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HERD COMPOSITION AND PRODUCTIVITY INDICES OF RUMINANT ANIMAL IN TEACHING AND RESEARCH FARM FEDERAL UNIVERSITY OF KASHERE GOMBE, GOMBE STATE

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Abstract
The research was conducted at the department of Animal Science Teaching and Research Farm Federal University of Kashere. The variables of interest and data collected were weaning weight, parturition interval, and litter number at birth. Others are weight at birth, mortality rate, survival rate, attrition percentages and productivity index. The data collected was analyzed using derived models by Wilson and Mason (1983) as presented. The results indicated that weaning weight for the cattle is 80.5±2.5, for the sheep 15.0±2.0, for the goat 14.7±2.0 Parturition interval for the cattle 260±11, sheep 150±9, for the goat 150±8. Litter number at birth for cattle 1, sheep and goat 1.61 and 1.81. Weight at birth was 420.5in cattle ±2.0, sheep and goat 45.5±2.0 and 43.5±2.0. Number of Parturition in cattle was 4.5, 7.3 in sheep and 9.5 in goats3 and 9.5. Mortality rate in cattle 0.2, sheep 0.25 and goat 0.29%. Estimated Individual flock weight in cattle was 332, sheep 40.5 and goat 38.8. Initial flock size was 32, sheep 35 and goat 34. Final flock size in Numbers was cattle 27, sheep 26 and goat 28. Flock exits were cattle 7, sheep 9 and goat 7.Attrition percentages for cattle were15.6, sheep 25.7 and 20.6. The study concluded that, the productivity parameters of cattle sheep and goats were better in Cattle and Goats. Therefore attempt should be made in improving their performance by keeping proper productivity records.

Key Words: Herd Composition, Productivity Indices, Ruminant Animals

Introduction
Animal Productivity is one parameter frequently used to express the potential performance of a particular production system on some animals (Abubakar, 2011; Bayemi, *et al.,* 2013). . Herd composition and productivity indices of cattle, sheep and goat of ruminant animal are very important resource information that plays a predominant role in the sustenance of the live hoods of impoverished families especially in the rural area of tropical countries (FA.O 2018). Among the livestock in Nigeria, cattle, sheep and goats constitute the farm animals largely reared by farm families in the country's Agricultural system. Nigeria has population of estimated of 34.5million goats, 22.1million sheep and 13.9million cattle. The objective of the study is to determine the herd composition and productivity indices of the indigenous breed cattle, sheep and goats in the Animal Science Teaching and Research farm, Federal University of Kashere.

Materials and Methods
The research was conducted at Animal Science Teaching and Research Farm Federal University of Kashere. The variables of interest and data collected includes weaning weight (weight of the young animal after weaning using weighing Scale), Parturition interval (Number of days between two consecutive births), Litter number at birth (Recorded number of offspring(s) during parturition), Estimated Individual flock weight (Sum of Individual weight in the herd / the total number), Attrition percentages (Flock exits / Initial flock size x 100) etc.
The data collected was Analyzed using derived models by Wilson and Mason (1983) as presented below:

1. *Live Weight per Parturition (Y) = $\frac{LWW \times 365}{SPI}$*

Where Y = Live weight per parturition; LWW= Litter live weight at weaning;
SPI = Subsequent parturition interval

2. *Recruitment ration* = $\frac{Es + Esl + Esi + Cni}{IFs}$

Where Es = Exit from Sales,Esl= Exits from Slaughter; Esi= Exit from Social interaction
Cni = Change in Net Inventor; IFs = Initial flock size

3. *Productivity Index* = $\frac{365\ (N-1) \times ALs \times AS \times AW}{Ta - Ti}$

Where N = Number of parturition, ALs= Average litter Size at birth;
AS= Average survival rate until weaning; AW=Average weaning weight
Ta = Age at present parturition; Ti = Age at first parturition

4. *Mortality rate = Number of dead animals / Live Animals X 100.*
5. *Survival rate = (Percentage number of (infected) survived animals recorded compared to live and healthy animals)*

Results and Discussion

Table I shows Cattle breed composition, population and average ages in Teaching and Research Farm Federal University of Kashere. In general there were twenty seven (27) Cattles separated into three breeds, namely white Fulani, Sokoto Gudali and Red Bororo breeds. Among the breeds White Fulani were the major breeds in the herd (22) representing 81.5% of the total herd composition. There were two Sokoto Gudali dry cows without heifers or calves. Similarly Red Bororo breeds have only four years aged cow and two 2 dry cows with an average age of 3.5 years. This result suggests the findings of (Bayer, 1986; Bourn, *et al.*, 2010 and Dipeolu,2020), where the future expansion of the herd depend on the productivity parameters of white Fulani cattle which are composed of heifers and both male and female calves. The table shows that dry cows were seven 7, bulls five 5 while milking cows and heifers were four each.

There were twenty six (26) goats in the farm. Maradi breed aged (2.0 to 3.30) year were the predominant breed in the herd representing 50% of the total herd composition. There were five (5)does, one(1)buck, three milking does with two (2) male and one (1)female kids respectively. The Red Sokoto breed were ten (10)comprising of two (2)does, four 4 bucks and two(2) milking does with one(1) male and one (1)female kids. The Sahelian and the Boar breeds have only one (1)and two(2) bucks respectively. Generally the number of bucks in the goat herd is eight representing (30.77 %.) This implies that the ration of male to female is higher as indicated by (Iyayi, *et al.*,2019) and may be a factor for lower kids in the herd as a result of competition during service or mating and subsequent fertilization.There were twenty eight (28) sheep comprising of Yankasa five (5), Uda Twenty (20) and Balami three (3) breeds. The Sheep herd is composed mainly of Uda breeds accounting about (71.4 %) of the total sheep population.

Table I: Cattle Goat and Sheep Population / Average Ages in Teaching and Research Farm Federal University of Kashere.

						Calves		
Cattle Breed	Cows	Bulls	Dry	Lactating	Heifers	Males	Female	Total
Whites Fulani,	2	5	3	4		2	2	
Age (Years)	(3.5)	(3.8)	(3.2)	(3.6)	4 (2)	(0.6)	(0.83)	22

Sokoto Gudali, Age (Years)	0	0	2 (3)	0	0	0	0	2
Red Bororo, Age (Years)	1 (4)	0	2 (3.5)	0	0	0	0	3
Total	3	5	7	4	4	2	2	27

					Kids			
Goats Breeds	Does	Bucks	Dry	Lactating	Young	Males	Female	Total
Maradi , Age (Years)	5 (3.3)	1 (3)	0	3 (3.2)	1 (2)	2 (0.4)	1 (0.25)	13
Red Sokoto , Age (Years)	2 (2.7)	4 (3.5)	0	2 (2.5)	0	1 (0.45)	1 (0.4)	10
Sahel , Age (Years)	0	1 (3)	0	0	0	0	0	1
Boar , Age (Years)	0	2 (3.3)	0	0	0	0	0	2
Total	7	8,00	0	5	1	3	2	26

						Lambs		
Sheep Breeds	Ewes	Rams	Dry	Lactating	Young	Males	Female	Total
Yankasa, Age (Years)	0	2 (3.3)	0	1 (2.5)	1 (2)	0	1 (0.33)	5
Uda, Age (Years)	2 (3.7)	4 (2.9)	3 (2.3)	4 (3.5)	4 (2.8)	2 (0.42)	1 (0.33)	20
Balami, Age (Years)	0	0	0	1 (3)	1 (1)	0	1 (0.25)	3
Total	2	6	3	6	6	2	3	28

The result in table II shows the productivity indices of the animals Cattle Sheep and Goats in the teaching and research farm of federal University of Kashere. The Age at first parturition (years) shows that the average value for both cattle breeds was (3.5) years and 1 year for both sheep and goats. However, the Age at present parturition was 4 years foe cattle while there was a difference of 0.1 in sheep and goat. The weaning weight of Litter (Kg) indicated that calves are weaned at the average weight of (80.5±2.5,) while sheep and goats are weaned at the weight of (15.0±2.0)and (14.7±2.0 kg) respectively. Parturition interval (days) show similar values in sheep and goats of (150) days while cattle it was almost one year (260) days. Litter number at birth indicated that cattle produces single calves while there is sometimes a twining ability in sheep and goats with an average figure of (1.61) and (1.81) litters respectively. Mortality rate was higher in goats (29.0%) followed by sheep (25%) and (20.0>in cattle). The major parameters measured includes Weight at birth (kg), Number of Parturition, Estimated Individual flock weight (kg), Initial flock size in Numbers, Final flock size in Numbers, Change in Inventory and Flock exits in Numbers (Sales, Death etc). Others are Survival rate until weaning, Attrition percentage, Live Weight per Parturition, Recruitment ratio and Productivity Index.

Conclusion and Recommendation

The study concluded that that the productivity parameters of cattle sheep and goats in teaching and research farm Federal University of Kashere were better in Cattle and Goats. Therefore attempt should be made in improving their production. With good information about the animal's genetics, better selection decisions can be made to improve herd performance, Records of production parameters should be properly kept for future uses by research farms and individual farmers.

Table II Means of Parameters Composing the Productivity Indices of Cattle Sheep and Goats at F.U.K Teaching and Research Farm (± S.E.) of flock average.

S/N	Parameter	Cattle	Sheep	Goat	SEM
1	Age at first parturition (years)	3.5	1	1	0.83
2	Age at present parturition (years)	4	2.2	2,1	0.62
3	Weaning weight of Litter (Kg)*	80.5±2.5	15.0±2.0	14.7±2.0	21.88
4	Parturition interval (days)	260±11	150±9	150±8	36.67
5	Litter number at birth	1	1.61	1.81	0.24
6	Mortality rate	0.2	0.25	0.29	0.03
7	Weight at birth (kg)	420.5±2.0	45.5±2.0	43.5±2.0	125.33
8	Number of Parturition	4.5	7.3	9.5	1.45
9	Est. Individual flock weight (kg)	332	40.5	38.8	97.45
10	Initial flock size in Numbers	32	35	34	0.88
11	Final flock size in Numbers	27	26	27	0.33
12	Change in Inventory	5	9	7	1.15
13	Flock exits in Numbers (Sales, Death etc)	7	10	11	1.2
14	Survival rate until weaning	0.8	0.75	0.71	0.03
15	Attrition percentage	15.6	25.7	20.6	2.92
17	Live Weight per Parturition	113	36.5	35.7	25.63
18	Recruitment ratio	0.38	0.54	0.52	0.05
19	Productivity Index	64.5	39.06	53.28	7.36

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