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ACCLIMATIZATION AND SURVIVABILITY OF KHOSTI FISH *COLISA FASCIATUS* (BL. & SCHN.) IN LABORATORY CONDITIONS

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R. P. Singh and H. S. Padney (1981) Acclimatization and survivability of khosti fish *Colisa fasciatus* (Bl. & Schn.) under laboratory conditions. *Bull. Inst. Zool., Academia Sinica*, **20**(2): 73-77. Khosti fish *Colisa fasciatus* was studied in relation to its feeding habit, behaviour and survivability under laboratory conditions. Fish resembled with plankton feeders and exhibited advantageous habit of diversified food selection. Moreover, individuals were found to feed in the surface, column and bottom strata of aquatic media simultaneously, under controlled conditions, with distinct behaviour of training to feed at a particular time. Size and weight of fish manifested reciprocal relation to survivability against the stress laid by physico-chemical changes in the hydrosphere. Consequently, survivability depleted by heavy and constant water stream. Conclusively, observations proved that khosti fish would serve the purpose of typical laboratory individual to conduct experiments in the field of fish nutrition in India.

Khosti fish is a small aquarium fish of India. Recently few workers have conducted certain nutritional experiments with this fish. The fish has been described to be useful due to hardy nature and easy handling. Consequently, their diversified food selection and feeding habit has proved them identical to the few Indian carps[5,6]. Therefore, it may be a typical experimental fish to study fish nutrition in laboratory conditions in India. On the same line gold fish (a aquarium fish *Carassius auratus* L.) has already been experimented to conduct various nutritional investigations in Japan[3].

Change in hydrosphere from field to the laboratory, results stress on survivability of fish and mortality may occur. Several other fish viz., *Oncorhynchus kisutch*[4], *Clupea harenqus* L.[8] and *Salmo gairdneri*[2] have been experimented already to study their survivability under various conditions.

The present experiment was aimed to study the acclimatization and survivability of Khosti fish in laboratory conditions.

MATERIALS AND METHODS

(A) Source of supply

Fish were caught by hand net from Ramgarh Lake, Gorakhpur in several instalments during July, August and September. They were brought from lake to the laboratory in plastic buckets within three hours of netting.

(B) Stocking

Rough sorting was done according to size and weight of fish by visual assumption. Three groups—smaller, medium and larger in size and weight were kept in earthen aquaria separately. Thereafter, their weight and length was recorded.

(C) Maintenance of aquarium

General tap water was used as media of fish aquarium. Heavy chlorinated water supply was avoided up to maximum extent. Water of aquarium was siphoned out at the morning and evening hours during feeding days. Direct hit of water stream was avoided to save the fish from mechanical injury.

(D) Elimination of dead fish

Dead fish of all the three groups were eliminated from aquarium thrice daily—morning, noon and evening, to maintain the aquatic environment healthy. Number of dead fish was recorded every day group-wise accordingly.

(E) Use of pesticides and anti-biotic

Earthen aquaria were washed fortnightly with 5% solution of copper sulphate to remove the unwanted growth of microbiota on the inner wall of aquarium. Used containers were replaced from washed one, whenever its need was understood.

Once in a week, fish were treated with penicillin to protect them from fungal and bacterial infection. Antibiotic was directly poured into media (10^6 unit/30 litres) and water was not siphoned out till 12 hours whenever drug was used.

(F) Feeding

Fish were subjected to starvation for 24 hours after the moment of stocking. Thereafter, they were allowed to feed on shrimp powder. Feeding frequency was twice daily, 1st at early morning and 2nd at late evening. Just after adlibitum feeding, remaining feeds were siphoned-out with water stream.

(G) Temperature record

Temperature of aquatic media was recorded every day in the morning hours during the period of survivability experiment.

RESULTS AND DISCUSSION

(A) Survivability

Netting shock, abrupt physico-chemical change and thick stocking density resulted heavy mortality of the fish at lake site in the plastic buckets. Subsequently, when fish were sorted by hand, they received mechanical shock again. As a result, higher mortality rate was recorded in the laboratory in beginning hours. Thereafter too, mortality was time specific i. e. large number of fish died during beginning days and it was gradually minimized with prolongation of time for each fish group (Table 1). Three groups of fish having small, medium, and large body size and body weight exhibited different mortality rate. The group having large size and heavier body weight showed highest mortality rate while two subsequent group exhibited low and lowest mortality rate respectively (Table 1).

Mortality rate increased when heavy intake of tap water into aquarium was siphoned out constantly at the same rate on the other end. Subsequently, elevated mortality rate was recorded when unfed food particles were left as such in aquarium and water was not replaced for long duration. In this condition, microbiota were marked to grow on the wall of aquarium, specially at the junction of air and water level.

(B) Breathing and Physical activity

Fish kept into various aquaria under new physico-chemical conditions showed vigorous movement by comming up and going down in the water column, encircling along the wall of aquaria and jumping strongly above the water level. Intensified physical activity increased the energy demand. As a result, fish were seen to consume more oxygen via gulping the air by comming near or slightly above the water surface at short intervals. This heavy breathing was related with their air breathing habit which was facilitated by the presence of accessory respiratory organs in the fish. During later days, however, respiration rate minimised and fish exhibited peaceful nature.

(C) Feeding trend

Fish were capable to become trained for feeding at particular time. Better feeding time was found at early morning and late evening hours. Trained fish exhibited their presence

TABLE 1.
Survivability of the khosti fish in laboratory conditions.

Sl. No.	Fish group		A		B		C	
1.	Mean weigh±S. D. (g)		1.85±0.61		5.03±0.94		7.83±2.12	
2.	Mean length±S. D. (cm)		4.73±0.41		6.80±0.31		7.70±0.70	
3.	Number of fish experimented		150		150		150	
	Temperature °C	Days	No. of surviving fish	% age of initial stock	No. of surviving fish	% age of initial stock	No. of surviving fish	% age of initial stock
4.	27±1	2	136	90.6	124	82.6	112	74.6
5.	27±1	3	124	82.6	108	72.6	94	62.6
6.	27±1	4	116	77.3	100	66.6	79	52.6
7.	27±0.5	5	109	72.6	94	62.6	67	44.6
8.	27±1.5	6	105	70.0	91	60.6	58	38.6
9.	27±2.0	7	105	70.0	89	59.3	51	34.0
10.	27±1.5	8	104	69.3	89	59.3	45	30.0
11.	27±1	9	104	69.3	88	58.6	43	28.6
	Total mortality		46	30.6	62	41.3	107	71.3

near the water level even when food was not given to them. Noon (middle four hours of the day time) was found to be poor as fish exhibited reluctant behaviour toward feeding or very slow feeding trend.

Fish trained for a week only were capable to take their food from fingers touching the water level. But when food was spread over the water surface, it was fed by gulping the particles. Submerged food particles suspended in the water column were fed in the fashion of column feeding while food present on the bottom was plucked via mouth by arranging the length-wise body perpendicular to the bottom.

Structure of mouth and feeding habit resulted the fish to be plankton feeders i. e. small particle could serve the purpose only. Slight larger particle of loosely bound granules were broken into pieces by striking on the same with the mouth of the fish to make the size of food particle appropriate for feeding. By altering the food and observing the capability to accustom for new food, feeding nature of fish was omnivorous.

Survival of the test individual is important to find out their suitability in the required field of study. Moreover, data of survival in response to varying body length and weight facilitate the appropriate selection of fish size for designed experiments. Better survivability of young khosti fish in the laboratory indicate their suitability for various experiments in the field of fish nutrition.

The group having small size and light body weight resulted higher survivability of the khostifish in present experiment. Cruz and Laudencia[1] experimenting with *Clarias batrachus* noted 73.33% survivability in fish eating 34.14 g (4% of body weight) and 58.67% survivability in fish eating 41.46 g of feed (4% of body weight). Recently Stickney *et al.*[7] also noted higher survivability (81.5 to 88%) in *Tilapia nilotica* having light weight range (0.33 g to 0.58 g) while fish having heavy weight range (0.65 to 0.83 g) could result lower rate of survivability (75.0% to 78.5%). These results coincide with the result of present study.

What may be the reason for higher survivability of young fish is a significant question. There may be two possibilities in order to explain the facts. First—that young fish have stronger capability to respond against the environmental changes than older one and therefore, they regulate their body physiology

accordingly in more efficient manner. Second—that vitabity of young individual is better than old individuals. However, conclusively, it can be suggested that inspite of tender body small individual may have better capability to survive in the dynamic climate by quick regulation of body physiology to environment (Fig. 1).

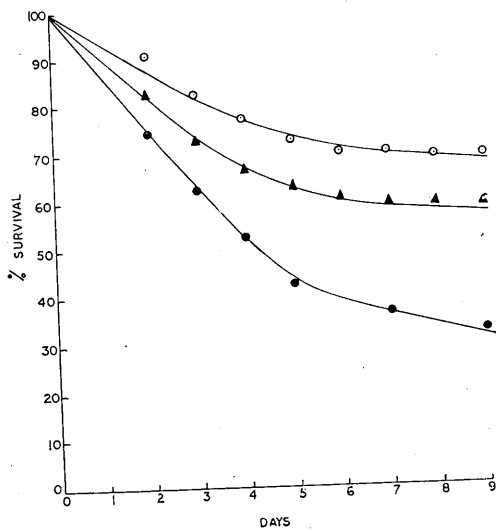

Fig. 1. Per cent survival of the *Colisa fasciatus* under the condition reported in Table 1.
Smaller group o–o
Medium group ▲–▲
Larger group •–•

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克斯蒂鬪魚 *Colisa fasciata* (Bloch and Schneider) 在實驗室內之馴養及存活率之研究

R. P. SINGH and H. S. PANDEY

本文乃記述印度產克斯蒂鬪魚在實驗室內之食性、行爲以及存活率之研究結果。由本種魚類口部之構造看來，理應屬浮游生物捕食魚，然因其所攝取食物種類之多樣性，似爲雜食性魚類。魚隻經定時之訓練後已能分別適應捕食水面、水層以及底層之各類食物。魚之大小及體重與魚體因受物理化學性環境因素變動所引起之存活率之變化有相互之關連。例如存活率可因注入水族箱水流之急速而降低。總而言之，由本實驗結果獲知本種魚乃理想之實驗用魚，可供作研究印度產魚類營養學之模擬實驗材料。