

FOOD SELECTION OF TWO CO-OCCURRING CARPLETS  
*BARBUS CUMINGI* AND *BARBUS NIGROFASCIATUS*  
(OSTEICHTHYES, CYPRINIDAE) IN A MOUNTAIN STREAM  
OF SRI LANKA

by

K.H.G.M. DE SILVA and R.M.D. SOMARATHNA  
(*Department of Zoology, University of Peradeniya, Peradeniya, Sri Lanka*)

SUMMARY

The food and feeding ecology of *Barbus cumingi* and *B. nigrofasciatus* were studied by monthly sampling for 15 months in a head-stream of Mahaweli river and also in small experimental tanks. Both species fed on the bottom aufwuchs layer but, when available, preferred formulated dry feed.

Although the composition of the diet of both species depends mainly on the food items available in the habitat, the relative abundance of different food items in the diet of each species and that of the habitat were found to be significantly different. Both species mainly fed on diatoms and detritus in the stream and on green algae in the experimental tanks, but avoided blue-green algae in both habitats. Both species included in their diets relatively more diatoms and less detritus as they grew.

The quantitative dietary composition of the smaller individuals of the two species was significantly different, but that of the larger individuals was found to be not significantly different. The quantitative dietary composition was also significantly different between some of the size classes of each species despite the high degrees of dietary overlap between these classes.

**KEY WORDS:** *Barbus*, Cyprinidae, feeding biology, fish, Sri Lanka, stream, tropical.

INTRODUCTION

Tropical streams are inhabited by a large variety of fish species, several species often occupying the same macro-habitat. The niche differentiation of such fish assemblages has been studied recently by several authors (SENANAYAKE & MOYLE, 1981; MOYLE & SENANAYAKE, 1984; SCHUT *et al.*, 1984; KORTMULDER, 1987; YANG, 1988; WIKRAMANAYAKE & MOYLE, 1989; WIKRAMANAYAKE, 1990).

In Sri Lankan streams about 30 species of indigenous Cyprinidae (which family dominates the tropical Asian waters in general) are found. Most of these species are minor carplets with herbivorous or omnivorous feeding habits (FERNANDO, 1965; GEISLER, 1967; SCHIEMER & HOFER, 1983; MOYLE & SENANAYAKE, 1984) and several of such species are frequently found in the same habitat. Preliminary investigations indicated that *Barbus cumingi* Günther and *B. nigrofasciatus* Günther occur together in many locations in the head-streams of river

Mahaweli and that both species feed mainly on the diatoms and detritus indicating a wide dietary niche overlap. Therefore, the two species were selected to investigate the significance of the dietary overlap between the species as well as between the different size classes of each species.

## MATERIALS AND METHODS

### *Habitat*

Feeding biology of *B. cumingi* and *B. nigrofasciatus* was studied in a perennial montane stream, which is about 10 km long and situated 7° 1'N, 80° 29'E. The stream begins from a hill range at an elevation of about 1200 m and joins the river Mahaweli at an elevation of 585 m. Its substratum mainly consisted of pebbles and stones in some places and sand and mud in others. The stream in the study area was 10-15 m wide and had a moderate water flow (5-15 cm sec<sup>-1</sup>). The submerged stones, rocks and other objects in the pool area of the substratum were covered with aufwuchs.

### *Sampling*

Monthly samples were obtained during the period of September 1986 to November 1987 from five sites, which were selected randomly at the beginning of the study, along a stretch of about 100 m near the mouth of the stream. A monthly sample contained 25-50 individuals of each species. Samples were collected between 0700 and 1100 hrs using a cast net with a diameter of about 4 m and stretched mesh size of 10 mm. The fish were immediately injected with a 5% formalin solution into the body cavity. During each sampling session, the temperature, pH, conductivity, turbidity and concentration of dissolved oxygen of water were measured using calibrated portable electronic meters. The speed of water flow was estimated by noting the time taken by a floating cork to travel a specified distance along the middle of the stream. The average of five readings was taken as the speed of water flow. Monthly mean depth of water was calculated by measuring the depth at 1 m intervals along a line transect at each site. The rainfall data were obtained from the Meteorological Station at Blackwater Tea Estate, which was situated at the same elevation about 2 km away from the sampling site.

### *Food analyses*

Fish were divided into three size classes by total length, viz., <31, 31-45, and >45 mm. In order to study the dietary composition, contents of the enlarged anterior portion of the gut of five randomly-chosen specimens of each size class from each monthly collection were carefully removed, pooled and suspended in 10 ml of water. If necessary, the sample was further diluted. Five 1 ml samples of the suspension were studied in a Sedgewick Rafter Cell under a stereo-microscope. The relative abundance of each food item was estimated by counting the number of each item present in 50 squares along the diagonals of the counting grid. The sums of the counts of five samples were used as the basic data in statistical analysis. Since the actual time of sampling during each month varied within the time period of 0700-1100 hours, in analyzing the basic data it was assumed that the feeding behaviour of the two species did not change within this time period in different months.

The composition of the food source in the habitat was estimated using aufwuchs samples. The aufwuchs layer on the stone surfaces on which the two species had been feeding was carefully scraped off and collected. Two such samples were taken each month from two of the five sampling sites and were analyzed in a manner similar to that of the gut contents.