly basis over the 24 month period of study. The average water temperature in the river ranged from 18.1 to 28.3 °C, while the pH varied between slightly acidic to alkaline (6.8 to 7.6). The variation in dissolved oxygen was from 4.0 to 10.5 mg/l and that in carbon dioxide from 1.2 to 4.6 mg/l. Alkalinity was low to medium (20 to 81.0 mg/l), conductivity varied between 22.5 to 142.3 μmhos/cm, while total dissolved solid ranged from 11.6 to 70.3 mg/l.

The planktonic population was low in the river with its density ranging from 14 to 64 u/l. It included mainly Bacillariophyceae, Chlorophyceae, and Myxophyceae. Bacillariophyceae fluctuated between 10.7 to 81.8%, Chlorophyceae 13.6 to 64.3% and Myxophyceae 3.6 to 25%. Among zooplankton, copepod and rotifer were found in small number. The population of periphyton ranged between 2660 to 28,320 u/cm², showing distinct variations with season. Periphyton population was higher during winter. The main periphyton groups encountered were Bacillariophyceae, Chlorophyceae and Myxophyceae. Bacillariophyceae dominated over Chlorophyceae. Myxophyceae population was all time low (1.8 to 8.7%). Animal groups were almost absent, except the nematodes, which occurred during the month of June. Macrobenthos population in the river ranged from 32 to 381 no./m². During winter and post-monsoon months benthic fauna were the maximum. Minimum benthic population was seen during monsoon.

Morphometric and meristic characters were studied in Labeo gonius from the river Brahmaputra. The ratios of different body measurements and their relative percentage to total length were established. The regression of different body measurements on total
length was carried out and these were found to be linear in both the sexes. No sexual dimorphism could be seen in morphometric and meristic characters of the fish.

The biology of L. gonius from the river Brahmaputra was also studied. The length-weight relationship (LWR) in this species followed the cube law. There was no significant difference in the values of ‘b’ in fish of different size and sex. The equation of LWR were

Log W = -13.082 + 3.3198 log L (r = 0.9676) for Juvenile;
Log W = -2.323 + 3.159 log L (r = 0.9754) for male;
Log W = -11.58 + 3.0085 log L (r = 0.9754) for female;
Log W = -11.804 + 3.159 log L (r = 0.9696) for gutted male; and Log W = -11.082 + 2.8989 log L (r = 0.9676) for gutted female.

The relative condition factor (Kn) was higher in smaller size-group. It declined with increase in size. The variations in Kn values in different months followed a similar pattern in both the sexes. Maximum Kn values were recorded in June and minimum in December. Variations in Kn value was also found to be closely related with changes in gonadosomatic index of fish. The observed variations in Kn were attributed to factors like variations in environmental condition, availability of food and maturity of gonad.

The anatomical features of L. gonius revealed that it is a herbivorous fish. Inferior mouth, thick lip, extremely long alimentary canal, seemed best suited for its herbivorous feeding habit. The food of L. gonius mainly consisted of decayed organic matter, mud, sand, and both phytoplankton and zooplankton. Zooplankton appeared to be the main food of fry and fingerling. In adult, detritus and mud were found to substitute the planktonic food. As the fish is bottom feeder, some amount of sand was encountered in the stomach of all the fish.
Zooplankton was completely absent in fish of larger size-group. Among planktonic food, Bacillariophyceae formed a greater proportion of food composition. Seasonal variation was also noticeable in the gut content of *L. gonius*. Planktonic food was maximum during the period from September to March, which was substituted by detritus and mud during the monsoon months. Feeding intensity was higher during October to November. During winter (December to January), the gastrosomatic index (GSI) was low. GSI registered an increasing trend from February to April. A diminishing trend in GSI during May to August indicated towards low feeding intensity in both the sexes, especially in female and this was ascribed to maturation of gonad during the period. During monsoon months heavy rainfall caused dilution of food items, leading to scarcity of food, and hence intensity of feeding was low during this period. Intensity of feeding was higher in juvenile than the adult fish. There was no significant difference in GSI of male and female fish. However, feeding intensity was slightly lower in female fish. Relative gut length (RLG) was found to increase with the size of the fish. As the fish shifted from planktivorous to herbivorous feeding habit, their RLG increased subsequently.

The average sex ratio of *L. gonius* from the river Brahmaputra was found to be 1: 1.14. The male attained maturity at 172 mm while the female at 186 mm total body length. The spawning season of the fish commenced in late July and continued up to August. The ovary contained a single batch of ova and spawned only once during the year. Rise in water temperature and heavy showers and other physico-chemical factors appeared to stimulate the spawning of this species. The gonadosomatic index was found to reach its peak value in male and female during June and July, respectively. The fecundity in *L. gonius* ranged from 18,697 to 2,03,233, with an average of 99,098. The fecundity followed the cube law with respect to fish length. Fecundity
seemed more related to weight than the length of the fish. The observations on various aspects of breeding biology of *L. gonius* from the river Brahmaputra were generally comparable with the findings on several other species of Indian carps.

During 2000-01, the total fish landing at Uzan Bazar fish landing centre, Guwahati was 258.85 tonnes of which the contribution of *L. gonius* was 10.27 tonnes. It constituted around 3.96% of the total catch. In 2001-02 the total fish landing at the above centre was 608.72, tonnes with *L. gonius* contributing 22.66 tonnes or 3.72% of the total fish catch. Fishery of this species was found to commence in July and continue till December in the river Brahmaputra. The peak fishing season was from July-August. The maximum landing were reported for fish of 1-year group, up to 150 mm in total length. The retail price of fish during the period was found to fluctuate between Rs. 100-170 kg⁻¹. Fishing gears such as cast net, gill net, dip net, bag net, drag net, hook and line were generally found to be used for catching *L. gonius* and other fish species from the river Brahmaputra.

**THESIS**