EFFECT OF DARTING PHENOMENON OF AFRICAN CATFISH *HETEROBRANCHUS LONGIFILIS* (BURCHELL, 1822) ON GROWTH PERFORMANCE OF NILE TILAPIA; OREOCHNOMIS NILOTICUS (LINNAEUS, 1758).

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INTRODUCTION

Many fish farmers in Nigeria stock their ponds with tilapia in monoculture, but sometimes with African catfish, although tilapia is always the focus of the enterprise in the country. It is liked by many, and attracts good cash value; the feeds are cheap and affordable. The main problem in tilapia culture is the early spawning and rapid overpopulation in ponds, which leads to, stunted growth and poor performance (Dadzie, 1982). There is therefore need to improve in the system especially if intended to capture more market.

The Polyculture of tilipia with catfish is well documented (Madu et al, 1987; pastastico et al, 1982). In most of these culture catfish is used as predators to control tilapia population and improve growth.

However, experiments have revealed low predatory performance of catfish in certain stocks resulting in growth performance of tilapia that are not significantly ($P<0.05$) different from those of monocultures. (Taege in press).

The occurrence in African catfish of offspring's with high growth superiority (darting) over individuals of same age bracket; with more aggressive sibling connibalism have been reported (Madu et al, 1987; Ewa-Oboho, 1998), but no research had been carried out to assess the performance of tilapia in polyculture with these fast growing (shooters) African catfish. This research therefore attempts to isolate the fast growers of and to determine their effect on growth performance of the nile tilapia (Oreochromis nilotocus).

METHODOLOGY

This study was carried out in the fish farm complex of the Institute of Oceanography University of Calabar. Water source was a perennial reservoir and the experiment was performed in a system with water flow of 2-3 l/sec.

Matured breeders of H. longifilis and O. niloticus were collected from brood stock earthed ponds and transferred to the indoor hatchery where they were sexed and tested for ripeness as described by Daget and litis (1965) and teugels (1982, 1990).

2.1 BREEDING OPERATION

Breeding of catfish (H. logifilis) was carried out by hypophysation according to the method described by legendry (1986) using purified carp pituitary extract at a dose of 4g/kg body weight. Fertilized eggs were incubated in water with flow-through rate 1-3 Lmin. Mean hatching percentage was 80%.

2.2 LARVAL REARING AND GROWTH MONITORING

Hatchlings of H. longifilis were measured for total length and weight and distributed into two 501 aquaria at dentisy of 18 larval/C and fed at 3% body weight (Ewa-Oboho etal 1998). Fry were fed exclusively on live food (Zooplankton) within first 14 days (Hecht et al 1988) then later with dry food in the form of crumbled non-pelletised feeds formulated according to Balogon and Ologhobo (1989) with 40% protein. Fast growing (darting) fish were identified and removed every 7 days.

2.3 FATTENING OF FRY

The two types of fry (shooters and non-shooters) of H. longifilis were transferred separately into outdoor tanks at density 15 larva/m^2 fed diet of 40% crude protein at 5% body weight thrice daily, supplemented with zooplankton. Fingerlings were harvested 6 weeks later at average weight; 35.4 and 60.3g for "non-shooter" and "shooter" respectively.

2.4 EXPERIMENT ON POLYCULTURE

Fast growing fingerlings (shooters) of H. longiflis (60.3g) and non-shooters (35.4g) were separately stocked with mixed tilapia breeders (50.4g) in 0.02ha replicate ponds at density of 5000 catfish/ha with 20,000 tilapia/ha at 1:3 male: female sex ratio. Mixed sex tilapia in monoculture at density 20,000 tilapia/ha and 1:3 male; female sex ratio was the control. Fish were fed at 5% biomass with crumbled non-palletized feeds with 40% crude protein twice daily. Twenty randomly selected fish were sampled for weight bi-weekly and at the end of 168 days ponds were drained, total numbers and weight of fish noted. Physico-chemical parameters of water used for all experiments were determined according to standard methods (APHA, 1985) and presented in table 1. One-way analysis of variance (ANOVA) was used for all statistical comparison of growth indices.

3 RESULTS

3.1 GROWTH PERFORMANCE

Table 2 shows the growth performance of 0. niloticus in Polyculture with "shooters" and "non-shooters" of H. longifilis. The best performance was recorded in 0.nilotiacus stocked with "shooters". The mean weight gained was significantly different ($P<0.05$) from 0. niloticus in monoculture. However, no significant difference ($P< 0.05$) exists between 0. niloticus in polyculture with shooters and those with non-shooters and between tilapia in monoculture and those in Polyculture with non-shooters. Tilapia in monoculture show the least growth performance. (Table II)

TABLE 1:
Mean values of some physical and chemical parameters of water used for experiments.

Parameters	Aquaria	Outdoor ponds	Growth ponds
Dissolved Oxygen (mg/l)	6.8	7.0	7.8
Ammonia (mg/l)	0.1	0.04	0.06
PH	7.5	8.8	8.0
Temp. (°C)	26.8	28.0	25.8

TABLE 2:
Growth performance of tilapia Orecochnonius niloticus in polyculture with catfish Heterobranchus longifilis

Ponds	Species	Stocking Rate of Tilapia ha	Initial weight (g)	Final weight (g)	Mean Daily weight (g)	Specific growth rate %
1	O. niloticus with catfish (shooter)	20,000	50.46	499.5^{c}	2.6^{b}	1.36^{b}
2	O. niloticus with catfish (non-shooters)	20,000	50.4^{b}	440.4^{b}	2.3^{bc}	1.23^{bc}
3	O. niloticus in monoculture	20,000	50.4^{b}	246.9^{c}	1.2^{c}	0.93^{cd}

Figures in a column followed by the same superscript are not significantly different.

SPECIFIC GROWTH RATE

The highest specific growth rate (SGR) was recorded in tilapia stocked with shooters (1.14%). Tilapia in monoculture shows the least SGR. Significant difference ($P<0.05$) exit between SGR of tilapia stocked with shooters and those in monoculture. There was however no significant difference ($P>0.05$) between tilapia in polyculture with shooters and those with non-shooters and between tilapia stocked with non-shooters and the ones in monoculture.

3.2 FOOD CONVERSION EFFICIENCY

The FCE was generally lower for tilapia stocked with shooters, non-shooters and those in monoculture (5.58, 5.70 and 6.30 respectively). The highest FCE was recorded for tilapia in monoculture (6.3). This was not however significantly different ($P<0.05$) from those in polyculture.

3.3 DISCUSSION

The relatively low mean daily growth rate 1.2g/day of tilapia in monoculture agree with low rates (0.8g/day, 0.6g/day) recorded in monocultures with T.zilli and T. nilotica respectively by Dadzie (1982) and can be attribtued to the absence of predatory fish to check prolific breeding habit of tilapia and reduce density. Also, the difference between daily growth rate of tilapia in monoculture and those with "non-shooters" of H. longifilis was not significant ($P>0.05$). Properly because the "non-shooters" could not mature fast enough to effectively prey upon tilapia before they reproduce and increase density. The significantly higher ($P<0.05$) daily growth rate 2.6g/day of tilapia stocked with "shooters" of H. longifilis could be due to higher predatory potential of the later to reduce density of tilapia populaiton. In a similar experiment, Hulata et al (1982) using European and Chinese races of common carp established that highest densities gave least body weights as a result of competition for space and food. The highest F.C.E (6.3%) recorded for tilapia in monoculture in this study agrees with results of Maldonado et al (1979) Villarreal (1980) and pastastico et al (1982) that fish reared in higher densities consumed less food and converted far less efficiently spending greater energy on surfacing resulting in low growth performance and vice versa.

4. CONCLUSION AND RECOMMENDAITON

Although tilapia in Polyculture performed better than in monoculture in all cases, in this study, the mean growth rate depended on the predatory potential of fish co-stocked. Only tilapia stocked with efficient predatory fish can effectively reduce tilapia densities and significantly ($P<0.05$) improve the growth performance in ponds.

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