



RESEARCH ARTICLE

MORTALITIES AND REPRODUCTIVE PERFORMANCES OF GUDALI CATTLE AT THE WAKWA REGIONAL CENTRE OF AGRICULTURAL RESEARCH, CAMEROON (1998 - 2008)

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ABSTRACT

The study was conducted on records of animal movements of the Centre from 1998 to 2008. The maximum of the calving took place in March and April (33% of total births). The majority of services (48.6%) occurred in the period during which pastures were at their best level. Age at the first calving was 1606 ± 263 days (53.5 ± 8.8 months). More of the heifers (77.03%) calved for the first time after the age of 4 years. There was no significant relationship between age at first calving and month of birth of the female. Calving interval was 603 ± 227 days (20.1 ± 7.5 months). The intervals were significantly affected by the rank of lactation. The mortality rate of calves under 12 months was 26.7%. Most of the mortalities occurred before the age of 3 months (65% of total calf mortality), a majority (34%) in the three weeks following birth. Calves born during the rainy season had a death rate (28.4%) higher than that of calves born during the dry season (23.30%). It would appear that, in order to minimize these mortalities, a breeding season should be established order to regroup the births at the most favorable period.

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INTRODUCTION

In Cameroon, cattle are the main source of meat and milk. Cameroon's cattle herd is estimated at about 10 million of which the majority (38%) comes from the Adamawa Region (Deffo *et al.*, 2009). The main cattle breed reared in Ngaoundere is Gudali. These cattle are mostly reared by small farmers in an extensive system based on the use of rangeland, subject to weather conditions and faced many pathological stress (Mingoas *et al.*, 2006). The production system in Wakwa Agricultural Research Centre is similar to that of the farmers in the locality. In the past, many Gudali cattle productivity improvement works were carried out at the Centre (Lhoste P., 1967; Lhoste P., 1968).

In this area, the existence of extremely variable weather conditions during the year results in significant seasonal variations of different factors affecting the herd (feeding, reproduction, physiology). With the current phenomena of pasture degradation, the severity of the dry season, the high pest pressure, it is necessary to update the data on livestock production. The present work aims to study the reproductive performance of the Goudali cattle in the centre.

MATERIAL AND METHODS

Characteristics of the study area

The Wakwa Agricultural Research Centre is located in the Adamawa Region, Cameroon, and 10 km to the east of the

city of Ngaoundere. It is a climatic zone characterized by high guinea savannah vegetation and two seasons of almost equal length.

Herd management

The current farming system in the Centre is extensive. Animals use rangelands throughout the year. In the dry season supplementation with cottonseed cake is distributed to them. The bulls are left permanently in females herds. The services are principally done by free stud at the appearance of the heat.

Data Recording

Calf mortality

Calf mortality rate was calculated by dividing the total number of cases of calf mortality of less than a year by the sum of births during the period and multiplied by 100.

Births

The study focused on the annual average of services and calving (service period determined by the formula: calving date - 9 months), the average age at first calving, and the average interval between two consecutive calving for the period from 1998 to 2008. It was done from annual record of animal movements of the Centre during the reference period. For each parameter, the mean and standard deviation were determined.

The average annual service distribution and calving was established.

The average age at first calving (A1V) was determined from the career of all females born in 1998 and who calve at least once.

The calving interval (IV) was estimated from the group of females born in 1998 and who calve at least twice.

Statistical analysis was performed using XLSTAT Version 2007.6 software. The effects of season and year of birth of the female age at first calving and calving interval were performed by the Chi-2 test.

RESULTS

Average distribution of calving and services

Bulls being left permanently in different herds of females, the study of the natural distribution of births (Figure 1) gave therefore an idea of the natural distribution of the services (figure 2) .

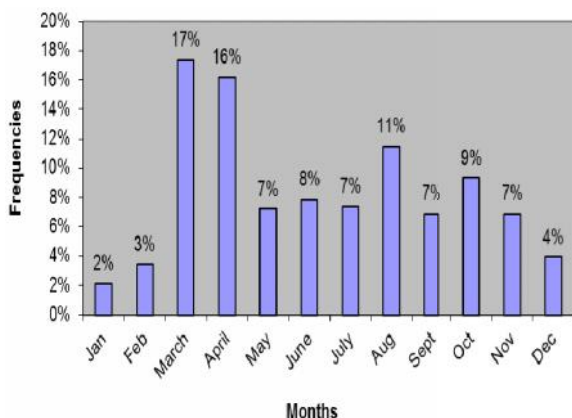


Figure 1 Natural distribution of calving

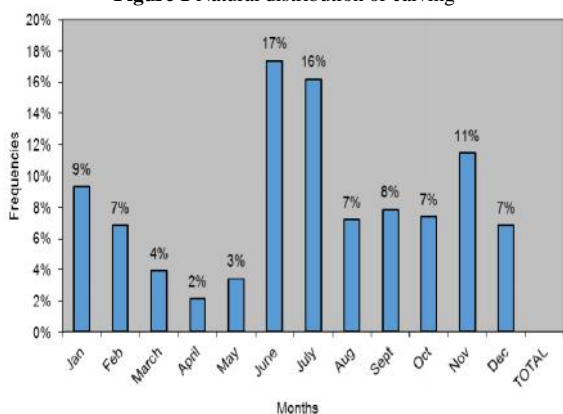


Figure 2 Natural distribution of services

Age at first calving (AFC)

The average age at first calving was 1606 ± 263 days, ie 53.5 ± 8.8 months. Figure 3 shows the distribution of AFC grouped into classes of four months.

Calving Interval (CI)

The average calving interval was 603 ± 227 days ie 20.1 ± 7.5 months. The CI was reduced with increasing rank of lactation

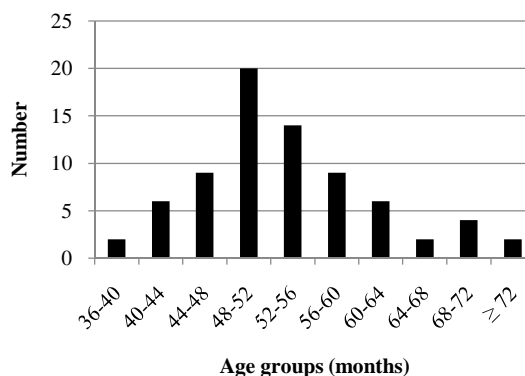


Figure 3 Distribution of AFC grouped into classes

(Table 1). Young females tend to have a longer CI (682.06 days) than multiparous.

Table 1 distribution of CI according to the lactation rank

Rank	1	2	3	4
Calving Interval	682.06 ± 272.37^a	527.04 ± 128.35^b	564.88 ± 149.45^{ab}	394.50 ± 50.20^b

Mortality

The mortality rate of calves less than 12 months has fluctuated over the past ten years with a mean value of 26.7 % (Table 2).

Table 3 shows the mortality rates according to the season. Calves born during the rainy season have a higher mortality rate (28.4%) than those born in the dry season (23.30 %).

DISCUSSION

Average distribution of calving and services

Maximum calving took place in March and April (33% of total annual births). The period from March to August have a combined roll of 66% of births. This is very common in flocks of Sudano Sahelian zones (Achard and Chanono, 1997; Denis and Thiongane, 1973). This could be explained by the availability of food at certain periods of the year since natural pasture is the only source of animal nutrition. Thus, researchers wishing to carry out work on calves should choose the period from March - May.

A service distribution according to different pasture levels shows that most services (48.6%) occurs in the month of June, July, August and September, during which grass is at the best level. Periods from October to January and February to May recorded 35.1% and 16.3% respectively. Thus, farmers wishing to use artificial insemination without heat synchronization should choose period between June to August.

Age at first calving

More than three quarters (77.03%) calved for the first time after the age of 4 years. The average age at first calving (53months) found in this study is greater than the interval of 40-50 months of tropical zebu reported by Galina and Arthur

Table 2 Number of deaths

Year of birth	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
Borned	55	55	76	86	63	75	55	40	49	57	611
Mort-nés	2	3	2	1	1	3	1	0	0	0	13
0-1 month	6	9	8	7	6	3	2	7	6	2	56
1-3 months	0	2	4	6	2	8	7	1	3	4	37
3-9 months	1	1	6	5	3	3	9	4	2	3	37
9-12 months	0	0	4	4	4	4	2	0	0	2	20
Total 0-12 months	9	15	24	23	16	21	21	12	11	11	163
Mortality rate	16.4%	27.3%	31.6%	26.7%	25.4%	28.0%	38.2%	30.0%	22.4%	19.3%	26.7%

Table 3 mortality rates by month of birth

Seasons Months	Rainy season						Dry season						Total
	April	May	June	July	Aug	Sept	Oct.	Nov.	Dec.	Jan.	Febr.	Mar.	
Born	99	44	48	45	70	42	57	42	24	13	21	106	611
Alive	69	32	34	29	53	29	44	36	20	7	14	81	448
Dead	30	12	14	16	17	13	13	6	4	6	7	25	163
%	30.3	27.3	29.2	35.6	24.3	31.0	22.8	14.3	16.7	46.2	33.3	23.6	26.7

(1989b) as well as those of other research work in Africa: 49.5 months among Malian Fulani cattle and 4 years in Nigerian Sunaji cattle. Other works in the same Centre in previous years gave lower values: about 48 months (Mbah *et al.*, 1987; Messine, 2003); this could be explained by the decline in herd management processes and pasture degradation that affect the nutritional status of cattle. Age at first calving can be influenced by animal management (Galina C.S. & Arthur G.H., 1989a). Other reports have shown that when adapted and improved management measures are taken, the AFC can be reduced to about 40 months.

There is no significant relationship ($p > 0.05$) between the AFC, the month and the season of cow's birth. But we observed that females born in the rainy season are 2 months older than females born during the dry season. Most calving at the Centre take place in the late dry season and early rainy season according to services which take place mostly in the middle of the rainy season. The age at which heifers are put in reproduction is 3 years. In the breeding season, most heifers born during the rainy season are older than those born in the dry season.

Calving interval

The CI (603 ± 227 days) was higher than the average tropical zebu (Galina and Arthur, 1989b) and that of Messine *et al.* (2007) in Goudali zebu of the region. It confirms the upward trend in the duration of CI in African cattle which is generally above 400 days: 665 days in Fulani cattle, 2 years in Nigerian Bunaji cattle and 620 days in Ethiopian Arsi cattle. This could be explained by the low or no nutritional supplementation in the dry season. Intervals were significantly affected by the rank of lactation ($P < 0.05$): CI is reduced with the increase in the lactation rank (Table I). Young females tend to have a longer CI (682.06 days) than multiparous. Previous work confirms this reduction (Denis, 1971; Messine *et al.*, 2007). This could be explained by the simultaneous nutrients needs of the heifer for growth and lactation.

Month and calving season had no significant effect on the CI. But the results show that the dry season tends to reduce calving CI (577 days) contrary to calving in rainy season (628 days) or end of the rainy season (683 days). This reduction in the duration of CI is due to the fact that cows that calved in the rainy season, when the breeding season arrive, they are

not yet ready and are waiting for the next season. While those that calved earlier in the dry season are ready.

The choice of calving period, permit the adaptation to climatic conditions and makes it easier for herd management. Grouped calving help streamlined the operation of its system to meet these requirements, contrary to the spread calving which is a source of many management difficulties.

In late pregnancy, cows have limited food needs and excessive fat is a source of calving difficulties. So the small amount of feed and some supplementation may be sufficient to cover their needs. In the case of calving during late dry season, feeding may be limited to the distribution of hay for animals in late gestation (case of food restriction). In addition to generating a low production cost, it is also adapted to a desired simplification food strategy by farmers during the expansion of the herds. Cows which give birth in the late dry season and those which give birth in early rainy season, do not suffer long period of pasture scarcity since there is high quality grass available a few weeks after the beginning of the rainy season. This covers high milk production needs and provides the necessary resumption of cow's condition for optimal fertility. For cows that calved at late rainy season, they can benefit from the growth of grass but must be complemented with good quality forage as soon as weather conditions become difficult.

Mortality

The analysis of the mortality rate shows that 34% of calve death occurs within three weeks following birth and 65% occurs before three months. These rates are higher than those obtained in other stations being located in the Sahel less favourable for breeding (Amuamuta *et al.*, 2006). This could be explained by the strong parasitic infestation of the wetlands.

Effect of Birth Season on calf mortality

In the rainy season, though grass is abundant, grazing land is heavily infested with gastrointestinal parasites which rapidly infect calves born during this period. These infections usually lead to the early death of calves. Contrary to the dry season, pasture is less infested by infective L3 larvae. The poorly infected calve quickly acquired immunity. So, in the late dry

season calving would be more reassuring for calves. Although calving at this period are stressful for the cow which must ensure the beginning of lactation at an unfavourable season, the cow recovery is satisfactory because the increase in lactation occurs when food conditions is the best.

Effect of gender on calves' mortality

There is no significant relationship ($p > 0.05$) between sex and calf mortality. But we observed that calf mortality rate of males (25.75%) is higher than that of females (21.50%).

CONCLUSION

In view of the high mortality rate, age at first calving and calving interval greater than elsewhere, one can say that the reproductive performance of the Centre Goudali cattle during these ten years have been bad .

A peak of calving in the late dry season is observed. Therefore, the research on the calves or the heat (artificial insemination) should be programmed at the end of the dry season or the middle of the rainy season respectively.

For better monitoring of the animals, there should be a breeding season, which will effectively determine a "season of birth" to the most favourable period. The duration of this breeding season may be 3 months. It should start from June and end in August as this will enhanced maximum births in late dry season.

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