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Herd Structure of Small-Holder Goat Productions in Otukpo L.G.A. of Benue State, Nigeria

O.M. Momoh* and A. O. Ochaba

Department of Animal Production, University of Agriculture, Makurdi Nigeria.

Target Audience: Researchers, educators, goat producers, animal scientists

Abstract

A study to ascertain the herd structure of small holder goat production systems was conducted in the four (4) districts of Otukpo Local Government Area of Benue state. Thirty five (35) farmers' herds were randomly selected from each of the four districts for the study. The combined use of questionnaires and visits were employed to collect the data on 1,602 goats belonging to 140 herds covered by the study.

Average herd size per farmer- household ranged from 10.4 to 12.5 goats with an overall average of 11.4. Male and female animals constituted 28.5% and 71.6% of the population, respectively. The 3-4 years age-group had the highest proportion of both the breeding bucks and breeding does (42.5% and 45.5%, respectively). Males less than 1 year old constituted 33.5% of the male population while females of the same age group constituted 30.2% of the female population. About 26.2% of the breeding does were in parity 1. This proportion declined with increasing parity with only 5.1% in parity 5. A mating ratio of 1 buck to 3 does was observed. The common criterion for culling was emergency need for money and this represented 40% of the animals leaving the herds.

Key words: Herd structure, goat production, breeding does, breeding bucks, age-group.

Description of Problem

Subsistence animal agriculture is the major contributor to the meat industry in Nigeria. This consists of small herds/flocks found in the rural, urban and peri-urban areas. Any effort to substantially raise the level of meat production in the country must take these farming communities into consideration.

A typical goat herd consist of bucks, breeding does and kids of both sexes with each class belonging to various age-groups. The size of the herd, the age-group structure and breeding status of males and females influence herd productivity. Age structure of males and females in a breeding flock influences annual genetic gain through both selection differential and generation interval (5). The breeding status of the breeding does in a herd affects herd productivity through its effects on litter size. Higher litter sizes are obtained at higher parities for instance.

This study was therefore designed to determine average herd size per farmer-household in the study area, investigate age-group structure, breeding status of the breeding does, and the criteria by which animals are culled from the herd.

* Author for Correspondence

Materials and Methods

The study was conducted in Otukpo Local Government area of Benue State. Otukpo Local Government area is located in the Middle belt area of Nigeria between longitude 7° 45¹ and 8° 00¹ and latitude 7° 15¹ and 7° 30¹ The study covered the four (4) districts making up the local government area namely, Otukpo, Ugboju, Adoka and Akpa.

Thirty-five (35) farmers' herds from each of the four districts were randomly selected giving a total of 140 farmers' herds. A total of 1,602 goats were covered in the study.

Observations were made in terms of size of individual herd, age and sex of various animals encountered and parities and litter sizes of the breeding does through the combined use of structured questionnaires, on-farm visits and interviews with the farmers.

Ages of the animals were recorded as provided by the farmers, and where accuracy was in doubt, they were estimated using the animals' dentition (4).

Animals covered by the study were grouped on the basis of: age, < 1year, 1-2 years, 3-4 years, 5-6 years, 7-8 years >8 years; and parity, 1,2,3,4,5,6, >6. Summary/descriptive statistics (simple averages and percentages) were used to present and analyse data collected. Chi-squared test was used to determine interdependence between age and culling criteria.

Results and Discussion

Table 1 showed the population and distribution of goats in the study area. The average herd size per farmer-household ranged from 10.4 to 12.5 goats with Adoka, Ugoju and Akpa having higher herds sizes in that order than Otupko district. Adoka, Ugboju and Akpa are essentially rural settings compared to Otukpo district which is a bit urban in nature as it is the headquarter of Otukpo Local Government Area. The higher herd sizes for these rural districts compared to Otukpo could be attributed to the fact that Otukpo as an urban district has urban legislative provisions that hinder animal rearing, in addition, the majority of the population are civil servants who only engage in part-time farming.

Table 1: Population land Distribution of Goats in Otukpo LGA: Location/Sex

	Otukpo		Ugboju		Adoka		Akpa		Total
Age(Yrs)	M	F	M	F	M	F	M	F	
<1	41	72	42	102	35	92	35	80	499
1-2	19	40	20	52	21	68	21	53	294
3-4	52	122	49	128	43	150	48	121	713
5-6	6	12	9	12	8	21	8	18	94
7-8	-	1	-	1	-	-	-	-	2
>8	-	-	-	-	-	-	-	-	-
Total	118	247	120	295	107	331	112	272	1602
Total Per Loc.	365		415		438		384		1602
Average Herd Size	10.5		11.9		12.5		11.0		11.4

M=Male F=Female

The overall herd size of 11.4 reported for this study agrees fairly with 12.0 goats per house-hold reported by Ademu (1) in a neighbouring state and 11.0 goats per house-hold reported by Ayoade et al (2) in a neighbouring local government area of the same state.

Table 2 showed the age by sex composition of the animals in the herd as well as buck : doe ratio. Males and females constituted 28.5% and 71.6%, respectively of the population.

The population of the breeding bucks ranged from 6.8% to 42.0% while that of breeding does ranged from 0.2% to 45.5%. The 3-4 years age group had the highest proportion of both breeding bucks and does (42.0% and 45.5% respectively). Males less than 1 year constituted 33.5% while females of that same age group constituted 30.2%.

The proportions of the respective sex decline with increasing age. The population was, therefore observed to be kept young since goats within the

Table 2: Age by Sex Composition of Goat Herds in the Study Area

Age Group (in Years)	Male	% Proportion	Female	%Proportion	Buck:Doe Ratio
<1	153	33.5	346	30.2	N.D*
1-2	81	17.7	213	18.6	1:3
3-4	192	42.0	521	45.5	1:3
5-6	31	6.8	63	5.5	1:2
7-8	-	-	2	0.2	0:2
>8	-	-	-	-	-
Total	457	28.5[a]	1145	71.6[b]	1:3**

*N.D. = Not determined due to under age.
**Average buck:Doe ratio.
a,b % proportion of male and female animals, respectively in the entire population

age of 5 years and above were very few. A young breeding population has the advantage of reducing the generation interval, thereby increasing annual rate of genetic progress. On the other hand, a young breeding herd with few older animals would decrease herd productivity in terms of number of kids born.

The average mating (buck: doe) ratio observed was 1:3. The implication of this mating ratio is that in an uncontrolled mating population (as is common with traditional small-holder goat production system where entire village herds are run as one herd) a high number of bucks to a few does would result to infighting among the bucks over doe(s) on heat. This could lead to injuries and the doe(s) going off heat without being bred, thereby leading to reduced reproductive rates. On the other hand, such a large number of bucks to does in a herd prevents inbreeding build-up and is suitable for the small herd sizes typical of small-holder goat production.

Table 3 showed the status of breeding does with respect to parities. 26.2% of them were in their first parity. Majority of the does were in their 1st, 2nd and 3rd parities, 26.2%, 22.9% and 20.9%, respectively.

Table 3 Status of Breeding Does with respect to Parity:

Breeding Status (Parity)	Number of Breeding Does	% Proportion
1	209	26.2
2	183	22.9
3	167	20.9
4	89	11.1
5	41	5.1
>6	-	-

The proportions of the breeding does decreased with increasing parity. Only 5.1% of the breeding does were found in the 5th parity. Parities 6+ virtually had no breeding does probably due to the culling practices adopted by the herd owners. Removing breeding does from the herd before attaining higher parities of 6 and above may have serious implications or herd productivity, and kid viability.

Increased litter sizes high birth weights and better mothering abilities are demonstrated at these parities (3).

Table 4 showed the criteria by which animals leave the herds. Most herd owners culled their goats as a result of emergency need for money. This represented about 42% of the animals leaving the herds. Old age ranked next and accounted for about 19% of the animals leaving the herds.

Old age is closely linked with sales for money since matured goats command higher prices in the market than young immature animals. Goats between the 3-4 age group were mostly culled. This would reduce herd productivity as this age group

Table 4: Culling Criteria

	Age-Groups (in Years)							
Criterion	<1	1-2	3-4	5-6	7-8	>8	Total	%
Death (due to disease)	7	5	9	5	12	-	38	18.0
Emergency need for money	-	22	44	14	8	-	88	41.7
Accidents	10	9	4	4	-	-	27	12.8
Ritual Sacrifice	-	3	4	9	2	-	18	8.5
Old age	-	-	-	7	15	18	40	19.0
Total	17	39	61	39	37	18	216	100

contains the most productive group. However this was compensated for by high replacement rate from the <1 year age group which was the least culled. The chi-square (X^2) analysis showed significant ($P<0.05$) interdependence between age group and culling criteria.

Conclusions and Applications

In this study, the herd size of small holder goat produces ranged from 10.4 to 12.5 goats per farmer-household with an overall average of 11.4 goats. The goat population was kept fairly young probably due to culling of older does for sales. The majority of the breeding does were found in parities 1,2 and 3 with a few in the higher parities. A high mating ratio of 1 buck to 3 does was observed. The observed structures in the herds studied could be attributed to lack of adequate information on the importance of older animals in the herd. It is recommended that small-holder goat producers be adequately informed on some basic animal breeding and production principles particularly as they relate to herd structure and its effects on productivity through extension/farmer education programmes.

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