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Growth valuation of *Channa striatus* fry fed with different live feeds

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ABSTRACT:

Today live feed play a very specific role in the aquaculture industry. Various live feed organisms were distributed throughout the world. The live feed which enhance the growth of the fish larval stage and as well as to maintain the survival of the fish population. In the initial stage of the exogenous feeding the young ones, which advice to provide planton soup in a very small size its depending on the mouth size of the young ones. In our study, I have chosen the Murrels species *Channa striatus* which is commercially important fish one in india, Thatswhy we prepared that species and provided the locally available live feed viz; Tubifix (D1) Chironomus larvae (D2) Beef liver (D3) Mosquito larvae (D4) and Plankton (D5) fed to the *Channa striatus* fry over a period of 45 days. Among the food *Chironomus larvae was* found to produce the best SGR (1.529±0.052) Weight gain (919.00±62.324) RGR % (9.162±0.70) ADG (g/day) (0.0874±0.0013) Growth rate (%) (40.55±0.299) Survival % (96.66±4.714) and the poor growth parameters were recorded in Planton soup (D5) respectively.

Keywords:
Channa striatus, growth, nutrition, live feeds.

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INTRODUCTION:

Channa striatus snakehead is an air breathing, and carnivorous in nature. They are widely distributed in Africa and Asia. It is having high market due to its tasty and flesh. They support economically important fisheries and aquaculture industry in many Asian countries (Ling, 1979; Chen, 1990). Among murrels *C.striatus* forms a significant role in capture fisheries of India. Characteristics of this fish that make it desirable cultivable food fish include rapid growth and the ability of the fish to store and use atmospheric oxygen for respiration in waters with low dissolved oxygen and they can withstand higher stocking densities also. It has been estimated that out of 18,000 t of marketable surplus air breathing fishes caught from natural resources in India, murrels account for nearly 12,000 t (Jhingran, 1975) with major part of them constituted by *Channa marulius, Channa striatus* and *Channa punctatus*. However, murrel culture is not practiced in a well-defined way in India due to several reasons. One of these is that there are no seed supply / sales center for murrels in country.

Various dry feed formulae have been investigated as possible substitutes of live food for larval development (Appelbaum and Dor, 1978; Dabrowski, 1983; 1984). In recent years suitability of various dry feed formulae has been investigated for the rearing of Cyprinid and catfish larvae (Bryant and Matty, 1981; Msiska, 1981; Hecht and Viljoen, 1982). However it has been shown that formulated compound diets do not provide optimal larval growth when used exclusively as larval food, especially during the early larvae stages of Cyprinids and catfish (Hogendoorn, 1980; Dabrowski, 1984; prinsloo and Schoonbee, 1986), therefore live food provide a substantial availability of protein and other essential nutrients (Jhingran, 1975; Ahmed, 1994, Thakur (1978), Munnet, 1979) provided some basic information on the feeding of *C.batrachus* fry. However development of suitable feed for rearing *Channa striatus* fry is lacking. It is therefore important to study the efficacy of a few selective feeds.

The fish farmers therefore depend on wild collection, which are unpredictable. Further, the rearing of hatchlings, post larvae and fry of *C.striatus* is a complicated process unlike the raising of carp fry, which has been standardized in some extent. Recently attempts have been made on larval nutrition of *Channa striatus* by (Qin *et al.,* (1997), Samantaray and Mohanty, 1997). But these authors have provided formulated pelleted feeds (instead of live feed) to the larvae resulting in poor survival and growth. In the present study a comparison is made on the growth of *C.striatus* larvae using tubifix, Chironomus, plankton and Beef liver and mosquito larvae as alternative live foods during the early larval growth phase of this species.

MATERIALS AND METHOD:

Channa striatus fry (length: 3.57+0.05cm, weight, 0.425+0.03 g) were collected from (CARE) earthen pond and acclimatized in the cement tanks for a period of one week during this period they were fed with plankton soup. They were grouped into 5 batches and stocked for 10 individual for each treatment with three replicates and reared in plastic troughs. (Capacity 15/Lt).

Water quality parameters viz; temperature 29°c ±1°c dissolved oxygen 6.1-6.6 mg/lt and pH 7.5-8.25 were recorded throughout the study. They were fed with Tubifix, Chironomus larvae, Beef liver Mosquito larvae, and Plankton soup twice/day (11.00hrs, 13.00hrs) *ad libitum.* The feeding trial was continued for a period of 45 days. Water was changed every day with minimal disturbance to the experimental animals full nos. the length, and weight were recorded once in every fortnight, the growth parameters viz, weight gain (%), specific growth rate and (%/day) and survival (%) were estimated as

Formula:

The energy budget of the fish was calculated by following the IBP formula

$$\text{Specific growth rate=SGR (\%/day)} = \frac{\text{In log Final body weight -In log initial lives weight (g)}}{\text{Experimental duration}} \times 100$$

$$\text{Weight Gain (\%)} = \frac{\text{Final live weight-Initial live weight}}{\text{Days}} \times 100$$

$$\text{Average daily growth rate (\%) (ADG \%)} = \frac{\text{Growth (live wt.g)}}{\text{Duration}} \times 100$$

$$\text{Survival (\%)} = \frac{\text{No of fish introduced}}{\text{No of fish survived}} \times 100$$

$$\text{Mean growth rate} = \frac{\text{Final mean weight}}{\text{Initial mean weight/days}}$$

RESULTS:

All foods were readily accepted from the start of feeding. The beef liver was taken by larvae from the bottom of the trough, Where as Zooplankton, mosquito larvae in the mid water of the trough and the tubifix, Chironomus taken by the larvae from the bottom. The body composition of the fish fed on different diets and growth parameter was presented in table 1 and from the table 2 body protein, carbohydrate and lipid of the fish is higher in the diet of D2 and followed by other diets groups. And fig 1 shows the Specific growth rate and relative growth rate and growth rate of *Channa striatus* fry

Live food is regarded as the best for fishes, many crustacean, insect larvae. In present study the result revealed that the highest SGR (1.529 %/day), was obtained in the individual fed with Chironomus larvae (Table 1) followed by tubifix fed on (1.383%/day), beef liver (1.22%/day) mosquito larvae 1.112%/day and plankton (1.082%/day).The best weight gain was obtained those fed on Chironomus larvae (919.00). And followed by (705.64) those fed on tubifix. The best survival rate of (96.66 %) was obtained in *Channa striatus* fed on Chironomus larvae whereas the lowest survival (73.33 %) were observed in those fed on plankton.

DISCUSSION:

The results showed that live food, in particular Chironomus larvae is a most desirable diet for the rearing of the *Channa striatus* larvae. The importance of artemia as live food (Hogendoorn, 1980; Msiska, 1981) is again

Table 1.Growth and Survival of *Channa striatus* fry fed on different types of diets

	Diets				
	Tubifix (D1)	**Chironomus larve (D2)**	**Beef liver (D3)**	**Mosquito (D4)**	**Plankton (D5)**
Initial length (cm)	3.5060± 0.0240	3.6030± 0.0180	3.5860± 0.1090	3.6600± 0.141	3.5230± 0.0530
Initial weight (g)	0.4060± 0.0200	0.3900± 0.0310	0.4250± 0.0410	0.4430± 0.040	0.4630± 0.0260
Final length (cm)	6.9180± 0.0720	7.6600± 0.0820	6.6900± 0.0520	6.5120± 0.305	6.0540± 0.0690
Final weight (g)	3.2670± 0.0200	3.9480± 0.0560	2.8500± 0.0810	2.1100± 0.082	2.1260± 0.0100
Experimental duration	45	45	450	45	45
SGR%/day	1.3830± 0.0490	1.5290± 0.0520	1.2200± 0.0970	1.1120± 0.081	1.0820± 0.0450
Weight gain%	705.640± 41.805	919.000±62.3240	578.150±74.7800	380.200±38.370	360.185±26.4700
ADG (g/day)	0.0723± 0.0004	0.0874± 0.0013	0.0629± 0.0016	0.0466± 0.001	0.0472± 0.0002
Growth rate (%)	39.3900± 0.3010	40.5500± 0.2990	37.7900± 0.6000	35.5600± 0.760	35.1800± 0.5510
Survival %	90.0000±14.1400	96.6600± 4.7140	76.6600± 4.7140	66.6600± 4.714	73.3300± 9.4280

confined by this investigation, However Prinsloo and Schoonbee (1986) observed zooplankton as best live food in comparison to commercial dry feed for the rearing of the silver carp and grass carp species over a period of 10-14 days; silver carp and grass carp larvae accursed relatively better growth with zooplankton as compared to commercial dry food. In our present study instead of Zooplankton Chironomus displayed superior growth and other parameter were recorded, due to the higher protein 61.17% and haem content of the Chironomus larvae. Qin, fast, DeAnda & Weidenbach (1997) also developed a protocol for weaning larval snake heads from live artemia to formulated feed, but grow out performance with formulated feed was not evaluated.

Live food is an important diet in the rearing of larvae of a member of fish species (Hogendoorn; 1980; Msiska, 1981; Stenson; 1982) indicated the importance of rotifer *Brachionus plicatilis* for mass larval rearing of fishes and stressed the value of the inclusion of rotifers in combination with artificial dry feeds for the optimum growth of *Cyprinus carpio* larvae. Matlak and Matlak (1976) indicated that rotifers are important food items of carp larvae during the first three weeks in nursery ponds. Zooplankton is the best larval food for a variety of fish larvae (Kilambi and Zdinak, 1982; Geiger, 1983a, and Dabrowski, 1984). The nutritional value of artemia for *Cyprinus carpio* larvae indicated good growth (Bryant and matty, 1981). A variety of dry foods were used for the rearing of *C.carpio* larvae (Appelbaum and Dor, 1978; Hecht and Viljean, 1982).

According to (Cahu *et al*., (1998), larvae receiving live food also showed better survival and growth than larvae receiving artificial diets, sea bass *Dicentrarchus labrax*, Abi-Ayad and Kestemont (1994) observed the highest SGR in gold fish *Carassius auratus* larvae fed the mixed diets. Whereas the lowest SGR (1.325%/day) fed on plankton. Numbers of reports are available on larval rearing, Mahseer larvae, (Rai, 1990), also reported that larvae of Mahseer fed with plankton showed better growth when fed with other supplementary diets. In addition to the fry of katle *Acrossocheilus hexagonolepis* also showed better growth, when fed with 30% protein content with plankton soup (Rai, 1990).

Malkotra and Munchi (1985) found that formulated feed might also be physically unsuitable for most first feeding fish larvae because large food particles that didn't pass down the gut could subject larvae to physical stress or physiological stress. The fish growth rate is generally related to availability and density of optimal food (Mittelbach, 1981).Walleye growth increased after they switched their diets from

Table 2.Body composition of the *Channa striatus* fry fed on different diets

	Diets					
	Initial	**D1**	**D2**	**D3**	**D4**	**D5**
Protein %	14.01	15.14	16.28	15.68	14.21	14.32
Carbohydrate %	0.88	0.98	1.01	0.88	0.94	0.93
Lipid %	3.14	3.16	3.06	2.94	3.01	2.84
Ash %	3.20	3.50	3.90	2.80	3.20	3.40
Moisture%	76.14	74.15	73.48	75.14	74.28	75.01

D1-Tubifix, D2-Chironomus, D3-Beef liver, D4-Mosquito, D5-Plankton.

zooplankton to Chironomids (Fox *et al.,* 1989).But in our present study Chironomus larvae displayed superior growth fed with the *Channa striatus* fry is reported.

Dabrowski (1982) reported that many small fish larvae do not have the enzymes for digesting non-living diets. So we were applied different types of feeds. Artemia nauplia suitable for rearing of the young ones. Some relevant reports are available; Fluechter (1980) found that protein digestion enzymes in live Artemia nauplia were responsible for successful rearing of White fish *(Coregonus lavaretus)* larvae.

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CONCLUSION:

Our present results strongly support the use of live food in the early larval growth phase of *C.striatus* fry. So the blood worm is strongly recommended to the rearing of *C.striatus* fry, it should not affect further development of the larvae and fry.

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