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## Frequency of feeding behaviour on growth performance of walking cat fish, *Clarias batrachus* (Linn.)

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**Abstract:-** The study was conducted to assess the impact of different feeding rates and feeding frequencies on the growth and survival of fingerlings of Walking Cat Fish, *Clarias batrachus*. Test fish were fed with supplementary diet composed of rice bran, mustard meal, meat cum bone meal & soyabean meal (in equal proportions) @10% (FR<sub>1</sub>), 20% (FR<sub>2</sub>), 30% (FR<sub>3</sub>), 40% (FR<sub>4</sub>), 50% (FR<sub>5</sub>) & 60% (FR<sub>6</sub>) body weight. The experiment was conducted for 90 days where 20% feeding rate (FR<sub>2</sub>) resulted in maximum body weight gain of fish, when reared indoor. Likewise, specific growth rate as well as protein efficiency ratio was also significantly ( $P < 0.05$ ) highest in (FR<sub>2</sub>). In another experiment, the fishes were fed at three feeding frequencies viz. Once a day (FF<sub>1</sub>), twice a day (FF<sub>2</sub>) and thrice a week (FF<sub>3</sub>) for 60 days. The maximum increase in body weight was observed in (FF<sub>1</sub>). No significant differences were observed for water quality parameters with respect to different feeding rates and feeding frequencies. It was concluded that feeding rate @ 20% body weight once a day is appropriate for indoor rearing of fingerlings of *Clarias batrachus* (LINN).

**Key words:** Specific Growth Rate, Protein Efficiency Ratio, *Clarias batrachus*, Feeding Rate, Feeding Frequency.

### INTRODUCTION

The Walking Cat Fish (*Clarias batrachus*) is one of the most preferred food fish for the consumers of Asian Countries due to its good taste, less bones and medicinal qualities. Feed is the most expensive part of Cat Fish production. As feed cost occupies 60-70% of the total operational expenditure in fish culture, Selection of appropriate feeding rate as well as frequency are of primary concern, which otherwise increase the input cost to significant level. For the larval stages, live food mainly Zooplanktons are given along with supplementary feed to

satiation<sup>1</sup> and for later stages (fry and fingerlings), the feed amount as well as the feeding frequency needs to be defined so as to avoid wastage. Time of feeding, feeding rate and feeding frequency affect the feed intake and its utilization and growth performance of different fish species such as *Heteropneustes fossilis*, Channel Cat Fish, *Ictalurus punctatus*<sup>2</sup> *Chanos chanos*<sup>3</sup> and African Cat Fish, *Clarias gariepinus*<sup>4</sup>. The present study was conducted to evaluate the effect of different feeding rates and feeding frequencies on growth of fingerlings of *Clarias batrachus*.

### MATERIALS & METHODS

Experiments were conducted in plastic pools of 960 capacities. The pools were prepared 2-3 days before the

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stocking of fish. At the base, 4cm thick soil bed was provided and water level of 20 cm was maintained. Azolla (An aquatic weed) was spread on the surface and small pieces of PVC pipes were placed in each pool to provide shelter for fish. The fish were reared in stored ground water and aeration was provided through aerator stones, attached to a compressor.

For both the experiments, pools were manured with cow dung and poultry dropping @ 300g (1:1) and initial doze and 40g (1:1) at fortnightly intervals. Manure was soaked for 2 hours in water and then the filtered water was added to the ponds.

The supplementary feed used in both the experiments was composed of deoiled rice bran, deoiled mustard cake, meat cum bone meal and soyabean meal (each and equal proportion). The finely ground ingredients and prepared diets were analyzed for proximate composition and gross energy<sup>5,6</sup> (Table-1).

For first experiments, ten fingerlings of *Clarias batrachus* were stocked in each pool. The average length and weight of fish was 8.29±0.64 cm and 4.75±0.90g

respectively, at the time of stocking. Fish were fed with supplementary diet @ 10%(FR<sub>1</sub>), 20% (FR<sub>2</sub>), 30%(FR<sub>3</sub>), 40%(FR<sub>4</sub>), 50%(FR<sub>5</sub>) & 60%(FR<sub>6</sub>) body weight of fish once a day at 16:00-16:30 hr.

In second experiments, ten fingerlings of *Clarias batrachus* were stocked in each pool. The average length and weight of fish was 18.17±0.5 cm and 48.03±7.90g respectively, at the time of stocking. Fish were fed with supplementary feed @ 20% fish body weight once a day (FF<sub>1</sub>) at 4:00pm, twice a day (FF<sub>2</sub>) at 10:00am and 4:00pm and thrice a week (FF<sub>3</sub>) at 4:00pm.

Water of pools was replaced every week after taking the water samples of analysis.

Water samples were taken in the morning hours (9:00am) and were analyzed for temperature, pH and dissolved oxygen<sup>7</sup>.

Survival of fish was determined by comparing the number of fish present at the termination of experiment with that of fish stocked. Growth of fish was assessed by measuring body length and weight. Data was analyzed for the following parameters:

A.	Increase in length (%)	=	final body length - initial body length/initial body length x 100
B.	Increase in weight (%)	=	final body weight - initial body length/initial body weight x 100
C.	Specific growth rate	=	1 <sub>n</sub> final body weight - 1 <sub>n</sub> initial body weight/culture period x 100
D.	Protein efficiency ratio	=	fish weight gain(g)/protein intake(g)

Data was analyzed statistically using one way ANOVA

**RESULTS AND DISCUSSION**

**Experiment.1**

The effects of different feeding rates were observed on the water quality parameters, Survival and growth of *Clarias batrachus*. The studied revealed that during the experimental period no significant differences in different treatment were observed for water quality parameters. Survival of fish recorded was 100% in all the treatments. Percent increase in weight was maximum in FR<sub>2</sub> followed by FR<sub>4</sub>, FR<sub>6</sub>, FR<sub>1</sub>, FR<sub>5</sub> and FR<sub>3</sub> both SGR (1.24) and per (0.29) were observed maximum in FR<sub>2</sub> (Table-2)

**Experiment.2:**

Effects of different feeding frequencies were observed in water quality parameters, Survival and growth of *Clarias batrachus*. The studied revealed that during the experimental period no significant differences in different treatment were observed for water quality parameters. Hundred percent survivals of fish were recorded in all the treatments. Percentage increase in weight was maximum in FF<sub>1</sub> followed by FF<sub>3</sub> and FF<sub>2</sub> respectively. PER was observed maximum (0.17) in FF<sub>1</sub> (Table-3).

**Table-1: Proximate composition of different ingredients and prepared diet (on dry weight basis)**

Ingredients	Crude protein (%)	Ether extract (%)	Nitrogen free extract (%)	Energy (k cal/g)	P/E ratio (mg protein/cal)
Rice bran*	22.75	2.87	39.01	2.94	77.38
Mustard meal*	42.0	7.09	33.56	4.09	102.68
Meat cum bone meal	20.34	6.90	38.86	3.19	63.76
Soyabean meal*	4.29	1.75	37.411	4.10	120.21
Prepared diet	33.60	4.66	37.28	3.59	93.59

\*Solvent Extracted

**Table-2: Water quality parameters and growth of *Clarias batrachus* fed at different feeding rates.**

Parameters	FR <sub>1</sub>	FR <sub>2</sub>	FR <sub>3</sub>	FR <sub>4</sub>	FR <sub>5</sub>	FR <sub>6</sub>
Temp. (°C)	20.60 <sup>a</sup> ± 1.16	20.72 <sup>a</sup> ± 1.15	20.84 <sup>a</sup> ± 1.14	20.96 <sup>a</sup> ± 1.19	21.08 <sup>a</sup> ± 1.19	21.17 <sup>a</sup> ± 1.20
pH	10.01 <sup>a</sup> ± 0.12	9.61 <sup>ab</sup> ± 1.16	9.26 <sup>a</sup> ± 1.10	9.25 <sup>b</sup> ± 0.11	9.19 <sup>b</sup> ± 0.12	9.31 <sup>b</sup> ± 0.09
D.O (mg l <sup>-1</sup> )	5.97 <sup>a</sup> ± 0.57	5.50 <sup>a</sup> ± 0.58	2.53 <sup>b</sup> ± 0.36	2.46 <sup>b</sup> ± 0.23	2.48 <sup>b</sup> ± 0.29	2.81 <sup>b</sup> ± 0.36
Initial body length	8.22 <sup>a</sup> ± 0.64	8.40 <sup>a</sup> ± 0.57	8.10 <sup>a</sup> ± 0.73	8.44 <sup>a</sup> ± 0.48	8.26 <sup>a</sup> ± 0.47	8.34 <sup>a</sup> ± 0.73
Final body length	10.28 <sup>ab</sup> ± 0.62	12.26 <sup>a</sup> ± 0.15	9.96 <sup>b</sup> ± 0.43	10.92 <sup>ab</sup> ± 0.53	10.60 <sup>ab</sup> ± 0.59	10.54 <sup>ab</sup> ± 0.54
% Change in length	25.06	45.95	22.96	29.38	28.32	26.37
Initial body length	4.63 <sup>a</sup> ± 1.04	4.56 <sup>a</sup> ± 0.89	4.89 <sup>b</sup> ± 0.07	4.74 <sup>a</sup> ± 0.69	4.83 <sup>a</sup> ± 0.85	4.87 <sup>a</sup> ± 1.07
Final body length	8.72 <sup>ab</sup> ± 1.41	13.46 <sup>a</sup> ± 0.74	8.47 <sup>b</sup> ± 0.27	10.89 <sup>ab</sup> ± 1.40	10.12 <sup>ab</sup> ± 1.85	10.08 <sup>ab</sup> ± 1.21
% Change in length	88.33	195.17	73.21	129.74	83.00	106.98
Protein Efficiency rate	0.034	0.036	0.011	0.016	0.008	0.007
Specific growth rate	0.49	1.24	0.46	0.58	0.54	0.54

**Table-3: Water quality parameters and growth of *Clarias batrachus* fed at different feeding frequencies.**

Parameters	FF <sub>1</sub>	FF <sub>2</sub>	FF <sub>3</sub>
Temp.(°C)	24.20 ± 1.07 <sup>a</sup>	24.20 ± 1.07 <sup>a</sup>	24.20 ± 1.07 <sup>a</sup>
pH	7.64 ± 0.07 <sup>a</sup>	7.42 ± 0.04 <sup>a</sup>	7.45 ± 0.07 <sup>a</sup>
D.O (mg l <sup>-1</sup> )	1.86 ± 0.56 <sup>a</sup>	1.44 ± 0.67 <sup>a</sup>	1.78 ± 0.38 <sup>a</sup>
Total alkalinity (mg l <sup>-1</sup> )	305.20 ± 65.42 <sup>a</sup>	385.20 ± 60.33 <sup>a</sup>	3418.40 ± 18.34 <sup>a</sup>
Initial body length	17.53 ± 1.58 <sup>a</sup>	18.73 ± 0.78 <sup>a</sup>	18.87 ± 0.73 <sup>a</sup>
Final body length	18.56 ± 1.18 <sup>a</sup>	18.43 ± 0.78 <sup>a</sup>	18.93 ± 0.64 <sup>a</sup>
% Change in length	5.6	1.4	0.3
Initial body length	47.03 ± 12.28 <sup>a</sup>	47.10 ± 4.69 <sup>a</sup>	49.96 ± 5.01 <sup>a</sup>
Final body length	52.24 ± 10.87 <sup>a</sup>	47.20 ± 6.30 <sup>a</sup>	50.55 ± 7.68 <sup>a</sup>
% Change in length	11.07	0.21	1.18
Protein Efficiency rate	0.173	0.003	0.019

The present study revealed that feeding @20% FBW once a day resulted in higher growth of *Clarias batrachus*, when reared indoor. Feeding at lower (10%) and higher (>20%) rates resulted in reduced growth. Not much work has been done on the feeding rates of *Clarias batrachus*. Ng *et.al.* (2000)<sup>8</sup> reported feeding rates of 2.5% FBW per day for bagrid Cat Fish (*Mystus numerous*) at the best.

There was decrease in growth parameters when the frequency was increased from once a day to twice a day. The growth was also very low when the frequency was decreased from once a day to thrice a week. These results are in contrast with that of channel Cat Fish, *Ictalurus punctatus* where feeding once a day was found to be similar in terms of growth when fed twice a day<sup>9</sup>. The study by Jarboe and Grant (1997)<sup>10</sup> indicated that feeding small fingerlings of channel Cat Fish once daily and grow out channel Cat Fish twice daily gave the best results, in term of growth.

For different fish species, different results observed with respect to feeding frequency<sup>3</sup>. Feeding once a day was found to be appropriate in stinging Cat Fish, *Heteropneustes fossilis*<sup>11</sup>; twice per day for channel Cat Fish, *Ictalurus punctatus*<sup>12</sup>; four times a day for Himri Barbel, *Barbus luteus* Heckel<sup>13</sup>. For *Clarias batrachus*, it could be concluded that feeding @ 20% FBW once a day resulted in best growth in indoor rearing experiments.

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