

# The diet of juvenile *Sillago sihama* (Forsskal, 1775) from three estuarine systems in KwaZulu-Natal

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## Abstract

The diet of *Sillago sihama*, a species whose juveniles occur regularly in KwaZulu-Natal estuaries, was investigated in Richards Bay, Durban Bay and Mlalazi Estuary. The species was carnivorous in all three systems, with a distinct size-related change in diet being noted. Small individuals (<60 mm SL) consumed primarily planktonic prey (mainly larvaceans and copepods) whilst larger specimens fed on benthic crustaceans, polychaetes and bivalve siphon tips. Although the prey consumed by *S. sihama* from different systems was similar, the trends of increasing reliance on benthic food sources with size differed. Fish from Mlalazi began feeding on benthos at a smaller size than those from Richards Bay and Durban Bay. This is ascribed to potentially higher plankton densities in the harbours due to animals from the marine environment being swept in through the deep entrance channels.

## Introduction

No research has been conducted on the diet of *Sillago sihama* in South African waters. Although not a dominant species, it is fairly common in a number of KwaZulu-Natal estuaries, extending as far south as Knysna, Western Cape (Smith and Heemstra, 1991). The species distribution in KwaZulu-Natal estuaries appears to be inversely related to turbidity, with most frequent occurrence and highest densities being recorded in clear water systems (personal observation) and as a result of the lack of information on the species diet from estuarine localities on the East Coast of Africa, it was considered important to initiate this study.

Studies from elsewhere in the Indo-Pacific have described contrasting diets for *S. sihama* from different regions. Chako (1949) and Radhakrishnan (1957) have reported that adult fish from Mannar Gulf and Palk Bay, India, are omnivorous. Gunn and Milward (1985), however, found no evidence of an omnivorous diet but rather a carnivorous one in juvenile and adult *S. sihama* sampled from beaches and estuaries in the Townsville region of Australia. Given these contrasting results it is unlikely that the role of this species in the food webs of KwaZulu-Natal estuaries can be inferred confidently from studies conducted in other regions. This provided a further reason for this study.

## Materials and methods

### Sampling

A summary of the location and description of study sites, dates of sampling, sample size and range of fish size classes caught is given in Table 1. Both Richards Bay and Durban Bay are large, shallow estuarine systems which have been modified to form deep-water harbours (Hay et al., 1993a and b). As such they now have wide, deep, permanently open mouths. Mlalazi Estuary is

a much smaller system with a narrow shallow mouth that is usually open. Sampling was undertaken as part of a general survey of the fish fauna of the three systems, during daylight hours over high tides. Fish were captured using a seine net (70 m x 2 m x 12 mm bar mesh) deployed from a motor boat and hauled ashore manually. *Sillago sihama* were separated from the rest of the catch and preserved immediately in 10% formalin.

### Laboratory

Standard length (SL) of each fish was measured to within 10 mm classes and the alimentary tracts removed. The percentage fullness of each stomach was estimated and the contents examined using a binocular microscope. Food items were identified to the lowest possible taxon and counted. The amount of each food type in individual stomachs was measured using a modification of the method of Hellawell and Abel (1971), in which the volume flattened between two microscope slides one millimetre apart was estimated. To facilitate the estimation of the volume of food, a 1 mm x 1 mm graph-paper grid was attached to the under-side of the bottom slide. Unit depth allowed volume to be extrapolated directly by counting the number of 1 mm<sup>2</sup> squares that were obscured by each particular food type.

Hyslop (1980) has emphasised the need to employ more than one method of dietary analysis. Accordingly stomach contents of *S. sihama* were analysed using three such methods:

- Frequency of occurrence: the number of stomachs in which each food item occurred was counted and expressed as a percentage of the total number of stomachs containing food.
- Numerical occurrence: the number of individual prey items in each food category was expressed as a percentage of the total number of individuals in all food categories.
- The points method of Ricker (1968): points were allocated to each food category according to the volume it represented in relation to that of all food groups in each stomach and the estimated percentage fullness of the stomach:

$$\text{Points} = (\text{Vol.1}/\text{Vol.2}) \times \% \text{ fullness}$$

where Vol.1 = volume of food category in stomach, and  
Vol.2 = volume of total stomach contents.

This method gives an approximate volumetric analysis of diet.

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