REPRODUCTIVE SURVIVAL OF WEST AFRICAN DWARF SHEEP AND GOAT IN NIGERIA UNDER INTENSIVE MANAGEMENT SYSTEM[1] /

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Resumen

En este estudio se colectó datos de mortalidad en ovejas (carneras, animales en crecimiento y adultos) y en cabras (recién nacidas, animales en crecimiento y adultos) por un período de tres años, desde noviembre de 1977 hasta octubre de 1980. El efecto de estación climática no tuvo ningún efecto en la proporción de ovejas machos y hembras muertas en ninguna de las edades estudiadas. En la estación lluviosa murieron más ovejas en crecimiento que durante la estación seca, efecto no observado en los carneros ni en los adultos.

La época seca no afectó el número de cabras macho o hembra muertas; sin embargo, durante la estación lluviosa murieron más machos en todas las edades estudiadas. Durante la época de lluvia murieron más cabras en crecimiento que durante la estación seca. No se encontró un efecto de estación sobre la relación cabritos-cabras muertas.

Introduction

Chiboka and Thomas (1) indicated that West African Dwarf sheep found in the South-Western part of Nigeria are not usually reared under intensive systems of livestock management. The same thing is true of West African Dwarf goats. There is a high mortality of these livestock in the Teaching and Research Farm of the University of Ife where they are reared under the intensive management system. The present survey therefore is undertaken to determine the reproductive survival of the West African Dwarf sheep and goats in Nigeria under the intensive management system and also if the season of the year affects mortality.

Materials and methods

The data for this study were collected from the sheep and goat farm records at the University of Ife, Teaching and Research Farm, during the years 1977 to 1980. There are two seasons in the year, the dry season in this part of the country is from November to March, while the rainy season is from April to October based on the weather records from the research farm (Table 6). The sheep data were divided into the following three catogories (i) the preweaning group (from birth to fourteen weeks *post partum*) called lambs, (ii) growers (from fourteen weeks *post partum* to puberty, seven months *post partum*) and (iii) adults (from seven months *post partum* onwards). The goat data were divided into similar categories except that the young animals in the preweaning group are called kids. Males and females involved in the experiment were identified during the data collection. Two types of analyses were made in each animal category. One consisted of classifying the data according to two attributes to determine the relation between type of sex and mortality within each season, hence two classes were considered, namely (i) males and (ii) females. For any sex that died during the three years, the death record was noted. Thus the sexes were classified according to their status (dead or alive) at the end of the three years. The numbers of animals falling in the four classes are given in Tables 1 and 3 (for sheep and goats respectively), called a 2 x 2 contingency Table (5) and the real analysis consisted of classifying the data according to two other attributes to determine the relation

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Table 1. Effect of sex on mortality of lambs, growers and adult sheep during dry and rainy season.

COMPARISON	SEX	DRY SEASON			RAINY SEASON		
		Dead	Alive	Chi-square (x^2)	Dead	Alive	Chi-square (x^2)
LAMBS	Male	13	34	0.52 ns	18	27	0.81 ns
	Female	5	20		21	46	
GROWERS	Male	3	24	1.14 ns	20	3	1.43 ns
	Female	2	43		19	7	
ADULTS	Male	3	113	0.015 ns	4	109	0.41 ns
	Female	9	311		9	361	

ns (P> 0.05).

Table 2. Effect of season on mortality of lambs, growers, and adults in sheep.

COMPARISON	SEASON	DEAD	ALIVE	CHI-SQUARE (x^2)
LAMBS	Dry	18	54	1.9 ns
	Rainy	39	73	
GROWERS	Dry	5	67	94.20[1]
	Rainy	39	10	
ADULTS	Dry	12	424	0.003 ns
	Rainy	13	470	

1 (P > 0.01).

between type of season and mortality; hence two classes were considered, namely (i) dry season and (ii) rainy season. Death records of animals that died in each season were collected at the end of the three years and in each season, animals were classified according to their status (dead or alive) at the end of the three years. The numbers of animals falling in the four classes are given in Tables 2 and 4 (for sheep and goats respectively) considered also as a 2 x 2 contingency Table (5) and the actual analysis is shown on Tables 2 and 4 (for sheep and goats respectively).

Results

In the three categories of sheep (lambs, growers and adults), the observed differences in proportion dead between males and females did not differ ($P > 0.05$) in each of the two seasons (Table 1). There is a significant difference ($P > 0.01$) in the observed difference in proportion of growers dead between dry and rainy season while the observed differences in proportion of lambs and adults dead between dry and rainy season did not differ ($P > 0.05$) significantly (Table 2). In the three categories of goats (kids, growers and adults) the observed differences in proportion dead between males and females in dry season did not differ ($P > 0.05$) significantly (Table 3). But in rainy season, the observed differences in proportion dead between males and females showed a highly significant difference ($P > 0.01$) in each of the three categories of goats (Table 3). Table 4 shows that the observed difference in proportion of growers dead

Table 3. Effect of sex on mortality of kids, growers and adult goats during dry and rainy season.

COMPARISON	SEX	DRY SEASON			RAINY SEASON		
		Dead	Alive	Chi-square (x^2)	Dead	Alive	Chi-square (x^2)
KIDS	Male	24	6	0.83 ns	34	4	9.36**
	Female	18	8		22	16	
GROWERS	Male	2	22	0.56 ns	11	7	8.26**
	Female	9	54		9	31	
ADULTS	Male	2	38	0.07 ns	6	29	15.63**
	Female	5	120		7	258	

** ($P > 0.01$).

Table 4. Effect of season on mortality of kids, growers, and adults in goats.

COMPARISON	SEASON	DEAD	ALIVE	CHI-SQUARE (x^2)
KIDS	Dry	42	14	0.03 ns
	Rainy	56	20	
GROWERS	Dry	11	76	90.87**
	Rainy	20	38	
ADULTS	Dry	7	158	0.23 ns
	Rainy	13	287	

** ($P > 0.01$)

Table 5. Maximum and minimum temperature distribution from November 1977 to October 1980.

MONTH	YEAR 1977/1978 T°C		YEAR 1978/1979 T°C		YEAR 1979/1980 T°C	
	Max.	Min.	Max.	Min.	Max.	Min.
NOV.	32.6	20.4	31.2	19.3	30.0	21.3
DEC.	31.0	19.0	32.2	21.2	31.0	17.2
JAN.	33.4	17.0	31.1	21.2	32.0	21.8
FEB.	35.0	22.4	35.0	22.0	33.8	22.0
MAR	33.2	22.0	34.0	21.0	33.0	24.0
APR.	30.0	20.4	32.0	22.0	32.5	22.6
MAY	30.3	21.0	31.0	21.1	30.2	21.8
JUN.	29.0	21.1	29.1	21.0	28.9	21.0
JUL.	26.4	19.0	28.2	21.0	26.4	19.8
AUG.	26.7	20.0	26.0	20.0	26.4	19.4
SEPT.	27.0	21.0	29.0	20.0	27.9	19.8
OCT.	29.0	21.0	31.0	21.0	25.6	21.5

between dry and rainy season was significant ($P > 0.01$) while the observed difference in proportion of kids and adults dead between dry and rainy season showed no significant ($P > 0.05$) difference.

Discussion

Sheep and goats in South-Western parts of Nigeria are not usually reared under the intensive system of management unlike sheep and goats in the temperate countries. Tables 2 and 4 show that there is more mortality amongst growers in the rainy season than in the dry season in both sheep and goats. Traditionally, the native Nigerian sheep (Weast African Dwarf sheep) and goats (West African Dwarf goats) roam about streets and bushes scavenging from garbage and eating local forage. Though these animals are allowed to move freely, they still go back to their respective homes or owners at the end of the day. In the rainy season or harmattan when the weather is fairly cold especially in the mornings and nights, there are hearths (fire-places) where both humans and sheep and goats gather to warm themselves. But in the Teaching and Research Farm of the University of Ife, these fire-places are not provided. This lack of fire-places during the humid rainy season might be a major cause of the death of these livestock. Post mortem of most of the dead sheep and goats in the rainy season did not reveal too many specific pathogens to explain the high mortality. Since the West African Dwarf sheep and goats are being reared under the intensive system of management, the life-style in their natural (traditional) habitat should as much as possible be simulated. Fire-places could be provided in the pens for these livestock in the rainy season or they could be bred in the rainy season in such a way that they lamb or kid during the dry season.

For the lambs and kids born in dry season, shades should be provided to obviate the harmful effects of hyperthermia. It has been found (4) that cattle make more rapid gains and survive more during the hot part of the summer if they have access to shade. When natural shade such as trees is not available, artificial shades will prove profitable. Construction of shades and planting of plants that will ultimately provide shade are already underway in the University of Ife Teaching and Research Farm. A preliminary study in which gravid sheep are programmed to lamb in dry season and the dams and lambs allowed to go out to the paddocks till about noon when they are returned to the pens showed highly significant reduction in mortality. It is therefore hoped that construction of shades and planting of shady plants will prove to be a major panacea in reducing heat stress and increasing survival rate in both sheep and goats. The International Livestock Centre for Africa, ILCA (2) has a pilot study in Fashola in Oyo town of Oyo state of Nigeria, their animal hutches and shady plants help a great deal to protect the sheep and goats from extremes of weather. Tables 5 and 6 show the temperature and rainfall patterns during the period of the experi-

Table 6. Rainfall and relative humidity distribution from November 1977 to October 1980.

MONTH	YEAR 1977/1978*			YEAR 1978/1979			YEAR 1979/1980		
	RF	RH (%)		RF	RH (%)		RF	RH (%)	
	(mm)	10 AM	4 PM	(mm)	10 AM	4 PM	(mm)	10 AM	4 PM
NOV	1 75	81 0	49 0	85.09	79 0	57 0	39 50	82.3	62 0
DEC.	0.00	73.3	47 0	0.13	83 0	50 0	1 00	77.5	49 3
JAN.	4 06	75 2	41.3	0 00	84 0	43 0	0 00	80 8	46 3
FEB	41 40	79 0	40.0	0 00	76 0	36 0	7.14	78 9	43 0
MAR	131.84	83.0	48.4	153 66	78 0	48.4	27 30	75 2	46.2
APR	314 42	87.1	64 3	169.40	81 0	61 0	81 7	73.9	50 0
MAY	155.44	832.2	66.1	352 70	81.0	69 0	152 10	79.2	64.7
JUN.	168 65	86.0	71 3	246.30	86 2	72 0	105 90	84.9	67 8
JUL.	359 96	89.0	78.0	254.40	93 0	71 0	181.00	88.0	76 6
AUG	201 30	88.0	75.0	402 50	89 0	78.0	233.20	81.5	78.2
SEPT	142.65	87.0	72 0	137.00	87 0	73.0	337.10	88.5	72.4
OCT.	127.50	86.0	73.0	176 20	84 3	68.0	255 20	87 7	69 5

* RF = RAINFALL RH = RELATIVE HUMIDITY.

ment. In both dry and rainy seasons the difference between maximum and minimum temperature is not drastic. The low-temperatures characteristic of winter are completely absent. Similarly, the relative humidity does not change significantly irrespective of season thereby making the loss of evaporative heat especially in dry season more difficult. But the adverse effect of high humidity in the rainy season is usually offset by the constant rainfall in the rainy season. Thus under this environment it will be more expensive to provide the young animal with constant supply of heat in the rainy season than to construct shades and have shady plants to protect the animals from hyperthermia in the dry season.

Besides the adverse effect of high temperature and humidity on the sheep and goat growers, the method of weaning the growers could be contributing to their death. Under the intensive system in the University of Ife Research Farm, the growers are weaned at fourteen weeks *post partum* (3) by physically separating them from their dams as it is done in the temperate countries. But traditionally in South-Western part of Nigeria, these dams move about with their young scavenging and eating local forage till the dams encounter males which scare away the young. Over time the presence of the male leads to reduction in the suckling intensity by the young until the corpora lutea of pregnancy regress culminating in the dams manifesting heat (estrus) and being bred by the males. The advantage of this is that at no time does the young completely lose maternal presence and influence. It is possible that the loss of maternal attachment at weaning by the growers might affect their ultimate viability. An experiment is underway to simulate the traditional method of weaning in the intensive management system. In this ongoing experiment, a male will be put with the nursing dam about 8 weeks *post partum* till the dam is bred, stil leaving the young around. In this case the young will be left with the dam for a period significantly beyond fourteen weeks *post partum*. This is hoped to be a compromise between the traditional and the exotic methods of weaning.

Table 3 shows that more male goat growers and adults diet within the male groups than the equivalent female growers and adults within the female groups in the rainy season.

Abstract

Mortality data on sheep (lambs, growers and adults) were collected over a three year period from November 1977 to October 1980. In the same period, equivalent data were collected in goats (kids, growers and adults). Season had no effect on the proportion dead between males and females in each of the three categories of sheep (lambs, growers and adults). More sheep growers died in the rainy season than in the dry season but season had no effect in the proportion of dead lambs and adult sheep. In goats, dry season did not affect the proportion dead between males and females; whereas more males died in the rainy season than in the dry season in each of the three categories of goats (kids, growers and adults). More goat growers died during the rainy season than in dry season. There is no seasonal effect in the proportion of goat kids and adult goats that died.

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Reseña de libros

GAUCHER, G. Traite de pedologie agricole. Tomo II. Les facteurs de la pedogenese Editions G. LeLotte. Disar, Belgique, 1981. 730 p.

El tomo II de la serie Pedologia Agricola, enfatiza en los factores de la pedogénesis, sin repetir la información del tomo I escrito en términos de una edafologia orientada hacia la pedologia.

El libro consta de once capítulos, uno inicial introductorio y otro final de síntesis. Los restantes capítulos (2 a 10) tratan sobre los factores clima, aspectos biológicos, roca madre, tiempo, geomorfologia, erosión, hidrologia, el hombre y paleoclima en cuanto a su efecto sobre la pedogénesis. Este enfoque permite elaborar más a fondo en aspectos de erosión, hidrologia, influencia humana y paleoclima en la formación de los suelos, en contraposición con el concepto clásico de discutir la formación del suelo en función de cinco factores.

La discusión de los factores clima, organismos y material parental (capítulos 2 a 4) es sumamente amplia. El autor presenta información relevante a variadas regiones del mundo, sin enfatizar en aspectos de una sola zona ecológica. En estos tres capítulos se nota una presentación bastante cualitativa de la información y quizá demasiado extensa. El autor presenta varios sistemas de clasificación de climas, de especies vegetales y de rocas.

En el capítulo 5 se discute el factor tiempo y su relación con la génesis del suelo. Quizá es un poco difícil de creer, pero se razona en este capítulo que la mayoría de los suelos del mundo no son más antiguos que 2 500 años; se resalta la idea del Cuaternario como período pedogenético.

Los capítulos sobre relieve y erosión describen las principales geoformas y su modificación posterior por agentes erosivos. La relación entre la geomorfología original y modificada por la erosión se presenta en forma elegante, con muchas ilustraciones.

Los factores hidrológicos y su relación con la pedogénesis se describen en el capítulo 8. Se discuten los principales regímenes hídricos, relacionados con excesos o déficits de agua en el suelo como subcapítulos.

El capítulo 9 es amplio en la descripción del efecto del hombre como factor formador de suelos. Se describen los principales sistemas de cultivo y su efecto sobre la morfología del suelo. El penúltimo capítulo trata sobre paleoclimas y paleosuelos para terminar el texto con un resumen y un enfoque global de pedogénesis.

El libro recopila información valiosa muy dispersa en la literatura mundial. Desafortunadamente, más que los factores pedogenéticos, los temas tratados representan capítulos separados sobre clima, geología, hidrología, sistemas de cultivo y otros. El enfoque cualitativo empleado por el autor limita el alcance de la discusión pedogenética; en todo el libro (730 páginas) solo se incluyen siete cuadros con datos numéricos.

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