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QUALITATIVE AND QUANTITATIVE CHARACTERIZATION OF BODY MORPHOMETRIC OF INDIGENOUS PIGS IN THE HUMID ENVIRONMENT OF NIGERIA

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ABSTRACT
This study focussed on the qualitative and quantitative characterization of some body morphometric of indigenous pigs in the humid environment (Iseyin) of Oyo state, Nigeria.Data on 290 extensively managed indigenous pigs were collected using visual appraisal, measuring tape rule (cm) and hanging scale. The qualitative data include, coat colour, tail type, snout type, ear type and teats pairs using visual appraisal while those of quantitative characters were body length, snout length, head length, neck length, ear length, leg length, tail length, body height, chest girth, circumference of neck, body circumference and body weight. The data collected were analyzed using descriptive and student T-test statistics of Statistical Analysis System (2003). The predominant coat colour of indigenous pig is black, erect ear, long-straight snout and straight tail with 5 pairs of teats.The mean values of each of the body parameters showed greater variations and these variations could be employed for further genetic improvement. Sexual dimorphism favoured the female pigs except head length, snout length, neck length and leg length which were not significantly different ($P > 0.05$). With this diverse body morphometric, the local pigs can be exploited for genetic improvement and breed standardization.

KEYWORDS: qualitative, quantitative, body morphometric, local pigs, humid

INTRODUCTION

The intake of protein in Nigeria stands at 3.5g/caput/day (Ironkwe and Amefule, 2008) and this is far less than the 35g caput/day recommended by the World Health Organisation. This shortage of animal protein consumption is partly due to the high cost of conventional meat sources like cattle, goat, sheep (Tewe, 1999). It is therefore necessary to search for a cheaper alternative source of meat to meet the ever increasing demand for animal protein.

The indigenous pigs have been recommended as a good alternative source of cheap, high quality animal protein that suits escalating human population. They have relatively low cost of production and their growth rate is fast (Osaro, 1995).They also have short generation interval, high production potential, high prolificacy and high carcass yield. They adapt easily to environmental condition (ILCA, 1992). They are good converter of food waste to valuable products. Their annual growth rate (3.8%) is higher than that of the human population (2.30-2.80%) (Ironkwe and Amefule, 2008). The average mature body weights for male and female indigenous pigs are 15kg and 23kg respectively and the common coat colours are white with black patches, black, white and white/black. They have short erect ears, curled or straight tail and straight or long face.

However, there have been great concerns in recent declining in the number of indigenous pigs of Nigeria and this could be attributed to the development of villages into towns, dirtiness and destructive habits. These unwholesome habits had made many people to regard them as nuisance in the community and their survival is left in the hands of the rural populace.

In view of the global concern regarding the disappearance of indigenous or local animal genetic resources and the need to promote the indigenous animals, there is need to establish breed standards for indigenous pigs under the small scale holders so as to serve as baseline information for further genetic improvement.

Description of the study area

The study was conducted in Iseyin Local Government area of Oyo State, Nigeria. The area is located in the South Western part of Nigeria and lies on Latitude $7^{0}57^{1}$ N and Longitude $3^{0}35^{1}$E with the altitude ranging from

50-200 metres above the sea level. The climatic condition of this area is tropical wet and dry with average annual rainfall ranging between 905mm and 1063mm.

Animals and their Management

The study involved the local or indigenous pigs. The management system adopted in the study area is purely extensive system where the pigs were left to scavenge and come back at night to the owner's compound. Locally available feed materials used for feeding them occasionally include, kitchen waste, cassava tubers and peels, fruits such as mango and pawpaw. There is no water provision either for drinking or wallowing and little or minimum shelter is often provided at night.

Two hundred and ninety local pigs (158 adults, 132 growers) were assessed for both qualitative and quantitative phenotypic measurements. Data collected on the qualitative characters include coat colour, tail type, snout type, ear type and teats pairs using visual appraisal. Data on quantitative characters which include, body length, snout length, head length, neck length, ear length, leg length, hair length, tail length, body height, chest girth, circumference of neck, body circumference and body weight were collected with the use of Tailors' measuring tape (cm) and hanging scale calibrated up to 100kg. The description of the quantitative measurements is as follows;

Body length: measured as a distance from the shoulder girdle to the anus, Snout length:measured as a distance from nostril to the nose bridge, Head length: measured as a distance from the snout to the skull end, Neck length: measured as a distance from the skull end to the shoulder girdle, Ear length: measured as a distance from the base of ear to the tip, Leg length: measured as a distance from elbow to the toes, Tail length: measured as a distance from the beginning of tail anus region to the tip of the tail, Body height: measured as a distancefrom shoulder to the toewhile standing on the flat surface, Hoof height:measured as adistance from the beginning of hoof to the toe, Chest girth: measured as the width of the chest, Neck circumference: Thewidthoftheneck, Body circumference: Thewidthofthebody, Body weight: Thewas taken by the use of hanging scale suspended on a branch of tree.

Data collectedon phenotypic assessments were analyzed using the descriptive and Student-T test statistics of Statistical Analysis System (2003).

RESULTS AND DISCUSSION

The frequencies and percentages of qualitative charactersare as shown in Table 1. The study revealed thatblack was the most common coat colour of indigenous pigs. This agrees with the findings of Subalini*et al.*(2010) and Blench (2000). It also agrees with the previous findings of Ravindran*et al*. (1984) and Pathiraja (1986). However, it disagrees with the studies of Nsoso*et al.* (2004), Mbaga*et al.* (2005) and Agricultural Research Council (2010), that indigenous pigs of Africa are usually white in coat colour. The presence of multi-coloured coats is an indication that the local pigs are still under natural selection and no conscious effort has been directed towards the choice of colour.It was observed that most of the indigenous pigs in the studied areas had skin pigmentation, that is, the colour of the coat is usually the colour of the skin. Although, this could bea negative characteristicbecause majority of the consumersoften show low preference for meat with dark pigmentation (Subalini, *et al*., 2010).

Greater number of pigs had long and straight snout type (88%). The long and straight snout in local pigs had been reported earlier (Adebambo, 1994; Blench, 2000; Mbaga*et al*., 2005; Ademola*et al*., 2009).The present study had revealed two ear types, erect and droppy, however, short erect ears predominate (77%). The length of the ears varies between 7 – 14cm while the orientation could be either upward or horizontal. A previous study of Sahaayaruban*et al.* (1983) had reported indigenous pigs with short erect ears pointed backwards.

Curled and straight tail types were observed amongstthe indigenouspigs; however, 55% had straight tails. The curled tails were generally thin and showed an upward curl forming a circle related to previous studies of Subalini*et al.*(2010) in Sri-Lankan indigenous pigs.

Variation in number of teats among male and female pigs is one of the criterions widely used in morphological diversity studies. In the present study, the number of teats possessed by the indigenous pig ranged between 4 - 6 pair and 5 pairs were observed to be most common (68%). The observation of 4-6 pair of teats as recorded in

this study though agreed with literatures (Mbaga*et al*., 2005) but it is at variance with the findings of 6-7 pair of teats in village pigs of Sri-Lanka (Subalini*et al.*, 2010).

Table 1: The frequencies and percentages of qualitative characters of indigenous pigs in Ogbomoso

Parameters	observation	Frequency	Percentage
COAT COLOUR:			
White	290	30.00	25.00
Black	290	78.00	65.00
White/Black	290	12.00	10.00
TAIL TYPE:			
Curled	290	54.00	45.00
Straight	290	66.00	55.00
EAR TYPE:			
Droopy	290	28.00	23.00
Erect	290	92.00	77.00
SNOUT TYPE:			
Long and straight	290	106.00	88.00
Medium and straight	290	14.00	11.70
NUMBER OF TEAT PAIR:			
4	250	20.0	16.7
5	250	82.00	68.00
6	250	18.00	15.00

Table 2and 3 revealed the mean and variances of body morphometric indigenous boars and sows; and young boars and gilts in Ogbomoso, Nigeria. Generally, the variances calculated for each of the body morphometric showed that there were existences of greater variations in each of the body parameters and summing up that our local pigs are still under the influence of traditional population and no conscious efforts has been directed towards the choice of any particular trait. The body morphometrics that showed greater variations were the body length, tail length, body height, body circumference, neck circumference, neck girth and body weight. Apart from the tail, all other traits are of economic value and the variations therein could be exploited by animal breeders for further genetic improvement and higher profitability in the long run. Generally, the mean values of body parameters were slightly higher in sows than boars, however, it was other way round in the young boars and gilts.

Table 2: Body morphometric of Adults indigenous boars and sows in ogbomoso, Nigeria

BOAR				SOW		
Parameters	Obs	Mean	Variance	Obs	Mean	Variance
Head length(cm)		21.98	0.91	119	23.62	6.47
Snout length(cm)		13.70	2.18	119	14.63	7.10
Ear length(cm)		11.40	1.24	119	12.37	1.44
Body length(cm)		87.76	69.42	119	102.32	155.28
Tail length(cm)		15.18	11.83	119	21.57	20.23
Neck length(cm)		10.30	2.91	119	10.66	2.19
Leg length(cm)		28.88	2.68	119	29.15	4.75
Body height(cm)		49.26	25.40	119	51.52	54.29
Body circumference		65.50	17.61	119	81.97	74.13
neck circumference		42.02	48.51	119	57.55	48.16
teat pairs(cm)		5.20	0.16	119	5.12	0.36
chest girth(cm)		8.60	2.78	119	12.95	19.19
hoof height(cm)		2.90	0.42	119	3.76	0.99
body girth(cm)		28.94	0.39	119	34.60	6.85
body weight(kg)		42.80	12.16	119	40.00	51.31

Table 3: Body morphometric of indigenous growing pigs in Ogbomoso, Nigeria

Young female				Young male		
Parameters	Obs	Mean	Variance	Obs	Mean	Variance
Head length(cm)	74	17.65	4.29	58	19.46	1.28
Snout length(cm)	74	10.05	1.16	58	12.40	1.57
Ear length(cm)	74	9.08	1.16	58	9.13	3.76
Body length(cm)	74	73.68	0.63	58	77.06	62.02
Tail length(cm)	74	14.95	36.64	58	14.83	0.15
Neck length(cm)	74	8.18	0.86	58	8.23	2.61
Leg length(cm)	74	22.43	1.12	58	22.36	4.27
Body height(cm)	74	41.85	7.66	58	38.53	44.89
Body circumference	74	64.28	4.89	58	60.16	7.00
Neck circumference	74	38.63	3.22	58	40.23	9.49
chest girth(cm)	74	8.00	0.81	58	8.33	3.29
hoof height(cm)	74	2.95	0.34	58	3.40	0.19
body girth(cm)	74	27.30	7.46	58	26.13	3.11
body weight(kg)	74	24.25	2.28	58	26.33	1.65

The sex effect on the pooled estimates of body parameters (Table 3) revealed that there were sexual dimorphisms in favour of female pigs generally except head length, snout length, neck length and leg length. Pathiraja (1986) reported higherbodyweight in adult females pigs than male in their investigation of a cross breeding program between village pigs and exotic pigs under intensive management conditions.However, Sudhakar and Gaur (2006) did not record any significant sex effect on any of the body measurements in Indian indigenous pigsexcept weight at birth. Although the present findings revealed higher body parameters in the female pigs however, this could not be unconnected with the fewer number of male pigs measured. It was observed that male pigs were hardly left after six months, they were either sold or slaughtered for consumption. The values of body weight in the present findings are within the range reported by Adebambo (1982) in the Nigerian indigenous pigs and Subalini*et al* (2010) in Sri Lankan indigenous pigs.It appears that the ability to survive under the harsh conditions could be linked to evolutionary adaptation to a low input production environment, hence the smaller size (Lekule and Kyvsgaard, 2003).

Table 4: Pooled estimates of mean body morphometric of indigenous pigs (male & female) based on sex in Ogbomoso, Nigeria

Parameters	obs	Male	Female
Head length(cm)	220	21.04±0.02	21.63±0.03
Snout length(cm)	220	13.21±0.18	13.10±0.08
Ear length(cm)	220	10.55^{b}±0.05	11.28^{a}±0.05
Body length(cm)	220	83.75^{b}±0.30	92.78^{a}±0.20
Tail length(cm)	220	15.05^{b}±0.40	19.37^{a}±0.40
Neck length(cm)	220	9.53±0.45	9.83±0.24
Leg length(cm)	220	26.44±0.55	26.91±0.15
Body height(cm)	220	45.24^{b}±0.03	48.30^{a}±0.03
Body circumference(cm)	220	63.50^{b}±0.60	76.08^{a}±0.50
neck circumference(cm)	220	41.35^{b}±0.50	51.24^{a}±0.30
chest girth(cm)	220	8.50^{b}±0.06	11.30^{a}±0.50
hoof height(cm)	220	3.09^{b}±0.01	3.49^{a}±0.01
body girth(cm)	220	27.89^{b}±0.10	32.17^{a}±0.20
body weight(kg)	220	15.00^{b}±0.50	23.42^{a}±0.30

Mean values within the same row carrying different superscript are significantly different ($P < 0.05$).

CONCLUSION

There is the potential to develop the indigenous breed to contribute significantly to the indigenous pig industry based on the positive qualities of the breeds and in view of the breed going into extinction. Though the native pigs are of little value for commercial pork production, they will remain valuable as sources of meat and secondary income to the rural household economy, the hardiness and adaptability to harsh management conditions seem to compensate for their low productivity.Therefore, exploiting these potentials will add value to the pigindustry and hence their conservation.

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