Herd structure and incidence of supernumerary teats and wattles in smallholder goat production in Plateau State

Abstract

The study has the objectives of determining the incidences of supernumerary teat and wattles in goat and the relationship between the two traits. The survey was conducted with 104 farmers having 948 goats. Attributes measured were herd, herd size, male, female, coat colour, long hair back, long hair at the thigh, long hair back and thigh region, udder pigmentation, beard, dam, tassel, farmer's experiences on supernumerary teat, and tassel. Data were analysed using descriptive statistics and correlation in J.M.P genomics software. The relationship between pattern of inheritance was also determine with 83 (43.45 %) of the dams that had supernumerary teat having the chance of transferring it to their offspring and 78 that had tassel having 45.3 % chance of transferring it to their offspring. Based on the result obtained on tassel it shows that out of 78 that have tassel it have 45.3 % chances of transferring it to their offspring.

Keywords: Teats, wattles, herd, goats, supernumerary

Introduction

The goat population in Africa was projected to be 171 million in 1990 by the FAO, with 22 million in Nigeria. However, according to a recent livestock census, Nigeria's goat population is estimated to be 34.5 million (Rim, 1991). The value connected to goat production determines whether or not goats are kept in any given culture. Goats are mostly raised for meat (Williamson and Payne, 1978). According to Brinkmann and Adu (1977), goat meat accounts for around 20% of all meat consumed in Nigeria. Because goats murdered in rural regions are rarely reported, this is most likely an underestimation. In the Nigerian sub-humid zone, almost 85% of small-scale farmers keep West African dwarf goats (Bayer, 1986). Tethering or free range grazing on fenced natural pasture are two traditional techniques of raising goats during the rainy season. While limiting movement may help to prevent crop damage. It helps to alleviate feed stress. Farmers are attracted to the introduction of herbaceous legumes into enclosed fallow land because it alleviates the feed shortage during the wet season. At the same time, it helps to repair or increase soil fertility for following cropping by fixing nitrogen from the environment. Furthermore, goats contribute significantly to the well-being of smallholder arable farmers in Nigeria due to the cash gained when they are sold. The global community is concerned about reducing poverty and improving the well-being of the rural poor. Goat farming could benefit farmers, particularly women, who own the majority of goats and are tasked with the care of small ruminants, along with their children. The production of small ruminants (sheep and goats) is increasing. Goats can also be used for research purposes. Other advantages include their low cost, low risk of total loss and high reproductive rates (Ngetegize, 1989; peacock, 1995). According to breed standard colour trait (red in Angus cattle, body spots in ,many horse breeds such exclusion can also be for physical traits such is a split scrotum in many goat and sheep breeds, or polledness or horns in many breeds of several species. Other breeds fault other traits considered by the association to be defects such as supernumerary teats in goats. This is a huge issue with dairy goats, but a

minor case in meat or other goats. Wattles on dairy goats are essentially hair-covered appendages of flesh dangling from the goat's throat area, according to those who have attempted to characterize them. Wattles are sometimes termed "bell" or "skin tag" and are most typically present in dairy cross boers and dairy goats, according to material on the triple goats website. A goat can have one or two wattles. They have no function and are thought to be a "leftover" genetic characteristic from evolution. Gall (1980), who studied the association between body conformation and milk production in dairy goats, concluded that wattles on dairy goats suggest strong milk production capacity. Similarly, horned animals or goats without wattles are more productive than heterozygous polled animals or goats with wattles. The ability to recognize the hereditary defect in herds requires a thorough understanding of supernumerary teat and wattle.

Materials and Methods

Location

The study was carried out from August 2010 to December 2010 in plateau central area of Nigeria. Plateau state covers a total area of 26,224.14 km^2. The state is located in the middle belt zone of the country. It lies between latitudes 8^0 and 10^0 North and longitudes 7^0 and 11^0 East. Though situated in tropical zone, the climate of the state is the nearest equivalent of temperate climate. There are two seasons viz the rainy season, lasting from April through October and dry season spanning from the month of November to March. Mean temperature of 10^0 C and maximum of 30^0 C, while mean rainfall varies between 13175.5 mm in the southern part and 1460.0 mm on the high plateau.

Animals and their Management

Animals were allowed to graze on nearby natural pastures, and grasses taken from crop fields and tree bushes were occasionally provided. Crop wastes are also used as supplemental feed during the post-harvest and extended dry seasons. The goats were kept in little mud houses with thatched or metal roofs at night.

Data Collection

A diagnostic survey was carried out from August to December, 2010 in order to characterize the goats of central plateau. The goats were identified according to breed, coat colour, supernumerary teat, long hair at the back, and around the thigh region, udder pigmentation, breed and tassel. Herd size, number of females per herd and where possible dams of goats were also identified. Individual farmers' experiences on supernumerary teat and tassel were also ascertained.

Data Analysis

Animals were allowed to graze on nearby natural pastures, and grasses taken from crop fields and tree bushes were occasionally provided. Crop wastes are also used as supplemental feed during the post-harvest and extended dry seasons. The goats were kept in little mud houses with thatched or metal roofs at night.

RESULTS AND DISCUSSION

The descriptive statistics of goat herds in plateau state is presented in table 1. The average herd size, male, female, supernumerary teat, normal hair, long hair at the back, long hair at the thigh region, long hair at the thigh and back, beard and tassel were 9.125; 4.106, 5.038, 1.587; 3.904, 4.490, 4.471, 3.865, 2.067 and 3.462 respectively. Table 2 showed that there were more female (54.96 %) in the herds than males (45.04 %). Incidence of supernumerary teat was 31.67 %. Majority of the goats were either having normal hairs (43.04 %) or had long hairs at the back and thigh (42.72 %). Few goats had long hairs only at the back (7.17 %) or at the thigh region (7.7 %). Beard goat in both sexes was (22.89 %) and tassel presence was (37.45 %). Coat colour attributes in the goats were black brown and white have (17.83 %), tan (2.64 %), brown (9.28 %) black and white (20.68 %), black and brown (43.48 %), black (9.28 %), white (1.88 %) and brown and white (4.11 %).

Table 1: Descriptive statistics of goat herds in plateau central

Attributes	N	Means ± SE	CV (%)	minimum	maximum
Herd size	104	9.125±0.31	33.93	2.0	20.0
Males	104	4.106±0.18	42.65	0.0	9.0
Females	104	5.038±0.21	42.38	1.0	12.0
Supernumerary teat	104	1.587±0.15	91.53	0.0	5.0
normal hair	104	3.904±0.27	68.80	0.0	12.0
long hair at back	104	4.490±0.25	56.97	0.0	12.0
Long hair at thigh	104	4.471±0.26	58.55	0.0	12.0
long hair at the thigh and back	104	3.865±0.26	66.38	0.0	12.0
Beard	104	2.067±0.19	91.25	0.0	7.0
Tassel	104	3.462±0.24	69.83	0.0	9.0

N: Number of data set; SE-Standard error; CV-Coefficient of variation

Table 2: The distribution of goats according to sex, supernumerary teat, long hair back, long hair at the thigh region, beard, tassel and coat colour.

Attribute	Observed	Frequency %
Sex:		
Male	427	45.04
Female	521	54.96
Supernumerary teat (female only)		
Present	165	37.67
Absent	356	68.33
Hair type		
Normal hair	408	43.04
Long hair back	68	7.17
Long hair thigh	67	7.07
Long hair back and thigh	405	42.72
Beard		
Present	217	22.87

Absent	731	77.11
Tassel		
Present	355	37.45
Absent	593	62.55
Coat colour		
Black, brown and white	169	17.83
Tan	25	2.64
Brown	88	9.28
Black and white	196	20.68
Black and brown	325	34.48
Black	88	9.28
White	18	1.88
Brown and white	39	4.11

Positioning of supernumerary teat in goat of plateau according to location

Table 3 shows the positioning teat in the goat studied. The positioning of supernumerary teat showed that in majority of the does that possessed it either unilaterally of the left teat 77 (46.67 %) or bilaterally 47(28.48 %) while those that possessed it on the right side are the least 41 (24.85 %), equally the distribution of supernumerary teat shows that Bokkos has the highest number 38, Kanke has 37 number of does having supernumerary teat, Kanam 32 number of does that have it, Mangu 31 does that have it, and Pankshin has the least.

Table 3: Positioning of supernumerary teat in goat of plateau central according to location

location	Number	Right observed	%	Left observed	%	Right and left observed	%
Mangu	31	8	25.08	12	38.71	11	35.48
Pankshin	27	9	33.33	13	48.14	5	18.51
Kanke	37	12	35.13	18	48.65	6	16.22
Bokkos	38	8	21.05	20	52.63	10	26.31
Kanam	32	3	9.37	14	43.75	15	46.87

Incidence of Long Hair, Udder Pigmentation, Beard and Tassel in Does of Plateau Central

Table 4: shows that incidence of long hair, udder pigmentation, beard and tassel. The resul;t showed that (7.49), 6.72), (41.8) and (43.95) of the goats had long hairs at the back, thigh, back and thigh and absent, respectively. Majority of the does had no udder pigmentation (52.78 %). However, the does that had their udder pigmented the pigmentation was majority black (65.45 %); others were black and brown (15.05 %)

and brown (19.51 %). Beardness in the does was only (12.48 %) with majority being non-beard (87.52 %). Incidence of tassel in the does was (36.07 %).

The correlated relationship between supernumerary teat, long hair, tassel and beard is presented in Table 5. Normal hair was significantly and positively correlated with long hairs at the back was significantly and positively correlated with beard and tassel in the does (P< 0;01; r= 0.42- 0.43). long hairs at the back was significantly and positively correlated with long hair at the thigh region, long hair at both back and both back and thigh region and presence of tassel (p<0.01; r=0.48- 0.86). Supernumerary teat was positively and significantly correlated with long hairs at the back and long hairs at both the back and thigh region (p<0.05; r=0.30-0.31); but no- significantly and negatively correlation correlated with beard (p<0.05; r=0.05).

Table 4: Incidence of long hair, udder pigmentation, beard and tassel; in Does of plateau central

	Observation	%
Long hair back	39	7.49
Thigh	35	6.72
Back and thigh	218	41.84
Absent	229	43.95
Udder pigmentation		
present	246	47.22
Absent	275	52.78
black	161	65.45
Black and brown	37	15.04
Brown	48	19.51
Beard		
Present	65	12.48
Absent	456	87.52
Tassel		
Present	188	36.00
Absent	333	64.00

Expression Pattern of Supernumerary Teat, Long Hair, Udder Pigmentation, Beard and Tassel among Dams and their Offspring

Table 6: indicates percentage expressivity of dam qualities and their offspring's. Dams with supernumerary teat had about (43.45 %) of offspring's born to long haired dams had long hairs. For udder pigmentation, beard and tassel, (36.03 %), (29.32 %) and (45.30 %), respectively of offspring's of dams possessing them expressed those qualities.

Table 5: Relationship between supernumerary teats, long hair at back, long hair thigh, long hair at the back and thigh and beard

Hs	M	F	ST	NH	LHB	LHT	LHTB	B	T
Herd size (HS)	0.723**	0.846**	0.432**	0.576**	0.638**	0.602**	0.500**	0.507**	0.695**
Male	-	0.256	-	0.467**	0.437**	0.406**	0.321*	0.512**	0.571**
Female		-	0.440**	0.449**	0.569**	0.538**	0.459**	0.310*	0.536**
Supernumerary teat (ST)			-	0.263	0.301*	0.287	0.311*	-0.050	0.279
Normal hair (NH)				-	-0.010	-0.092	-0.103	0.425**	0.420**
Long hair at back (LHB)					-	0.858**	0.862**	0.218	0.481**
Long hair at thigh (LHT)						-	0.884**	0.155	0.479**
Long hair at thigh and back (LHTB)							-	0.070	0.409
Beard (B)								-	0.253
Tassel (T)									-

*P<0.05; ** P<0.01- Significant

Table 6: Expression pattern of supernumerary teat, long hair back, udder pigmentation, beard and tassels among dams and their offspring

	N	%
Supernumerary teat	83	43..45
Long hair	122	66.82
Udder pigmentation	112	36.03
Beard	21	29.32
Tassel	78	45.3

Farmers experience on supernumerary teat and tassel in goat of Plateau central.

The experience of farmers on supernumerary teat and tassel in the study area is presented in Table 7. Within the study area, about 60.6 and (62.5 %) of small holder goat farmers do not have experience on the occurrence pattern of supernumerary teat and tassel, respectively in their goat herds. However, the 41 farmers (39.4 %) that indicated having knowledge of the occurrence pattern of supernumerary teat in the herds expressed their opinion as follows: (39.0 %) of them said that if the dams have it the offspring's would equally have it; (24.4 %) said that offspring of dams that have it may not possess it, (9.8 %) indicated that offspring's may have it without their dams having it while (26.8 %) indicated that if dams do not have it their offspring's would not possess it. On the expression of tassel, the 39 experienced farmers (37.5 %) indicated that if present in the dam it would equally be expressed in the offspring (25.6 %); occurrence in the dams does not lead to occurrence in the offspring's (30.8 %); could occur in the offspring's of not possessing dams (20.5 %) and that if it did not occur in the dams the offspring's would not have it (23.1 %).

Table 7: Farmers experience on supernumerary teat and tassel on goat of Plateau central

Characterisation	Supernumerary teat N	%	Tassel N	%
No response	63	60.6	65	62.5
Dams and offspring have it	16	39.0	10	25.6
Dams have it but offspring's don't	10	24.4	12	30.8
Dams don't but offspring does	4	9.8	8	20.5
Dams and offspring's don't have it	11	26.8	9	23.1

Discussion

Goat herd structure

The observed average herd size 0f 9.1 goats who ranged between 2 and 20 is comparable to a herd of 4 to 30 goat reported by Akpa *et al*. (2010) and Nemeth *et al.* (2004). The presence of more female goats in the herds than males equally collaborates the report by Akpa *et al* (2010) on Kano brown goats. The indication that approximately two out of five does in a herd possessed supernumerary teat is moderately high and this may have influence on the production performance of goats. The mean 2.1 and 3.5 beard and tasselled goats per head in plateau central is an indication that every goats approximately 2 and 4 goats would have beard and tassel, respectively.

Incidences of supernumerary Teat, Hair Types, Beard, Tassels and Coat Colour in Goat

The incidence of supernumerary teat of (31.6%) in does in this study was by far higher than (11%) reported for Kano brown goats by Akpa *et al.* (2010) and (15%) for West African Dwarf goats by Oseni *et al.* (2006). However, it is intermediate to the observation of Larsen (1998) who studied 163 does and documented that (75%) of them had supernumerary teat.it had been reported that the presence of supernumerary teat constitute a major source of udder abnormality in WAD in goats (Amao et al., 2003): although it is a common knowledge that the possession of supernumerary teat is related to high fertility and prolificacy. The high incidence of wattle tassel of 37.4 % in these goats could be and evidence of good production potential for them. Wattle had been thought to aid in thermoregulation (Odubote, 1994a); and in dairy goats have been observed to be an indication of good milk production potential. This is possible, judging from this result of this study which indicated that wattle dams had (45.3%) chances transferring it to their offspring. The observation that males predominated the females in beard is in agreement with the report of Lauvergne (1987). The wide variation in coat colour of goats varing from pure and mixtures of white, black, brown and tan is an evidence of the interbreeding nature of the goats herds studied. This is very much evidence in the preponderance of colour mixture of black and brown and white (17.83%). The basics colour of white, tan, brown and black were low in frequency (1.88, 2.64 and 9.28%), this is contrary to the report of Oseni *et al* (2006) who studied 126 goats and recorded that 42(33.33%) black had the highest coat colour. The distribution of goats with normal hair in the goat herds

studied was about (43.04 Vs 42.72%) indicating that the genes controlling hair type in these herds were randomly distributed due to random mating of the goats Rodero *et al*. (1996) had observed that length of hair is determine at one locus with two alleles: HL^2 for long hair and HL^+ for short and latter being dominant. The positive and significant correlation between supernumerary teat and goats that possesses long hair is an indication that this trait is favoured probably by genes controlling long hairs in goats. On the other hand, genes controlling normal (short) hair would favoured normal and beard and tasselled goats in this population under study.

Conclusion

Based on the result obtained out the 165 dams that have supernumerary teat 83 (43.45 %) have the chances of transferring it to their offspring. Based on the result obtained on tassel it shows that out of 78 that have tassel it have 45.3 % chances of transferring it to their offspring. Extension programme on improved method of animal production be extended to the owners. A programmed should be organised for farmers on supernumerary teat and wattle in goats and their managerial approach.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors

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