

Full Length Research Paper

Genetic resources of sheep and goat populations in Southern parts of Kaduna State, Nigeria

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A study was carried out in eight local government areas of the Southern senatorial zone of Kaduna state to characterize adult sheep and goats. A total of 400 sheep and 800 goats were used. Two sheep breeds (Uda and Yankasa) were identified in the area; Most of the sheep were Yankasa (spotted black), above 3 years old and did not have beards or wattles. Goats could not be distinguished into distinct breeds, but classified according to colour and size. There were however some indications of some progeny being to closer Red Sokoto and other, to West African Dwarf (WAD). While Yankasa (spotted black) sheep appeared to be the dominant (96.24%) breed reared in the study area, the brown goat was mostly dominant in Jaba, (49%), Jema'a (46%) and Kachia (53%) locations. Similarly, 96.75% of Goats had neither beards, wattles or manes (normal), while only 5.375 and 1.625% had beards or manes respectively. Since Yankasa sheep and, black and brown goats were higher in number, it is recommended that the Yankasa, and the black and brown goats should be preferred for rearing in the study area.

Key words: Goat, Kaduna State, Nigeria, phenotypic distribution, sheep.

INTRODUCTION

Sheep are important domestic animals on which farmers in the tropics depend for their livelihood. A study in Zaria (Gefu, 2002) revealed that 80% of respondents kept poultry, goats and sheep primarily to meet immediate household needs and also to supplement family income. Although small ruminant species are widely distributed, sheep remain neglected resources (Devendra and McLeroy, 1982) and the important role of this species in tropical agriculture is inadequately understood (Wilson, 1983).

The sheep is the fourth oldest domestic animal after the

dog, cow and pig. Sheep belong to the Sub-Family Bovidae. The genus *Ovis* includes all sheep, while domesticated sheep belong to the species *Ovis aries*. Their original centre of domestication seems to be the Arlo Caspian steppes, including the area occupied by present day Iran and Iraq (McLeroy, 1961).

Livestock species tend to be distributed according to vegetation and agro-climatic zones. The semi-desert is the camel zone. Cattle are found in the semi-arid, while the sub-humid is the sheep/goat zone In Nigeria; livestock distribution follows the more conventional divisions of *masseur*

- The breeding area in the north; *engresseur*
- The fattening area in the middle belt, and *consomatteur*

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- The consumption area mostly in the south.

These divisions coincide roughly with the Sudan, Guinea and forest vegetation zones respectively (Iro, 2006). The study aims at identifying the genetic resources of sheep and goat populations in the study area for possible improvement/preservation through recommendation of sheep and goat species that thrive best in the study area.

The study intends to find out the phenotypic distribution of sheep and goats breeds/types across the Southern Senatorial zone of Kaduna State and to determine the most discriminating phenotypic parameters among sheep and goats populations across the different local government areas.

STUDY AREA

The study was conducted in the southern parts of Kaduna state. Kaduna state occupies almost the entire mid-central portion of Northern Nigeria and shares boundaries with Zamfara, Katsina, Niger, Kano, Bauchi, Nasarawa, Plateau states and the Federal Capital Territory (FCT). It is located between latitudes 9° 03' and 11° 03'N, longitudes 6° 5' and 8° 38'E. The southern part of Kaduna state, which is bordered by Niger, FCT, Nasarawa and Plateau states lies between 9° 3' and 10°N, longitudes 7 and 8° 38'E (SYB, 2006).

The study area enjoys a wet season from April to October with an average annual rainfall of about 1524 mm while the months of November to March, and sometimes up to early May (when rains are late) marks the dry season. Temperatures range between 24 and 34.3°C with a relative humidity of 55% in the dry and 90% in the rainy season (SYB, 2006). The vegetation in the area is tropical grassland while the remaining part of the state is mostly guinea savannah with tree species such as *Parkia clappatomania*, *Gmelina arborea*, *Acacia* spp., *Tamarix parviflora*, etc. Grass species include *Andropogon gayanus*, *Panicum maximum*, *Pennisetum pedicellatum*, *Axonopus compressus*. A variety of shrub and herb species including *Amaranthus spinosa*, *Ceanothus pervifolias*, *Hibiscus cannibinus*, *Ipomea* spp., *Glycine max*, *Cajanus cajans*, *Manihot utilisima*, are also found (Mecha and Adegbola, 1980). Browse plants include *Balanitesa egyptica*, *Leucaena leucocephala*, *Gmelina arborea*, *Vermonia* spp., *Khaya senegalensis*, *Mangifera indica*, (Saleem et al., 1979). Activities such as overgrazing, bush burning, over cropping and tree felling for firewood have modified the vegetation to its present grassland status.

Sampling technique and sample size

Data were collected randomly on 50 sheep and 100

goats between January, 2010 and June, 2011 in major markets from each of the 8 locations: Jaba, Jema'a, Kachia, Kagarko, Kaura, Kauru, Sanga and Zango in the study area. Sex, coat colour, dental arrangement and horn type were also observed.

Prior to taking the measurements, the animals were identified in each location on the basis of species, breed/strain, coat colour, sex and age. Ages of animals were provided by the farmers and verified using dentition method (Sastry and Thomas, 1980). Three age groups recognized were < 2.5, 2.5 - 3 and > 3 years

Statistical analysis

The data was analyzed using descriptive statistics and

$$\text{Chi-Square } \frac{(O - E)^2}{E}$$

RESULTS AND DISCUSSION

Sheep distribution by some observed factors

Table 1 shows the distribution of sheep by breed, age sex and beards/wattles/manes. Yankasa (spotted black) were the most ($p < 0.001$) dominant (96.24%) breed reared in the study area followed by Uda (black and brown) sheep (1.5%); The Yankasa (spotted brown) was lowest in number (0.75%). Sheep above 3 years of age were more in number (60.75%; $p < 0.001$) than those between the ages of 2.5 and 3 years (22.75%) and below 2.5 years of age (16.5%). In terms of sex, males accounted for 50.75% of the sheep population while females made up the remaining 49.25%, but the difference was not significant. Most of the sheep in the study area had neither beards, wattles nor manes that is normal. Sheep with a combination of beard, wattle or mane were significantly ($p < 0.001$) more than those with wattle (5.25%), mane (4.5%) or beard (2.25%).

Sheep distributions by type/breed and location are shown on Table 2. Yankasa (spotted black) were more in number across all the locations studied. There were few Yankasa (spotted brown), Uda (brown) and Uda (black).

Table 3 shows the distribution of goats by age and other parameters. There was a high number of brown goats (40.125%) in the study area, followed by black coat coloured ones (38%); with black/white and brown spotted white coat coloured ones being the least in number (4% each).

Goats above 3 years of age (58.125) constituted the highest number available for the study, followed by other age groups. There was also a significant difference ($p < 0.05$) in the sex ratio with female goats accounting for 58.125% of the population. 89.25% of goats in the study area had either beards or wattles, only 5.375 had beards and 1.625% had wattles. The dominant ear type among the goats was the erect type (96.75%).

Table 1. Sheep distribution by some observed factors.

Category			
Breed/Type	Number	%	X²
Yankasa (spotted black)	385	96.25	1083.06***
Yankasa (spotted brown)	3	0.75	
Uda (brown)	6	1.5	
Uda (black)	6	1.5	
	400	100	
Age			
< 2.5 years	66	16.5	139.65***
2.5 – 3 years	91	22.75	
>3 years	243	60.75	
	400	100	
Sex			
Males	203	50.75	0.09ns
Females	197	49.25	
	400	100	
Beards /wattles/manes			
Normal	352	88	847.5***
Beards	9	2.25	
Wattles	21	5.25	
Manes	18	4.5	
	400	100	

ns = not significant; *** = Significant at 0.001. Source: Field survey, 2010.

Table 2. Sheep and Goat distribution by type/breed and location.

Type	Location	Jaba	Jemaa	Kachia	Kagargo	Kaura	Kauru	Sanga	Zango	X²	
Sheep											
Yankasa (black)		50	47	47	47	50	50	50	44	274.76***	
Yankasa (brown)		--	--	2	1	--	--	--	--		
Uda (brown)		--	2	--	--	--	--	--	4		
Uda (black)		--	1	1	2	--	--	--	2		
		50	50	50	50	50	50	50	50		
Goats											
Black		33	33	14	37	50	36	52	39		
Brown		49	46	53	30	29	45	29	42		
Dark brown		--	14	5	12	--	--	1	--		
Light brown		9	--	9	--	10	6	2	5		
Ash		7	3	17	5	7	8	6	6		
Brown spotted white		--	--	--	4	--	--	--	--		
White brown		--	--	--	8	--	--	--	--		
White black		--	3	--	3	--	5	10	--		
White		--	--	2	1	3	--	--	--		
Black white		2	1	--	1	1	--	--	--		
Total		100	100	100	100	100	100	100	100		

Source: Field survey, 2010.

Table 3. Goats distribution by some observed factors.

Breed/Type	Number	%	X²
Black	304	38	
Brown	321	40.125	
D/brown	32	4	
L/brown	41	5.125	
Ash	59	7.75	
Brown spotted white	4	0.5	1074.2***
White/brown	8	1	
White/black	21	2.265	
White	6	0.75	
Black/white	4	0.5	
	800	100	
Age			
<2.5 years	174	21.75	
2.5 – 3 years	161	20.125	221.58***
>3 years	465	58.125	
	800	100	
Sex			
Males	325	40.625	
Females	475	59.375	28.125***
	800	100	
Beards/wattles/Manes			
Normal	744	93.00	
Beards	43	5.375	1179.29***
Manes	13	1.625	
	800	100	
Ear Type			
Erect	774	96.75	
Floppy	26	3.25	699.38***
	800	100	

ns = not significant *** = Significant at 0.001. Source: Field survey, 2010.

The Yankasa (spotted black) is the dominant breed (96.25%) reared in the area. Sheep above 3 years old (60.75%) were more in number, but there was no significant variation in number according to sexes. Like with goats, normal sheep (with no beards, wattles or manes) were more in number (88%).

Goat distribution by some observed factors

Table 3 shows the distribution of goats by some observed factors. There was significant ($p < 0.001$) variation in number of goats by type with the brown being commonest (40.125%), followed by the black type (38%). The brown spotted white (0.5%) and the black/white (0.5% each) were the least in number, followed by the

white type (0.75%). Goats aged 3 years and older were significantly ($p < 0.001$) higher (58.128%) in number than those below 2.5 years (21.75%) and 2.5 - 3 years (20.125%). There was similarly significant ($p < 0.001$) difference in sex ratio, with female goats accounting for 59.37% of the population and the males, 40.625% out of the 800 goats studied.

Table 3 also shows the distribution of goats according to beards, manes and ear type. Most goats (93%) had neither beards, wattles nor manes (normal) while only 5.375% and 1.625% had beards and manes respectively. The presence of beards and wattles in this study appeared to be mutually exclusive as there was not a single case of both traits on one goat. The dominant ear type among goats studied was the erect type (96.75%), with the floppy type accounting for only 3.25% of the goat

population.

Kachia (53%), Jaba (49%), Kauru (45%) and Jemaa (46%) had more brown goats than other locations, while Sanga (52%) and Kaura (50%) had a higher black population of goats, as shown on Table 2. Other goat types, like the dark brown, light brown; ash were spread sparsely across the study locations.

Sheep distribution by some observed factors

A breed may be defined as a group or population of animals so linked by ancestry that their primary identifying characteristics are generally passed from parents to offspring in a uniform manner (Devendra and McLeroy, 1982). There are four main breeds of sheep in Nigeria. These are the West African Dwarf, Yankasa, Uda and Balami. The Yankasa (spotted black) breed was dominant in the study area and spread across all locations. This is supported by the reports of Phillips (1977) and Osinowo et al. (1985), who observed that the Yankasa sheep was the most numerous and most widely distributed of the Nigerian breeds and is found throughout the Guinea and Sudan Savannah zones. The Uda, which constituted 1.5% of sheep in the study area were reported by Oni (2002) to be dominant in North Western Nigeria with its crosses found in the north East and Central Nigeria. The Yankasa (spotted brown) are likely to be crosses as brown colour is not their typical description. It is well known that multicolour among animals is a sign of crossbreeding.

Goat distribution by some observed factors

The brown goats followed by the black were dominant in the study area. The brown goats could be the transitional type of Red Sokoto and breeding with the WAD type, could probably have given rise to the second highest type (black), which might have been pure WAD and crosses. Mecha (1975) reported that there was high unrestricted mating between breeds in northern Nigeria.

Goats contribute 24% of Nigeria's meat supply and feature prominently in its economy as a quick source of cash to farmers (Adu and Ngere, 1979). This perhaps explains why adult goats aged 3 years and older are normally sold off were significantly higher than other age groups in the study. Female goats were more dominant, possibly due to the fact that most males not needed for breeding were culled from the herd before they attained sexual maturity. This is in agreement with Oseni and Ajayi (2008) who attributed it to early disposal of males from the flock for slaughter/sale.

That Kachia, Jaba and Jema'a had more brown goats confirms the downward flow of the Red Sokoto (brown) from the Northern parts of the state towards the south. Kachia is northmost along the commercial route linking

the study area to the northern parts of the state. The dominance of the black goat in Sanga, and Kaura is equally likely as a result of the influx of the WAD goats from the southern parts into the study location. Lakpini (2002) observed that the central states of Nigeria have a mixture of Northern and Southern types of goats.

Conclusion

Two sheep breeds (Uda and Yankasa) were identified in the area, but goats could not be distinguished into distinct breeds, but classified according to colour and size. There were however some indications of some progeny being to closer Red Sokoto and other, to WAD. The black and brown goat type and the Yankasa breed of sheep were however significantly higher than other types in population. The sheep and goat population in the study area was made up of mostly adults (58.24% goats and 60.75%, sheep) above 3 years of age. The proportion of bearded and maned sheep and goats in the location were about equal, however wattles were only found among goats.

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