

The diet of *Brycinus nurse* (Pisces: Characidae) from Asa reservoir, Ilorin, Nigeria

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Abstract: From November 1991 to October 1993, 980 specimens of the characid *Brycinus nurse* were collected from Asa reservoir to examine its diet. The diet was analyzed using the frequency of occurrence, numerical and gravimetric methods. Two hundred and sixty nine (27.45%) of the stomachs examined were empty. The fish was an omnivore feeding extensively on a wide array of plant and animal food items. These consisted of 9 families, 10 genera and 10 species. The most extensively consumed plant food item was aquatic plant parts which occurred in 63.88% of the stomachs, and accounted for 6.06% by number and 12.10% by weight while the ephemeropteran, *Povilla adusta* was the most dominant animal food item, occurring in 50.92% of the stomachs, and accounting for 11.98% by number and 11.86% by weight. Conversely, the least consumed plant food item was *Volvox* occurring in 4.49% of the stomachs and accounting for 0.18% by number and 0.35% by weight, while the fish *Barbus* sp. was the least consumed animal food item occurring in 0.51% of the stomachs, accounting for 0.03% by number and 1.62% by weight. New food items not previously recorded such as a watermite, *Aspatharia sinuata* and *Barbus callipterus* were found in the stomach contents. The nonspecific feeding regime of the fish and its ability to utilize different food items effectively was what accounted for the prominence and wide distribution of the fish in the lake.

Key words: *Brycinus nurse*, characidae, stomach content analysis, Nigeria.

Brycinus nurse (Paugy, 1986), a characid, is important in African inland fisheries, due to its abundance, widespread distribution, food and commercial value. Investigations of many aspects of its biology, including feeding, have been carried out by several workers (Bowmaker 1969, Lauzanne 1976, Mitchell 1976, Adebisi 1978, Paugy 1980, Albaret 1982, Fagade 1983, Oni *et al.* 1983, Bankole 1989, Victor and Brown 1990). They show that *B. nurse* is a euryphagous species, utilizing various kinds of food resources available in its habitat. Fagade (1983) and Bankole (1989) regarded it as an entomophagous fish, with a preference for aquatic insects such as chironomid larvae and *Povilla adusta*. Oni *et al.* (1983) and Hanna and Scheimer (1993)

described it as a planktivore, feeding copiously on *Peridinium*, *Volvox*, crustaceans, and, occasionally, on *Melosira*, *Fragillaria*, and *Microcystis*. The plant feeding habit of the fish, mainly on seeds, fruits, vegetable matter, grasses and decaying leaves, has been reported by Adebisi (1978) and Paugy (1980). However Victor and Brown (1990) classified it as a detritivore, with detritus as its major food component.

The survey was initiated between 1991 and 1993, to identify the various food items consumed by the species in Asa Reservoir and also its trophic status in relation to other fish species in the reservoir.

Asa Reservoir has a surface area of 302 ha with a maximum depth of 14 m and is located

approximately 4 km south of Ilorin township (8°28'-8°52' N and 4°35'-4°45' E), Nigeria.

MATERIALS AND METHODS

Nine hundred and eighty specimens of *B. nurse* were collected by bimonthly sampling, from November 1991 to October 1993. The fishes were caught using surface set gillnets of 3.81 to 5.00 cm mesh sizes. Their weights (± 0.5 g) and total lengths (± 0.5 cm), were recorded and the stomachs were removed and preserved in 4% formaldehyde. The specimens were deposited in a deep freezer in the Fisheries and Hydrobiology Laboratory, University of Ibadan, Nigeria. In the laboratory, the stomachs were opened and the contents analyzed. The prey items were identified to the lowest taxonomic level following Mellanby (1938) and Ward and Whipple (1950).

The number of empty stomachs was also recorded. The frequency of occurrence, numer-

ical and gravimetric methods as in Hynes (1950), Ricker (1968) and Hyslop (1980), were used in the analysis of the stomach contents.

RESULTS

Table 1 summarizes the food items found in the stomach of *B. nurse*. The fish was omnivorous with a vast array of food items consumed including 9 families (flagellates, bivalves, copepods, branchiopods, ephemeropterans, arachnids, cyprinids, chlorophytes and higher plants), comprising of 10 genera and 10 species.

The most dominant plant food item was aquatic plant parts, occurring in 63.88% of the stomachs and accounting for 6.06% by number and 12.10% by weight. *Povilla adusta* was the most dominant animal prey occurring in 50.92% of the stomachs, accounting for 11.98% by number and 11.86% by weight. The flagellates, copepods, bivalves, arachnids,

TABLE 1

Summary of food items in the stomach of *Brycinus nurse* (12.20-22.60 cm T.L.) in Asa Reservoir, Ilorin, Nigeria

Food items	Numerical method		Gravimetric method		Occurrence method	
	No	N%	No	W%	No	0%
FLAGELLATA						
<i>Volvox</i>	318	0.18	1.27	0.35	44	4.49
BIVALVIA						
<i>Aspatharia sinuata</i>	25	0.01	0.64	0.18	11	1.12
COPEPODA	19	0.01	0.50	0.14	14	1.43
BRANCHIOPODA						
<i>Ceriodaphnia</i> eggs	16 869	9.39	8.39	2.30	393	40.10
<i>Ceriodaphnia</i> sp.	39 004	21.70	12.46	3.41	335	34.18
EPHEMEROPTERA						
<i>Povilla adusta</i> eggs	55 580	30.93	19.62	5.37	108	11.02
<i>Povilla adusta</i>	21 531	11.98	43.35	11.86	499	50.92
ARACHNIDA						
Watermite	11	0.006	0.20	0.05	10	1.02
Cyprinidae						
<i>Barbus</i> scale	48	0.03	1.91	0.52	20	2.04
<i>Barbus</i> sp	46	0.03	5.94	1.62	05	0.51
CHLOROPHYCEAE						
(Green algae)						
<i>Spirogyra</i>	203	0.11	2.39	0.65	45	4.59
HIGHER PLANTS						
Unidentified seeds	35 160	19.56	128.52	35.16	204	20.82
Plant parts	10 899	6.06	44.2	12.10	626	63.88
Detritus	-	-	96.12	26.29	698	71.22

TABLE 2
Monthly feeding intensity of Brycinus nurse in Asa Reservoir, Ilorin, Nigeria

S/No.	Months	Number of stomachs examined	Number of empty stomachs	Percentage of empty stomachs
1.	November 91	15	0	0
2.	December	33	0	0
3.	January 92	34	0	0
4.	February	47	19	40.43
5.	March	54	17	31.48
6.	April	43	24	55.81
7.	May	32	21	65.63
8.	June	32	09	28.13
9.	July	47	08	17.02
10.	August	41	05	12.20
11.	September	61	04	6.56
12.	October	62	29	46.77
13.	November	28	08	28.57
14.	December	36	17	47.22
15.	January 93	31	14	45.16
16.	February	22	05	22.73
17.	March	61	19	31.15
18.	April	36	11	30.56
19.	May	36	07	19.44
20.	June	60	18	30.00
21.	July	29	11	37.93
22.	August	60	11	18.33
23.	September	45	10	22.22
24.	October	35	02	5.7
		980	269	27.45

cyprinids and chlorophytes were food items found occasionally in the stomach contents.

New food items like *Aspatharia sinuata*, *Barbus callipterus* and a watermite not previously recorded in the stomachs of *B. nurse* in any lake were found. However this occurred in less than 5% of the stomachs and contributed to less than 2% of its diet by the numerical and gravimetric method.

Each of the methods of the stomach content analysis employed, emphasized the importance of the different food items.

A total of 27.45% of all the stomachs was empty (Table 2). The number of empty stomachs showed a seasonal variation, with higher percentages of empty stomachs recorded during the onset of the rains.

DISCUSSION

The array of food items found in the stomach of *B. nurse* was similar to that recorded for

the species by Adebisi (1978), Paugy (1980), Fagade (1983), Oni *et al.* (1983), Bankole (1989), Victor and Brown (1990), and Hanna and Scheimer (1993). There was however a unique observation in the diet of *B. nurse* in Asa Reservoir, in that some animal food items such as *Aspatharia sinuata*, the watermite and *Barbus callipterus* found in the stomachs of the species were not recorded by any of the authors. However, Graham (1929) and Blache (1964) had previously reported the feeding on fish such as *Physalia pellucida* and small clupeids by *B. nurse*.

The trophic status of the fish indicates that it is an omnivore and consequently it feeds on a broad spectrum of food items, a feature that similarly occurs, in its other close relatives. *Brycinus macrolepidotus* is known to feed on a wide variety of plant and animal materials and as such is classified as an omnivore (Ekpo 1993).

The non-specific feeding habit of *B. nurse* is what has accounted for its wide distribution and prominence in Asa reservoir. Petr (1967)

classified *B. nurse* as a nonspecific feeder. It fed on *Physalia pellucida* and some small clupeids, when they were in abundance. However when terrestrial insects were lacking in its environment, it fed on chironomids and ostracods, and did not hesitate to eat higher plants, pieces of wood periphyton. It also fed on *Volvox* when it bloomed. Lagler (1977) stated that most fishes are labile in their feeding habits and are not very specific as to the type of food they eat. *Brycinus nurse* seems to be such an example of fish.

RESUMEN

Se recolectaron 980 especímenes del charácido *Brycinus nurse* desde noviembre 1991 hasta octubre 1993 en la reserva Asa para examinar su dieta. La dieta se analizó usando los métodos numérico, gravimétrico y de frecuencia de aparición. De los estómagos examinados, 269 estaban vacíos. El pez era un omnívoro, alimentándose extensivamente de una amplia gama de tipos de comida de plantas y animales. Estos consistieron de 9 familias, 10 géneros y 10 especies. El tipo de planta consumido más extensivamente fue partes de plantas acuáticas, que apareció en 63.88% de los estómagos, y representó el 6.06% por número y el 12.10% por peso, mientras que el efemeróptero, *Povilla adusta*, fue el tipo de alimento animal más dominante, apareciendo en 50.92% de los estómagos y representando el 11.98% por número y el 11.86% por peso. En cambio, el tipo de alimento menos consumido fue *Volvox* apareciendo en 4.49% de los estómagos y representando el 0.18% por número y el 0.35% por peso, mientras que el pez *Barbus* sp. Fue el tipo de alimento animal menos consumido apareciendo en 0.51% de los estómagos y representando el 0.03% por número y el 1.62% por peso. En los contenidos estomacales se encontraron nuevos tipos de alimento no registrados anteriormente como un ácaro acuático, *Aspatharia sinuata* y *Barbus callipterus*. El régimen de alimentación no específico del pez y su habilidad de utilizar efectivamente diferentes tipos de alimento es lo que explica la prominencia y la amplia distribución del pez en el lago.

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