Supported by tetfund TERTIARY EDUCATION TRUST FUND

Morphometrics of Two Edible Frog Species [Crowned Bullfrog (*Hoplobatrachus occipitalis*), and Medine Grassland Frog (*Ptychadena pumilio*)] in Ibadan, Nigeria

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Received: March 20, 2022 **Accepted:** June 18, 2022

Abstract: Edible frog species are integral part of the economy as they are used as an alternative source of protein and are involved in international trade. Conservation efforts on them require information on their morphometry, which is scarce. Therefore, this study documents the preliminary morphometrics of two edible frog species [crowned bullfrog (*Hoplobatrachus occipitalis*), and medine grassland frog (*Ptychadena pumilio*)] in Ibadan, Nigeria. Twenty seven (27) live samples of adult *H. occipitalis* and Six (6) live samples of *P. pumilio* were used for this study. Live weights (LW) and 15 other external body measurement were taken. Means and standard deviations were computed. The T-tests and Pearson's correlation coefficients were conducted at $p<0.05$. The LW [52.14±39.58; 22.00±14.20] and Snout-vent length (SVL) [7.83±2.19; 7.00±2.00] in *H. occipitalis* were significantly higher than that of *P. pumilio*. The LW in *H. occipitalis* showed significant ($p<0.05$) positive correlations with all other measured parameters. In *P. pumilio*, the LW correlates significantly with SVL (r=0.94), head length (HL) (r=0.82), thigh length (THL) (r= 0.86), fore arm length (FLL) (r= 0.86), IOD (r=0.90), eye diameter (ED) (r=0.90) and tympanum diameter (TD) (r=0.90). The highest correlation coefficient (r=0.98) was found between the LW and SVL in *H. occipitalis*. These two parameters also had a high correlation coefficient (r=0.94) in *P. pumilio*. This study provides a preliminary data on the morphometrics of two edible frog species (*Hoplobatrachus occipitalis* and *Ptychadena pumilio*) in Ibadan, Nigeria. Molecular investigation of the species is recommended as it will further help in their management and conservation.
Keywords: Conservation, Correlation, *Hoplobatrachus occipitalis*, Morphometrics, *Ptychadena pumilio*

Introduction

Evolutionary changes in the physical characteristics, phylogenetic analyses and species delineation have been flagged to benefit from the analyses of morphometric measurements of many organisms (Watters *et al*., 2016; Coker *et al.,* 2018; Coker *et al*., 2020). Multiple methods of investigation during biological experiments has been suggested by some scientists (Dapporto *et al.,* 2014, Török *et al.,* 2015). The sustenance of morphometric studies despite new genetic/molecular methods, having found application in the field of medicine, forensics (Elwa 2010) is being encouraged (Martin *et al*., 2016)

Edible frog species are an integral part of the economy in areas with large frog populations. Villagers are employed to catch and prepare frogs for consumption as an alternative source of protein. They are now being involved in international trade as tons of edible frogs are shipped across international borders annually (Mohneke, 2011; Gonwouo and Rodel, 2008). Aside from their value as an essential food source, frogs are also being used for cultural reasons and as traditional medicine in areas where Western medicine is not available.

Frogs are excellent bio-indicators of the ecosystem health or habitat quality (Pyke, 2008: Saber *et al*., 2017), and are easily affected by changes in the environment. Their populations are degenerating throughout the world and overexploitation has been figured as one of the major reasons for the worldwide decline (Niasse *et al*., 2004). Other threats are habitat alteration and destruction, invasive species, pollution, infectious changes and climate change (Gibbons and Stangel, 1999; Haliday, 2008). Over exploitation without planning for the sustainability of these frog species would have direct and indirect impacts on their populations and the ecosystem. Amphibians are important components in various terrestrial and aquatic ecosystems and their reduction or disappearance would have consequence effect on the ecosystem and other relative components (Toledo *et al*., 2007; Mohneke and Rodel, 2009).

The IUCN Red List (2021) categorizes both crowned bullfrog (*Hoplobatrachus occipitalis*), and medine grassland frog (*Ptychadena pumilio*) as Least Concern, but the rate of their exploitation could pose a great threat for the animals in Nigeria and other West African countries (Mohneke and Rodel, 2009). The species are being hunted for various uses such as food and medicinal uses. The habitat of the species is also greatly disturbed which might lead to the depreciation of the species and hence, the need to conserve the animal arises. The efforts to protect the animal against being endangered or being extinct are directly linked to researches on the behaviour of the species habitat, morphology and morphometry.

Allozyme markers have been used to characterize some edible species of frogs (*H. occipitalis* and *Xenopus muelleri*) in Southwestern Nigeria (Coker *et al*., 2021) in an attempt to provide genetic information that could help in the conservation program of edible frog species, but morphological information provides supportive evidence of some underlying genetic differentiation (Will *et al.* 2005: Trauth *et al*., 2007). Morphometric studies of edible frog species are scarce in Nigeria, therefore, this study documents the preliminary morphometrics of two edible frog species [crowned bullfrog (*Hoplobatrachus occipitalis*), and medine grassland frog (*Ptychadena pumilio*)] in Ibadan, Nigeria.

Methods

This study was carried out within the city of Ibadan, Southwestern Nigeria. Twenty seven (27) live samples of adult Crowned Bullfrog (*Hoplobatrachus occipitalis)* captured from Awba dam, University of Ibadan and Six (6) live samples of Medine grassland frog *(Ptychadena pumilio)* captured from Alatare River, Ologuneru, Ido local government Ibadan, were used for this study. Captured frogs were placed in an aerated transparent container with a lid and transported to the Conservation Genetics Laboratory of the Department of Wildlife and Ecotourism Management, University of Ibadan.

Each frog was carefully taken out of the aerated container onto a white platform on which different body measurements took place. The frogs were handled with extra caution so as not to choke them or make them go through much discomfort. They were returned to their natural habitats after they have stabilized.

Live weights (LW) of the animals were taken in grams using a weighing balance (Scout Pro SPU402: 400g). Fifteen (15) other external body measurement were taken in centimeters with the aid of tape rule, meter rule and thread (Figure 1).

The external body measurements includes: Tibia length (TL) refers to the length of the outer surface of the flexed knee to the heel/tibio-tarsal inflexion; Eye diameter (ED) refers to the diameter of the eye; Snout-vent length (SVL) refers to length from the tip of the snout to posterior margin of the vent; and head width (HW) refers to the broadest part of the head or the angle of the jaws; Head length (HL) from the posterior of the jaws to the tip of the snout; Eyes to Nostril distances (END) refer to the length of the outer surface between the Eyes and the Nostril; The foot length (FL) refers to the length of the toes on the hind limb of the frog; Thigh length (THL) is the length posterior to the toes; Snout length (SL) refers to the length from the tip of the mouth to the back of the head; Hand length (HAL) refers to the length of the outer fingers or the frog species; Forearm length (FLL) is the length of the whole fore limb of the frog species; Interorbital distance (IOD) is the distance between the two eyes of the frog; Internarial distance (IND) refers to the space or distance between the nostrils of the frog; Tympanum diameter (TD) Is the diameter of the frog's ear or Tympanum; Upper eye lid width (UEW) is the measurement of the frog's eyelid. i.e. the upper part of the frog's eye.

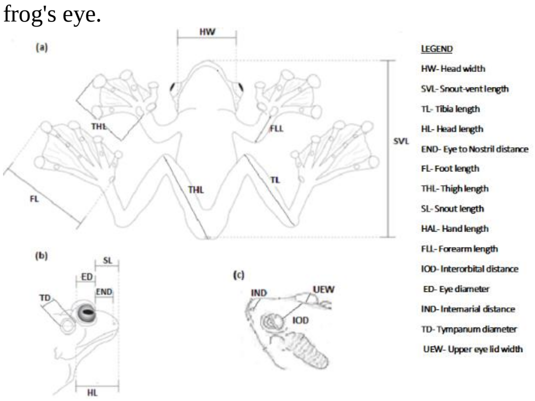

Figure 1: Schematic representation of the morphometric character measurements (a-ventral view; b-lateral; c-dorsal view) for *Hoplobatrachus occipitalis* and *Ptychadena Pumilio* in Ibadan, Nigeria

Data Analysis*:* Means and standard deviations were computed. The T-tests and Pearson's correlation coefficients were conducted at $p<0.05$. The Pearson correlation coefficient (r) with two tailed tests of statistical significance at 0.05 levels were carried out to find out the strength of association and the consistency of the relationships between the live weight (g) of the animals and measurements of other morphometric parameters.

Results and Discussion

Comparisons between the external morphometry of Hoplobatrachus occipitalis and Ptychadena Pumilio

Table 1 shows the comparisons between the morphometrics of *Hoplobatrachus occipitalis* and *Ptychadena Pumilio. H. occipitalis* had higher values than *P. pumilio* in all the measured parameters except in the Eye -Nostril distance [END], Fore arm length [FLL], Inter orbital distance [IOD] and Tympanum diameter [TD]. Live weight (LW) [52.14 ± 39.58; 22.00 ± 14.20] and Snout-vent length (SVL) [7.83 ± 2.19; 7.00 ± 2.00] in *H. occipitalis* are significantly higher than that of *P. pumilio*.

Hunting pressure and habitat destruction lead to changes in the dynamics of several species and this could greatly impact their physical appearances/sizes with time (Coker *et al*., 2020). Frog species are further sensitive to climate change due to their dependence on water bodies which are highly affected with the progressive change in climate change. Monitoring the morphometrics of species over a specific period could provide insight to the effect of climate change on their conservation (Sheridan and Bickford, 2011). Morphometric comparison of the studied edible frog species **(***Hoplobatrachus occipitalis* and *Ptychadena pumilio)* with a previous data is difficult due to the scarcity of such data. This study therefore provides a preliminary information for a future comparison for an effective conservation efforts for the species.

Molecular analyses have not been able to settle the uncertainty surrounding the taxonomic status of the Illinois Chorus Frog (*Pseudacris streckeri illinoensis*) relative to Strecker's Chorus Frog (*P. s. streckeri*) of the southcentral United States, (US). But morphological study carried out by Trauth et al. (2007) recommended the listing of Arkansas *P. s. illinoensis* as a distinct population. In their study, tibia length, mass (weight), snout-vent length and head lengths were significant in discriminating the populations. Fifteen anuran morphometric measurements as standardized by Watters *et al*. (2016), aside the live weight, were used for the current study. This will ensure ease in the repeatability (Wiens 2001) and future comparisons which is essential in the monitoring of the species. Twelve of the measurements were higher in *H. occipitalis* than *P. pumilio* and only the live weight (LW) and snout-vent length (SVL) were significant. Eye-nostril distance (END), fore arm length (FLL), inter orbital distance (IOD) and tympanum diameter (TD) have higher values in *P. pumilio* but not significant.

Hind limbs has been suggested to discriminate among populations of frogs (Essner *et al.,* 2010). This did not adequately discriminate between the populations of farmed and wild individuals of Dybowski's frog (*Rana dybowskii*) (Xia *et al*., 2011). Likewise, in this study, the tibia length and thigh length did not significantly discriminate the two species.

Table 1: Mean values and standard deviation of external morphometric parameters of *Hoplobatrachus occipitalis* and *Ptychadena Pumilio*

Parameters	Hoplobatrachus occipitalis (n=27)	Ptychadena Pumilio (n=6)
Live weight [LW] (g)	52.14 ± 39.58*	22.00 ± 14.20
Head Width [HW] (cm)	2.77 ± 0.82	2.17 ± 0.75
Snout-vent length[SVL] (cm)	7.83 ± 2.19*	7.00 ± 2.00
Tibia length [TL] (cm)	3.12 ± 1.00	2.83 ± 0.75
Head length [HL] (cm)	2.89 ± 0.94	2.50 ± 0.55
Eye -Nostril distance [END] (cm)	0.61 ± 0.19	0.83± 0.41
Foot length [FL] (cm)	4.94 ± 1.58	3.83 ± 1.17
Thigh length [THL] (cm)	3.30 ± 1.01	2.83 ± 0.75

Snout length [SL] (cm)	1.32 ± 0.34	1.00 ± 0.00
Hand length [HAL] (cm)	1.78 ± 0.45	1.50 ± 0.55
Fore arm length [FLL] (cm)	1.78 ± 0.60	1.83 ± 0.75
Inter orbital distance [IOD] (cm)	0.39 ± 0.09	0.67 ± 0.52
Eye diameter [ED] (cm)	0.70 ± 0.23	0.67 ± 0.52
Internarial distance [IND] (cm)	0.30 ± 0.08	0.17 ± 0.41
Tympanum diameter [TD] (cm)	0.53 ± 0.16	0.67 ± 0.52
Upper eyelid width [UEW] (cm)	0.52 ± 0.17	0.50 ± 0.55

*-Significant at p<0.05

Relationships among Measured Parameters of *Hoplobatrachus occipitalis* and *Ptychadena Pumilio*

Tables 2 and 3 reveal the correlation matrices between each pair of the measured parameters of *H. occipitalis* and *P. pumilio*, respectively. The live weight in *H. occipitalis* shows significant (p<0.001) positive correlations with all other measured parameters (HW- Head width, SVL- Snout-vent length, TL- Tibia length, HL- Head length, END- Eye to Nostril distance, FL- Foot length, THL- Thigh length, SL- Snout length, HAL- Hand length, FLL- Forearm length, IOD- Interorbital distance, ED- Eye diameter, IND- Internarial distance, TD- Tympanum diameter, UEW- Upper eye lid width). Every other pair shows positive significant correlations at $\alpha_{0.001}$, except between SL/IOD (r=0.47), HAL/IND (r=0.53), FLL/IOD (r=0.52), IOD/ED (r=0.43) and ED/IND (r=0.48), showing significant correlations at $\alpha_{0.05}$. Only FL and IOD were not correlated (r=0.36).

In *P. pumilio*, the live weight correlates significantly with SVL (r=0.94), HL (r=0.82), THL (r= 0.86), FLL (r= 0.86), IOD (r=0.90), ED (r=0.90) and TD (r=0.90). The SVL correlates significantly with IOD, ED and TD (r=0.97). TL correlates with IOD, ED and TD (r=0.86). FL correletes significantly with IND (r= 0.91), THL correlates with FLL (r= 1.00), IOD (r=0.86), ED (r=0.86) and TD (r=0.86). The SL correlates with HAL (r= 0.90) and UEW (r= 0.90) while FLL correlates with IOD, ED and TD (r=0.86).

The highest correlation coefficient (r=0.98) was found between the live weight (LW) and snout-to-vent length (SVL) in H. occipitalis. These two parameters also had a high correlation coefficient (r=0.94) in P. pumilio, though SVL has a higher value in correlation with IOD, ED and TD (r=0.97). This implies that either of the two parameters can be used to predict the other. Interestingly, it is only the LW and SVL that significantly distinguished between the two species in this study (Table 1).

In H. occipitalis, all the paired parameters, except FL/IOD revealed significant positive correlations suggesting that most of the parameters can be used in predicting one another. This was not particularly true for P. pumilio where fewer significant correlations were observed. This may be as a result of the lower sample size for this species.

Table 2: Pearson's correlation coefficient (r) of the external body morphometry of *Hoplobatrachus occipitalis* from Ibadan, Nigeria

	LW (g)	HW (cm)	SVL (cm)	TL (cm)	HL (cm)	END (cm)	FL (cm)	THL (cm)	SL (cm)	HAL (cm)	FLL (cm)	IOD (cm)	ED (cm)	IND (cm)	TD (cm)	UEW (cm)
LW (g)	1	0.93** (0.00)	0.98** (0.00)	0.95** (0.00)	0.84** (0.00)	0.82** (0.00)	0.79** (0.00)	0.95** (0.00)	0.90** (0.00)	0.81** (0.00)	0.75** (0.00)	0.62** (0.00)	0.86** (0.00)	0.61** (0.00)	0.88** (0.00)	0.92** (0.00)
HW (cm)	0.93** 0.00	1	0.95** (0.00)	0.94** (0.00)	0.88** (0.00)	0.81** (0.00)	0.77** (0.00)	0.90** (0.00)	0.78** (0.00)	0.82** (0.00)	0.88** (0.00)	0.69** (0.00)	0.84** (0.00)	0.74** (0.00)	0.87** (0.00)	0.89** (0.00)
SVL (cm)	0.98** 0.00	0.95** 0.00	1	0.97** (0.00)	0.87** (0.00)	0.86** (0.00)	0.78** (0.00)	0.95** (0.00)	0.89** (0.00)	0.85** (0.00)	0.83** (0.00)	0.65** (0.00)	0.88** (0.00)	0.65** (0.00)	0.88** (0.00)	0.91** (0.00)
TL (cm)	0.95** 0.00	0.94** 0.00	0.97** 0.00	1	0.84** (0.00)	0.84** (0.00)	0.76** (0.00)	0.94** (0.00)	0.87** (0.00)	0.85** (0.00)	0.81** (0.00)	0.65** (0.00)	0.84** (0.00)	0.68** (0.00)	0.88** (0.00)	0.89** (0.00)
HL (cm)	0.84** 0.00	0.88** 0.00	0.87** 0.00	0.84** 0.00	1	0.82** (0.00)	0.62** (0.00)	0.83** (0.00)	0.80** (0.00)	0.71** (0.00)	0.78** (0.00)	0.56** (0.00)	0.75** (0.00)	0.64** (0.00)	0.80** (0.00)	0.74** (0.00)
END (cm)	0.82** 0.00	0.81** 0.00	0.86** 0.00	0.84** 0.00	0.82** 0.00	1	0.57** (0.00)	0.82** (0.00)	0.85** (0.00)	0.71** (0.00)	0.76** (0.00)	0.59** (0.00)	0.62** (0.00)	0.61** (0.00)	0.66** (0.00)	0.80** (0.00)
FL (cm)	0.79** 0.00	0.77** 0.00	0.78** 0.00	0.76** 0.00	0.62** 0.00	0.57** 0.00	1	0.68** (0.00)	0.62** (0.00)	0.76** (0.00)	0.76** (0.00)	0.52** (0.01)	0.82** (0.00)	0.36 (0.07)	0.74** (0.00)	0.76** (0.00)
THL (cm)	0.95** 0.00	0.90** 0.00	0.95** 0.00	0.94** 0.00	0.83** 0.00	0.82** 0.00	0.68** 0.00	1	0.90** (0.00)	0.80** (0.00)	0.73** (0.00)	0.55** (0.00)	0.84** (0.00)	0.56** (0.00)	0.83** (0.00)	0.89** (0.00)
SL (cm)	0.90** 0.00	0.78** 0.00	0.89** 0.00	0.87** 0.00	0.80** 0.00	0.85** 0.00	0.62** 0.00	0.90** 0.00	1	0.70** (0.00)	0.63** (0.00)	0.47* (0.02)	0.75** (0.00)	0.50** (0.01)	0.81** (0.00)	0.77** (0.00)
HAL (cm)	0.81** 0.00	0.82** 0.00	0.85** 0.00	0.85** 0.00	0.71** 0.00	0.71** 0.00	0.76** 0.00	0.80** 0.00	0.70** 0.00	1	0.75** (0.00)	0.58** (0.00)	0.76** (0.00)	0.53** (0.01)	0.71** (0.00)	0.74** (0.00)
FLL (cm)	0.75** 0.00	0.88** 0.00	0.83** 0.00	0.81** 0.00	0.78** 0.00	0.76** 0.00	0.76** 0.00	0.73** 0.00	0.62** 0.00	0.75** 0.00	1	0.52** (0.01)	0.77** (0.00)	0.61** (0.00)	0.71** (0.00)	0.76** (0.00)
IOD (cm)	0.62** (0.00)	0.69** (0.00)	0.65** (0.00)	0.65** (0.00)	0.56** (0.00)	0.59** (0.00)	0.52** (0.01)	0.55** (0.00)	0.47* (0.02)	0.58** (0.00)	0.52** (0.01)	1	0.43* (0.03)	0.67** (0.00)	0.54** (0.00)	0.60** (0.00)
ED (cm)	0.86** (0.00)	0.84** (0.00)	0.88** (0.00)	0.84** (0.00)	0.75** (0.00)	0.62** (0.00)	0.82** (0.00)	0.84** (0.00)	0.75** (0.00)	0.76** (0.00)	0.77** (0.00)	0.43* (0.03)	1	0.48* (0.01)	0.82** (0.00)	0.82** (0.00)
IND (cm)	0.61** (0.00)	0.74** (0.00)	0.65** (0.00)	0.68** (0.00)	0.64** (0.00)	0.61** (0.00)	0.36 0.07	0.56** (0.00)	0.50** (0.01)	0.53** (0.01)	0.61** (0.00)	0.67** (0.00)	0.48* (0.01)	1	0.62** (0.00)	0.59** (0.00)
TD (cm)	0.88** (0.00)	0.87** (0.00)	0.88** (0.00)	0.88** (0.00)	0.80** (0.00)	0.66** (0.00)	0.74** (0.00)	0.83** (0.00)	0.81** (0.00)	0.71** (0.00)	0.71** (0.00)	0.54** (0.00)	0.82** (0.00)	0.62** (0.00)	1	0.79** (0.00)
UEW (cm)	0.92** (0.00)	0.89** (0.00)	0.91** (0.00)	0.89** (0.00)	0.74** (0.00)	0.80** (0.00)	0.76** (0.00)	0.89** (0.00)	0.77** (0.00)	0.74** (0.00)	0.76** (0.00)	0.60** (0.00)	0.82** (0.00)	0.59** (0.00)	0.79** (0.00)	1

Note: LW- Live weights, HW- Head width, SVL- Snout-vent length, TL- Tibia length, HL- Head length, END- Eye to Nostril distance, FL- Foot length, THL- Thigh length, SL- Snout length, HAL- Hand length, FLL- Forearm length, IOD- Interorbital distance, ED- Eye diameter, IND- Internarial distance, TD- Tympanum diameter, UEW- Upper eye lid width; *p* value in bracket; *-Significant at p<0.05; **-Significant at p<0.01

Table 3: Pearson's correlation coefficient (r) of the external body morphometry of *Ptychadena Pumilio* from Ibadan, Nigeria

	LW (g)	HW (cm)	SVL (cm)	TL (cm)	HL (cm)	END (cm)	FL (cm)	THL (cm)	SL (cm)	HAL (cm)	FLL (cm)	IOD (cm)	ED (cm)	IND (cm)	TD (cm)	UEW (cm)
LW (g)	1	0.67 (0.14)	0.94** (0.01)	0.66 (0.16)	0.82* (0.04)	0.59 (0.22)	0.80 (0.06)	0.86* (0.03)	0.59 (0.22)	0.51 (0.30)	0.86* (0.03)	0.90* (0.01)	0.90* (0.01)	0.59 (0.22)	0.90* (0.01)	0.51 (0.30)
HW (cm)	0.67 (0.14)	1	0.80 (0.06)	0.77 (0.08)	0.73 (0.10)	0.76 (0.08)	0.72 (0.11)	(0.41) (0.42)	0.62 (0.19)	0.73 (0.10)	(0.41) (0.42)	0.69 (0.13)	0.69 (0.13)	0.54 (0.27)	0.69 (0.13)	0.73 (0.10)
SVL (cm)	0.94** (0.01)	0.80 (0.06)	1	0.80 (0.06)	0.73 (0.10)	0.74 (0.10)	0.68 (0.13)	0.80 (0.06)	0.72 (0.11)	0.73 (0.10)	0.80 (0.06)	0.97** (0.00)	0.97** (0.00)	0.49 (0.32)	0.97** (0.00)	0.73 (0.10)
TL (cm)	0.66 (0.16)	0.77 (0.08)	0.80 (0.06)	1	0.73 (0.10)	0.54 (0.27)	(0.42) (0.41)	0.65 (0.17)	0.46 (0.36)	0.73 (0.10)	0.65 (0.17)	0.86* (0.03)	0.86* (0.03)	(0.11) (0.84)	0.86* (0.03)	0.73 (0.10)
HL (cm)	0.82* (0.04)	0.73 (0.10)	0.73 (0.10)	0.73 (0.10)	1	0.45 (0.37)	0.78 (0.07)	0.73 (0.10)	0.25 (0.64)	0.33 (0.52)	0.73 (0.10)	0.71 (0.12)	0.71 (0.12)	0.45 (0.37)	0.71 (0.12)	0.33 (0.52)
END (cm)	0.59 (0.22)	0.76 (0.08)	0.74 (0.10)	0.54 (0.27)	0.45 (0.37)	1	(0.35) (0.50)	0.54 (0.27)	0.40 (0.43)	0.45 (0.37)	0.54 (0.27)	0.63 (0.18)	0.63 (0.18)	0.20 (0.70)	0.63 (0.18)	0.45 (0.37)
FL (cm)	0.80 (0.06)	0.72 (0.11)	0.68 (0.13)	(0.42) (0.41)	0.78 (0.07)	(0.35) (0.50)	1	(0.42) (0.41)	0.60 (0.21)	0.47 (0.35)	(0.42) (0.41)	0.55 (0.26)	0.55 (0.26)	0.91* (0.01)	0.55 (0.26)	0.47 (0.35)
THL (cm)	0.86* (0.03)	(0.41) (0.42)	0.80 (0.06)	0.65 (0.17)	0.73 (0.10)	0.54 (0.27)	(0.42) (0.41)	1	0.22 (0.68)	0.24 (0.64)	1.00** (0.00)	0.86* (0.03)	0.86* (0.03)	(0.11) (0.84)	0.86* (0.03)	0.24 (0.64)
SL (cm)	0.59 (0.22)	0.62 (0.19)	0.72 (0.11)	0.46 (0.36)	0.25 (0.64)	0.40 (0.43)	0.60 (0.21)	0.22 (0.68)	1	0.90* (0.01)	0.22 (0.68)	(0.64) (0.17)	(0.64) (0.17)	(0.70) (0.12)	(0.64) (0.17)	0.90* (0.01)
HAL (cm)	0.51 (0.30)	0.73 (0.10)	0.73 (0.10)	0.73 (0.10)	0.33 (0.52)	0.45 (0.37)	0.47 (0.35)	0.24 (0.64)	0.90* (0.01)	1	0.24 (0.64)	0.71 (0.12)	0.71 (0.12)	0.45 (0.37)	0.71 (0.12)	1.00** (0.00)
FLL (cm)	0.86* (0.03)	(0.41) (0.42)	0.80 (0.06)	0.65 (0.17)	0.73 (0.10)	0.54 (0.27)	(0.42) (0.41)	1.00** (0.00)	0.22 (0.68)	0.24 (0.64)	1	0.86* (0.03)	0.86* (0.03)	(0.11) (0.84)	0.86* (0.03)	0.24 (0.64)
IOD (cm)	0.90* (0.01)	0.69 (0.13)	0.97** (0.00)	0.86* (0.03)	0.71 (0.12)	0.63 (0.18)	0.55 (0.26)	0.86* (0.03)	(0.64) (0.17)	0.71 (0.12)	0.86* (0.03)	1	1.00** (0.00)	(0.32) (0.54)	1.00** (0.00)	0.71 (0.12)
ED (cm)	0.90* (0.01)	0.69 (0.13)	0.97** (0.00)	0.86* (0.03)	0.71 (0.12)	0.63 (0.18)	0.55 (0.26)	0.86* (0.03)	(0.64) (0.17)	0.71 (0.12)	0.86* (0.03)	1.00** (0.00)	1	(0.32) (0.54)	1.00** (0.00)	0.71 (0.12)
IND (cm)	0.59 (0.22)	0.54 (0.27)	0.49 (0.32)	(0.11) (0.84)	0.45 (0.37)	0.20 (0.70)	0.91* (0.01)	(0.11) (0.84)	(0.70) (0.12)	0.45 (0.37)	(0.11) (0.84)	(0.32) (0.54)	(0.32) (0.54)	1	(0.32) (0.54)	0.45 (0.37)
TD (cm)	0.90* (0.01)	0.69 (0.13)	0.97** (0.00)	0.86* (0.03)	0.71 (0.12)	0.63 (0.18)	0.55 (0.26)	0.86* (0.03)	(0.64) (0.17)	0.71 (0.12)	0.86* (0.03)	1.00** (0.00)	1.00** (0.00)	(0.32) (0.54)	1	0.71 (0.12)
UEW (cm)	0.51 (0.30)	0.73 (0.10)	0.73 (0.10)	0.73 (0.10)	0.33 (0.52)	0.45 (0.37)	0.47 (0.35)	0.24 (0.64)	0.90* (0.01)	1.00** (0.00)	0.24 (0.64)	0.71 (0.12)	0.71 (0.12)	0.45 (0.37)	0.71 (0.12)	1

Note: LW- Live weights, HW- Head width, SVL - Snout-vent length, TL - Tibia length, HL - Head length, END- Eye to Nostril distance, FL - Foot

Note: LW- Live weights, HW- Head width, SVL- Snout-vent length, TL- Tibia length, HL- Head length, END- Eye to Nostril distance, FL- Foot length, THL- Thigh length, SL- Snout length, HAL- Hand length, FLL- Forearm length, IOD- Interorbital distance, ED- Eye diameter, IND- Internarial distance, TD- Tympanum diameter, UEW- Upper eye lid width; *p* value in bracket; *-Significant at $p<0.05$; **-Significant at $p<0.01$

Conclusion

Information of the morphometrics of edible frog species is necessary for their effective management and conservation. Such information can aid in the understanding of the effect of Climate change, deforestation and hunting pressure on the species when compared over a period of time. This study provides a preliminary data on the morphometrics of two edible frog species [crowned bullfrog (*Hoplobatrachus occipitalis*), and medine grassland frog (*Ptychadena pumilio*)] in Ibadan, Nigeria. *H. occipitalis* has significant higher mean in weight and snout-to-vent length compared to *P. pumilio.* Molecular investigation of the species will further help in their management and conservation efforts.

Acknowledgement

The authors would like to appreciate Mr Akorede Olawode, Miss Opeyemi Lana and Miss Aanuoluwapo Adejobi, of the Department of Wildlife and Ecotourism Management, University of Ibadan, for their assistance during the field work and data collection.

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