FISHERIES

Growth performance of gold fish, *Carassius auratus* in aquarium and cage

The growth performance of 72 days old hatchlings were evaluated under cage culture and conventional aquarium conditions. The low-cost cage (L: 2.84×B: 1.13×H: 1.07 mt) was fabricated with bamboo and nylon net. The cage was placed submerged inside a pond (Fig 1). Fishes with initial mean body weight of 0.52±0.18g and mean body length of 3.19±0.58cm were stocked in the cage. In the other hands, fishes with initial mean body weight of 0.02±0.17g and mean body length of 2.17±0.71cm were earlier stocked in aquarium. The fishes in cage were allowed to feed on natural foods only, whereas in aquarium, fishes were partially supplemented with rice polish along with the natural foods (planktons). Samplings were done on 35 and 70 days from the beginning of trial. The study observed that, gold fish reared in cages attained better growth rate and developed bright coloration faster than (Fig 2) the aquarium-reared ones. The details of growth attainment after 70 days of rearing are presented in Table 1.

Fig 1. View of cage

Fig 2. Gold fish from cage

Kinetic of enzyme alkaline phosphatase in endangered Chocolate mahseer *N. hexahonolepis* and its nutritional status

Table 1. Changes in growth parameters of Gold fish reared in cage and aquarium for 70 days.

Rearing system	Weight parameters				Length parameters			
	Absolute Growth (g)±SD	Growth Increment (g/fish/day)	Specific Growth Rate (%)	Total Weight Gain (g/fish)	Absolute Length (cm)±SD	Length Increment (cm/fish/day)	Specific Length Rate (%)	Total Length Gain (cm/fish)
Cage	2.57±2.07	0.04	0.03	4.96	1.9±0.9	0.03	0.01	0.6
Aquarium	0.68±0.12	0.01	0.06	0.68	1.4±0.4	0.02	0.007	0.06

Fig 3. Endangered Chocolate mahseer, *N. hexagonolepis*

The enzyme alkaline phosphatase is widely distributed in nature and is characterized by a high pH in the ecosystem. The physiological role of alkaline phosphatase remains uncertain except for a role in bone mineralization and as stress indicator. In the present study, attempt was made to assess the activity of alkaline phosphatase in different organs of Chocolate mahseer (Fig 3) and its significance in counteracting stress due to captivity or confinement. Further, the study also investigated the nutritional profile of Chocolate mahseer, which is considered as an endangered species. The study revealed that, the activity of alkaline phosphatase is more in kidney followed by liver, intestine and muscle (Fig 4). The increased activity in kidney may be due to the fact that, the phosphatase are very important for regulation of various metabolic process that occurs by phosphorylation and dephosphorylation with kinase, especially during stress condition to meet the energy requirement in the animal. Further, the Chocolate mahseer is found to be rich in crude protein, calcium and phosphorus (Table 2).

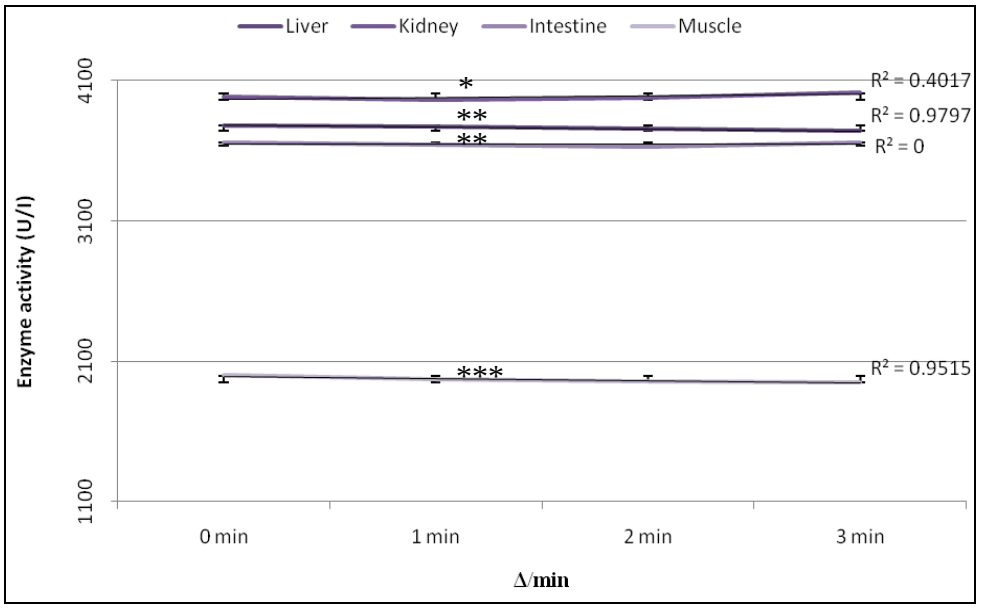

Fig 4 Activities of Alkaline phosphatise in different organs of Chocolate mahseer. Means with a common asterisks significantly differ (*P*<0.05)

Table 2. Nutritional profile of Chocolate mahseer, *N. hexagonolepis*

Nutritional parameters	Percentage
Crude Protein	76.78
Ether Extract	06.48
Dry Matters	31.89
Crude Fibre	00.35
Total Ash	07.50
Calcium	01.03
Phosphorus	01.95
Cholesterol	170 mg/dl

Study on pathogenic fungi in fish culture ponds located at mid-hill altitude

For fungal disease characterization, live infected fish (Indian major carps; n= 10 per species) were randomly collected from farm complex of ICAR Complex, Barapani during 2009-2010. Samples from each infected pond were collected after 2, 6, 10 and 20 weeks from the onset of disease. The cotton-wool appeared on the body surface of fishes (Fig 5) were removed by sterile incubating loop and incubated in Sabauravd's dextrose agar plates and store at 22-30°C for 5-10 days inside incubator. The plates were observed everyday at 1000Hrs for growth (Fig 6). For identification of fungus, the cultures were subjected to Lactophenol Cotton Blue

stain and were examined under a microscope at magnifications between 10-100X. The microbiological test observed that, the predominant pathogen was *Saprolegnia* sp. (Fig 7). Interestingly, the occurrence of fungal pathogen was directly correlated with the lowest water temperature (8-10°C), pH (4-5) and dissolved oxygen (3-5ppm).

Fig 5. Diseased fish recovered from a culture pond

Fig 6 Growth of fungus on a culture plate

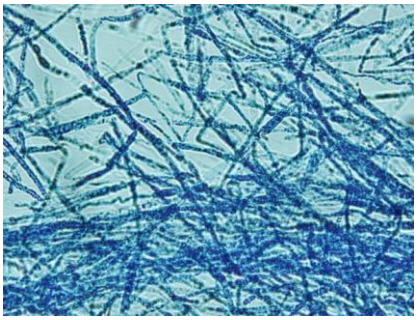

Fig 7 Fungus identified as *Saprolegnia* under microscope

Nutritional profiling of commercially important food fishes

The fishes are the cheap source of easily digestible protein. In North Eastern Hills, majority of the population are non-vegetarians and prefer fish or meat in every diet. A database on nutritional facts of fishes that are either native to the region or introduced from other states or country will give an idea to the consumers and/or dieticians a preference to choose a fish that is nutritionally sound. With this objective, in the ongoing study, native fishes of NEH region and exotic fish species introduced in the region are screened for their nutritional status. The live fish samples were collected from various sources like lake, river, stream and ponds. The samples were dried in oven (Fig 8) to estimate the moisture content and subjected to further analysis. Nutritional profile of some of the important cultivable fish species are presented in Fig 9.

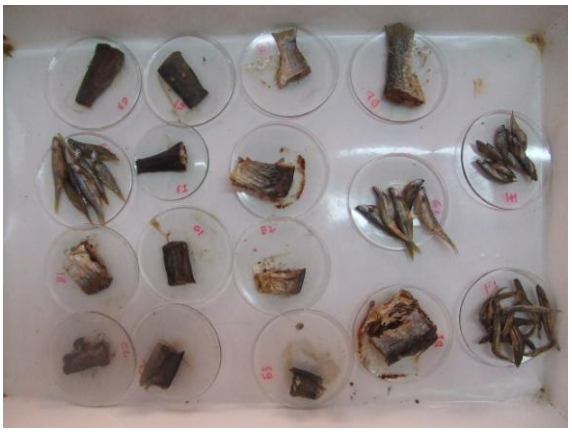

Fig 8. The oven dried fish samples ready for further analysis

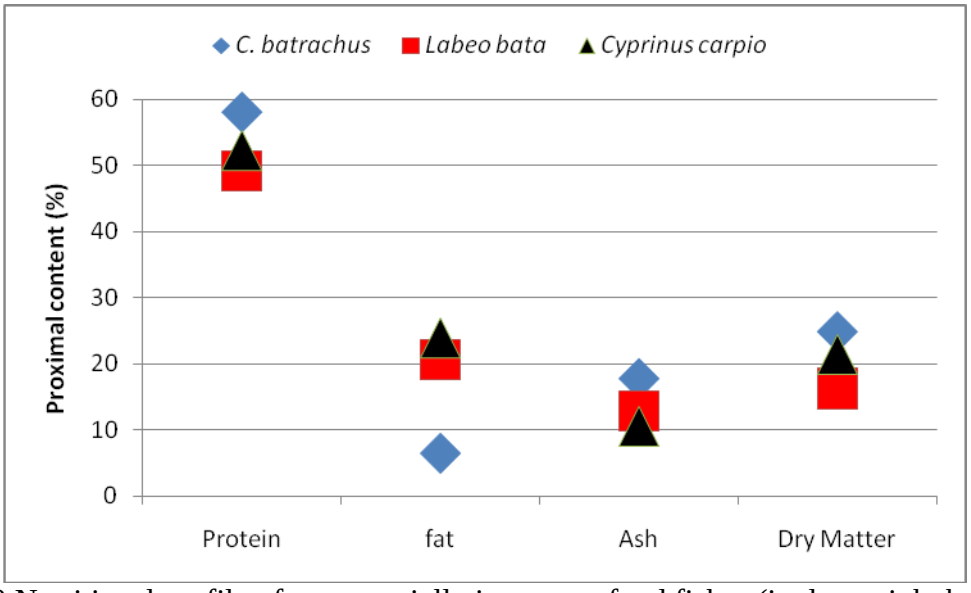

Fig 9 Nutritional profile of commercially important food fishes (in dry weight basis).

Integrated fish cum poultry farming

On station trial on fish cum poultry has been started at the farm complex of the fisheries division to evaluate the growth performance of fish without any supplementary feeding under mid altitude condition. The fishes are solely depended on the poultry droppings and natural fish food organisms produced in the pond. A combination of three indigenous carp species viz. *C .mrigala, L.gonius and L.bata* species are stocked in a pond of 0.14 hectare. A low cost poultry house has been erected over the pond to rear 25 nos. of layer birds of Vanaraja variety. The experiment is under progress and results are encouraging.

Introduction of improved variety of Common carp in NEH region

Common carp is one of the ideal fish species for aquaculture and is one of the most sought after species especially in the North Eastern Hill states. However, the growth of the existing variety *communis* is not encouraging due to several factors. Moreover the species attain early maturity resulting in low flesh content. Considering the importance of Common carp, the country imported the Hungarian strain for evaluation. This new variety has been evaluated by the Karnataka University of Animal and Fisheries Science at its Fisheries research station, Hebbal, Bangalore.

The Fisheries division of the ICAR Research Complex, Umiam has recently procured a stock of both breeders and growers seeds of this new and improved variety for quality seed production and to test the performance of the variety in the NEH states. The ICAR RC NEH, Umiam shall make an attempt to cater to the needs of the seeds of this improved variety in the NEH states.