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GROWTH PERFORMANCE OF CLARIID CATFISH SEEDS USING PITUITARY AND OVATIDE

V.A. OKONJI and E. ONU

Department of Fisheries, Faculty of Agriculture, University of Benin, Benin City, Nigeria

ABSTRACT

The effects of natural (Pituitary) and synthetic (Ovatide) hormones on the growth performance of clariid catfish seeds were investigated. The clariid catfishes included *Clarias gariepinus, Heterobranchus bidorsalis* and their hybrid. Three concrete tanks measuring 4 x 5m were used for the study. Each tank was partioned into 1 x 1.25m using netting materials of 2mm size (Happas). The fish culture was set up as semi-intensive system. Fish seed of clariid catfishes was produced using Ovatide and Pituitary extract at the University of Benin fish hatchery. Fingerlings of average size of 2g were selected from seeds produced from each hormonal type and from each fish species and stocked at a stocking rate of 10fish/m^2 .The experiment was designed as two (hormonal type) X three (fish species) factorial in complete randomised design replicated twice. The fishes were fed with commercial diet containing 40% crude protein . Such data as weight gain, absolute growth rate, relative growth rate, feed conversion ratio and survival were collected and subjected to analyses of variance.The result showed significant ($P<0.05$) difference in the growth performance of fish species produced with Ovatide and Pituitary extract. Heteroclarias produced with Pituitary extract had fish survival, mean bi weekly weight gain and absolute growth rate of 100%, 45.75g, and 35.63g/day respectively. These were significantly higher ($p<0.05$) than the one produced from ovatide with values of 44.59g and 34.6g/day for mean bi-weekly weight gain and absolute weight gain. The trend was the same for *C. gariepinus* and *H. bidorsalis*. Therefore the use of Pituitary extract proved better than the ovatide in terms of survival, and growth of hatchlings.

Key words: Pituitary; Ovatide; Clariid catfishes; Growth performance.

INTRODUCTION

As Nigeria strives towards attaining food security come 2020, aquaculture as an emergent technology appears to be a vital tool to the achievement of this laudable vision. Aquaculture is believed to be an efficient production system for protein-rich animals which can help combat famine and malnutrition in developing countries. However, it is bedeviled with inadequate supply of high quality fish seed for continuous production. In the last decade, significant research has been conducted worldwide on fish seed production using pituitary preparations (Nwadukwe, 1993). Much of these had centered on pituitary extracts of salmon and carp. Other hormonal materials still capable of inducing ovulation and spawning include gonadotropins, human chorionic gonadotropins, clomipgene citrate, luteinizing-hormone releasing hormone (LH-RH), ovopel, ovatide and ovaprim (Woynarovich and Hovarth, 1983; Manosroi *et al.*, 2004; Eyo, 2002; Peter *et al.*, 1998). With these, the challenge of supplying large numbers of fish seed seems to have been surmounted. However, little is known about the effects of these hormones used for seed production on growth rate, food conversion ratio, and survival of culture fishes.

In fish, as with all higher animals, hormones play a critical role in the reproductive process. As reported by Wornarovich and Horvath (1983) and Abol-munafi *et al.* (2006), hormones are chemical messengers released into the blood by specific tissues, such as the pituitary gland. The hormones travel through the bloodstream to other tissues, which respond in a variety of ways. One response is to release another hormone which elicits a response in yet another tissue. The primary tissues involved in this hormonal cascade are the hypothalamus, pituitary gland and gonads (Wornarovich and Horvath, 1983; Schoonbe e*t al.*, 1980).

Pituitary gonadotropins (GtHs) and ovarian steroid hormones regulate oocyte growth and maturation in teleosts and other vertebrates (Nwadukwe , 1993) and can be externally introduced to the pituitary or the ovary as external interference during induced breeding (Bruzuska, 2002). Various types of hormones have been used to induced oocyte maturation and spawning for various species of fishes (Nwuba and Aguigwo, 2002; Mansroi *et al.*, 2004). *Clarias gariepinus* have been induced with different type of hormones with varied results. Some of the hormones used included pituitary suspension (Ricchter, 1985), synthetic hormones such as Clomiphene citrate (Agigwo, 1991). Testosterone may also be involved in oocyte development, through the initiation of germinal vesicle breakdown (GVBD) during final oocyte maturation.

Considering the alarming rate at which new synthetic gonadotropin analogues are produced by western countries and exported to developing countries, it has become pertinent to check if there are differences in the effects of these synthetic hormones compared to the natural pituitary extract on the growth of fishes. Lots of works have been done on their effects on fry and fingerlings survival (short term effects) but none has been carried out on growing of table-size fishes (long term effects). It is in line with this that this research was designed to determine the survival and growth of the clariid catfish fingerlings produced from various hormones overtime.

MATERIALS AND METHODS

The four broodstocks of *C. gariepinus* (with weight of 500g each*)* and*, H. bidorsalis (*with weight of 600g each*)* were induced to produce the seeds of Clariid catfishes namely, *C. gariepinus, H. bidorsalis* and their hybrid (Hetericlarias). Each fish species was produced with two different types of hormone: ovatide, synthetic hormone adminstered at a recoomended dosage of 0.2ml/kg; and fresh puitary extracted from *C. gariepinus,* administered based on equal weight bases between the donor fish and the receipient broodstock.

The fish seeds produced were collected after six weeks of nursing for culturing in concretanks. Three concrete tanks measuring 4 x 5m were used for the culture or study. Each tank was partioned into 1 x 1.25m netting materials of 2mm size (Happas). The fish culture was set up as semi-intensive system. 50 fingerlings of average size of 2g were selected from seeds produced from each hormonal type and from each fish species. The concrete tanks were filled with borehole water and fertilized with poultry dropping at the rate of 10kg/100m^2 of the tank water (Okonji and Obi, 1999). Each happa or unit was stocked at the rate of 10fishes/m^2 under the semi-intensive culture system. The culture fishes were fed Coppens (commercial feed of 40% crude protein) daily at 900hrs and 1600hrs at 5% body weight. Water was occassionally flush when water transperency (Secchi disk reading) is less than 30cm.

The experment was designed as two hormonal type X three fish species factorial in complete randomised design replicated two times. The treatment were the two hormonal types / fish species. A total of twelve culture units was used. Data were collected were weight gain, fish survival, absolute weight gain, relative weight gain and feed conversion ratio. Absolute and relatve growth rates were calculated as Final – initial weight of fish/culture period (days) and Final – intitial weight of fish/Initial weight X 100 respectively.

Data collected were analysed using Genstart statistical package version 8.0. Data were tested using analyses of variance and means were separated using duncan multiple range test.

RESULTS AND DISCUSSION

The results on the effects of different hormonal types used in producing fish seed on the growth performance of different species of clariid catfishes are shown in Table 1. The results showed that there was significant difference in some growth parameters such as survival, mean bi-weekly weight gain, absolute growth rate and relative growth rate among the various catfish species seed produced from different hormones ($P<0.05$). Also the result showed that pituitary hormones performed significantly better in fish survival, bi-weekly weight gain, absolute growth rate and relative growth rate ($P<0.05$). Figure 1 showed that Heteroclarias seeds produced with Pituitary hormones had higher and better growth than others *Heterobranchus bidorsalis* produced had lower growth rates in both hormones compared with seeds of heteroclarias and *Clarias gariepinus*. However, the pituitary hormone produced seeds also produced higher growth rates than the ovatide produced seeds.

Generally, the result (Table 1) showed that Heteroclarias performed better than *C. gariepinus* and *H. bidorsalis*. This result agrees with Legendre *et al*. (1992) who reported that Heteroclarias performs better than *C. gariepinus* and *H. bidorsalis* in terms of growth while the growth oh *H. bidorsalis* is better than *C. gariepinus* . The better growth performance of Heteroclarias may be attributed to the improvement of the growth through hybrid vigor as reported by Dunham and Smitherman (1983).

The hormonal types were observed to have significant difference in growth performance of the clariid catfishes. This may be attributed to the fact that some hormones are growth inhibitors while others are growth promoters depending on the dosage and the target animal as reported by Nwokoye *et al*. (2004). The rate of promoting or inhibiting growth also varies with fish species. The Heteroclarias seed appears to have benefited better from the hormones as growth promoters than the other fish species. This can be accounted for by its higher growth performance than *C. gariepinus* and *H. bidorsalis* (Table 1 and Fig.4). Also, pituitary extract produced seed showed higher growth performance than seeds produced from Ovatide. This agrees with the report of Dask (2004) who noted that endogenous gonadotropins appear to significantly enhance the secretion of the right type of steroids in abundant quantity enabling complete maturity of ova for spawning and growth.

Heteroclarias produced with Pituitary extract had fish survival, mean bi weekly weight gain and absolute growth rate of 100%, 45.75g, and 35.63g/day respectively. These were significantly higher than that produced from ovatide. The trend is the same for *C. gariepinus* and *H. bidorsalis*.

The result of feed conversion ratio showed that there was no significant difference in the feed conversion ration of the various fish species produced with pituitary and ovatide($P>0.05$). Thus differences in growth of the various fish seed types produced from different types of hormones may be due to the hormonal type and not feed consumed.

CONCLUSSION

The results of the study showed that the type of hormone used for seed production had significant ($p<0.05$) effects on growth performance of Clariid catfishes. The Pituitary extracts was observed to promoter higher growth of the fishes than the synthetic hormone (Ovatide). This trend was observed for Heteroclarias, *C. gariepinus* and *H.bidorsalis*.

However, Heteroclarias was observed to have better growth performance than *C. gariepinus* and *H. bidorsalis* with *H. bidorsalis* having the least growth performance. The use of pituitary extract for seeds production would better growth performance.

Table 1: Effects of hormonal types used for fish seed production on growth performance and feed conversion of Clariid catfishes

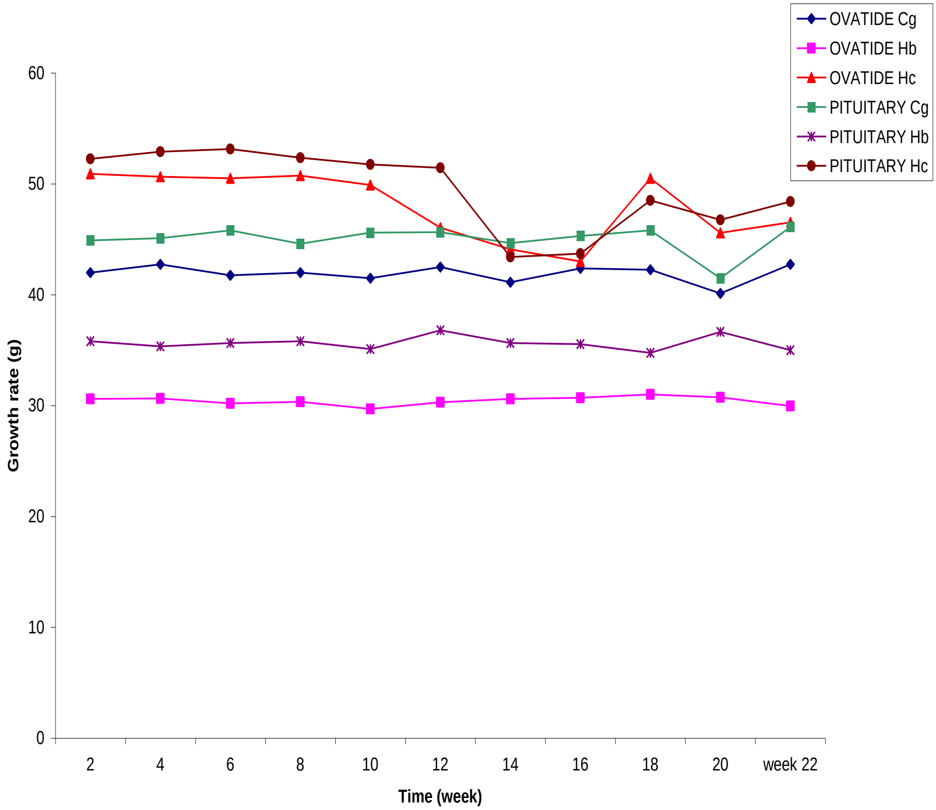
Growth Parameters	Hormonal Types	Clariid Catfish Species			Mean Hormone
		Cg	Hb	Hc	*
Survival	Ovatide	20	100	100	75±8.64b
	Pituitary	100	100	100	100±0.00 ^{a}
	Mean Species	40±9.97 ^{b}	100±0.00^{a}	100±0.00^{a}	
Bi-weekly Weight Gain(g/2weeks)	Ovatide	38.96	28.38	44.59	37.31 ±12.02^{b}
	Pituitary	41.5	33.09	45.75	40.11 ±12.69^{a}
	Mean Species **	40.23±11.0^{b}	30.74 ±8.17^{c}	45.17±13.73^{a}	
Absolute Growt rate(g/day)	Ovatide	29.7	27.68	34.6	30.75±48.9^{a}
	Pituitary	32.1	25.45	35.63	31.08±46.3^{a}
	Mean Species **	31.06±12.5^{b}	26.57±49.8^{c}	35.12±7.1^{a}	
Relative Growth Rate(%)	Ovatide	72.19	58.91	66.68	65.93±8.29^{b}
	Pituitary	165	78.54	97.63	113.72±40.69^{a}
	Mean Species **	118.59±53.61^{a}	68.72±12.53^{c}	82.15±18.72^{b}	
FCR	Ovatide	1.59	1.55	1.55	1.55±8.64^{a}
	Pituitary	1.55	1.6	1.5	1.55±8.5^{a}
	Mean Species **	1.57±0.05^{a}	1.58±0.05^{a}	1.5±0.05^{a}	

NB: Means with same letter in colum for each parameter are not significantly different(P>0.05)

Cg= Clarias gariepinus

Hb = Heterobranchus bidorsalis

Hc = Heteroclarias



Fig; 1: Effect of Hormonal types on growth rate of Clariid catfihes over type

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