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DE-GROWTH OF ANABAS TESTUDINEUS FRY REARED IN A CAPTIVE CONDITION WITH RESPECT TO SEASONAL TEMPERATURE

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Growth of 26 days old fries (Anabas testudineus) were reared for one year in the laboratory of Fisheries Resources Management, Faculty of Fisheries Sciences, West Bengal during August 2002 to July 2003. Prior to stocking the cemented tanks were well prepared with a thin layer of soil and organic manures (cow dung) and left for 7 days. After 4 days of manureing, tanks were inoculated with plankton (Phytoplankton and Zoo planktons) respectively. The fries (26 days old) were stocked in the cemented tanks with a density of 6 numbers of fry per one square meter area of water with a height of 1 meter. During stocking the average length and weight of the fries were 18.50 ± 0.042 mm and 1.32 ± 0.029 g respectively. Initially the fries were depending on the planktons grown in the vats, and then after 2 months fries were fed (3% of their body weight) with the formulated feed (with a protein value of 35%) up to end of the experiment. After one year of rearing the fries were grown to the length of 74.30 ± 0.091mm and weight of 13.917 ± 0.063 g. Growth rate (r = 581) and specific growth rate (r = 0.512) did not have strong positive correlation with temperature with the significant at 1% and 5% respectively.

Keywords: *Anabas testudineus* fry, Growth rate, Specific growth rate

INTRODUCTION

Climbing perch Koi (*Anabas testudineus*) is an important indigenous fish species of India. It is a one of vulnerable species of fishes caused environmental, over catching and uncultured well (Bungas *et al.,* 2013). The fish is very popular for its delicious taste and flavour. This species considered as a valuable item of diet for sick and convalescent. According to Saha (1971), the fish contain high values of physiologically available iron and copper essentially needed for hemoglobin synthesis. Climbing perch is involved the vulnerable species causing by over fishing, pollution and also the culture method is not established yet (Mukharjee *et al.,* 2002).

The growth of the fry with respect to the seasonal temperature below 20 ^{0}C, gave a negative value of growth rate and specific growth rate. It is called **De-Growth**.

Culture of *Anabas* was a grate challenge for the scientists and aqua culturists because of three regions. i) Availability of quality seed, ii) Feed, iii) Growth rate (Low) in comparison to other cultivable species like carps. Carp culture is an age old practice in India. Therefore its seed production and feed formulation techniques are already been standardized and also easily available. In one year, a carp can grow to a weight of one kg or even more to be a table size fish But. *Anabas* can grow up to 50 to 60 gm weight in a year. Therefore, it requires 20-18 fishes to be grown to get one

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kg. After successful breeding of *Anabas* in the laboratory of the department, the fries were reared in the captive condition with different seasons and temperature variation.

MATERIALS AND METHODS

The 26th day's old fries of *Anabas testudineus* were collected from the laboratory of Fisheries Resources Management, Faculty of Fisheries Sciences, and West Bengal during August 2002 to July 2003. Fries were induced breed and reared in the same laboratory and were collected for this experiment. The fries were reared in different cemented tanks in replicates under an out-door condition. Prior to stocking the cemented tanks were well prepared with a thin layer of soil and organic manures (cow dung) and left for 7 days. The tanks were prepared with a layer of soil bed of 6cm height, cow dung as organic manure (at the rate of 250kg/ha as applied in the aquaculture ponds) and pond water of 1meter height. After 4 days of manureing, tanks were inoculated with plankton (Phytoplankton and Zoo planktons) respectively.Due to planktonic growth the colour of water turns to slight green. The fries (26 days old) were stocked in the cemented tanks with a density of 6 numbers of fry per one square meter area. Before stocking, fries were acclimatized well with the water temperature. During stocking the average length and weight of the fries were 18.50 ± 0.042mm and 1.32 ± 0.029 g respectively. Initially the fries were fed on the planktons grown in the tanks, and after 2 months of stocking, fries were fed (3% of their body weight) with the formulated pellet feed (with a protein value of 35%) up to end of the experiment. Freshly prepared pellet feed was fed after (Ghosh and Das, 2004) twice daily during morning and evening hours. Water quality parameters (DO, pH, CO_2, Alkalinity, Hardness and NH3-N) were recorded. In every fortnight period about 50% of water was exchanged by filtered pond water. From the reared tank random sampling was done in every fortnight period. The Length was measured in millimeter scale; Weight (w/w) was taken by using the electric balance and water temperature of rearing tanks in ^{0}C respectively. After one year of rearing, the fries were grown to young ones with the length of 74.30 ± 0.091 mm and weight of 13.917 ± 0.063 g. Growth rate and Specific growth rate of fries were estimated for one year with respect to the seasonal variation of temperature by using the standard formulae used (Mathavan and Christopher, 1980).

- Growth rate (g) = dw/dt(weight change = dW per unit time = dt)
- Specific growth rate (G% wt/day) = Log W_2 – Log W_1/ T_2 - T_1

where,

W_1 = Initial weight of fish

W_2 = Final weight of fish

T_2-T_1 = Time period in days

Log = Natural logarithm

RESULTS AND DISCUSSION

The growth performance of the fry of *Anabas testudineus* reared for one year in captive condition was studied with respect to seasonal temperature. After one year, the fry grown to a length of 74.30 mm and gained a weight of 13.917 gm (Table 2). The growth curve of fry or juveniles of *A. testudineus* is represented in (Table 2). The seasonal variations in growth (weight gain) of *A. testudineus* fry in relation to temperature are represented in (Table 2). These two growths explained that growth is not a continuous process. It has rather discontinuous because during winter (January to February) when temperature dropped to below 20 ^{0}C, growth is retarded and the growth became disrupted. But during spring (March and April) as the water temperature increased above 20 ^{0}C the growth is resumed. It is seen (Table 3) that temperature and growth rate did not have a strong positive correlation (r = 0.581). Maximum growth rate of 0.0819g/fish/day had been observed during summer (May to June) when average water temperature was recorded as 20.5 ^{0}C. During winter when water temperature decreased below 20 ^{0}C growth rate was negative due to retard of growth. Temperature and specific growth rate also did not show

Table 1: Water Quality Parameters (DO, pH, CO_2, Alkalinity, Hardness, NH_3-N) of Rearing Rank

Water Quality Parameters	Range	Average
Temperature (^{0}C)	15-30	28.5
pH	7.4-8.2	7.8
DO (mg/l)	4.8-5.9	5.35
CO_2 (mg/l)	1.2-2.3	1.75
Alkalinity (mg/l)	111-146	128.5
Hardness (mg/l)	120-180	150
NH_3-N	0.02-0.04	0.04

Table 2: Growth of Fry (*Anabas testudineus*) in Different Seasonal Temperature of Water

Months	Fortnightly Sampling	Water Temp. (^{0}C)	Feed Supplied	Mean Length of Fry (mm)	Mean Weight of Fry (g)	Growth Rate (g/fry/day)	Specific Growth Rate (%)
Aug.	I	30	plankton	18.50 ± 0.042	1.115 ± 0.024	0	0
	II	29	plankton	19.34 ± 0.082	1.530 ± 0.035	0.0277	2.1094
Sept.	I	28.5	plankton	20.54 ± 0.062	1.990 ± 0.044	0.0307	1.7524
	II	27	plankton	22.6 ± 0.049	2.455 ± 0.061	0.031	1.3999
Oct.	I	26.5	feed	24.24 ± 0.037	2.955 ± 0.034	0.0333	1.3258
	II	25	feed	26.45 ± 0.029	3.495 ± 0.028	0.036	1.1189
Nov.	I	23.5	feed	28.9 ± 0.033	4.075 ± 0.061	0.0387	1.0236
	II	22	feed	30.20 ± 0.051	4.675 ± 0.052	0.04	0.9157
Dec.	I	21.5	feed	33.35 ± 0.059	5.305 ± 0.041	0.042	0.8428
	II	20.5	Feed	34.76 ± 0.071	5.865 ± 0.073	0.0373	0.669
Jan.	I	18	Feed	34.77 ± 0.064	5.806 ± 0.064	-0.0039	-0.0684
	II	16.5	Feed	34.78 ± 0.061	5.715 ± 0.044	-0.0066	-0.1053
Feb.	I	15	Feed	34.78 ± 0.031	5.590 ± 0.038	-0.0083	-1474
	II	17.5	Feed	34.79 ± 0.081	5.525 ± 0.071	-0.0043	-0.078
Mar.	I	20	Feed	36.85 ± 0.063	6.125 ± 0.062	0.04	0.6873
	II	22.5	Feed	38.65 ± 0.051	6.871 ± 0.068	0.0497	0.7662
Apr.	I	21.5	Feed	41.48 ± 0.062	7.716 ± 0.052	0.0563	0.7732
	II	26.5	Feed	44.72 ± 0.047	8.662 ± 0.044	0.0631	0.771
May	I	28.5	Feed	48.93 ± 0.055	9.891 ± 0.032	0.0819	0.8845
	II	29	Feed	54.72 ± 0.031	10.700± 0.046	0.0542	0.5279
Jun.	I	30.5	Feed	58.46 ± 0.044	11.549± 0.081	0.0562	0.5053
	II	32	Feed	63.70 ± 0.051	12.305± 0.074	0.0504	0.0227
Jul.	I	31	Feed	68.17 ± 0.072	13.178± 0.047	0.0592	0.457
	II	31	feed	74.30 ± 0.091	13.917± 0.063	0.0493	0.3637

Note: I = On 1st day of month, II = On 15th day of the month.

(Table 3) a strong positive correlation (r = 0.512). Maximum specific growth rates were observed in the early developmental stages and during winter a retarded growth is occurred.

From the study it was found that, the growth of the fry in captive condition increasing with respect to weight gain (Table 2). According to Besra (1997) the growth of fish in captive condition is comparatively less than that of the growth in natural condition. The growth of the fry with respect to the seasonal temperature below 20 ^{0}C, gave a negative value of growth rate and specific growth rate. It is called De-Growth. With the increase of temperature of

Table 3: Relationship of Ambient Water Temperature with Growth Rate and Specific Growth Rate of Fry of *Anabas testudineus*

Parameters	Temp. (^{0}C)	Regression Co-efficient (b)	Intercept (a)	Equation Y = a + bx	Co regression Co-efficient (r)
Water Temp. vs. Growth Rate	15 to 32	0.002718	-0.0297	Y= -0.0297 + 0.00272x	0.581**
Water Temp. vs. Specific Growth Rate	15 to 32	0.05797	-0.692	Y= -0.692 + 0.05797x	0.512*

Note: ** Significant at 1%, * Significant at 5%.

temperature above 20 ^{0}C, growth rate and specific growth rate is found increased (Table 3). Therefore proper care on feeding and tank management is required to get higher growth of *A. testudineus* in captive condition.

REFERENCES

- Besra S (1997), "Growth and Bioenergetics of *Anabas testudineus* (Bloch), an Air-Breathing Climbing Perch of South-East Asia", p. 43, Narendra Publishing House, Delhi.
- Bungas K, Arfiati D and Marsoedi Halim H (2013), "Effects of Protein Levels on the Growth of Climbing Perch, *Anabas testudineus* Galam Type, in Peat Water", *Int. Res. J. Biological Sci.*, Vol. 2, No. 4, pp. 55-58.
- Ghosh M and Das S K (2004), "Effect of Diatary Prtien Levels on the Growth of *Anabas testudineus* (bloch) Fingerlinge", *Indian J. Fisheries*, Vol. 51, No. 4, pp. 425-430.
- Mathavan S and Christopher M S M (1980), "Studies on Food Utilization in *Macropodus cupanus* (Pisees: Bslontidae)", *Matsya*, Vol. 6, pp. 23-29.
- Mijkherjee M, Praharaj A and Das S (2002), "Conservation of Endangered Fish Stocks Through Artificial Propagation and Larval Rearing Technique in West Bengal, India, Aqua", *Asia*, Vol. 7, No. 2, pp. 8-11.
- Saha K C (1971), *Fisheries of West Bengal*, West Bengal Government Press, Alipore, West Bengal, India.