

Original Research

Effect of the use of single dose of prostaglandin $F_{2\alpha}$ in cows after one month of calving, to determine the heat induction in the local cows of suburban area of N'Djamena, Chad

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ABSTRACT:

The objective of this study was to evaluate the effect of the systematic use of a single amount of the prostaglandin $F_{2\alpha}$ after one month of calving on the renewal of sexual activity of beef at Chad. (Sixty five (65) cows of local breeds from N'Djamena urban area were selected and divided into two groups: Forty-three (43) cows were treated with Prostaglandin $F_{2\alpha}$, one month after calving and 22 cows as witnesses. More than half (60.46%) of the cows answered the treatment and 39.54% did not react. The answer varied with the parity (68%) for the first half of the cows against 32% for the multiparous but the body weight at calving did not have an effect. Only, the acceptance of overlapping was retained for the detection of return in heat, which took place on an average of 2.36 ± 0.14 days after treatment. The treatment made it feasible to have one year interval between calving (first heat of 32.36 ± 0.14 days.) Heat thus obtained, can be used as reference to the stockbreeders to program the reproduction of their herd in order to have one year interval calving-calving closed. This test sample gave better indication in first half of the cows while waiting for confirming it in the station.

Keywords:

PGF_{2α}, single amount, induction of heat, postpartum, bovines, Chad

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INTRODUCTION

The postpartum anoestrus is a period between calving and resumption of postpartum sexual activity in cows. It is normal when its duration does not exceed 60 days postpartum. Beyond this period, it becomes pathological and negatively affects the duration of the Calving Interval (CI) (Opsomer *et al.*, 1996). The anoestrus postpartum is common in tropical cattle and especially in the Sahel region of Chad. In these regions, particularly in Chad, the resumption of sexual activity and behavioral manifestation after calving, are often late. They can reach six (6) months or even a year (Agba, 1975). According to Ledoux (2011), this period depends largely on calving season, parity, the husbandry and cyclical the nature of anomalies after calving (dystocia, metritis, pyometra, delayed uterine involution and ovarian dysfunction).

These anomalies affect the reproduction by delaying the return of the first heat after calving, disturbing regularity of heats prior to reproduction and the reproduction by delaying implementation of cows (Ledoux, 2011). This results in a long interval calving (IVV) ranging from 15 to 18 months. Now, for a cow to have a good reproductive performance, it must present a normal cycle with regular heat ^{calving 1st} heat interval (IVC1) detected in 41, an interval calving first projection (IVSP) of 72 days and a IVV 387 days (Ponsart *et al.*, 2006). The lack of accurate information on this subject and the traditional character of livestock in Chad make it difficult to know the cause of low reproductive performance of cattle. However, poor herd management and especially the lack of monitoring of reproduction are the cause of these poor performances.

To improve the reproductive performance of cows, hormone therapy was an interesting alternative for individual treatment and un systematic for all cows in the herd (Hanzen *et al.*, 1996). Indeed, two alpha prostaglandin F (PGF_{2α}) because of its induction effects of the recovery of ovarian activity and acceleration of

uterine involution (Mechekour 2003; Dudhatra *et al.*, 2012; Khatri *et al.*, 2013) is used to induce the resumption of sexual activity in cows.

The objective of the study is to evaluate the effectiveness of treatment with prostaglandin on the resumption of postpartum ovarian activity in the local cows four races Chad.

MATERIALS AND METHODS

Study Area:

The study took place in cattle farms, located around N'Djamena within 50 Km from the city of the Sudano-Sahelian zone of Chad. Climate plan alternation between a rainy season (June-September) and a dry season (October to May) was observed. The isohyète varies from 400 to 600 mm of rain per year and the temperature ranges from 29°C in cool period (December-February) and 50°C during the hot season (March to June). This is one of the areas of high concentration of cattle in Chad. In addition, improved types of farms begin to develop on the outskirts of this city, and uses artificial insemination as reproduction mode.

Study Animal: The study involved 65 local breeds of cows (Arabic, Kouri, Bororo, Bokolodji and Grand) divided in two groups (Table 1). These cows were chosen based on their calving date and parity (at least one calving). No pre-breeding control was made but the animals were followed after calving until 60th postpartum day to test the effect of administration of a single dose of prostaglandin on the resumption of postpartum sexual activity. The cows that calved within a month were recorded.

However, the production parameters such as body condition at the time of calving (appreciated by the rating status on a scale of 1 to 5), age, parity, and postpartum health were also recorded in order to assess their effects on treatment.

The animals were identified using numbered ear loops. Their staple diet consisted of forage present on

Table 1: Distribution of cows selected according to the batch and parity for experimentation in the area of N'Djamena (Chad)

Race	Lot1			Lot2		
	Primipare	Multipare	Grand Total	Primipare	Multipare	Grand Total
Arabic	12	11	23	05	07	12
Kouri	02	07	09	00	02	02
Bororo	04	04	07	01	06	07
Bokolodji	01	02	03	00	01	01
Grand Total	19	24	43	06	16	22

natural pasture. Sometimes deitary supplement are made to the artificial insemination campaign approach (IA). Reproduction is mainly by natural mating, but to a lesser extent artificial insemination are also carried out.

PGF_{2α} treatment:

The 65 selected cows were divided into two lots: Lot-1 with the 43 heads received systematically intramuscularly, 2 ml of PGF_{2α} (Estrumate®, 500 micrograms cloprostenol) per cow, one month after calving and Lot-2 (control) consisted of 22 females received no treatment. The animals were taken every day to pasture by herdsman.

Heat detection:

The heats were followed by visual observation from the day of treatment until the 60th day postpartum for the experimental lot (Lot-1) and calving until 60th postpartum day for the control group (lot-2). The herdsman were responsible for heat detection by visual observation of overlap acceptance. For each detection date observed heat was noted and the duration of the heat treatment-event interval was calculate by day.

Data analysis:

Variables such as the percentage of response to treatment, the period of return to heat after calving, lot and parity were evaluated. The data were entered into Excel. The XL-STAT software (6.1.9 Version) was for descriptive statistices (calculation of frequencies, means and standard - type). The variance analysis (ANOVA) was done using the Newman-Keuls test at 5% level.

To evaluate the effectiveness of treatment, the percentage and heat recovery time after calving in both groups were estimated and compared. The judgment criterion was the superiority or inferiority of the rate of return to heat after treatment of cows from the experimental lot, compared to the untreated lot.

RESULTS AND DISCUSSION

Heat return rate after treatment

In between batches, the percentage of return to heat within 60 days postpartum was better in the treated group than in the untreated (Table 1).

Despite the effectiveness of prostaglandin being low in healthy cows systematic treatment (Hanzen *et al.*, 1996; Fleurquin, 2013), this test has allowed us to have some results in farming extensive livestock system . The result was encouraged and indicate susceptibility of treatment to be effective on the resumption of postpartum sexual activity among Chadian cattle.

Processing time

The processing time is in agreement with the study of Smith and Carlos (2002) which raised interest of the use of prostaglandin F_{2α} around 30 days postpartum puerperal disorders and resumption of ovarian activity in

Table 1: Heat return rate of local cows based lots in the area N'Djamena (Chad)

	Positive (%)	Negative (%)	Grand Total
Lot 1	60.46 (n = 26)	39.53 (n = 17)	100% (n = 43)
Lot 2	22.73 (n = 5)	77.27 (n = 17)	100% (n = 22)

cows. But this treatment is not justified for healthy cows and to make it more effective, the treatment must be done in the first two injections and should not be done before the 24th day after the 40th day postpartum 88 (Guilbault *et al.*, 1988 and Hanzen *et al.*, 1996 Bencharif *et al.*, 2000 Fleurquin, 2013).

Response to treatment in the test batch

The percentage of return to heat in Lot 1 was very high (Figure 1). Considering the injection time after calving. This reflects the degree of inflammation of the uterus, postpartum months less than in immediate postpartum period. However, it was higher than 16.66% (first injection) reported by Amjad *et al.*, (2006) where PGF_{2α} is injected systematically for 85 days in Sahiwal Zebu. The low rate of return to heat in the first 60 days of the control group compared to the experimental group showed that PGF_{2α} had a significant effect on the resumption of postpartum sexual activity. It decreased the number of days open from 6 months older (Agba 1975) to 32.36 ± 0.14 days after calving in zebu. Pending confirmation by studies in the resort, this result is a very explorable and economical approach for the control of the calving interval to improve the reproductive performance of Sahelian cattle.

Gender and age of the cows

The average rate was 1.85 ± 1.06. She has had an effect on treatment response. Primiparous gave a good result. Response to treatment was better in

primiparous than in multiparous (Figure 2). The difference between positive and negative results was significant (p <0.05).

This result is justified by the fact that the heifers (young) have more often delay of uterine involution compared to multiparous (older). Uterine inflammation would have increased sensitivity to prostaglandin F_{2α} do rid the uterus of its content, increase the defense of the animal, lyse the corpus luteum if its presence is linked to inflammation. and accelerate uterine involution to restart ovarian activity. These effects are reported by many authors who have not advised the use of prostaglandin on healthy cows (Hanzen *et al.*, 1996; Bencharif *et al.*, 2000 Mechekour 2003 Dudhatra *et al.*, 2012, Fleurquin, 2013 Khatri *et al.*, 2013).

Body condition score

The average body condition score at calving cows was 3 ± 0.55 without significant difference (P> 0.05) between batches (Figure 3)

The body condition score of the animals at the time of treatment had no effect on treatment response. The small difference of the circular body condition of cows, had no effect on the outcome . For cons, the effect of weak note body condition at calving or weight loss after calving on resuming sexual activity was noted in Charolais cows. In that race, it was reported that gender and weight loss after calving affected the duration of postpartum anoestrus. The heifers cows that

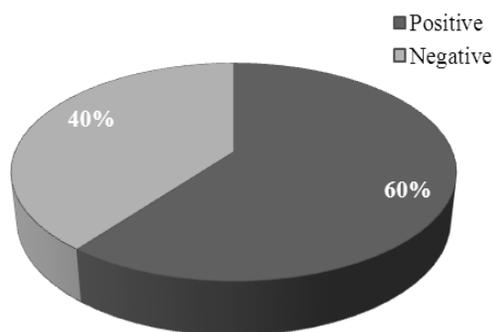


Figure 1: Percentage of response to treatment in the batch of cows experienced in the area of N'Djamena (Chad).

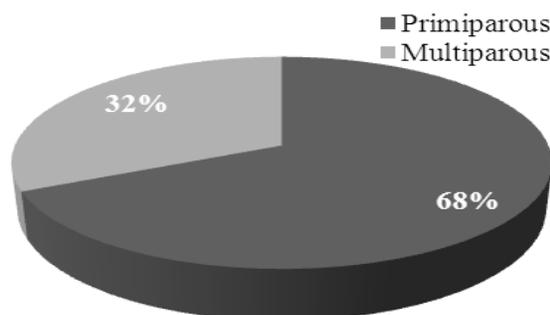


Figure 2: Responses (%) treatment between primiparous cows and multiparous cows in the area of N'Djamena (Chad)

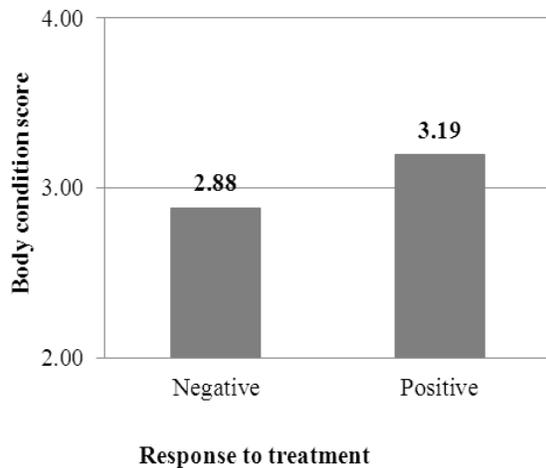


Figure 3: Treatment response according to the body condition of cows calving in the area N'Djamena (Chad)

have lost weight after calving, had a long postpartum anoestrus (Mialon *et al.*, 1996 and Disenhaus *et al.*, 2008).

In the heat of time after the onset of treatment, the median time to onset of heat in lot 1 was 2.36 ± 0.14 days post treatment, or 32.36 ± 0.14 days after calving with 72, 73% in 2 days. The framework within well, with the objective of one calf per cow per year, to achieve. It is even lower than that fixed by Ponsart *et al.*, (2006)

The time back after calving showed that in the lot 2, the heat of events averaged 69.50 ± 37.75 days. This period varied from 33 to 149 days after calving. A low number (22.73%) cows showed their heat in the two months postpartum. In contrast, the majority (77.27%) cows have not been heat beyond 60 days postpartum. But even in temperate countries where reproduction is controlled, the return rate of Charolais cows in heat is low (58%), before three months after calving (Mialon *et al.*, 1996). This confirms the abnormally prolonged *anestrus* reported in tropical cattle (Agba 1975). These low percentages of recovery in cyclicity cattle in tropical or temperate compared experimental results have justified the effect of prostaglandin on resuming sexual activity. Mastering the resumption of postpartum sexual activity appears to be an important parameter for reducing the calving

interval in Chadian cattle.

CONCLUSION

The study showed that it is possible to induce the heat back in a month in postpartum cows at Chad. The local cows that are primiparous better answered than multiparous, probably because of the degree of uterine involution between the two categories of cows.

The misconduct of breeding cows due to the absence of a registration register, did not assess the effects of uterine infections, retained placenta and treatment.

Studies on homogeneous animals (parity) on station or in farms where the conduct of reproduction is done well (followed by heat) are needed for a better understanding.

The use of PGF_{2α} single dose to a month postpartum reduce the number of days open for local cows of Chad. Through this reference for heat, the breeder could program the reproduction of these animals to remain in the calving interval of around 12 months.

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