Preliminary Study on the Food and Feeding Habits of *Schilbe mystus* (Linn., 1762) in River Nyando

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Abstract

Schilbe mystus (Butterfish) is one of the "endangered species" of Lake Victoria, whose fishery was once of commercial importance. The annual landings have declined from about 400 mt in 1968 to a bare 15 mt in 1991. The average size of the species is smaller than that reported by Greenwood (1966). During the study, the size range sampled was 11.2 to 25.6 cm. fork length with the majority measuring 14.0–15.0 cm FL. The food and feeding habits of the fish are discussed. Study on the gut content shows that *Schilbe mystus* preys mainly on insects with chironomid larvae as the dominant prey.

Introduction

River Nyando drains the east of the Nyanza Gulf from Londiani. The sources of the river are in Tinderet forest, a high land area about 80 km east of Kisumu. The total drainage area at Ahero, about 20 km from Lake Victoria, is about 2,680 km^2. The most important industries in the area are sugar industries at Chemelil and Muhoroni, while there is a large scale rice irrigation scheme at Ahero.

Schilbe mystus is among the endangered species of Lake Victoria and its affluent rivers (Kibaara, 1981). These group of fishes are potamodromous i.e. they migrate within affluent rivers at the time of floods to spawn in the lateral pools and surrounding submerged grasslands (Cadwalladr, 1965; Fryer, 1973; Whitehead, 1959). The fisheries of rivers affluent to the Nyanza Gulf were once significant (Cadwalladr, 1964; Whitehead, 1959), but there has been a decline in the catches. This has been attributed to overfishing at the river mouths, a practice

which removed gravid females before they spawned in the flood pools. (Cadwalladr 1965).

Schilbe mystus still forms part of the basis for small but locally significant fisheries and more research is vital in order to define management measures necessary for management. This paper examines the food and feeding habits of *Schilbe mystus* in River Nyando.

2.0 Area of Study

Nyando river generally gets deeper and narrower towards the mouth. River banks in the lower regions are covered by *Ceratophyllum*, phragmites and *Cyperus papyrus*. Onguo river enters Nyando at approximately 10 km from the mouth, while Jordan gets its water from Nyando during floods. Jamalanga flood pools further down are believed to have been formed by constant trampling by hippopotamus. The study was concentrated between 10 and 20 km from the river mouth.

Materials and Methods

The data used here has been extracted from the on going project viz "Preliminary studies on the distribution of the potamodromous fishes along River Nyando". The data are for the months of February to August 1991.

Fish samples were collected by beach seine. Other samples were obtained from fishermen who used various methods, ranging from gillnets, traps, hooks to hand catching. Fishing either in the river or in the cut-off pools, depended on the water level. For most of the specimens, the fork length (FL) of the fish was measured, station indicated and condition of river/ pool bank and type of bottom were recorded. In some cases the stomach and ovaries were collected and preserved in 5% formalin and Gilson's fluid respectively. The stomach contents were analyzed by use of a microscope and recorded using the frequency of occurrence method (Hynes, 1959).

Results and Discussion

4.1 Catch Composition

During the project survey in February, no *Schilbe mystus* were recorded. Instead *Clarias gariepinus*, *Labeo victorianus* and *Oreochromis* spp were caught at station D (Fig.1), approximately 15 km from river mouth. Further downstream at station B, approximately 10 km from river mouth, *Schilbe mystus* were recorded as other species including *Synodontis*, *Clarias* and *Oreochromis* increased in abundance. Rise in water level in late March resulted in an increase in abundance of all the species at station B. In April there were floods and these filled flood pools. Table 1 shows the size composition of *Shilbe mystus* recorded during the study.

These results show that the majority of *S. mystus* caught are below 16.0 cm FL which is smaller than the size reported by Greenwood (1966).

4.2 Food and Feeding

The percentage frequency of occurrence of various food items realized in the stomach of various size groups of *S.mystus* is shown in Table 2.

Results show that the two larger fish groups share a variety of food items than the smaller fishes below 15.0 cm. The latter appear to be restricted to small sized preys. Presence of plant material in the stomach of fishes above 15.0 cm (FL)

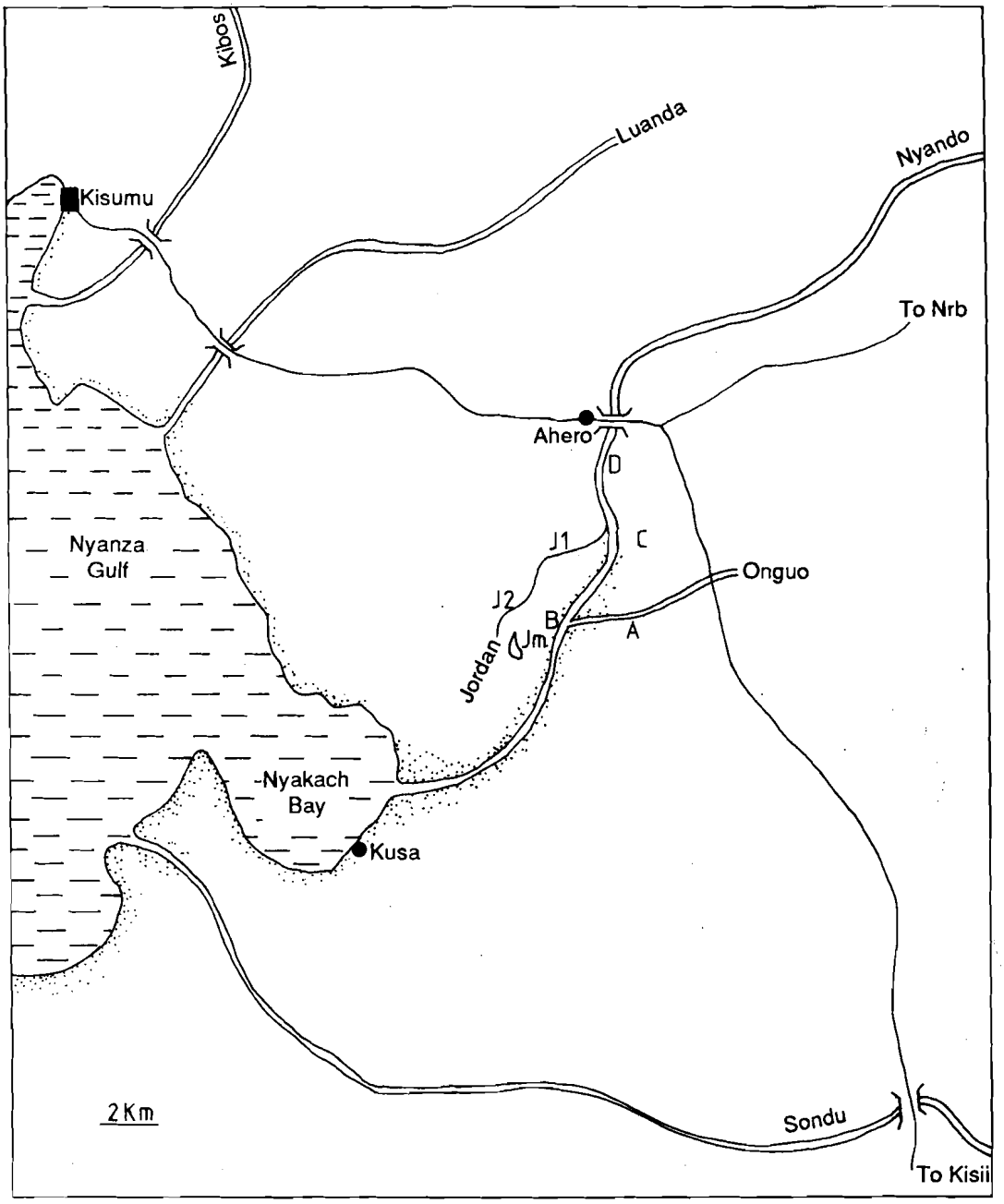

Fig 1. Map showing the area of study of River Nyando and the point at which it enters Lake Victoria

Table 1: Size composition of *Schilbe mystus* sampled between February– August 1991

Size range	Frequency
10.0–10.9	1
11.0–11.9	9
12.0–12.9	12
13.0–13.9	61
14.0–14.9	174
15.0–15.9	138
16.0–16.9	74
17.0–17.9	32
18.0–18.9	12
19.0–19.9	7
20.0–20.9	9
21.0–21.9	9
22.0–22.9	4
23.0–23.9	3
24.0–24.9	3
25.0–25.9	1

Table 2: Frequency (%) of occurrence of various food items in the stomach of *Schilbe mystus*

Food Types	Fish size (cm)		
	10.0–15.0 (5)*	15.1–20.0 (81)*	20.1–25.0 (39)*
Dipteran eggs	0	0	2.6
Dipteran larvae (Chironomid)	60	32.4	28.2
Dipteran pupa (Chironomid)	20	19.6	20.8
Other Dipteran larvae	0	6.2	2.6
Dipteran adult	0	3.6	0
Coleoptera larvae	20	3.6	0
Coleoptera adult	0	0	10.4
Hymenoptera adult	0	1.2	2.6
Ephemeroptera nymph	0	3.6	0
Hemiptera nymph	0	1.2	2.6
Hemiptera adult	0	4.8	5.2
Orthoptera adult	0	0	2.6
Fish remains	0	4.8	0
Plant material	0	10.8	18.2
Sand	0	6.2	5.2
Empty stomachs	1	2	0

* No. in parenthesis indicates no. of fish with food.

shows that *Schilbe mystus* is omnivorous. The plant parts identified were mostly leaves and roots of higher plants. Reports based on samples from the main lake (Graham, 1929; Corbet, 1961; Greenwood,1966) show that Haplochromines were the dominant prey for *S. mystus*. Our findings, however, show that in the riverine environment, insects are the dominant food of *S. mystus*. This corroborates the report of Corbet (1961).

From the data, it is clear that the two items of prime importance in the diet of all size groups of *S. mystus* were chironomid larvae and pupa. This is probably not because of preference but may be due to the relative abundance of these two food items in the habitat. This was confirmed by the cluster of these on the beach seine net during the fishing activity.

Fishes less than 15.0 cm tend to avoid nymphs and adult prey possibly because of their large size and tough exoskeletons. Other food items common in the stomachs of larger fishes were: Coleoptera (larvae and adult), Hemiptera (nymph and adult), plant material and sand grains. The latter probably was ingested accidentally with other material. Only four fishes in the study sample had fish remains in their stomachs.

The food and feeding habits of *Schilbe mystus* in the riverine habitat varies with that in the lacustrine environment. In the former, the species is predominantly insectivorous ingesting mainly chironomid larvae and pupae. The results also indicate that the species is a facultative feeder, able to change their diets according to the availability of different food items as was observed by Lowe McConnell (1977).

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Rapporteur's Comments

— The food of *Schilbe mystus* in River Nyando, Kenya, is predominantly chironomid larvae and pupae. Their consumption depends on abundance and not on preference.
— The need to carry out more work on the species and riverine species was stressed and comparison with other rivers and even the main lake was recommended.