BODY-WEIGHT VARIATIONS IN FOUR WEEK OLD *Clarias gariepinus*

EBONWU, B.I., MEGBOWON, I., AYO-OLALUSI, C.I. & MOJEKWU, T.O.
Nigerians Institute for Oceanography and Marine Research, PMB 12729, Lagos

ABSTRACT

The variation in size and weight of fry and fingerlings of *Clarias gariepinus* has been a major factor affecting the success of hatchery production of the species. It encourages cannibalism, thus reducing the overall survival. The disparity in weight and population was assessed to determine the necessity of sorting as a reliable method of controlling size disparity and mortality in hatchery production. Two-week-old fry with average weight of 15mg and length range of 0.8-0.9cm were randomly sampled and stocked at 200 fry/litre in 30 litre circular tanks. The fish were fed for four weeks on 45% crude protein diet, *ad libitum*. At the end of four weeks, there were three groups; large, medium and small with mean weight of 4.02g, 1.24g and 0.17g, respectively. The cumulative mean weight was 1.8g, population ratio was 1:8:10 for large, medium and small, respectively.

INTRODUCTION

The African Catfish genus *Clarias* (Scopoli, 1777) has a widespread distribution and is found in Africa and South East Asia. Some species are of great economic importance both in fisheries and aquaculture. *Clarias gariepinus* (Burchell 1822) is a highly valued commercial fish widely cultured in Nigeria and has been cultured at subsistence level from fingerlings sourced from the wild (Sydenham, 1997). The development of a reliable method for the production of *C. gariepinus* fingerlings was one of the priorities of aquaculture research in Africa and the success in intensive fingerling production today is based on such works. Feeding of the larvae, fry and fingerlings of the catfish have been most studied and may influence growth and survival of the fish. However, some technically related issues like competition, cannibalism and size disparity are still lingering culture problems (Viveen *et al* 1985, Jansen 1985, de Graaf *et al* 1995). The growth of fry and fingerlings of *C. gariepinus* is dependent on the quality and quantity of the feed and percentage of body weight, which often decreases as fish size increases. Different groups of the same cohort can be identified in hatchery operation consisting of smaller size fingerlings which are more in number than the bigger ones (Janssen,1985). This size disparity encourages cannibalism between the two groups as the bigger size prey on the small ones. Other biological factors such as social dominance, territorial hierarchy and consequently higher relative aggression could result in reduction of survival rate considerably (Janssen 1985a, 1985b; de Graaf *et al* 1995). This paper evaluates the population ratio of the various size groups.

MATERIALS AND METHODS

Two weeks old fry (15mg and 80-90mm) were randomly sampled and stocked in 30 litres circular plastic tanks with two replicates. The fry was stocked at 200 fry/litre and fed for 4 weeks on 45% protein diet, *ad-libitum* three times daily with daily water exchange. pH and temperature were monitored using electronic pH and temperature using electronic pH and temperature meter, model pH – 009 {III} with temperature range of 0-50°C resolution and accuracy of ±0.1pH = ±1.0°C while ammonia value was estimated from temperature ammonia monogram (Trussel 1972); Emerson *et al* 1975;). The experimental set up was aerated using model Hp – 116; 30A SUN-SUN aerator. Data were subjected to linear regression analysis.

RESULTS

The weight range of the harvested fingerlings was 2.1-8.3g of large, 0.7-2.0g for medium and 0.1-0.7g for small. The mean weights were 4.02g, 1.24g and 0.17g while R^2 was 0.8676, 0.9564 and 0.8125 respectively (Fig.1). The cumulative average weight was 1.8g. The population ratio of the fingerlings was 1: 8: 10 for large, medium and small respectively, while survival was 30%. Water quality monitored showed that pH was 6.0-7.0 while temperature range was 27-30°C with estimated ammonia valued at 0.0654-0.7991.

DISCUSSION

The result showed a wide variation in the weight of the *C. gariepinus* from 0.1-8.3g with an average weight of 1.8g. This average weight is also considered low. Although, de Graaf, 1995 observed a variation in the weight, a weight range of 2-3g in five weeks old fingerling in earthen nursery ponds was reported. The difference in these findings might be due to variation in stocking rate and management practices such as feed and water holding facilities. The stocking rate is a major factor affecting growth rate in fish. Sahoo *et al* (2000) observed that increasing the stock density decreases the total weight, specific growth rate and % weight gain of *Clarias* larvae. Although three groups of fingerlings, large, medium and small were reported in this work, Ayinla and Nwadukwe (1988) and Adebayo *et al* (2001) observed four different sizes of fingerlings obtained from the same parent stock at every spawning exercise of *C gariepinus* and reported that increasing the brood stock weight resulted in a higher percentage of fast growers. They opined that the significance of size variation in a population of catfish species with high cannibalistic tendency is the attendant adverse effect on the yield. It can therefore be inferred that climatic conditions play significant roles in the survival and production of catfish seed. The medium size (R^2 =0.9564) would be more economical to sell considering the ratio and total biomass.

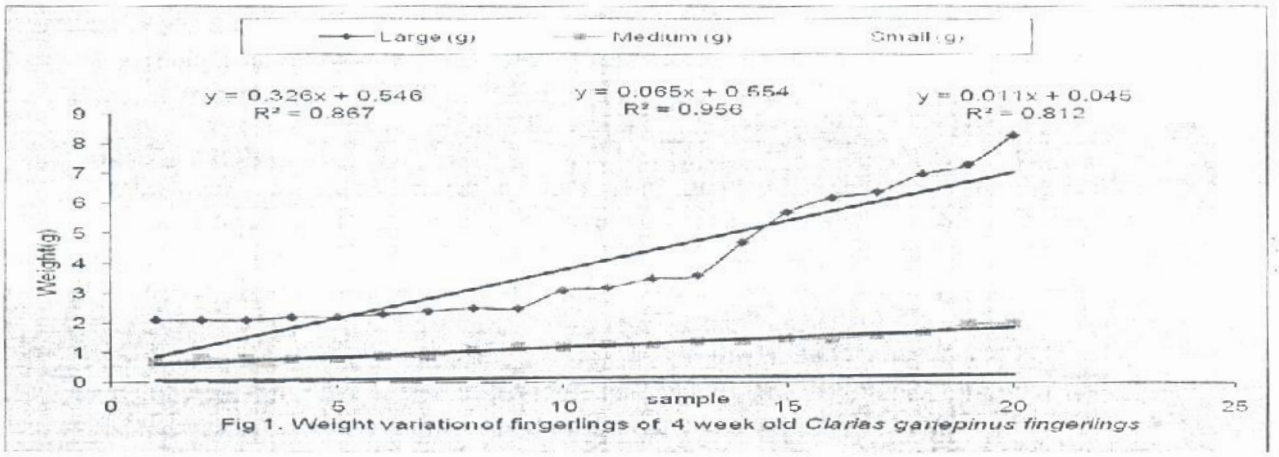

Fig 1. Weight variationof fingerlings of 4 week old *Clarias gariepinus fingerlings*

The disparity in weight encouraged cannibalism, thus leading to 30% survival. It becomes necessary therefore that early sorting after the second week of hatching is necessary to reduce mortality through cannibalism (Viveen *et al* 1985, de Graff *et al* 1989). Feeding difference size groups of the same cohort can affect production as bigger sizes suppress smaller ones due to social dominance, territorial hierarchy and aggression. The success of intensive fingerling production either in water recirculation system or flow-through requires high stocking density with sizeable fingerlings hence early sorting should start from the second week coupled with adequate feeding regime.

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