

<https://doi.org/10.33003/jaat.2025.1103.17>

EVALUATION OF OESTRUS, PREGNANCY STATUS AND GROSS GENITAL ABNORMALITIES OF SMALL RUMINANTS PRESENTED FOR SLAUGHTER AT MAIDUGURI CENTRAL ABATTOIR BORNO STATE, NIGERIA

¹D, Iiyasu., ²F, A, Lawan., ³A. M. Abdullahi., ³A. Abdulhamid., ¹AR, Mustapha., ⁴S.T. Muhammad., ¹J. Stephen and ¹I. D. Peter

¹Department of Theriogenology, Faculty of Veterinary Medicine, University of Maiduguri, Nigeria

²Department of Veterinary Microbiology, Faculty of Veterinary Medicine, University of Maiduguri, Nigeria

³Department of Veterinary Teaching Hospital, University of Maiduguri, Nigeria

⁴Department of Veterinary Teaching Hospital, Ahmadu Bello University Zaria, Nigeria

Corresponding author: Dauda Iiyasu, e-mail: drdisambo@gmail.com; disambo@unimaid.edu.ng; Phone number +2348063294756

ABSTRACT

This study evaluated the oestrus status, pregnancy rate, and gross reproductive abnormalities in small ruminants (ewes and does) presented for slaughter at the Maiduguri Central Abattoir, Borno State, Nigeria, between June and August 2024. A total of 500 genital tracts were examined (191 ewes and 309 does). The proportions of grossly normal genitalia were 31.94% in ewes and 33.01% in does. Common abnormalities included ovarian cysts, uterine torsion, pyometra, and metritis. Sahel and Red Sokoto goats were the most slaughtered breeds, followed by Yankasa and Uda ewes. The findings highlight the need for reproductive health evaluation and farmer sensitization on the importance of retaining cycling and pregnant females for herd sustainability.

Keys: - Oestrus, pregnancy status, gross genital abnormalities, does, ewes, breeds and Maiduguri abattoir

INTRODUCTION

Numerous diseases have been reported to compromise reproduction and production in small ruminant (Ali *et al.*, 2019). Most of these infections usually interfere with the state of estrus cycle and the fertility status of the animals (Stewart & Shipley, 2021). Genital abnormalities contributed significantly to the impediment of animal breeding by causing subfertility, infertility and sterility, which causes serious economic losses to the livestock industries and obstruct the source of livelihood (Agossou *et al.*, 2017). Investigation of Small ruminants (Does and Ewes) reproductive abnormalities based on abattoir survey of specimens usually it provides clinical information and the prevalence of the reproductive disorders of the animals (Smith *et al.*, 1999).

Small ruminants (Does and Ewes) are economically important livestock among the developing countries particularly Africa and Asian countries (Dehouegnon, 2017). Small ruminants play a significant role such as social livelihoods, economic growth and food security in most of the developing countries (Abera, 2018; Ahmad, 2004). They are essential in supporting low-income families, particularly in the rural areas with milk and meat as a source of animal protein and livelihoods as reported by Yakubu *et al.* (2016). There were 875.5 million does (goats) and one billion Ewes (sheep) in the world and according to Alemu (2020), around 95.7 % and 63.3 % of does and ewes respectively, were situated in developing

countries and this symbolize 70 - 80 % of the total animal production in the world (Ahmed, 2017).

Surveys have shown 85 % of rural households, farmers and small-time business across people of all age groups kept small ruminants in Nigeria (Fajemilehin & Salako, 2008). These constitute the largest group of small ruminant among livestock in Nigeria (53.8 million) and also constituting 6.2 % of the World's goat population Farghali (2020). The Nigerian indigenous goats have been classified based on phenotypical appearance into three distinct breeds, the Red Sokoto goat, Sahel goat and West African Dwarf goat which were mostly found in the North Western, North East and Southern part of Nigeria Farghali (2020)

While, the sheep population in Nigeria is estimated at 37.4 million and large population are usually found in the northern part of Nigeria as reported by Lawal (2012). The common breeds of sheep found in Nigeria are Yankasa, Balami, West African Dwarf (WAD) and Uda (Farghali *et al.*, 2020). The Yankasa and Balami are the most numerous breeds of sheep found in the Guinea savanna and semiarid north region of Nigeria (Hananeh *et al.*, 2019). While, Uda are found in the North and middle belt of Nigeria, West African Dwarf is mostly restricted to the Southern part of Nigeria (Balaro *et al.*, 2022). Several disease conditions that habitually affect small ruminants, were known to compromise their reproductive physiology which mostly associated congenital abnormalities, hyperplasia and

hypoplasia of the reproductive organs, infectious diseases have been reported to cause abortion, delayed estrous, subfertility, infertility and sterility (Hristov & Stoimenov, 2020). The gross genital diseases abnormalities observed in most of the animals presented for slaughter in the abattoirs of the developing countries particularly Nigeria are true reflections of the fertility status of the animals in the farms (Estill, 2022).

Therefore there is need to study the frequent gross reproductive organs abnormalities and review of reproductive health, farmer sensitization on the importance of retaining cycling and pregnant animals for optimum herd reproduction.

MATERIALS AND METHODOLOGY

Study Area

This study was carried out at Maiduguri central Abattoir within Maiduguri which is the capital of Borno State Nigeria, located in semi-arid zone of West Africa. It is situated around the north-east part of Nigeria, bordered with Adamawa to the south, Gombe to the west, Yobe to the north-west, Republic of Niger to the north, Chad republic to the north east and Cameroon to the east. Borno State lies between latitude 11°5` N and longitude 13°5` E and at altitude of 354m above the sea level, with a total of 72,605 square kilometers. It falls within the Sahel region of West Africa an area noted for the great climatic and seasonal diversity (Ajibola *et al.*, 2022).

Study Design

This study was designed to evaluate estrus, pregnancy status and the common genital organs abnormalities of small ruminants presented for slaughter at the Maiduguri central abattoir, the study was carried out within a period of 8 weeks which started in June and ended in August 2024. Breeds of goats and sheep identified were Sahel, Red Sokoto and West African Dwarf and Balami, Uda, Yankasa

and West African Dwarf respectively. Evaluation of estrus were done prior to slaughter according to the method describe by Estill (2022). While, the breed identification for goats and sheep were done according to the methods described by Kouamo and Asongafec (2020). Pregnancy status was also determined by gross examination of the uterus and presence of fetal structures. Thereafter, the reproductive organs of the small ruminants were grossly evaluated during anti-mortem and postmortem examination according to the methods described by (Kouamo *et al.*, 2019).

Sample and Sample Collection

Taking logistic convenience into consideration in the study area, a systematic purposive, sampling procedure was adopted. Accordingly, two clinical working days of the week were selected for investigation. All ewes and does encountered on corresponding days were included in the study. In this manner, a total of 500 animals including 191 ewes and 309 doe were sampled within the study period.

Data Analyses

Data were analyzed using Microsoft Excel 2010 version 13 statistical software. Data were analyzed using descriptive statistics to compute frequencies and percentages of the reproductive disorders and described lesions quantitatively respectively.

RESULTS

Abattoir investigation of female small ruminant genital organs disorders revealed various reproductive organs lesion as presented in Table 1 while other genital disorders associated with ewes and does of various breeds presented for slaughter in the Maiduguri central abattoir were also presented in Table 2.

Table 1: Presents the percentage of lesions observed on Vulva Vagina and cervix of Small ruminant presented for slaughter at the Maiduguri central abattoir

Small ruminants	Lesions on organs			Normal ewes	Percentage (%)
	Vulva	Vagina	Cervix		
Ewes	56	41	33	61	
Total (n=191)	(29.3%)	(21.4%)	(17.2%)	(31.9%)	100
Does	71	83	53	102	
Total (n=309)	(22.9%)	(26.8%)	(17.1%)	(33.0%)	100

The proportion of cycling does presented for slaughtered is relatively higher compared to the ewes. Similarly, the percentage of pregnant does is higher than that of ewes as presented in Table 2.

Table 2: Assessment of oestrus and pregnancy status of small ruminants presented for slaughter at Maiduguri central abattoir

Breeds of sheep	Cycling	Non-cycling	Number of animals	Non-pregnant	Pregnant
Balami	15 (33.3%)	30 (66.6%)	45	20 (44.4%)	25 (55.5%)
Uda	9 (12.2%)	65 (87.8%)	74	24 (32.4%)	50 (67.6%)
Yankasa	2 (2.8%)	70 (97.2%)	72	12 (16.7%)	60 (83.3%)
Total			191		
Breeds of goats					
Sahel	22 (13.4%)	142 (86.6%)	164	32 (19.5%)	132 (80.5%)
Red Sokoto	32 (27.8%)	83 (72.2%)	115	37 (32.2%)	78 (67.8%)
West African dwarf	5 (16.7%)	25 (83.3%)	30	3 (10.0%)	27 (90.0%)
Total			309		

The breeds of small ruminants presented for slaughter at the Maiduguri central abattoir were presented in percentage in Figure 1.

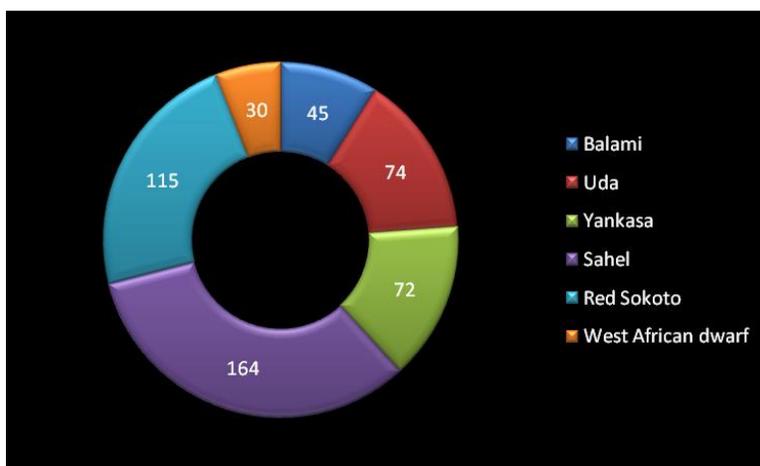


Figure 1: Number of breeds of small ruminant slaughtered between June and August 2024 at Maiduguri central abattoir

While the normal genital status and the pervasiveness of various types of reproductive tract disorders of small ruminants were presented in Table 3.

Table 3: Evaluation of some gross ovaries disorder of various breeds of small ruminant presented for slaughter at the Maiduguri central abattoir

Small ruminants	Breeds	Genital status	Location	Diseases	Number (%)
Ewe	Balami		Ovary	Follicular cysts	13 (28.9)
				Ovarobursal adhesions	7 (15.6)
Total	Uda	Normal (n=8; 17.78)	Uterus	Polycystic ovary	5 (11.1)
				Uterine torsion	9 (20.0)
			Ovary	Pyometra	3 (6.67)
					37 (82.20)
Total	Yankasa	Normal (n=74; 50.00)	Uterus	Pyometra	7 (9.46)
				Metritis	11 (14.86)
			Ovary	Ovarian tumors	2 (2.70)
				Ovarian cysts	17 (22.97)
Total	Sahel	Normal (n=72; 25.00)	Ovary	Ovarian cysts	5 (5.94)
				Polycystic ovary	11 (15.278)
				Follicular cysts	9 (12.50)
			Uterus	Endometritis	17 (23.61)
				Hydrosalpinx	5 (6.94)
				Pyometra	7 (9.72)
Total	Red Sokoto	Normal (n=115; 74.78)	Ovary	Ovarian cysts	17 (14.78)
				Follicular cysts	9 (7.83)
			Uterus	Hydrosalpinx	3 (2.61)
Total	West African dwarf	Normal (n=30; 60.00)	Ovary	Follicular cyst	5 (16.67)
				Uterus	Ovarian tumors
			Metritis		7 (23.33)
				Pyometra	2 (6.67)

DISCUSSION

This study provides a comprehensive appraisal of oestrus dynamics and pregnancy status of small ruminants presented for slaughter at Maiduguri central abattoir. Animals with clear signs of oestrus and pregnancy that were presented for slaughter shows the ignorance of the farmers on importance of keeping cycling and pregnant animals in their farms or herds (Mushonga *et al.*, 2017). This agreed with the findings reported by Iliyasu *et al.* (2015) who reported that farmers used to auctioned their animals during dry season irrespective of their fertility

status, and this might be attributed to the shortage of feeds during dry season and most of the pregnant animals cannot cover long distance in search of feeds, hence the health of the animals will be at risk (Hristov & Stoimenov, 2020) such animals might end up aborting the pregnancy or the physiology will be deteriorated (Saboor *et al.*, 2024).

The proportion of cycling and pregnancy among does is relatively higher than that of the ewes this agreed with the findings reported by Uko *et al.* (2024), and this can be linked to the low level of awareness of importance of

preserving cycling and pregnant animals, rather than presenting them for slaughter without recommendation from the veterinarians (Islam *et al.*, 2015). Other scholars are in the opinion of keeping fertile intact female animals may improve economy and social wellbeing of the farmers and the community, thereby reducing scarcity of animal protein and its by-products, thereby flourishing source of livelihood and wellbeing of the society.

Gross pathology of the reproductive organs based on post-mortem examinations revealed higher incidence of reproductive organs disorder associated with vulva, vagina and cervix among the small ruminants presented for slaughter this coincide with the findings reported by (Kouamo & Asongefec, 2020) and this may be portrait as reflection of poor reproductive health management practice that usually rehearsal in the herds or farms within the study area. The results of the current study agree with the prevalence of reproductive pathological abnormalities observed on some internal reproductive organs of small ruminants that were diagnosed as hydrometra, uterine atrophy, pyometra, endometritis and follicular cyst as reported by Yakubu *et al.* (2016) and Mohammed (2021). This is also in agreement with the findings reported by Agarwal *et al.* (2015) in some large ruminants and this might also be attributed to poor reproductive herd health practice, nutritional deficiency and inbreeding management practice by the farmers.

Similarly, the findings of the current study agreed with some previous results reported by Borden *et al.* (2013) and this might be ascribed to poor knowledge of reproductive health practice and inconsistency evaluation of the reproductive organs during breeding sound examination prior selection of the animals before breeding period, the occurrence rate of the genital disorder of small ruminants particularly the ewes remains lower in the present study than the findings reported by Salako, *et al.* (2004). This might be linked to different small sample size, location and season of the sampling. Zubair *et al.* (2022) also reported low prevalence of genital disorder of small ruminants were observed among West African Dwarf does this concur with the results obtained in the current studies and this might be accredited to variations in sample sizes, geographical locations, management practices, and possibly unavailability of such breed in the Sahel region although some scholar linked some of the disorders to breed-specific reproductive tract disorders which are susceptible to mostly West African Dwarf does.

Despite the reproductive organs disorder observed among Balami ewes, Sahel and Red Sokoto does they were able to exhibit signs of oestrus more than the other breeds of small ruminants found in the study area, this agreed with the findings reported by Mushonga *et al.* (2017) and Zubair *et al.* (2022), and this can be related to the resilience and

adoptability of their physiology to the environment above the other breeds that shows significant reduction in their oestrus signs, which greatly influence the pregnancy rate of the animals particularly the sheep.

The percentage of ovarian abnormalities observed in ewes and does in the present study were higher than the ovarian abnormalities of small ruminants recorded by Moghaddam and Gooraninejad (2007) and Paredes *et al.* (2024). Similarly Smith *et al.* (1999) also reported high percentage of ovarian abnormalities accompany by some internal reproductive organs abnormalities particularly the uterus and oviduct of some ruminants animals. The high number of the follicular cysts recorded in the present study was agreed with the findings reported earlier by Alosta *et al.* (1998); Smith *et al.* (1999) and Saboor *et al.* (2024) and this can be attributed to deficiency of some micronutrient that are responsible to maintain cell integrity and also to boost the immune system of the animals.

Uterine abnormalities recorded in present study include endometritis, pyometra, hydrometra, metritis and uterine torsion. Similar incidence of endometritis and uterine torsion were recorded in ewes examined of uterine disorder by Sudhakar *et al.* (2010) and Silva *et al.*, (2024). The variation in the prevalence of endometritis and uterine torsion observed may be probably due to differences in the antenatal reproductive health practice and management system.

Pyometra may arise as a sequel to chronic infection associated with endometritis (Arthur *et al.*, 1989) or as a result of infection subsequent to metritis (Silva *et al.*, 2024). Winter and Dobson (1992) reported metritis and hydrosalpinx in the genital tract of culled ewes. Lower incidences were also observed by Stewart (2021) among ewes and is attributed to the consequence of the chronic increase in the concentration of circulating steroids which usually depressed the immunity and anorexia, it also occurred in cases of cystic ovarian diseases and other internal reproductive organs disorder as reported by Uko (2024).

The highest number of small ruminants breed slaughtered during this study period was Sahel does followed by Red Sokoto does, Balami, Uda and Yankasa ewes were the least animals presented for slaughter at the Maiduguri central abattoir, this may be associated to availability and the financial cost of the animals, It is well documented that Balami and Yankasa are very expensive hence, are preserved for breeding purpose and some aged ewes are to be sold out during religious festivities.

CONCLUSION

The study highlights the occurrence of significant reproductive abnormalities in ewes and does slaughtered at Maiduguri Central Abattoir. Routine ante-mortem and post-mortem with particular interest on the reproductive examinations should be institutionalized to prevent the wastage of fertile animals. Farmer's education on herd reproductive health management is recommended to enhance reproduction and production sustainability in the herds.

Acknowledgments

The authors wish to thank the Manager and the management team of Maiduguri central abattoir and the Butchers association for their wonderful support that led to successful completion of the research work.

Conflict of Interest

The authors declared that there is no conflict of interest.

Authors' contribution

All authors of this study have a complete contribution to data collection, data analyses, and manuscript writing.

REFERENCE

Abera, T. (2018). Abattoir and Clinical Study of Small Ruminant Female Reproductive Disorders. *Livestock Research Results*, 5(11): 891-893.

Agossou, Dehouegnon Jerry, Tatiana Dominica Dougba, and Nazan Koluman (2017). "Recent developments in goat farming and perspectives for a sustainable production in Western Africa." *International Journal of Environment, Agriculture and Biotechnology* 2.(4): 238-248

Ahmad, M. Y. (2024). Foetal Wastage and the Future of Cattle Production in Nigeria: A Review. *Badeggi Journal of Agricultural Research and Environment*, 6 (3): 49-60.

Ahmed, R., Jingdong, L., Chandio, A. A., & Hussain, I. (2017). Livestock production and population census in Pakistan: Determining their relationship with agricultural GDP using econometric analysis. *Information Processing in Agriculture*, 4 (2), 168-177.

Alemu, T. (2020). Review on sheep and goat management practices, constraints, opportunities, and marketing systems in Ethiopia. *International*

Journal of Food and Nutritional Science, 5(2), 144-169.

Ali, S., Zhao, Z., Zhen, G., Kang, J. Z and Yi, P. Z. (2019). Reproductive problems in small ruminants (sheep and goats): a substantial economic loss in the world. *Large Animal Review*, 25 (6): 215-223.

Balaro, M. F. A., Cosentino, I. O., Ribeiro, A. C. S., & Brandão, F. Z. (2022). Ultrasound diagnosis in small ruminants: occurrence and description of genital pathologies. *Veterinary Sciences*, 9 (11): 597-599.

Dehouegnon, J. A., Tatiana, D. D. and Nazan, K. (2017). Recent Developments in Goat Farming and Perspectives for a Sustainable Production in Western Africa. *International Journal of Environment, Agriculture and Biotechnology*, 2 (4): 2047-205.

Estill, C. T. (2022). Troubleshooting reproductive failures in small ruminants. In American Association of Bovine Practitioners Conference Proceedings. 55: 159-160.

Fajemilehin, O. S., & Salako, A. E. (2008). Body measurement characteristics of the West African Dwarf (WAD) Goat in deciduous forest zone of Southwestern Nigeria. *African Journal of Biotechnology*, 7(14): 12-23.

FAOSTAT (2008). Food and Agricultural Organization of the United Nations Statistics Division. FAO Statistic Retrieved

Farghali, A., H., Khatem, KA K., & A Shamaa, A. (2020). Review on the common surgical affections in sheep and goats. *Journal of Applied Veterinary Sciences*, 5(3): 40-48.

Hananeh, W. M., Ismail, Z. B., & Daradka, M. H. (2019). Tumors of the reproductive tract of sheep and goats: a review of the current literature and a report of vaginal fibroma in an Awassi ewe. *Veterinary world*, 12(6): 775-778.

Hristov, K and Stoimenov, A. (2020). Hypospadias in small ruminants: A case report. *Traditional Method Veterinary Medicine* 5: 58-61.

Iliyasu, D., Ogwu, D., Yelwa, H., Yaroro, I., Ajani, J. A., Auwal, U. Jibrin, U. R. (2015). Incidence of bovine pregnancy wastage in Maiduguri abattoir, Borno State Nigeria. *International Journal of Livestock Research*, 5(8): 65-69.

- Islam, M. H., Sarder, M. J. U., Rahman, M. S., Haque, M. A., Islam, M. A., Jahan, S. S., & Khaton, R. (2015). Retrospective study of reproductive diseases of small ruminants in northern barind tract in Bangladesh. *Journal of Sciences*, 3(5): 136-140.
- Kouamo, J and Asongafec, T. B. (2020). Prevalence and Associated Risk Factors of Genital Abnormalities of Does and Ewes in the West Region of Cameroon. *PSM Veterinary Research*, 5(3): 81-96.
- Kouamo, J., Obama, S. F., & Sassa, A. M. (2019). Prevalence and risk factors of genital diseases of goats and ewes in the Far North Region of Cameroon. *PSM veterinary Research*, 4(3): 62-73.
- Mushonga, B., Twiyizeyimna, S., Habarugira, G., Kandiwa, E., Chinyoka, S., Samkange, A., & Bishi, A. (2017). Study of incidence of gross urogenital lesions and abnormalities on does slaughtered at Nyagatare slaughterhouse, Eastern Province, Rwanda. *Journal of Veterinary Medicine*,(1): 756-769.
- Saboor, A., Kalwar, Q., Rahimoon, M. M., Kolachi, H. A., Laghari, S. A., Kaka, A & Uddin A. (2024). Prevalence of Abortifacient Disorders in Small Ruminants: a Comprehensive Review. *Journal of Bioresource Management*, 11(4), 16.
- Salako, A.E. (2004). Maturity rate of some morphometric traits in the West African Dwarf Sheep of Nigeria. *Tropical Journal of Animal Science*, 7(1): 51-55.
- Silva, R. M., Macêdo, J. T., Lacerda, M. S., Azevedo, J. P. M., Ferreira, J. A., Cerqueira, R. B., & Pedroso, P. M. O. (2020). Lesions of the sheep reproductive system found in a slaughterhouse in the state of Bahia, Brazil. *Pesquisa Veterinária Brasileira*, 40 (12): 955-962.
- Smith, R. F., Dobson, H., Royal, M. D., Knight, C. H., & Sheldon, I. M. (1999). The high-producing dairy cow and its reproductive performance. *Reproduction in domestic animals*, 42, 17-23.
- Stewart, J. L., & Shipley, C. F. (2021). Management of reproductive diseases in small ruminants. *Veterinary Clinics: Food Animal Practice*, 37(1): 105-123.
- Uko, I. B., Obialigwe, T. F., Nyifi, S. A., Ekechukwu, K. C and Tanimu, E. (2024). Prevalence of foetal wastage in Jalingo abattoir: a retrospective study. *Sahel Journal of Veterinary Sciences*, 21(1): 39-43.
- Yakubu, D. H., John, B., Yekinni, O. T., Muhammad, M. B., Abdullahi, M. K., & Adisa, R. S. (2016). Agricultural information channels used by livestock farmers in Wurno local government area of Sokoto State, Nigeria. *Nigerian Journal of Rural Sociology*, 16 (4):6-13.
- Zubair, A. H., Haruna, U., Ilyasu, D., Mustapha, A. R., Lawan, A. F., Mustapha, M and Muhammad, S. T. (2022). Retrospective study of cattle fetal wastage at Hadeja Abattoir, Jigawa State: Economic implication and seasonal variation. *Sahel Journal of Veterinary Sciences*, 19 (1): 31-34.