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MORPHOMETRY OF ASIAN HOUSE SHREW (*SUNCUS MURINUS*) IN JAHANGIRNAGAR UNIVERSITY CAMPUS

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Abstract: A study was conducted on morphometry of Asian House Shrew, *Suncus murinus* at Jahangirnagar University campus, Savar, Dhaka from December, 2010 to November, 2011. A total of 85 shrews (55 males and 30 females) were studied for morphometric analysis. The body length of shrews varied from 13cm to 18 cm (mean 15.36, sd±1.17). Males were significantly differed from females in size which made them sexually dimorphic (t = 10.02, df = 83, p< 0.005). The body length of males ranged from 14.5 cm to 18 cm (mean = 16, sd±0.82) and in females it ranged from 13 cm to 15.5 cm (mean = 14.19, sd±0.74). The body weight of shrews varied from 45 gm to 138 gm (mean = 85.52, sd±25.6). The weight of males ranged from 65 gm to 138 gm (mean = 99.6, sd±20.03) whereas the body weight of females ranged from 45 gm to 82 gm (mean = 59.73, sd±10.54). Body length was positively correlated to the body weight (r = 0.917) as well as tail length (r = 0.673) and limbs length (forelimb length, r = 0.875 and hindlimb length, r = 0.971) and found to be significant at 1% level of significance.

Key words: Morphometry, House shrew, *Suncus murinus.*

INTRODUCTION

In Bangladesh, there are two species of shrews are known to occur- Asian house shrew, (*Suncus murinus*) and White toothed pygmy shrew, (*Suncus etruscus).* House shrew is very common and widely distributed throughout the country while the White toothed pygmy shrew is restricted only in the northeast region with doubtful occurrence (IUCN Bangladesh 2003 and Khan 2008).

Asian house shrew, an insectivorous small mammal, is highly dimorphic species with males being larger than females (Ishikawa *et al.* 1991). Phenotypic plasticity is also high in its reproductive effort (Rana and Prakash 1979) or growth rates (Ishikawa and Namikawa 1987). The remarkable phenotypic plasticity of *S. murinus* is mirrored by a great variety of taxonomic names attributed to this species for which up to 57 synonyms are listed by Hutterer (1993).

Body size is arguably the most important morphological trait of animals (Ralls 1977) which affect behavioural and ecological processes. The phenomenon of body size differences between males and females as sexual dimorphism differ significantly in animal kingdom (Andersson 1994), including mammals (Ralls 1977, Weckerly 1998, Schulte-Hostedde *et al.* 2000, 2001 and Issac 2005).

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Studies available on *S. murinus* mostly concentrated on growth, reproduction, genetics, ecology etc. (Hasler *et al.* 1977, Ishikawa *et al.* 1987,1989, Ruedi *et al.* 1996, Chang-Chun-Hsiang 1999, Baker 2005 and Duplantier 2005) rather than morphometry. In Bangladesh, very little information is available on its status and distribution but detail studies on morphometry is still scarce. Hence, the present study was intended to conduct on morphometry of this species.

MATERIAL AND METHODS

Study area: The study was conducted at Jahangirnagar University (JU) campus situated at 23°52´N and 92°15´E with an area of about 700 acres. JU campus comprises diverse ecological habitat such as grasslands, cultivated lands, bushes, woodlands and human settlements which are suitable for house shrews. The climate of this area is characterized by warm and humid summer, and dry and cool winter. In study period, maximum temperature was recorded during May (32.27°C) and minimum during January (12.86°C). The monthly average humidity was 83.34% and average rainfall was about 168 mm. Meteorological data were collected from the Department of Geography and Environment, Jahangirnagar University, Savar, Dhaka-1342.

Trapping and Measurements*:* The shrews were captured with metal live-traps of 26×11×10 cm from different habitats (e.g. human habitation, planted and woody area, and grassy area) in JU campus between December, 2010 and November, 2011. Traps, baited with biscuits, breads or dry fish, were set at night and checked in the following morning. Trapped shrews were anaesthetized by chloroform. Sexes were determined by the presence of mammary glands in females and penis in males. A total of 85 house shrews were studied for morphometric analysis where 55 were males and 30 were females. Data were collected in the following parameters-

Body weight (BW): total weight of individual shrew.

Body length (BL): from the tip of the snout to vent.

Tail length (TL): from the base of the tail to the tip.

Head length (HL): from the tip of the snout to neck.

Eye diameter (ED): horizontal diameter of eye.

Ear length (EL): length of pinna, vertical to body.

Upper lip length (ULL): from the tip of the snout to the end of upper lip opening.

Lower lip length (LLL): from the tip of the lower lip to the end of opening.

Forelimb length (FLL): from humerus to the tip of mid finger.

Hindlimb length (HLL): from femur to the tip of mid toe.

Body weight was taken with spring balance whereas rests of the measurements were made using measuring tape and centimeter scale nearest to a 0.1 cm.

Data were analyzed with the software package SPSS 16 for Windows. The t-test was used to analyze the mean differences among variables. Correlations among morphometric parameters were estimated using Pearson's correlation coefficients.

RESULTS AND DISCUSSION

The overall body length of shrews varied from 13cm to 18 cm with the mean 15.36 ±1.17 (Table 1) and the body weight ranged from 45 gm to 138 gm (mean = 85.52, sd±25.6). The tail length varied from 7.5 cm to 12 cm (mean = 9.29, sd±0.89) while the range of head length was 3.2 cm to 4.2 cm (mean = 3.61, sd±0.22) (Table 1).

Males were significantly differed from females in size which made the shrews sexually dimorphic ($t = 10.02$, $df = 83$, $p < 0.005$). Males were more robust, larger and heavier than females. In males, body length ranged from 14.5 cm to 18 cm (mean = 16, sd±0.82) and tail length ranged from 8 cm to 12 cm, (mean = 9.5 and sd±0.92) (Table 1). Body weight ranged from 65 gm to 138 gm, (mean = 99.6 and sd±20.03).

In females, body length ranged from 13 cm to 15.5 cm, (mean = 14.19 and sd±0.74) and tail length ranged from 7.5 cm to 10 cm, (mean = 8.7 and sd±0.52) (Table 1). Body weight varied from 45 gm to 82 gm, (mean = 59.73 and sd±10.54).

Table 1. Morphometric measurements of House shrews

Parameters (in cm)	Overall			Male			Female		
	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD
BL	13-18	15.36	1.17	14.5-18	16	0.82	13-15.5	14.19	0.74
TL	7.5-12	9.29	0.89	8-12	9.5	0.92	7.5-10	8.7	0.52
HL	3.2-4.2	3.61	0.22	3.3-4.2	3.69	0.20	3.2-3.7	3.46	0.15
ED	0.2-0.3	0.21	0.03	0.2-0.3	0.21	0.03	0.2-0.25	0.21	0.02
EL	1.2-1.8	1.41	0.13	1.3-1.8	1.4	0.12	1.2-1.5	1.3	0.11
UPL	2.2-3	2.53	0.18	2.5-3	2.6	0.18	2.2-2.5	2.4	0.09
LLL	1.1-1.5	1.3	0.08	1.3-1.5	1.34	0.07	1.1-1.3	1.25	0.05
FLL	5-6.3	5.64	0.29	5.6-6.3	5.79	0.17	1.8-2	1.89	0.09
HLL	7.2-9	8.04	0.44	8-9	8.29	0.27	7.2-8	7.88	0.28

The positive correlations were revealed among different morphometric parameters in shrews and found to be significant at 1% level of significance. Body length showed a linear and positive correlation to the body weight ($r = 0.917$), tail length ($r = 0.673$), forelimb length ($r = 0.875$) and hind limb length ($r = 0.971$) (Fig. 1). Strong correlation between body length and body weight was also evident in both male ($r = 0.842$) and female ($r = 0.808$) at 1% level of

significance (Table 2). Comparatively a weak correlation (r = 0.571 in male, r = 0.603 in female) was found in between body length and tail length. Besides, forelimb length and hind limb length were strongly correlated to body length in both male (r = 0.841 and 0.927 respectively) and female (r = 0.940 and 0.958 respectively) (Table 2).

Table 2. Pearson's correlation coefficients (r), Coefficient of determination (R^2) between morphometric parameters of male and female shrews ($p<0.01$).

Attributes	Male		Female	
	R^2	r	R^2	r
BL/BW	0.709	0.842	0.653	0.808
BL/TL	0.326	0.571	0.363	0.603
BL/FLL	0.708	0.841	0.884	0.940
BL/HLL	0.859	0.927	0.919	0.958

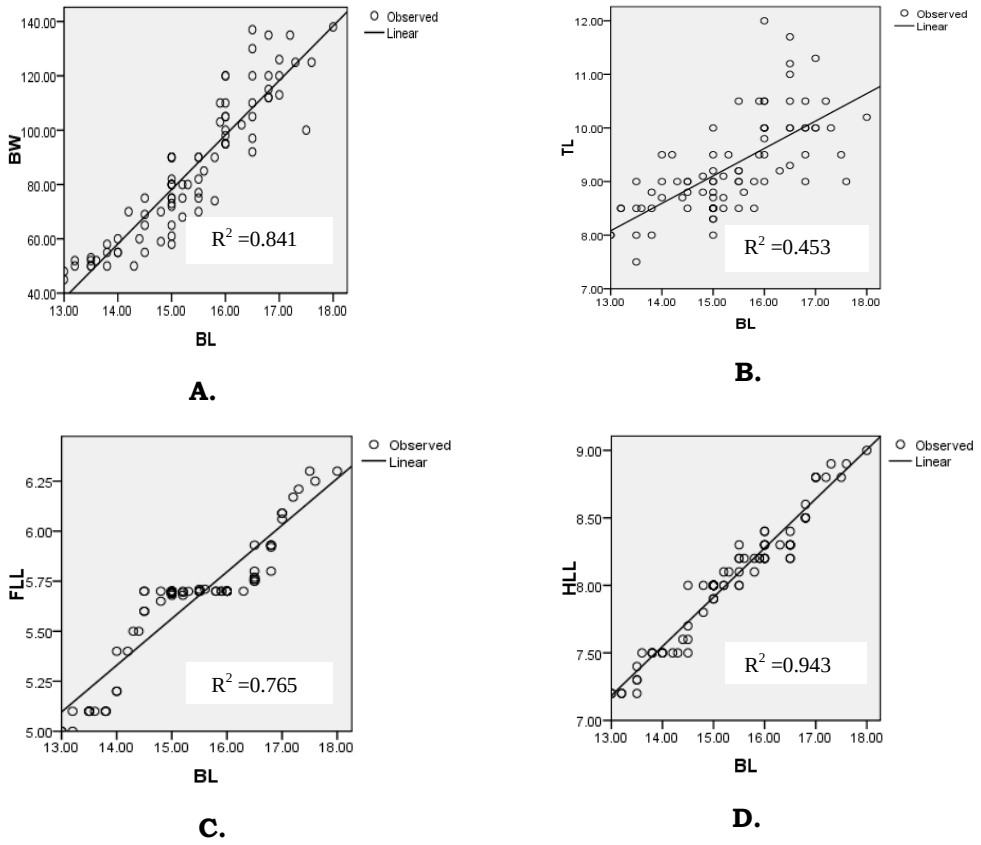

Fig. 1. Correlation between four morphometric parameters and body length (BL) A. body weight (BW), B. tail length (TL), C. forelimb length (FLL), D. hind limb length (HLL)

Individual characteristics are reported to vary with locality (Barbehenn 1962, Harrison 1955, Louch *et al*. 1966, Dryden 1968) and *S. murinus* is suggested as a highly plastic species (Dryden and Ross 1971) due to extreme morphological variations. Baker (2005) stated that head-to-body length of *S. murinus* is up to 15 cm and the tail length up to 8 cm which is nearer to the present findings. According to Chang-Chun-Hsiang (1999), total body length of adults in Taiwan typically varies between 100 mm and 150 mm, including the tail, whereas the total length of shrews (body length + tail length) varied between 210 mm and 283 mm here.

Comparative reports on *S. murinus* from different localities revealed that geographical variation exists in body weight of house shrews (Dryden 1968). Ruedi *et al*. (1996) mentioned that geographic variation in adult body weight range from 33.2 g to 147.3 g in males and from 23.5 g to 82.0 g in females. *Suncus murinus* on Guam are much smaller than those from other places. Dryden (1968) and Barbehenn (1962) reported that house shrews from Guam weighed about 30 gm (male) and 20 gm (female). Harrison (1955) recorded weights of 55 gm and 45 gm for male and female Malaysian *S. murinus*, respectively. On the other hand, Louch *et al.* (1966) reported that *S. murinus* from Calcutta averaged 105.6 gm and 67.7 gm for males and females, respectively. In contrast, the weight recorded in present study was nearer to that of Louch *et al.* (1966) which is likely occur due to the geographical closeness of study area rather than others.

So, the present results demonstrate an apparent geographical variation in size and weight of house shrews. Changes in body weight and size due to improved dietary conditions were reported for *Suncus* from Guam by Dryden and Ross (1971). The body dimensions of shrews might be partly controlled by various environmental factors (e.g., temperature, geography, geoecological isolation etc.) and genetic factors as well. Clearly, more data are needed in order to validate this interpretation.

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