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EVALUATION OF THE FEED PREFERENCE OF CLIMBING PERCH (*ANABAS TESTUDINEUS*) FOR WILD GUPPY, TILAPIA AND TADPOLES TO UTILIZE AS A POTENTIAL LIVE FEED IN SRI LANKA

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This study was carried out to find the most preferred type of live feed of Climbing perch (*Anabas testudineus*) and recommending the daily requirement of preferred live feed for culturing of *A. testudineus* in Sri Lanka. Wild guppy (*Poecilia reticulata*), tilapia (*Oriochromis niloticus*) and tadpoles (*Bufu bufo*) around 1 cm of total length were used to find out the most preferred live feed of *A. testudineus*. Daily requirement of the preferred live feed type was determined. Results showed that feed preference of *A. testudineus* for tadpoles were significantly (p<0.05) higher than for wild guppy and tilapia. Small (0-25 g), medium (25-50 g) and large (50-75 g) sized *A. testudineus* required 0.84, 1.78 and 1.93 g of tadpoles / fish / day respectively in fresh weigh basis.

Key Words: *Anabas testudineus*, Feed preference, Live feeds, Daily Requirement

Anabas testudineus (Climbing perch / *Kavaiya*) is one of the hardiest, indigenous freshwater fish in Sri Lanka's inland waters and is able to tolerate extremely unfavorable water conditions, which is associated mainly with turbid, stagnant waters (Pethiyagoda, 1991). It is naturally found in fresh and brackish waters, canals, lakes, ponds and swamps of Pakistan, India, Bangladesh, Sri Lanka, Burma, Singapore and the Philippines (Jhingran and Taiwar, 1991). They are well known for their taste, high nutritive value, recuperative and other medicinal qualities (Marimuthu *et al*., 2009). *A. testudineus* contains high iron and copper content, which is essential for hemoglobin synthesis (Sarma *et al*., 2010). In addition, it is considered as a healthy diet since it contains easily digestible polyunsaturated lipids and many essential amino acids (Kohinoor *et al*., 1991). At the same time, this fish can be potentially used as biological control agent for mosquitoes in rice fields and temporary pools since it can survive extremely unfavorable water conditions and very low water levels even in mud (Zalina, 2012). This fish is suitable for culturing in rice fields as rice-fish integrated farming systems. Juveniles of Climbing perch are also having export value for the aquarium trade (Pethiyagoda, 1991).Therefore *A. testudineus* is economically important in Southeast Asia, and is in high demand especially in Southern Thailand, Malaysia and the Philippines (Chotipuntu *et al*., 2010).

Climbing perch culture has been expanding especially in certain parts of India including North Eastern state due to high price and increasing market demand (Sarker *et al*., 2005). Although *A. testudineus* is very common indigenous freshwater fish species in Sri Lanka, currently it is an underutilized resource. But Kodithuwakku *et al*. (2012) have developed the mass production method of seedlings of *A. testudineus* under Sri Lankan conditions. That is very much vital to develop this species for the commercial culturing in Sri Lankan reservoirs and in culture ponds in the future. Moreover it is very much mandatory to identify proper feeding system to this fish species which is suitable for the culturing purpose. The natural food spectrum of *A. testudineus* is very wide and it may vary from a diet of filamentous algae to that of pure carnivorous nature (Potongkam, 1972). Gastric pH of *Anabas* indicated that it is a stomached fish and due to that it has been described as a predator or as a carnivore fish (Pandey *et al.*, 1992). Therefore it is important to find out

what is the most preferred live feed of *A. testudineus* among cheaply available live feeds found in Sri Lanka.

Therefore the objectives of this study are to find out the most preferred live feed of *A. testudineus* from wild guppy (*Poecilia reticulata*), tilapiya (*Oriochromis niloticus*) and tadpoles (*Bufu bufo*) and to find out the daily requirement of the preferred live feed type.

MATERIALS AND METHODS

Study location

Experiments were conducted at the Department of Animal Science, Faculty of Agriculture, University of Peradeniya.

Fish collection and maintenance

A. testudineus fish samples were caught using hook and line from Anuradhapura, Kuliyapitiya and Puththalam areas of Sri Lanka and they were transported to the faculty in oxygenated polythene bags. Three Glass tanks (1.5 m x 0.5 m x 0.75 m) were cleaned and disinfected using, salt solution and water. Then each tank was filled with tap water up to 20 cm, three days before fish stocking. Next, fish were stocked in those glass tanks and initial acclimatization was carried out for two weeks. Fish were fed with wild guppies and tadpoles during acclimatization period. One third of water was siphoned out and same volume of new dechlorinated tap water was refilled weekly for the improvement of water quality.

Study I - Determination of most preferred live feed type of *A. testudineus* among three different live feeds

Experimental design

Experimental design was the two factor factorial experiment with complete randomized design (CRD). 'Fish size' and 'feed type' were the two factors. Factor 'fish size' had three levels as small, medium and large in which the body weight of fish varied in between 0-25 g, 25-50 g and 50-75 g respectively. Factor 'feed type' had three levels such as 1cm long wild guppy (*Poecilia reticulata*), 1 cm long tilapiya (*Oriochromis niloticus*) and 1cm long tadpoles (*Bufu bufo*).

Measurement of live weight of fish

A plastic pan with a little amount of water was kept on a top loading balance and reading was turned to zero. Then the fish was taken to the hand and after draining the water, it was carefully kept in the plastic pan and the reading was taken.

Grouping and stocking of fish

Collected fish were categorized into three classes according to their live weights. 0-25 g, 25-50 g and 50-75 g were the weight classes and three fishes from each category were selected for the feeding experiments. Equal sized nine glass tanks were cleaned and filled with tap water up to 20 cm height, before three days of fish stocking. Each tank was stocked with one fish. All the fish were starved for two days before conducting the feeding experiment.

Collection of 1cm long wild guppy, tilapia and tadpoles

Wild guppy and tilapia were caught from the pond and tadpoles were collected from the cement tanks which are located at the Department of Animal Science, Faculty of Agriculture, University of Peradeniya.

Determination of most preferred feed type

Ad libitum feeding was performed to each replicate, which was placed in a randomized manner (Table 1). Number of the left over fish given as feed was determined after 24 hours every day.

Insert table 1 here.

Statistical analysis

Data on most preferred feed type was analyzed using Analysis of Variance (ANOVA) using a PROC GLM procedure of SAS statistical software package. The probability level of 0.05 was utilized to account for the statistical significance. Mean separation of the means of feed intake was carried out by least significant difference.

Study II- Determination of the daily requirement of the preferred feed (Tadpoles)

Feeding experiment was carried out using nine fish. They consisted of three small (0-25 g), three medium (25-50 g) and three large (50-75 g) fish which were selected from fish used for the determination of most preferred feed type (Item 3.5.5). Each glass

tank of 30×20×30 cm was stocked with a single fish in a randomized manner and *ad libitum* feeding was carried out for five days with tadpoles each of 1 cm total length. 50, 100 and 150 tadpoles were added (Plate 1) into small, medium and large fish respectively at 0900 h and remaining number of tadpoles were counted on the following day at 0800 h and the total consumed was calculated using the formula.

Intake of tadpoles = number added - number remaining on next day

Plate 1: Feeding of tadpoles for the fish of small (0-25 g) category

Average daily requirement of tadpoles for each fish was taken by calculating the mean of intake values during five days.

Experimental Design

Complete randomized design was used to check whether is there an effect of fish size on the average daily intake of tadpoles. Small, medium and large fish were the three treatments used and three replicates of each treatment were conducted. This experiment was carried out for five days.

Statistical analysis

Any significant effect of fish size on the daily live feed intake was analyzed using Analysis of Variance (ANOVA) using a PROC GLM procedure of SAS statistical software package. The probability level of 0.05 was utilized to account for the statistical significance. Mean separation of the means of feed intake was carried out by least significant difference.

Estimating the average live weight of tadpoles

Tadpoles of around 1cm length were used in this experiment. 200, 1cm long tadpoles were counted and kept on the tissue paper in order to absorb water. Sub sampling was done from the 200 tadpoles and weight of each subsample was measured. There by the mean weight of a tadpole was calculated.

RESULTS AND DISCUSSION

Fish collection and maintenance

During the dry season, water level of the seasonal tanks goes down. When it comes to the end of the dry season water is only observed in the several pits located at the tank bottoms. Samples of *A. testudineus* caught from those pits using rod and line. Fish did not die since the hook did not make serious wounds.

When transporting the fish in polythene bags should use double polythene bags because *A. testudineus* has sharp spines in the dorsal

Table 1: Experimental set up with three levels of factor 1 (small, medium and large) and three levels of factor 2 (G- Guppy; T-Tilapia; TP-Tadpoles).

Size		Replicates		
		1	2	3
Small	(0-25g)	G, T, TP	G, T, TP	G, T, TP
Medium	(25-50g)	G, T, TP	G, T, TP	G, T, TP
Large	(50-75g)	G, T, TP	G, T, TP	G, T, TP

and pectoral fins. Supply of oxygen is not necessary because of the air breathing ability of this fish species (Hughes and Singh, 1970).

Maintenance of *A. testudineus* did not require any special management practices, but providing a relatively low water height and proper covering the tank top are important to avoid jumping out from the tank.

Determination of most preferred live feed type of *A. testudineus* among three different live feeds

Irrespectively of the size of *A. testudineus*, a significantly higher ($p<0.05$) preference for tadpoles (*Bufu bufo*) was observed than wild guppy (*Poecilia erticulata*) and tilapiya (*Oriochromis niloticus*) (Figure 1). A significantly higher ($p<0.05$) preference for tilapia of 1cm total length was observed when compared with guppy (Figure 1).

During this study it was observed that predation of each live feed by *A. testudineus* depends several factors. If the *A. testudineus* can identify that the given feed is alive and if the movements of this live feed is slow, preference for that particular feed become high. Tadpoles (*Bufu bufo*), which was found for the most preferred live feed, possessed the above described two characteristics.

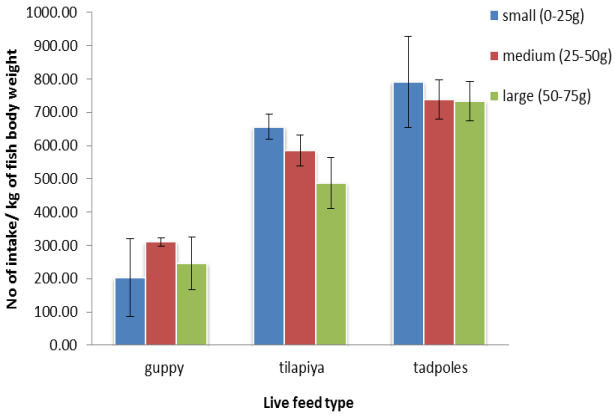

Figure 1: Intake of guppy, tilapia and tadpoles by different sizes of *A. testudineus*

Determination of the daily requirement of the preferred feed

Results showed that fish size has a significant ($p<0.05$) effect on the total daily intake of tadpoles. Both large and medium sized *A. testudineus* had observed a significantly higher ($p<0.05$) number of intake of tadpoles when compared with the small sized fish (Table 2). However a significantly difference ($p>0.05$) was not observed in the tadpole intake of small and medium sized *A. testudineus* (Table 2).

Table 2: Mean intake of 1 cm long tadpoles by different sizes of *A. testudineus*

Weight classes	Mean no of tadpoles intake for five days Mean ± SD
Small (0-25 g)	24.0 ± 8.8^{a}
Medium (25-50 g)	51.2 ± 13.3^{b}
Large (50-75g)	55.2 ± 14.6^{b}

Different superscripts in the same column indicate significant different among intake of tadpoles ($p<0.05$); values expressed as Mean±SD.

$$\text{Average live weight of 1 cm long tadpole} = \frac{7.0\ \text{g}}{200\ \text{tadpoles}} = 0.035\ \text{g}$$

According to the above calculation average live weight of tadpole was 0.035g. Therefore small, medium and large sized *A. testudineus* need 0.84, 1.78 and 1.93 g of tadpoles / fish / day respectively.

CONCLUSION

A. testudineus highly prefers live and weak prey such as tadpoles than fast swimming prey like Wild guppy. Small (0-25 g), medium (25-50 g) and large (50-75 g) sized *A. testudineus* need 0.84, 1.78 and 1.93 g of tadpoles / fish / day respectively

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