Short Communication

Morphometric Studies on *Hylarana temporalis* (Günther, 1864) in Gundia Region, Western Ghats

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Abstract

Statistical analysis with traditional morphometry was performed to analyse the intra population variation in Hylarana temporalis (Günther, 1864) (Anura: Ranidae) from Western Ghats, Gundia (N 12°49'E 75°34') of Dakshin Kannada District. Random samples (N=10) of individuals were collected from different sites to measure 11 morphometric parameters viz., snout vent length, head length, head width, eye diameter, tympanic diameter, eye- nasal distance, inter-orbital distance, thigh length, foot length, first finger length and first toe length. Significant correlation was obtained between the parameters and regression analysis were performed for two morphometric variables viz., head length and the total length and fitted regression equation, y= 1.049x + 0.036 (R² = 0.969) was obtained.

Keywords: Morphometry, *Hylarana temporalis*, Gundia.

Introduction

The Bronzed Frog, *Hylarana temporalis* (Anura: Ranidae) *Syn. Rana temporalis* Günther, 1864 *Sylvirana temporalis* (Günther, 1864) (figure 1) is a largely terrestrial species found throughout Western ghats of India. They are bronze-brown-tan in color with deep chocolate colored sides, hence the common name bronzed frog. The species breeds during non-monsoon seasons[1]. According to available morphological description of the species, it has a broad inter orbital space than the upper eyelid or also broader than the latter. The tympanum is usually larger as the eye. The first digit is described to be longer than the second digit with all the tips of the digit dilated into well developed disks[2]. Recently it is listed as a near threatened (NT) species in India in the IUCN red list status[3]. The present study was undertaken in the biodiversity hotspot of Western ghats as part of a diversity study encompassing Gundia region. Gundia region harbours nearly 36% of plant species, 87% of amphibians, and 41% of fishes, which are endemic to Western Ghats, availability of perennial sources of water has provided ample habitats for amphibians; hence they are persisting in this region even during non-monsoon periods[4]. Data obtained on the morphometry of the species during the present study would contribute to the knowledge of the bio-ecological perspectives of the species.

Material and Methods

Study area: The present study was undertaken in Gundia, Western Ghats of Dakshin Kannada District (N 12°49'E 75°34'). The region is part of the tropical rain forest of the Western Ghats a Biodiversity hotspot. The field work was carried out in the study sites during the months of January to March of 2012 during early hours of the day .Three visits were made to the selected study sites. During the course of survey 3-5 hours of *"time-constrained search"* for anurans in the study sites was undertaken in supplementation with *"opportunistic search"*. Survey was carried out near water bodies and micro-habitats such as, on the floor, rocks, leaves, under leaf litter, under logs, under the soil, among dried leaves, among weeds, near termite mounds etc. based on standard procedures[5].

Morphometric measurements: Randomly collected anuran samples were measured in the selected site. Eleven types of morphometric measurements (table 1) were taken using a thread and centimetre scale and recorded in centimetres (cm).

Figure-1
Hylarana temporalis **in its natural habitat**

Morphometric measurements of the samples (N=10) randomly collected during the survey were taken in the field conditions and animals were released after recording the observations. Care was taken to ensure no stress on the animals during the course of the measurements. The data was used to analyze the correlation between the morphometric parameters of the randomly collected individuals. Regression analysis was performed for two morphometric variables only *viz.,* head length and the total length for all the samples. The statistical analysis, correlation and linear regression were performed using SPSS software (11.5 version).

Results and Discussion

The descriptive statistics data along with the correlation analysis are tabulated sequentially (table 2 and 3). Regression plots of the morphometric parameters along with fitted regression equations are also depicted (figure 2). Average SVL of the sample measured was found to be 2.16 cm. Significant positive correlation was obtained between the parameters considered at 5% level of significance (table 3).

Growth and size at metamorphic climax are inversely correlated with density and slowly growing individuals metamorphose at smaller sizes[6]. The sample collected in the present study reflect the aforesaid observation, mainly representing small sized frogs.

Table- 1
Eleven morphometric parameters were considered in the present study

Sl.no	Morphometric parameter	Morphological measurement area
1	Snout Vent length (SVL)	The distance between the anterior tip of the snout and the posterior tip of the vent
2	Head length (HL)	The distance between the tip of the snout and the posterior margin of the tympanum including the tympanic annulus.
3	Head width (HW)	The greatest width of the head, at the level of the tympanum.
4	Eye diameter (ED)	The greatest distance between the anterior and posterior margins of the eye
5	Tympanic diameter (TD)	The longitudinal distance between the outer margins of the tympanic annulus.
6	Eye- nasal distance (END)	The distance between the anterior margin of the eye and the posterior mrgin of the naris.
7	Inter-orbital distance (IOD)	The distance between the outer margins of the two eyelids at the middle points.
8	Thigh length (THL)	Length between the lateral tip of the vent and the convex surface of the condyle (the knee was held at the flexed position).
9	Foot length (FL)	The distance between the posterior margin of the outer metatarsal tubercle and the tip of the fourth toe (longest toe).
10	First finger length (1FL)	The distance between the inner corner of the finger and the tip of the finger.
11	First toe length (1TL)	The length between the outer margin of the inner metatarsal tubercle and the tip of the 1st toe.

Table -2
Descriptive statistics of morphometric parameters of *Hylarana temporalis* (N=10) in Gundia region.

Parameter	Minimum	Maximum	Mean	S D
HL	.40	2.00	.6900	.49092
HW	.40	2.20	.7600	.52324
ED	.10	1.30	.2500	.37491
TD	.10	.60	.1700	.15670
END	.30	1.70	.5500	.41433
SVL	.70	8.50	2.1600	2.25743
IOD	.20	1.00	.3800	.22509
THL	.40	4.00	.9100	1.09894
FL	.50	4.50	1.0300	1.23653
1FL	.10	1.20	.3000	.33993
1TL	.10	2.00	.4600	.65013

Legends: Head Length (HL), Head Width (HW), Eye Diameter (ED), Tymphanic Diameter (TD), Eye and Nostril Distance (END), Snout Vent length (SVL), Interorbital distance (IOD), Thigh length (THL), Foot length (FL), 1st finger length (1FL), 1st toe length (1TL).

Table- 3
Correlation coefficient (r) values for parameters of *Hylarana temporalis* collected from Gundia region

	HL	HW	ED	TD	END	SVL	IOD	TL	FL	FFL	FTL
HL	1	.985**	.975**	.963**	.970**	.955**	.953**	.972**	.978**	.965**	.963**
HW		1	.986**	.973**	.989**	.975**	.964**	.988**	.990**	.950**	.916**
ED			1	.993**	.991**	.982**	.974**	.994**	.998**	.959**	.907**
TD				1	.984**	.961**	.958**	.976**	.986**	.939**	.903**
END					1	.966**	.965**	.987**	.990**	.939**	.895**
SVL						1	.960**	.985**	.984**	.950**	.869**
IOD							1	.980**	.980**	.973**	.890**
THL								1	.998**	.964**	.896**
FL									1	.965**	.908**
1FL										1	.950**
1TL											1

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).
Legends: Head Length (HL), Head Width (HW), Eye Diameter (ED), Tymphanic Diameter (TD), Eye and Nostril Distance (END), Snout Vent length (SVL), Interorbital distance (IOD), Thigh length (THL), Foot length (FL), 1st finger length (1FL), 1st toe length (1TL).
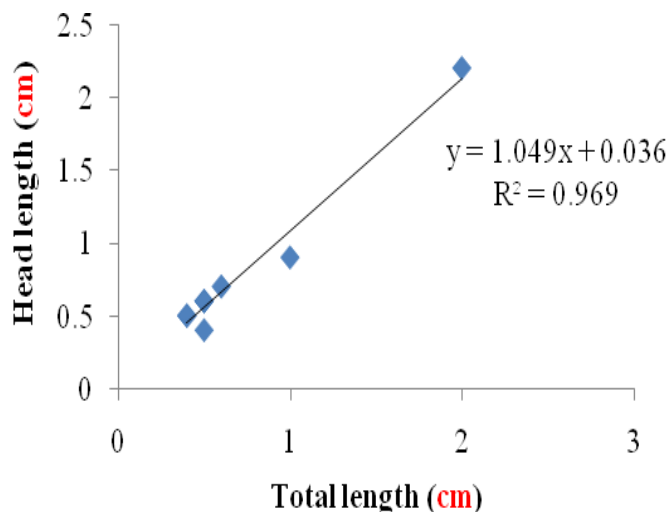

Figure-2
Regression analysis plots for two parameters *Hylarana temporalis* with fitted regression equation

$$y = 1.049x + 0.036$$
$$R^2 = 0.969$$

Conclusion

As the stipulated time for the present project work coincided with the off-season of anuran life cycle and was a short duration, the present findings therefore add to the data of anuran studies in India. Overall, in many cases significant positive correlation was obtained between the morphological parameters considered with few exceptions of negative correlations. The morphological data is unique being a rare data to be produced in terms of the species morphometry in the region and future studies in this regard would facilitate further understanding of the impact of immediate ecological conditions on the anuran morphology.

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