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New record of moose-faced loach, *Somileptus gongota* Hamilton, 1822 (Cypriniformes: Cobitidae) in Gangetic riverine system of plain land in West Bengal, India

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Abstract

Somileptus gongota Hamilton, 1822 previously recorded from North Bengal towards mountains, but there is no report of its occurrence from other parts of West Bengal till today. This is the first report from a river of South Bengal, Mayurakshi river, West Bengal. *S. gongota* is diagnosed by bulging eyes, suborbital spines and tubular nostrils with typical body colouration. Length-length relationships result a good significant correlation. The 'b' value of length-weight relationship ($b = 2.64$) indicate negative allometric growth.

The result of multiple linear regression equation calculated on various lengths shows highly significant.

Keywords: Mayurakshi river, bulging eyes, suborbital spines, length-length relationship, b-value

Introduction

Fishes of the genera *Somileptus* Swainson, in the family Cobitidae (Subfamily: Cobitinae) has a single species *gongota*. Spelling of the genus *Somileptus* is controversial. Menon ^[1] misspelled the genus as *Somileptes*, but Swainson ^[2], the author of the genus, spelled as *Somileptus* which is the correct name as used by Nalbant ^[3].

Distribution of the species in West Bengal is restricted to North Bengal and in north eastern part of India Assam, Arunchal Pradesh, Meghalaya and Uttar Pradesh and Bangladesh and Nepal ^[4-6]. Hamilton ^[7] recorded the type locality of *S. gongota* (synonym of *Cobitis gongota*) in the rivers of North Bengal towards mountain. But there is no report of its occurrence in the plains of West Bengal till today. Recently 10 specimens of *S. gongota* were collected from Mayurakshi river at Siuri, district Birbhum, West Bengal, a tributary of the river Ganges.

S. gongota, commonly known as "kukur latta" in Nepal ^[5], an ornamental fish possess bulging eyes, two pairs of nostrils of which one is tubular, with a typical body colouration above the lateral line and dorsum of the body. The present paper reports morphometric characters, including length-length and length-weight relationships of *S. gongota*

Materials and Methods

Ten specimens of different sizes (89-147 mm in length) were collected from Tilpara barrage on Mayurakshi river at Siuri (87°32'00"E, 23°55'00"N), District Birbhum, West Bengal (Fig.1) in different months of the year 2017. Fishes were caught by a local fisherman and the present workers collected the specimens in living condition. Morphological characters like colouration, position of eye, stripes in the fins etc were studied in living condition. Then the specimens were preserved in 8% formaldehyde solution. Measurements were taken within two days of preservation. 27 morphometric characters were measured by using dial calipers with 0.1 mm accuracy except total length (TL) and standard length (SL) on the left side of each specimen. Measurements of body parts were expressed as percentage of SL and head parts were expressed as percentage of head length (HL). Meristic counts were also taken.

Length-weight ratio of *S. gongota* was determined from the general formula,

$$W = aL^b$$

In its logarithmic form, viz. $\log W = \log a + b \log L$

Where, W = weight in gram,

L = length in mm.

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a = coefficient related to body form
and b = exponent.

Bivariate regression analysis was done on length-weight relationship. Regression analyses were also determined in between TL and SL and in between TL and HL to correlate length-length relationships.

As different body parameters like SL, FL and HL of a fish depends on TL, hence SL, FL and HL are the independent variables (i.e. predictors) whereas, TL is dependent variable (i.e. predictant). As the concerned species, *S. gongota* possesses no fork, so TL, SL and HL are considered for calculation of multiple linear regression analysis.

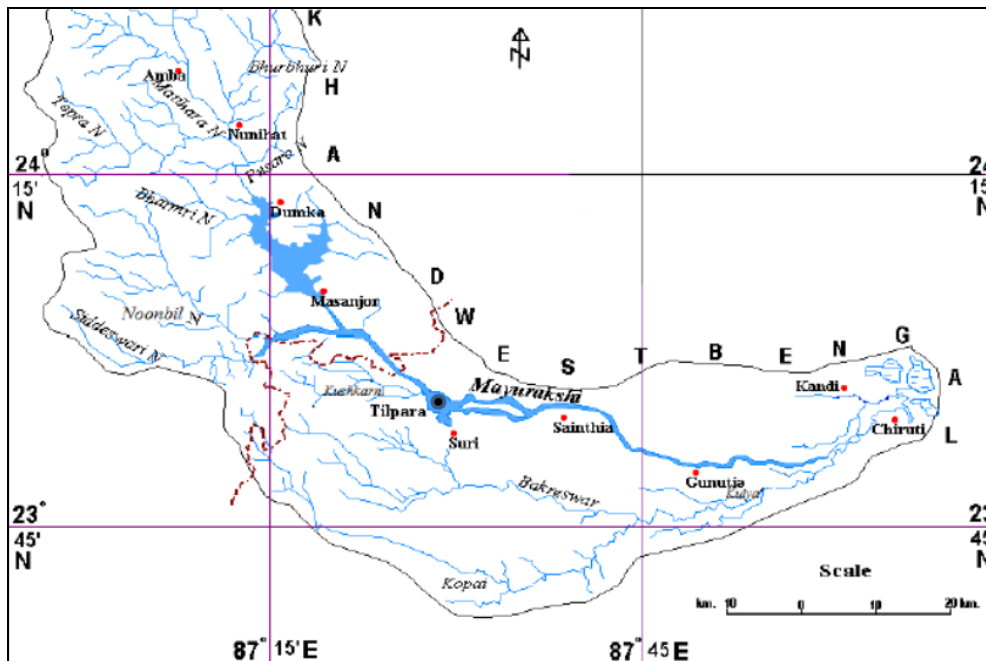


Fig 1: Collection site (•) at Tilpara Barrage on Muzurakshi River

Results

Diagnosis

Stout, elongated and cylindrical body, broader anterior part than the posterior; rounded abdomen; broad head with bulging eyes and suborbital spine below it; snout long, straight with warty tubercles; small, inferior horse-shoe shaped mouth; fleshy lip, thickly papillated upper one protruding over the lower lip; three pairs of barbels; dorsal fin origin just behind the pelvic fin origin; lateral line complete, slightly curved anteriorly; angular small scales adhere firmly; caudal fin subtruncate.

Meristic count: D iii8, P ii8, V ii5, A ii6, C 15-17.

Description

Morphometric data are presented in Table – I. Different morphological structures and colour pattern are presented in Plates 1 - 8. Body skin leathery, snout with dotted white spots protruded and covers half of the head length; lower lip fold contains several bristles; two nostrils, one is an aperture and another is tubular in shape; a narrow groove is present below the orbit where the infra orbital spines are inserted at rest;

eyes are covered with thin skin; vertical pupil; two pairs of rostral barbels and one pair of blackish maxillary barbel; at dorsum two parallel grooves present upto dorsal fin, then a single groove upto caudal region; anal fin reaches upto the base of caudal peduncle; pectoral fin base contains “U” shaped triangular muscular fold; axillary ventral fin lobe present; ventral fin adpressed; ventral, pectoral and anal fins are thick; fin rays of dorsal, pectoral and caudal bear rows of black stripes while anal and pelvic are yellowish and without stripes.

Six cloudy rectangular bands are observed along the dorsum. One of the bands encircles the dorsal fin base. Lateral side is pale brown in colour. Five squarish or semicircular cloudy patches present along the dotted lateral line. Rhomboid black spot is present at the caudal peduncle region where the lateral line ends. The ventral portion is yellowish or whitish. Under hand lens numerous black spots are present on the dorsum, more in number beside the dorsal fin origin in the adults while in the young, spots are more in number along the two ridges of dorsal side and dorsal fin origin. In young the maxillary barbels are whitish.

Table 1: Morphometric characters of *S. gongota* (n = 10).

Parameters	Range	Mean
Total length (TL) mm	86 – 144	123.20
Standard length (SL) mm	70 – 117.5	101.65
% SL		
Pre-dorsal length	52.87 – 58.34	56.34
Pre-pectoral length	20.49 – 25.77	23.49
Pre-ventral length	49.18 – 54.87	51.95
Pre-anal length	80.33 – 85.92	83.38
Dorsal fin length	15.92 – 18.92	16.72

Pectoral fin length	14.15 – 17.12	15.45
Ventral fin length	12.74 – 15.95	14.35
Anal fin length	13.21 – 14.41	13.75
Dorsal fin base length	11.50 – 13.11	12.63
Pectoral fin base length	4.26 – 6.60	5.39
Ventral fin base length	3.95 – 4.53	4.23
Anal fin base length	6.75 – 8.20	7.66
Body depth at anus	11.27 – 12.61	11.54
Body depth at dorsal fin region	14.79 – 18.03	16.32
Head length	24.10 – 28.17	25.77
Head width	11.66 – 14.02	13.02
Head depth	12.74 – 15.32	14.32
Caudal peduncle length	9.01 – 11.27	10.25
Caudal peduncle depth	7.75 – 9.01	8.36
Caudal fin length	19.81 – 25.35	23.23
% HL		
Snout	44.07 – 49.32	46.66
Eye diameter	11.90 – 17.50	15.40
Inter orbital distance	7.50 – 11.90	8.12
Inter narial distance	17.50 – 24.14	20.34
Barbels		
Rostral 1	16.07 – 18.87	17.31
Rostral 2	13.21 – 13.61	13.41
Maxillary	10.88 – 12.08	11.48

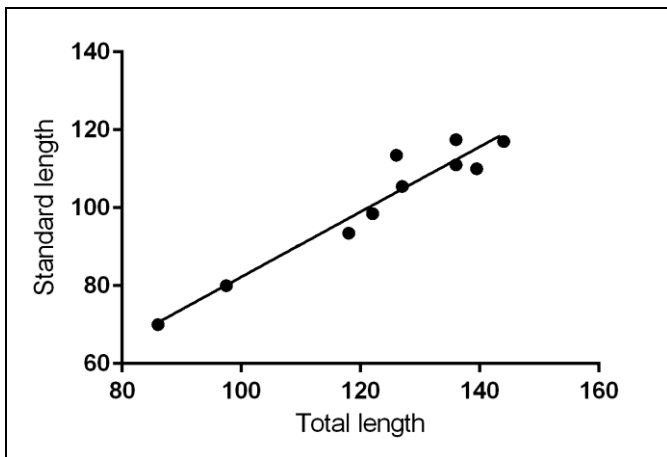


Fig 2: Regression of SL on TL of *S. gongota*. ($Y = 0.834X - 1.205$, $r^2 = 0.927$, $P < 0.0001$)

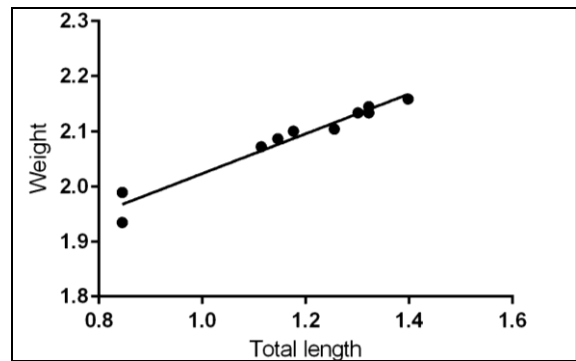


Fig 4: Regression of log weight on log length of *S. gongota* ($Y = 2.637X - 4.327$; $r^2 = 0.9531$; $P < 0.0001$)

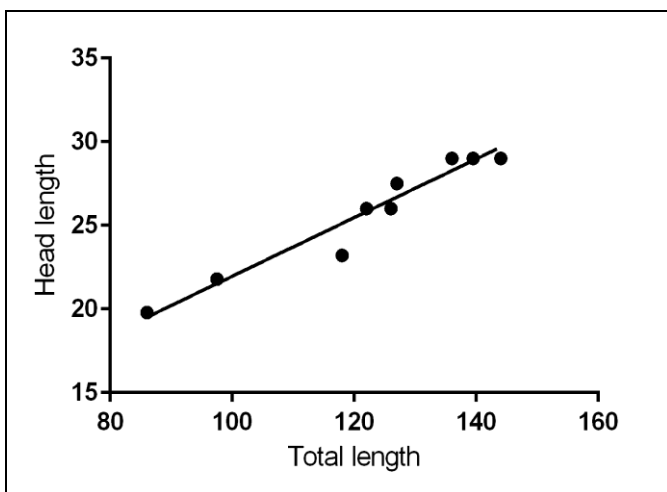


Fig 3: Regression of HL on TL of *S. gongota*. ($Y = 0.1752X + 4.440$, $r^2 = 0.938$, $P < 0.0001$).



Plates: 1. Dorsal view; 2. Ventral view of mouth along with pectoral fin; 3. Lateral view showing patches on body and stripes on dorsal and caudal fins; 4. Ventral view; 5. Dorsal view showing grooves on the dorsum; 6. Head view showing sub-orbital spines; 7. Lateral view showing axillary ventral fin lobe, muscular fold of pectoral fin and dots of lateral line; 8. Lateral view of *S. gongota*

Length-weight and length-length relationship

In the present study regression analysis was done in between logarithm of total length (TL) and logarithm of weight (Wt) of ten unsexed specimens (sample size). The analysis showed significant relationship (Fig. 4). Bivariate regression analyses were determined in between TL and SL and in between TL and HL. All the two analyses yielded significant results (Fig. 2 and 3). Multiple linear regression analysis of SL and HL on TL of *S. gongota* shows the following result:

Equation: $Y = -7.84 + 0.514SL + 3.027HL$

Variance: 17.98

r^2 : 0.9599

F statistics: 83.1097

Durban-Watson statistic: 2.66

The equation is good fit as the estimated value of dependent variable (TL) is nearer to the actual value (by putting the actual values of SL and HL). The value of F statistics is highly significant though Durbin-Watson statistic value reflects negative auto-correlation.

Discussion

There is a lot of controversy regarding the generic name *Somileptus gongota*. Hamilton^[7] first proposed the species in 1822 as *Cobitis gongota*; later Swainson^[8] replaced the type species as *Canthophrys albescens*; Viswanath^[9] mentioned it as unnecessary replacement^[4]. Swainson^[2] again renamed the type specimen as *Somileptus bispinosa*^[10, 11] which is now recorded by Menon^[1] as *Somileptes gongota*. Jayaram^[4] mentioned *Somileptus gongota* a single species found in Indian region.

According to Chaudhry^[12], *Canthophrys gongota* (*Somileptes gongota*) inhabits muddy hill streams, but the present workers found the species in a fresh water tributary of a river in plain land. The infra-orbital spines (Hamilton^[7] used the term prickles) act as defensive organ, covered by thin membrane and inserted in a groove. The observation of barbels was supported by Hamilton^[7], Nath and Dey^[13] and Karmakar^[14] though barbels were termed as tendrils by Hamilton. The vertical pupil as observed by present workers in the said species was demonstrated by Hamilton. Dotted lateral line (13 dots upto dorsal fin origin, then the dots turn to be a continuous line) as observed by the present workers was not documented by any workers previously.

Colour below the lateral line of the fish is yellowish or whitish while Hamilton^[7] mentioned it as silvery. But the colour of the dorsum and lateral sides as observed by the present workers is in concurrence with the observation of Hamilton^[7].

The first three dorsal fin rays are unbranched (the first one is minute, the second one is short and the third one is longest) followed by eight branched fin rays. Hamilton^[7], Nath and Dey^[13] and Karmakar^[14] also observed the same arrangement of fin rays.

Pectoral fin is rounded with ten fin rays as observed by Hamilton^[7] also. Nath and Dey^[13] and Karmakar^[14] only mentioned ten fin rays in pectoral fin. In our study, the first two fin rays are unbranched of which the first one is longer than the second and the rest eight are branched. Karmakar^[14] reported a fleshy peduncle at the inner base of each pectoral fin which was also observed by the present workers.

In relation to growth, 'b' value indicates isometric or allometric growth. According to Ricker^[15] when 'b' value is exactly 3.0, it indicates isometric growth. Wooten^[16] pointed

out that when 'b' value is significantly larger or smaller than 3.0 it indicates positive or negative allometric growth respectively. Allen^[17] suggested that for ideal fish follows 'cube law', the value of 'b' remains constant at '3.0'. But Martin^[18] illustrated that the value of 'b' usually ranges from 2.5 to 4.0 and in majority of cases 'b' is not equal to '3.0'. In the present study, the 'b' value is 2.64 i. e. negative allometric growth. But Islam *et al.*^[6] reported higher value of $b = 3.217$ (ranges from 2.982 – 3.452 i. e. positive to negative allometric growth), whereas, Forese *et al.*^[19] reported the range of 'b' value is 2.950 – 3.310 (nearly isometric to negative allometric growth) in *Canthophrys gongota*. According to Martin^[18], as the fish grows through several stages, the simple cube law does not hold well throughout the life span and regression coefficient 'b' shows certain variations. The variations in 'b' may be due to habitat, season, stomach fullness, age, sex, size, spawning and physiology of fishes^[20, 21].

One of the unique approach in fishery is the multiple linear regression equation. This is not only species specific, but also indicates the normal growth of a fish. In any species, the dependent variable i.e. TL can easily be estimated by putting the actual value of independent variables (SL, FL and HL) and vice versa. Major deviations of calculated value indicate abnormality in growth and size^[22].

Conclusion

The scanty information about the moose-faced loach, *Somileptus gongota* is a problem of cross reference and comparative study. Moreover, as it is an ornamental fish, this odd looking aquarium fish or 'live jewel', along with other ornamental loaches deserves the proper planning of conservation strategies for the benefit of fishery industry^[23] where they have considered *Canthophrys gongota* (= *S. gongota*) as LR-nt/LC (Lower Risk near threatened/ Least Concern).

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