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Short Communication

Growth response of juveniles of *Clarias bidorsalis* to imported floating feed and cost implication in Ilorin, Kwara State, Nigeria

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Growth response of *Clarias bidorsalis* juveniles weighing between 5 - 10 g that were fed with extruded (floating) imported feed known as coppens were investigated for 84 days. In a simple experiment, 500 juveniles of *C. bidorsalis* were stocked in four experimental tanks with a dimension of 0.93 × 1.2 × 0.98 m and water capacity of 1000l each containing 125 juveniles. These juveniles were fed with extruded feed. Given at two feedings daily at 8.00 and 18.00 h, growth performance were monitored using: weight gained, specific growth rate and feed conversion ratio. Results showed that *C. bidorsalis* juveniles increased in weight during the experimental period with a total weight gain range of 50 - 450 g and a mean weight gain of 242 g. Although the feed enhanced growth, the cost implication of the feed was exorbitant for the culturist. A development of a cheap and affordable feed is advocated in order to reduce cost of fish production.

Key words: *Clarias bidorsalis*, growth, weight-gain, cost implication.

INTRODUCTION

Floating (extruded) feed type has obvious advantages: it enables the culturist to monitor feeding intensity and feeding rate is adjusted accordingly. It also helps to reduce water pollution as a result of over feeding the fish (Falayi et al., 2006). In Nigeria presently, most of the extruded feed are imported and the prices are exorbitant. There is concerted effort to produce fish feed within Nigeria, some of the investigators which include Otubusin and Ifili (2000) obtained growth rate of 5.72 by feeding *Clarias gariepinus* with frozen maggot. Achionye-Nzeh et al. (2002, 2003 and 2004) used *Cirina forda, Rana esculenta* and *Macrotermes nigerensis* to replace fishmeal during formulation of different diets and obtained growth rates of 0.57 at 30% inclusion of *C. forda*. The specific growth obtained was 0.51 at 30% inclusion of *R. esculenta* and 0.64 at 30% inclusion of *M. nigerensis.* Buurma and Diana (2007) worked on the effects of feeding frequency on *Clarias* focus and observed that fish given three feedings per day experienced 19% faster growth ($P < 0.05$) than fish given the same ration in a single feeding per day. Kikuchi et al. (2006) also worked on feeding frequency of the Tiger puffer *Takifugu rubripes* and showed that daily food consumption and weight gain of fish that were 4 g in size fed three and five times daily, were significantly higher than those of fish fed once daily ($P < 0.05$).

The family *Claridae* is distinguished by a strong barbed spine in front of the pectoral fin but none preceding the dorsal fin. *Clarias* sp. is one of the cultured fishes in Nigeria and it is highly priced. There is little or no information on the growth response of floating feed imported into the country and the cost implication on *Clarias bidosalis*, this work elucidates both growth response and the cost implication. The objectives of this work are to determine the effects of extruded (floating) feed at two feedings a day on the growth of *C. bidorsalis*, to dertermine the amount of floating (coppens) feed required to grow *C. bidorsalis* to table size, and to determine the cost implication and to justify the importation of extruded feed to Nigeria.

MATERIALS AND METHODS

Experimental system

Four experimental tanks with a dimension of 0.93 × 1.2 × 0.98 m and water capacity of 1000 L of water were set up outside the laboratory in the Department of Zoology, University of Ilorin,

Table 1. Growth Performance of *Clarias bidorsalis* fed with extruded feed.

Parameter	Values obtained
Mean initial weight (g)	7.00
Mean final weight (g)	242
Mean weight gained (g)	235
Weight gained %	3385.7
Average daily weight	2.88
Specific growth rate (SGR)	0.22
Protein efficiency ratio (PER)	1.12
Feed conversion efficiency (FCE)%	0.26
Feed and Juveniles cost	$231
Feed intake	52.00kg
Mortality	5%
Expected yield	$317

Nigeria. The experimental tanks were covered with metal mesh screen to prevent fish from jumping out.

Experimental diet

Floating (extruded) artificial diet containing 45% protein were used to feed the fishes. The diameter of the feed was 2, 3, 4.5 and 6 mm, respectively.

Experimental fish

Juveniles of *C. bidorsalis* were procured from a small fish farm near Ilorin and were transported to the Department of Zoology University of Ilorin, Nigeria. The fishes were acclimatized for a period of three days.

Stocking and feeding

The fishes were randomly distributed into plastic tanks; 125 Juveniles of *C. bidorsalis* initial weight range of 5 to 10 ± 7.48 g were stocked in each Plastic tank. Fishes were fed 4% of their body weight at two feedings (half of the diet was given about the hour of 08.00 h and the other half about 18.00 h). The feed were broadcasted on the surface of the water and the experiment lasted for 84 days (12 weeks). Growth was monitored by taking measurements of weights and the fishes were returned to their respective bowls. Some of the growth parameters were calculated using the listed formulae:

$$\text{Specific growth rate (SGR)} = (\text{Log}_e W_2 - \text{Log}_e W_1)/ (T - t)$$

Where W_1 is the initial weight of fish (gram at time t) and W_2 is the final weight at time T; e is the base of natural logarithms.

$$\text{Protein efficiency ratio (PER)} = \text{Weight gained}/ \text{Protein fed}$$

Where protein fed is calculated as: (% Protein in diet × Total diet consumed)/ 100 (Mazid et al., 1978).

$$\text{Feed conversion efficiency} = (\text{Weight of feed fed} \times 100)/ \text{Mean weight gain}$$

(Utene, 1979).

The student t-test was used for significant difference in the observed data.

RESULTS AND DISSCUSION

The extruded feed promoted growth of juveniles of C. *bidorsalis* however differential Growth were observed in the fishes. The gain in weight varied from 50 - 450 g with a Mean weight gain of 242 g as shown in Table 1. The specific growth rate was 0.02, protein efficiency ratio was 1.15 and food conversion efficiency was 0.26. The survival rate was high, about 25 fishes died during the experimental period. The feed intake during the experiment period was 52 kg. The total cost of feed and juveniles representing the operating cost was $231. The expected yield is $317. The accruable revenue to the culturist is about $86. The economic benefits accruable to the culturist from embarking on the investment are too low.

The results indicated that the floating diet promoted growth in *C. bidorsalis*. Similar observations were made by Otubusin and Ifili (2000); Madu et al. (2000), and Achionye-Nzeh et al. (2002 and 2003) on *C. anguillaris*. Buurma and Diana (2007) and Kikuchi et al. (2006) observed that feeding more than once a day promoted growth better than feeding once per day. The results obtained in the present work were in line with the work of Buurma and Diana (2007), feeding was twice per day and it promoted growth in *C. bidorsalis*.

The cost implication of feeding the fish to table size was very high. Falayi et al. (2006) also observed that imported floating feed were exorbitant. This may discourage the culturist from going into fish production. Similar observation was made by Olokor et al. (2006) they observed that the cost implication of drying fish with fuel wood was huge.

There is the need to encourage the production of quality feed locally using local food items. This will reduce the running cost of fish production.

Fish culture apart from providing fish to met the protein intake of the people since the catch from the oceans, rivers, streams, brackish and swamps are dwindling due to over fishing (Comte, 1993; McClellan, 1993; Griffin 1993). Fish culture also plays major role in poverty alleviation by providing employment for both the young and retired people especially in a developing economy in a third world country like Nigeria. *Clarias* species thrive under low oxygen tension because of the shrub-like accessory breathing organ (Holden and Reed, 1972), which makes them the choice fish for culture in a developing country where the culturist cannot afford a recycling system.

The results obtained in the present research has shown that fish culture can provide fish to meet the protein demand of the teeming population in Nigeria but to achieve this goal, the feed production should be undertaken locally in order to reduce cost of production. This research has shown that imported feed is expensive

although it promotes growth of *C. bidorsalis*.

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