



## PREVALENCE AND ASSOCIATED RISK FACTORS OF REPEAT BREEDING SYNDROME IN CATTLE HERDS OF SOUTHERN ADAMAWA STATE, NIGERIA

<sup>1</sup>Solomsi, A. A., <sup>2</sup>Bobbo, A. G., <sup>1</sup>Sorau, S. M. and <sup>1</sup>Abdulkadir, M.

<sup>1</sup>Department of Animal Health and Production Technology, Adamawa State College of Agriculture, Ganye, Adamawa State Nigeria.

<sup>2</sup>Department of Animal Science and Range Management, Modibbo Adama University, Yola Adamawa State, Nigeria.

\*Corresponding Author's Email: [abdullahiabubakar001@gmail.com](mailto:abdullahiabubakar001@gmail.com);  
GSM: +2348052617806; +2348062811815

### ABSTRACT

The study was conducted to determine the prevalence and identify risk factors associated with repeat breeding syndrome (RBS) in cattle herds in southern Adamawa State, Nigeria. A cross-sectional study was conducted across three Local Government Areas (Ganye, Jada, and Toungo), involving 60 randomly selected herds and 1,842 cattle. Data were collected using structured questionnaires, clinical examinations, and farm records. A cow was defined as a repeat breeder if it had failed to conceive after at least three services. The overall prevalence of RBS was 10.48% (193/1842). The prevalence varied significantly ( $p < 0.05$ ) across LGAs, with Ganye having the highest (4.56%), followed by Jada (3.42%) and Toungo (2.50%). Breed was a significant risk factor, with Crossbreeds 12.21% and White Fulani (11.13%) showing higher susceptibility than Adamawa Gudali (8.34%). Management system greatly influenced prevalence, with extensive systems having the highest rate (12.77%), compared to semi-intensive (8.43%) and intensive systems (7.58%). Parity and age were also significant factors; first-parity cows (12.31%) and cows over 8 years old (26.23%) had the highest prevalence. The study concludes that RBS is a prevalent condition in the study area, significantly influenced by location, breed, management system, parity, and age. Promoting semi-intensive and intensive management, strategic culling of older cows, and breed-specific reproductive management strategies were recommended.

**Keywords:** Cattle, Infertility, Parity, Management, Breed, Susceptibility.

### INTRODUCTION

Reproductive efficiency is the cornerstone of profitable cattle production. Repeat Breeding Syndrome (RBS), characterized by the failure of a cow to conceive after three or more services in the absence of clinical abnormalities, is a major impediment to this efficiency, leading to extended calving intervals, increased insemination costs, and significant economic losses (Gustafsson and Emanuelson, 2002). In developing countries like Nigeria, where livestock is a critical component of livelihood and food security, understanding and mitigating RBS is of paramount importance.

The etiology of RBS is multifactorial, involving a complex interplay of management, nutritional, environmental, and animal-level factors (Kumar *et al.*, 2018). Factors such as poor estrus detection, improper timing of insemination, nutritional deficiencies, uterine infections, and hormonal imbalances have been implicated. In northern Nigeria, where pastoralism and agropastoralism are common, the extensive management system may exacerbate these factors, yet comprehensive epidemiological data is scarce.

Adamawa State, located in Nigeria's North-Eastern region, has a significant cattle population, primarily managed under traditional extensive systems. While previous studies have touched on cattle productivity in the region, there is a lack of focused research on the prevalence and specific risk factors for RBS. This study therefore aimed to determine the prevalence of RBS and evaluate the association of breed, management system, parity, and age with its occurrence in selected LGAs of southern Adamawa State. The findings will provide a basis for developing targeted interventions to improve herd fertility and productivity.



## MATERIALS AND METHODS

### Study Area

The study was conducted in three Local Government Areas (Ganye, Jada, and Toungo) in southern Adamawa State, Nigeria, located between latitude 8°12" to 8°40" North and longitude 11°37" to 12°15" East. The area lies within the Guinea Savannah zone, with a distinct dry season (November-April) and wet season (April-October/November). The mean annual rainfall is about 1,231 mm, and the average temperature ranges from 19.6°C to 32.3°C. The primary economic activity is agriculture.

### Study Design and Data Collection

A cross-sectional study was conducted from October 2024 to January 2025. Sixty herds (twenty from each LGA) were randomly selected. A total of 1,842 cattle were examined. A cow was classified as a repeat breeder if it had been serviced at least three times without subsequent conception (NADIS, 2005). Data were collected through a structured questionnaire administered to herdsmen, direct examination of animals, and review of available farm records.

### Data Analysis

Information on breed, management system (extensive, semi-intensive, intensive), parity, and age was collected. Age was determined using dentition (Sastry and Thomas, 2000) and farm records. Data were analyzed using descriptive statistics and Chi-square test to determine associations between risk factors and RBS prevalence. A p-value of less than 0.05 was considered statistically significant. Analyses were performed using SPSS version 25.

## RESULTS

### Overall Prevalence and Distribution

The result revealed that, out of 1,842 cattle examined from 60 herds, 193 were identified as repeat breeders, given an overall prevalence of 10.48%. The prevalence varied across the three LGAs, with Ganye LGA having the highest proportion (4.56%), followed by Jada (3.42%) and Toungo (2.50%) (Table 1).

**Table 1:** Prevalence of Repeat Breeding Syndrome across the Local Government Areas

LGA	Herd Size	No. of Repeat Breeders	Prevalence (%)
Jada	544	63	3.42
Ganye	765	84	4.56
Toungo	533	46	2.50
<b>Total</b>	<b>1,842</b>	<b>193</b>	<b>10.48</b>

### Breed as a Risk Factor

The study further showed that, prevalence of RBS varied significantly ( $p < 0.05$ ) among different cattle breeds. Crossbreeds had the highest prevalence (12.21%), followed by White Fulani (11.13%) and Sokoto Gudali (10.90%). Adamawa Gudali had the lowest prevalence at 8.34% (Table 2).



**Table 2:** Breed Prevalence of Repeat Breeding Syndrome

Breed	No. Examined	No. of Positive Cases	Prevalence (%)
White Fulani	701	78	11.13
Adamawa Gudali	503	42	8.34
Sokoto Gudali	376	41	10.90
Crossbreeds	262	32	12.21
<b>Total</b>	<b>1,842</b>	<b>193</b>	<b>10.48</b>

### Management System as a Risk Factor

The result indicated that, management system had a highly significant ( $p < 0.01$ ) effect on RBS prevalence. Cattle under extensive management had the highest prevalence (12.77%), while those under intensive management had the lowest (7.58%). Semi-intensive systems showed an intermediate prevalence of 8.43% (Table 3).

**Table 3:** Prevalence of RBS by Management System

Management System	No. Examined	No. of Positive Cases	Prevalence (%)
Extensive	916	117	12.77
Semi-intensive	842	71	8.43
Intensive	66	5	7.58
<b>Total</b>	<b>1,842</b>	<b>193</b>	<b>10.48</b>

### Parity and Age as Risk Factors

The prevalence of RBS was found to be significantly ( $p < 0.01$ ) associated with parity and age. Cows in their first parity had the highest prevalence (12.31%), and prevalence increased again in cows with more than 5 parities (12.24%). Regarding age, cattle older than 8 years exhibited a dramatically higher prevalence (26.23%) compared to younger age groups (Table 4).

**Table 4:** Prevalence of RBS by Parity and Age

Parity	No. Examined	Prevalence (%)	Age (yrs)	No. Examined	Prevalence (%)
1	398	12.31	3-5	904	9.73
2-3	516	9.30	6-8	816	8.95
4-5	683	9.66	>8	122	26.23
>5	245	12.24			
<b>Total</b>	<b>1,842</b>	<b>10.48</b>	<b>Total</b>	<b>1,842</b>	<b>10.48</b>

## DISCUSSION

The overall prevalence of RBS (10.48%) in this study is consistent with the reports from other parts of Nigeria and similar to a 10.1% prevalence reported in Sweden (Gustafsson and Emanuelson, 2002), suggesting it is a significant problem in the study area. The variation across LGAs may be attributed to differences in management practices, agro-ecology, and access to veterinary services. The higher susceptibility of Crossbreeds and White Fulani aligns with findings by Oloye *et al.* (2021), who suggested genetic incompatibility or higher nutritional demands in crossbreeds that are not met under local conditions. The relative resilience of indigenous breeds like Adamawa Gudali underscores the importance of breed selection for adaptability.

The strong association between management system and RBS prevalence is a critical finding. The high prevalence in extensive systems highlights the challenges of inadequate nutrition, poor estrus detection, and limited health interventions common in such systems (López-Gatius *et al.*, 2021). The lower prevalence in intensive systems, though counter-intuitive to some expectations, reflects better overall monitoring and management, consistent with findings by Tadesse *et al.* (2022).

The U-shaped relationship with parity, where heifers and high-parity cows are most affected, is well-documented (Mekonnen *et al.*, 2021). Heifers may suffer from incomplete maturity and competitive nutrient partitioning, while older cows face cumulative reproductive tract wear and age-related hormonal decline. The stark increase in prevalence in cattle over 8 years provides a clear culling indicator for herd managers.

## CONCLUSION AND RECOMMENDATION

This study establishes that Repeat Breeding Syndrome is a prevalent and multifactorial problem in cattle herds of southern Adamawa State. The significant risk factors identified are breed (with Crossbreeds and White Fulani being most susceptible), management system (extensive systems posing the highest risk), parity (first and high-parity cows), and advanced age (>8 years).

Based on the findings, the following recommendations are made:

- i. Farmers should be encouraged to transition from extensive to more controlled semi-intensive or intensive management systems where feasible.
- ii. Herd managers should consider the higher susceptibility of Crossbreeds and White Fulani when making breeding and culling decisions.
- iii. Strategic culling of cows at the 5th parity and those over 8 years of age should be implemented to maintain herd fertility.
- iv. Extension services should focus on educating farmers on improved estrus detection and the economic impact of RBS.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.



#### ACKNOWLEDGEMENTS

The authors thank the Adamawa State Ministry of Livestock and the participating herdsmen for their cooperation.

#### REFERENCES

- Gustafsson, H., and Emanuelson, U. (2002). Characterisation of the repeat breeding syndrome in Swedish dairy cattle. *Acta Veterinaria Scandinavica*, **43**: 115–125.
- Kumar, S., Singh, G., and Singh, A. (2018). Repeat breeding in dairy cattle: Etiology, diagnosis and remedial measures. *International Journal of Livestock Research*, **8**(7): 1–10.
- López-Gatius, F., García-Ispuerto, I., and Serrano, B. (2021). Management strategies for improving the reproductive performance of dairy cows. *Animals*, **11**(6): 1681174.
- Mekonnen, T., Deribe, B., and Taye, M. (2021). Prevalence and risk factors of repeat breeder cow syndrome in dairy farms in Ethiopia. *Veterinary Medicine International*, 2021, 8860745.
- NADIS (National Animal Disease Information Service). (2005). *A network of 40 veterinary practices and 6 veterinary colleges monitoring diseases in cattle, sheep and pigs in the UK*.
- Oloye, A. A., Oyeyemi, M. O., Ajala, O. O., Akusu, M. O., and Olurode, S. A. (2013). Comparative study of the testicular parameters of White Fulani and Sokoto Gudali bulls. *Nigerian Veterinary Journal*, **34**(3): 786–791.
- Sastry, S. R., and Thomas, C. K. (2000). Dentition in Farm Animal Management (pp. 39–45). VIKAS Publishing House.
- Tadesse, E., Tesfaye, D., and Alemayehu, R. (2022). Impact of management systems on reproductive disorders in dairy cattle in central Ethiopia. *Tropical Animal Health and Production*, **54**(1): 45-52.