

Wesner, Jeff

Status: **Faculty**
Dept: Biology

Email Address: **Jeff.Wesner@usd.edu**

Document Delivery uses Odyssey

Date Needed: 11/17/2019

RAPID request held locally (Main Library)

Copyright Information:

The copyright law of the United States (Title 17, United States Code) governs the making of photocopies or other reproductions of copyrighted material. Under certain conditions specified in the law, libraries and archives are authorized to furnish a photocopy or other reproduction. One of the specified conditions is that the photocopy or reproduction is not to be "used for any purpose other than private study, scholarship, or research." If a user makes a request for, or later uses, a photocopy or reproduction for purposes in excess of "fair use," that user may be liable for copyright infringement. This institution reserves the right to refuse to accept a copying order if, in its judgment, fulfillment of the order would involve violation of copyright law.

TN#: 577922



Call #:
Journals / 2nd Floor

Location:
Journals Second Floor

Title:
Hydrobiologia

Volume: **23**

Issue: **1-2**

Month:

Year: **1964**

Pages: **287-291**

ISSN:
0018-8158

Article Author:
Groenewald, A A v J

Article Title:
Observations on the food habits of Clarias gariepinus Burchell, the South African freshwater barbel (Pisces: Clariidae) in Transvaal

Book Author:

Document Delivery - Article

10-21-19
KJ

Delivered by:

University of South Dakota
USD University Libraries
414 E Clark St
Vermillion, SD 57069
Email: ill@usd.edu
Phone: 605-677-6087
Office Hours: Mon-Fri 8:00am-5:00pm

Deliver to:

Email Address: **Jeff.Wesner@usd.edu**

Jeff Wesner
414 E. Clark St
Vermillion, SD 57069

Observations on the Food Habits of *Clarias gariepinus* Burchell, the South African Freshwater Barbel (Pisces: Clariidae) in Transvaal

by

A. A. v. J. GROENEWALD *)

Provincial Fisheries Institute, Lydenburg, Republic of South Africa.

Present address: National Zoological Gardens, Pretoria.
(with 1 fig.)

ABSTRACT

Clarias gariepinus is a general carnivorous feeder whose food consists mainly of fishes, terrestrial invertebrates, aquatic insects and zooplankton. The proportion in which these food items are eaten vary considerably and instances of emergency and preferential feeding are discussed. The barbel is an indiscriminate feeder and the presence of large quantities of non-animal material, which are of little food value to a carnivorous species, must be regarded as incidental.

INTRODUCTION

Several features of the head region of this species such as the size of the mouth and the bands of small teeth may be regarded as adaptations for manipulating a big prey. On the other hand, the large number of fine and closely set gillrakers (GILCHRIST & THOMPSON, 1913) is clearly an anatomical feature of a plankton feeder. In recent

*) Received on February 14th, 1963.

years the opinion, based on isolated observations, has frequently been expressed that the freshwater barbel is not the formidable predator that it is generally believed to be.

In spite of the fact that it is widely distributed in Transvaal, the Orange River System and Natal little has been recorded about its food habits. Data which became available during population studies are now utilized to draw up a list of the most important food items, and their relative importance in the diet of this fish is compared.

For the present study the frequency of occurrence method was adopted (LAGLER, 1952), but in order to more accurately assess the relative importance of the different food types the percentage that each represented of the total volume of the contents of the individual stomachs was estimated and then multiplied by a factor for stomach fullness (LE ROUX, 1956). Only the stomach contents are considered here, but an examination of the intestinal contents has thrown some light on the food habits. Altogether 154 stomachs collected during the Spring and early Summer months of 1956 were examined, and of these 50 (32.5 %) were completely empty. The remainder came from three different localities and are discussed separately as ecological conditions differed considerably from one locality to the other.

INFLUENCE OF HABITAT ON FOOD HABITS

1. Jukskei River

This stream rises in the northern residential zone of Johannesburg and it is polluted to such a degree that its headwaters are not inhabited by fish. Barbel showed a greater tolerance to this particular type of sewage and mineral pollution than *Barbus marequensis*, *Barbus natalensis*, *Tilapia sparrmanii* and several small species of *Barbus*. The 43 individuals employed for this study were caught in a section where a bloom of zooplankton had developed but where few fishes other than large numbers of barbel occurred.

Under the unnatural conditions outlined above, the barbel fed exclusively on Entomostracans and Chironomids, which were the only kinds of animal food available. Most individuals from this locality gorged themselves at such a rate with these plankton organisms that not only was the whole alimentary canal filled to capacity but *Daphnia* removed from the rectum were not at all digested.

Detritus formed an important part of the contents of most stomachs. No fish were eaten (Table I, Fig. 1).

TABLE I.

Dietary items found in 104 stomachs of *C. gariepinus*, which ranged in size from 228 to 1,240 millimeters total length.

Food Item	Percentage of stomachs containing the item		
	Jukskei River	Barberspan	Vaal River
Detritus	49	28	29
Plankton	44	32	3
Fish	—	34	6
Aquatic Insects	4	6	6
Terrestrial Invertebrates	—	—	52
Crustaceans (Crabs and Prawns)	2	—	3

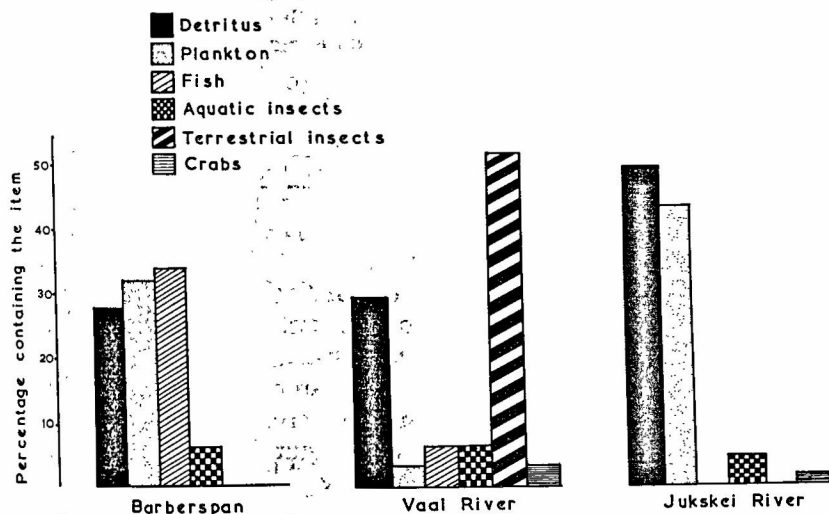


Fig. 1. Frequency of occurrence of different food items in stomachs of *Clarias gariepinus* ranging in size from 228 to 1240 millimeters total length.

2. Barberspan.

This fertile pan, known as one of the best angling waters of the Transvaal, is well-stocked with carp, yellow-fishes (*B. holubi*), mudfishes (*L. capensis* and *L. umbratus*), vleikurper (*T. sparrmanii*)

and minnows; and the zooplankton and littoral invertebrate fauna is comparatively rich. It was estimated that fish comprised more than 80 % of the total bulk of animal food contained in the stomachs of the 43 individuals examined from this locality. Numerically and in bulk smaller barbel contributed by far the greater part of the fish eaten. Table II shows that *C. gariepinus* is indeed capable of overpowering a big prey.

Although zooplankton occurred in 32 % of the stomachs (Table I, Fig. 1) it was relatively unimportant as a food item due to its small bulk. Aquatic invertebrates were eaten in even smaller quantities. Phytoplankton occurred in three stomachs, one stomach contained a duckling and in another eggs of either barbel or carp were found.

TABLE II.

The size-relationship between cannibalistic individuals of C. gariepinus and their prey (Barberspan).

Size of cannibal		Size of prey	
Length in millimeters	Weight in kilograms	Length in millimeters	Weight in kilograms
1245	14.79	610	1.70
1156	13.67	381	0.51
1028	7.54	254	0.17
610	1.74	356	0.28

3. Vaal River.

In spite of the fact that the population density of forage fishes was much greater in the Vaal River than in Barberspan, preference was given by all 18 barbel of this group to terrestrial invertebrates such as scorpions, beetles, millipedes and earthworms which had been disturbed by veld fires in the catchment area and were being washed downstream in large numbers. Only one stomach contained a small fish. Terrestrial insects also formed an important part of the stomach contents of *C. mossambicus* from Lake Nyasa (FRYER, 1959).

DISCUSSION

It has been shown that detritus, consisting of coarse or finely divided plant material (both fresh and decomposed), droppings of waterbirds etc. and inorganic debris occurred in considerable quantities in a large percentage of the stomach contents. In a small number of stomachs the contents consisted exclusively of detritus and it was thought that this could have been taken in while the barbel struggled to escape from the seine net.

However, in quite a number of individuals the intestine contained non-animal materials while the stomach was completely empty. This suggests that the barbel is an indiscriminate feeder, which in the pursuit of its prey incidentally swallows material that is of little food value to a carnivorous species. Plant fragments and seeds also occurred among the stomach contents of *C. mossambicus* from Lake Nyasa (FRYER, 1959).

The rainbow trout, a true carnivorous species, is known to eat bits of branches, seeds or even leaves floating downstream, and it would likewise be incorrect to regard *C. gariepinus* as an omnivore. The anatomy of the alimentary canal as described by ANGELOPULO (1947) is that of a typical carnivore.

The great adaptability in the food habits especially of large individuals contributes greatly to make *C. gariepinus* a very successful species, capable of populating and surviving in virgin waters, where forage fishes are absent. The possibility of combining barbel with *Tilapia* species in production ponds, as was suggested by BROWN (1955), should be investigated.

CONCLUSIONS

1. *C. gariepinus* is a general carnivorous feeder as regards both size range and diversity of animal organisms utilized as food.
2. The results of this cursory investigation suggest that the barbel is a piscivore of little consequence and its role in this connection seems to have been over-emphasized. At this stage it is probably best described as a clumsy piscivore which also exploits aquatic and terrestrial invertebrates as auxiliary or emergency food. A true picture of its food habits can only be obtained through further and more intensive study.

REFERENCES

- ANGELOPULO, VICTORIA, - 1947 - The anatomy of *Clarias gariepinus* (Burchell). Unpublished M. Sc. thesis, University of Pretoria.
- BROWN, J. M. - 1955 - Report of the work at the fish culture farm for the year 1955. Review of Kenya Fisheries 1955.
- FRYER, G. - 1959 - The trophic interrelationship and ecology of some littoral communities of Lake Nyasa with special reference to the fishes, and a discussion of the evolution of a group of rock-frequenting Cichlidae. *Proc. Zool. Soc. Lond.*, 132, 153—281.
- GILCHRIST, J. D. F. & THOMPSON, W. W. - 1913 - The freshwater fishes of South Africa. *Ann. S. Afr. Mus.* 11, 321—463.
- LAGLER, K. F. - 1952 - *Freshwater Fishery Biology*. Dubuque, Iowa: Wm. C. Brown.
- LE ROUX, P. J. 1956 - Feeding habits of the young of four species of *Tilapia*. *S. Afr. J. Sci.*, 53, 33—37.