

# Preliminary Findings on the General Characteristics of the Oestrous Cycle in Postpartum Ngaoundere Gudali Cows

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## Summary

A study was conducted to determine some important oestrous cycle characteristics (length and duration of oestrus) of Ngaoundere Gudali cattle at the Wakwa Agricultural Research Centre, Cameroon. The mean length of the oestrous cycle was  $21.8 \pm 0.5$  d, significantly ( $P < 0.05$ ) longer during the dry ( $24.1 \pm 0.7$  d) compared to the rainy ( $20.6 \pm 0.5$  d) season. A seasonal occurrence of oestrus was detected, suggesting that the oestrus in the Ngaoundere Gudali cow is more frequent during the rainy season. The oestrous period averaged  $9.8 \pm 0.6$  h, with a range of 5 to 13 h. It was concluded that although the oestrous characteristics of the Ngaoundere Gudali do not seem to differ significantly from what is reported in other zebu breeds, more studies are needed to draw a clearer picture of the oestrous cycle characteristics of the breed.

## Résumé

### Données préliminaires sur les caractéristiques générales du cycle oestral des vaches suitées Goudali de Ngaoundéré

Une étude a été conduite en vue de déterminer quelques caractéristiques importantes du cycle oestral (longueur et durée de l'œstrus) des bovins Goudali de Ngaoundéré au Centre de Recherche Agricole de Wakwa, Cameroun. La durée moyenne du cycle était de  $21,8 \pm 0,5$  j, significativement ( $P < 0,05$ ) plus longue pendant la saison sèche ( $24,1 \pm 0,7$  j) que pendant la saison des pluies ( $20,6 \pm 0,5$  j). L'apparition saisonnière de l'œstrus suggérerait que l'œstrus est plus fréquemment exprimé chez la vache Goudali de Ngaoundéré pendant la saison des pluies. L'œstrus a duré en moyenne  $9,8 \pm 0,6$  h, et a varié de 5 à 13 h. Il en a été conclu que les caractéristiques de l'œstrus du Goudali de Ngaoundéré ne diffèrent pas significativement de ce qui a été rapporté chez d'autres zébus mais des études plus approfondies sont nécessaires pour donner une image plus précise de ces caractéristiques.

## Introduction

Reports on beef cattle cow-calf operations show that the main reason for low productivity is the poor reproductive performance of females (7, 9). This situation results from a combination of genetic, physiological, management and environmental factors, which affect the female in all the different reproductive stages, including the oestrous cycle (3). Previous reports (2, 13, 14, 18, 20, 27) have shown the duration of the oestrous cycle in African zebu cattle to vary between 16 and 30 days, with an average of 21 days. Other studies have shown the duration of the oestrous cycle to be affected by season (23, 27) and oestrus to be shorter in zebu than in the *Bos taurus* cattle breeds (11, 18, 23). However, very little is known about these parameters in Ngaoundere Gudali cattle, one of the most popular cattle breeds of the Adamawa Highlands in Cameroon. The few existing reports on reproductive performance of this breed are based either on information from a very limited number of animals or on results from questionnaires (5, 12, 19). No research work has been carried out to-date, aimed at understanding the basic reasons for the breed's poor reproductive performance, despite its fairly good productive performance. It was therefore deemed necessary to establish the reproductive characteristics of the breed and the effects of environmental factors on these parameters, in order to devise management strategies geared at improving its reproductive efficiency. The aim of this study was to characterise the oestrous cycle in postpartum Ngaoundere Gudali cows.

## Materials and methods

The study was conducted on the beef herd of the Wakwa Regional Centre of Agricultural Research between November

2001 and May 2002. The Wakwa Research Centre is located on the Adamawa plateau, about 10 km east of Ngaoundere at latitude  $7^{\circ}30'N$  and longitude  $13^{\circ}30'E$ . Wakwa is situated at an altitude of approximately 1200 m above sea level. The breed, climatic conditions, soil, vegetation and general management practices have previously been described (1, 10, 16, 17, 21, 22, 26). Forty postpartum Ngaoundere Gudali cows, aged 5 to 8 years were monitored during a 200-day period following parturition (between mid October and end of May). The cows were maintained on natural pastures, with a dry season supplement (cotton seed cake, 200 g/100 kg BW) offered from mid-January to mid-April. Access to water was unrestricted during the day and the animals were housed in a pen at night. Oestrus was checked twice daily (06:00 to 07:00 and 16:00 to 17:00) with the aid of a penis-deviated teaser bull. All behavioural signs of oestrus and the duration thereof were recorded. Onset of oestrus was taken as the first time when the cow allowed the teaser bull to mount her or was mounted by another anoestrous cow, and stood still. Mean duration of oestrous cycle was determined as the number of days elapsing between two consecutive observed episodes of standing oestrus. When a cow first allowed herself to be mounted, she was isolated in a pen with the teaser bull and oestrous behaviour observed for spells of 30 minutes, at hourly intervals, until the cow no more allowed mountings. Duration of oestrus was then calculated as the time elapsed between first and last observed acceptance to be mounted (4).

In addition to the above historical data collected from the artificially inseminated herd at the Wakwa Centre were used to monitor the seasonal occurrence of oestrus. In this herd,

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oestrus was detected twice a day (7:00 to 7:30, and 16:00 to 16:30) and AI practised all year round. Thus, a total of 1504 occurrences of oestrus over a 9 year period (January 1980 to December 1988) were recorded. All data were analysed with the GLM procedures of SAS (25).

## Results and discussion

During the experimental period, a total of 81 oestrous cycles were observed in 25 of the 40 postpartum cows monitored, meaning that 37.5% (15/40) of the cows were in anoestrus or did not show oestrus during the 200 d observation period following parturition. Mean recorded oestrous cycle length  $21.8 \pm 0.5$  d, ranging from a minimum of 15 d to a maximum of 35 d. The frequency distribution of the length of the oestrous cycles is shown in figure 1.

Most of the oestrous cycles (67.9%) had a length comprised of between 18 and 22 d, while 18.52% of the cycles lasted

between 23 and 28 d. Only 4.9 and 8.6% of the cycles had a length of 15 to 17 and 30 to 35 d, respectively. These results are in agreement with those recorded from zebu breeds in Nigeria (2, 6, 13, 14, 20) and Ethiopia (18). Reports in other tropical areas showed the oestrous cycle length of tropical indigenous cattle breeds to stand between 16 and 30 d (11). In the present study, it is possible that the occurrence of silent oestruses and oestrus manifested at night might have been missed. The restricted duration of the observation periods, the relatively small number of animals available for the study and the unfavourable time of the year (mostly during dry season) did not allow for the observation of more than two oestrous periods in most of the cows. Dawuda *et al.* (6) have reported differences in length for the first, second and third oestrous cycles between the silent oestrus and oestrous cows to be not significant.

The oestrous cycles were significantly ( $P < 0.05$ ) longer during the dry season ( $24.1 \pm 0.7$  d), compared to the rainy season

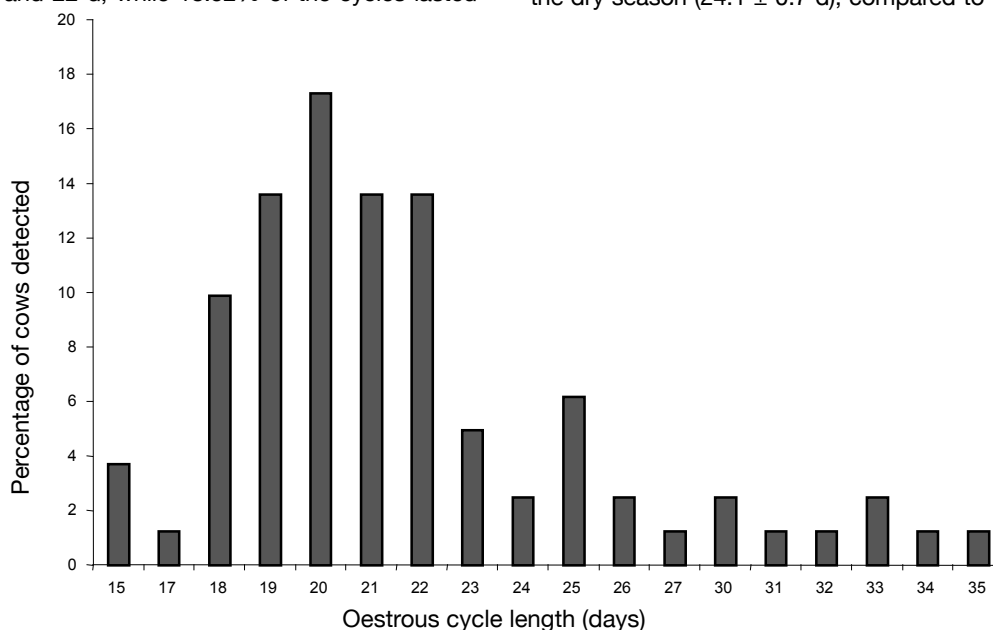


Figure 1: Frequency distribution of oestrous cycle length of postpartum Ngaoundere Gudali cows.

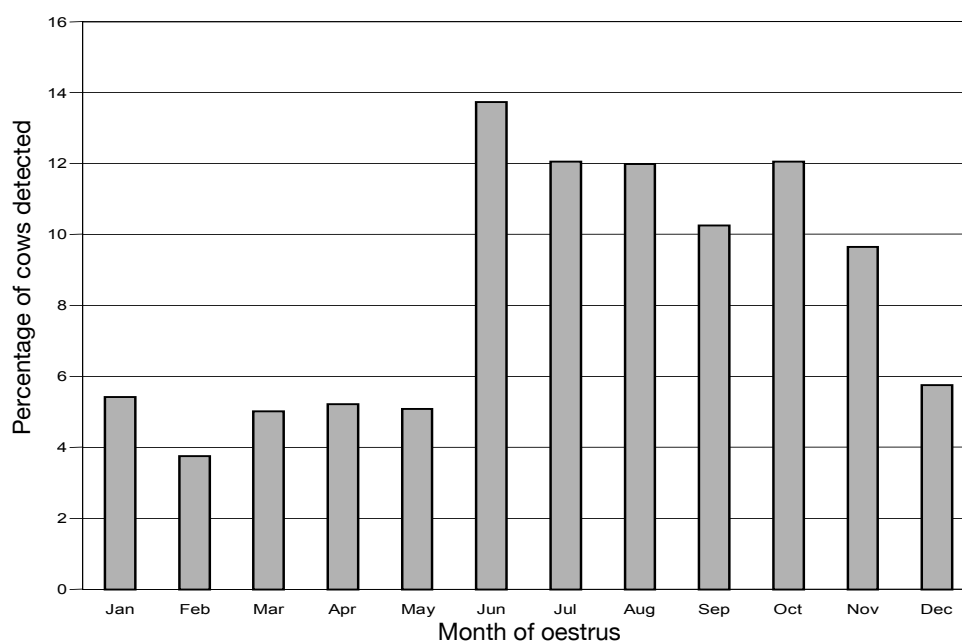


Figure 2: Average monthly distribution of oestrus over a period of 9 years in Ngaoundere Gudali cows.

(20.6 ± 0.5 d). The significant effect of season on the duration of the oestrous cycle has been previously reported elsewhere (15, 19, 23, 27). These reports are generally in agreement with the tendency for longer oestrous cycles during the dry season. Zakari *et al.* (27) working with the White Fulani and Sokoto Gudali in Nigeria, showed the oestrous cycles to be on average longer (26.04 d) in the pre-rainy season than during the rainy season (20.8 d). However, Mattoni *et al.* (19) and Lamothe-Zavaleta *et al.* (15) respectively reported oestrous cycles to be 1.3 and 2.1 d longer during the rainy season than during the dry period in zebu cattle. The observations recorded during the monitoring period show a significant ( $P < 0.05$ ) influence of season on the number of cows in oestrous. Twenty-eight cows (34.6%) were detected in oestrous during the 3 hotter months of the dry season (January to March), and the rest (53/81 or 65.4%) were cyclic during the 2 cooler months of the rainy season (April and May).

From the historical data collected from the AI herd, it was noted that the majority of the cows were detected in oestrous during the rainy season, which runs from April to October. The monthly distribution of the oestrous observations is shown in figure 2.

Only 28.9% of the oestrous manifestations observed during the 9-year period were detected during the dry (November to March) and early rainy season (April and May), compared to 71.1% during the rest of the rainy season (June to October), when the average daily temperatures were lower. The low incidence of oestrous at the onset of the rainy season (April to May) could be related to a nutritional carry-over effect from the previous dry period. During these two months, the grass has just begun to grow and does not meet the requirements of the cows, whose body reserves were depleted during the long and harsh dry season. The seasonal peak occurrence of oestrous correlates well with the seasonal concentration of births that occurs 9 months later. These results confirm that oestrous manifestation in the Ngaoundere Gudali cows is more prominently expressed during the rainy season - probably due to the beneficial combination of availability of green and nutritious pastures, and of the mild ambient temperatures.

During the dry season in the Adamawa Highlands, the poor quality and low quantity of the vegetation limits the reproductive efficiency of Ngaoundere Gudali cows. Lhoste (16) reported losses in bodyweight of up to 20% in lactating Ngaoundere Gudali cows during this period. It could therefore be hypothesised that during the dry season, most cows are in a state of nutritionally-induced anoestrous associated with lactational anoestrus, as a majority of the dams calving during the rainy season are still nursing their calves during the following dry season. The current results agree with those of Rakha and Igboeli (24) who suggested that day length, along with other environmental factors such as temperature, rainfall and nutrition, are of overriding importance in the expression of oestrus. Although these findings are contrary to those of Zakari *et al.* (27) in Northern Nigeria where oestrous in indigenous cows seems to be manifested more frequently during the hotter months of the

year, they confirm reports stating that cows tend to express oestrus more prominently during the cooler hours of the day. The observation periods in this case (06:00-07:00 and 16:00-17:00) are relatively cooler, and it has been shown that tropical breeds tend to show oestrous during the cooler hours of the days (15, 18).

The mean duration of oestrous periods recorded varied between 5 and 13 h, with a mean of  $9.8 \pm 0.6$  h, which is lower than the 10-20 h reported in the literature for tropical zebu cattle (8, 11, 15). An exception is the report of Johnson and Oni (13) in Nigeria showing an oestrous duration of 4 hours in Bunaji cattle in Nigeria. These differences could possibly be attributed to the different methods (duration and intervals) used for oestrous detection. In the present study, some of the cows may have been already in oestrous for some time before or after the observations were made. The actual onset and termination of the oestrous period could therefore have been missed and the low observation frequency could partially explain the shorter duration of the oestrous period recorded. As most of these observations were carried out during the rainy season, the effect of season on the duration of oestrous could not be determined. Zakari *et al.* (27) found mounting behaviour to be affected by season - it lasted longer in the rainy (4.7 hours) compared to the dry season (3.9 hours).

## Conclusion

The mean length of the oestrous cycle in the Ngaoundere Gudali cows is 21.8 d. Season significantly affects the length of oestrous cycle and the occurrence of oestrous in Ngaoundere Gudali cows. The cycles tended to be longer during the dry (24.1 d), compared to the rainy season (20.6 d). Most (65.4%) of the cycles detected occurred during the rainy season, with the majority concentrated in the period between July and October. The availability of nutritious (high protein) pastures during the rainy season seems to have a beneficial effect on the expression of the oestrous cycles. The mean duration of oestrous in Ngaoundere Gudali cows was recorded as 9.8 h, shorter than that reported in the literature for tropical zebu cattle, but this could be partially attributed to the low frequency of oestrous observation periods used in this study. More in-depth studies with a greater number of cows are deemed necessary for a better understanding of the oestrous cycle of local zebu cattle. Also, frequent blood sampling should be undertaken to qualify the pattern of circulating progesterone levels in these cows (both during the oestrous cycle and early pregnancy).

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