

SOME ASPECTS OF THE BIOLOGY OF HYPORHAMPHUS GAIMARDI IN UDA WALAWE RESEVOIR, A MAN-MADE LAKE IN SRI LANKA

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Abstract

Reproductive biology, food and feeding of Hyporhamphus gaimardi, a typical coastal and estuarine species which has become well-established in some freshwater reservoirs in Sri Lanka, were studied in Uda Walawe reservoir for 16 months.

The overall sex ratio was found to be 2.75:1 with females dominating the population. Fecundity of the fish 12.6-19.6 cm in length varied from 210 to 459 eggs/individual. Although this species appears to be spawning throughout the year, peak spawning season was observed to be February-March. Results also indicated that this is a multiple spawner which breeds within the reservoir. Analysis of gut contents showed that more than 80% of the diet consisted of crustacean zooplankton.

Introduction

Hyporhamphus gaimardi is a typical coastal and estuarine species (Munro 1955) and in the recent past, this species has become well-established in some freshwater reservoirs in Sri Lanka such as Uda Walawe, Madagiriya and Kawadulla (De Silva 1983).

Uda Walawe Reservoir (80°50'E, 6°30'N) which covers an area of 3,374 ha at full water level, supports a profitable fishery (Chandrasoma et al. 1986). The proportion of H. gaimardi in the commercial catch has served to be gradually increasing in the recent past. This paper discusses some aspects of reproductive biology, food and feeding of H. gaimardi in Uda Walawe Reservoir.

Material and Methods

Monthly samples of 150-200 individuals caught by hook-and-line were analyzed for 16 months. Total and standard length of each individual were measured to the nearest mm and eviscerated body weight was determined to the nearest 0.01 g.

Maturity stages of the gonads were identified using the scale described by De Silva (1973). Each gonad was weighed to the nearest 0.01 g to determine the gonadosomatic index (GSI). Mature ovaries were preserved in Gilson's fluid for one week to be used for fecundity estimations and diameter measurements.

Gut contents of each fish were examined under the optical microscope and the food items were identified to the genera level whenever possible. Quantitative analysis of gut contents were carried out according to the method described by Helawell and

Abel (1971). This method was found to be the most suitable for the present study since it enabled the easy and rapid quantification of microscopic food items of varying sizes. Dietary overlap among individuals of different size groups was determined by the index described by Schoener (1970).

Larval surveys were carried out each month by hauling a 50-µm mesh plankton net for about 300 m through surface water.

Results

Monthly variations of the sex ratio and GSI are shown in Fig 1. Overall sex ratio was found to be 2.75:1 with females dominating the population. The GSI of the females was always higher than that of the males. The highest values for the GSI of both sexes were observed in March.

Monthly variation in the percentage occurrence of females and males in different maturity stages is shown in Fig 2. Individuals of both sexes in the developing, developed and mature stages were observed almost throughout the study. Spent females were also encountered in most months.

Egg diameter distribution pattern of mature individuals is shown in Fig 3. Eggs with a diameter less than 0.3 mm were considered as reserve oocytes and were excluded from fecundity estimations.

Fecundity of the fish having a total length 12.6-19.6 cm and a weight of 5.35-20.11 g was found to vary from 210 to 459 eggs/individual. Relationships of fecundity (F) to body weight (W) to body weight (W) total length (TL) and gonadal weight (GW) were calculated to be as follows :

$$F = 10.3511 W + 233.2643 \quad (r = 0.5120, n = 40, p < 0.01)$$

$$F = 244.4707 GW + 190.4209 \quad (r = 0.7651, n = 40, p < 0.01)$$

$$F = 14.5970 TL + 111.8603 \quad (r = 0.3471, n = 40, p < 0.05)$$

Larvae of H. gaimardi ranging from 7 mm to 16 mm in total length were observed in March and December.

A well-developed stomach was not observed in the digestive tract of H. gaimardi. The intestine was long and coiled. Gill rakers were long and very close to each other. The number of gill rakers on the first gill arch of the left side of the body ranged from 32 to 35. This did not vary significantly with the size of fish ($r = 0.1382, n = 40, P > 0.05$). The distance between two adjacent gill rakers varied from 0.41 to 0.068 mm. This distance was found to increase significantly with total length ($r = 0.7492, n = 40, P < 0.01$).

In the gut contents, three genera of green algae, viz., Mougeotia, Closterium, Cosmerium, and seven genera of Diatoms, viz., Cocconeis, Cymbella, Cyclotella, Melosira, Navicula, Pinnularia and Synedra were identified together with two genera of Crustaceans, Camptocercus and Diaptomus. Nauplii larva