

## SHORT COMMUNICATION

### Comparative study of oestrus responses in unsynchronized jennies and jennies synchronized with single treatment of PGF2 $\alpha$ (lutalyse®) in Zaria, Nigeria

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#### Abstract

*This study was carried out to compare oestrus responses in unsynchronized jennies and jennies synchronized using single treatment of PGF2 $\alpha$  (Lutalyse®). Eight (8) cycling Jennies aged 3.0 $\pm$ 2.0 years were used for this study. The jennies were randomly assigned to 2 groups of 4 jennies each; Group 1 (n=4): Jennies in this group were not treated with any agent; Group 2 (n=4): jennies treated with a single injection of 10mg of Lutalyse®. The synchronized and unsynchronized jennies were observed for behavioural oestrus three times daily (8-10 am, 12-2 pm and 4-8 pm) for two oestrous cycles. The fertility parameters determined in this study were: Oestrus response rate (ORR), Time to onset of oestrus (TOO), Duration of oestrus (DOO) and Intensity of synchronization (IS) within 48 hours. The ORR and IS were expressed in percentages while TOO and DOO were expressed as mean  $\pm$  SEM. Comparisons between the groups were carried out using T- test. Onset of oestrus in group 1 (2.34 $\pm$ 0.32 hours) was lower ( $P < 0.01$ ) than 10.07 $\pm$ 4.91 hours in group 2. The duration of oestrus in group 1 (48 $\pm$ 24.0 hours) was longer ( $P < 0.05$ ). than 24.0 $\pm$ 0.0 hours in group 2. Oestrus response rate were 50 and 25% in both groups 1 and 2 while intensity of synchronization within 48 hours for groups 1 and 2 were both 50% ( $P > 0.05$ ). In conclusion, single treatment of PGF2 $\alpha$  injection did not improve oestrus response rate and intensity of synchronization. However, more than a single treatment of PGF2 $\alpha$  injection is recommended for effective oestrus synchronization in jennies.*

**Keywords:** Nigerian Jennies, Oestrus Responses, Lutalyse, Oestrus Synchronization, Intramuscular Injection.

#### Introduction

Donkeys are one of the ancient domesticated livestock species and are valued for their ability to survive under harsh conditions (Blench *et al.*, 1990; Swai and Bwanga, 2008). However, they are often regarded as animals of low social status and neglected by research and developmental organizations (Starkey, 1995). There are 41.5 million donkeys worldwide (Desalegne *et al.*, 2011), with a population of 0.8 million donkeys in Nigeria (Mabayoje and Ademiliyi 2004). In

Nigeria, donkeys are concentrated mainly in the northern states because of the savannah type of vegetation and fewer disease vectors such as tsetse flies (RIM, 1992). About 16,000 donkeys are transported annually from the northern to south-eastern Nigeria, where they are slaughtered for food (ATNESA, 1997; Blench, 2004). The jenny (jennet) is very similar in many reproductive aspects to the mare and puberty is usually attained at 1–2 years (Blanchard *et al.*, 1999). Although the oestrous cycle has been

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reported to range from 20 to 40 days (Fielding, 1988), oestrus usually lasts between 6 and 9 days, with ovulation occurring 5–6 days after the onset of oestrus (Vandeplasseche *et al.*, 1981). Gestational length occurs between 372–374 days and foal heat return to oestrus after parturition is 5 and 13 days. Synchronizing oestrus is usually achieved by using luteolytic agents such as prostaglandin  $F_{2\alpha}$  or one of its analogues (Lutylase<sup>®</sup>, Estrumate<sup>®</sup> Prostaglandin- $F_{2\alpha}$  e.t.c.). Prostaglandin- $F_{2\alpha}$  (PGF<sub>2 $\alpha$</sub> ) acts by terminating the luteal phase through regression of the corpus luteum. Dinoprost tromethamine (Lutylase<sup>®</sup>) contains naturally occurring Prostaglandin- $F_{2\alpha}$  (dinoprost) as the tromethamine salt. In the reproductive system, it plays a role in ovulation, luteolysis, gamete transport, uterine motility, expulsion of foetal membranes. In the ewe, oestrus occurs 2-5 days after luteolysis following intramuscular injection for 250 $\mu$ g either twice at a 5 to 14-day interval

(Jainudeen and Hafez, 2000; Kusina *et al.*, 2000). In this present study Lutylase was used to cause luteolysis and shorten the onset of oestrus.

This study was carried out to compare oestrus responses in unsynchronized jennies and jennies synchronized using single treatments of PGF<sub>2 $\alpha$</sub>  (Lutalyse<sup>®</sup>).

### **Materials and methods**

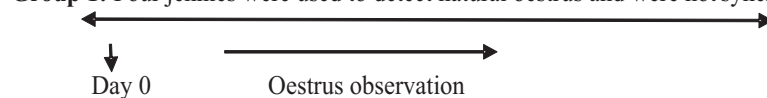
#### ***Study area, experimental animals and management***

This study was carried out at the donkey farm of the Equine and Camel Research Programme of the National Animal Production Research Institute (NAPRI), Ahmadu Bello University, Shika Zaria. Eight (8) cycling Jennies aged  $3.5 \pm 1.0$  years with mean body weight of  $95.6 \pm 2.5$ kg and mean body condition score of  $3.5 \pm 0.6$  were used for this study. The jennies were kept outdoors in a group and fed *Digitaria smutsii* (woolly finger grass), concentrate rations at 1.2kg/jennies/day and hay as basal diet while water was provided *ad libitum*.

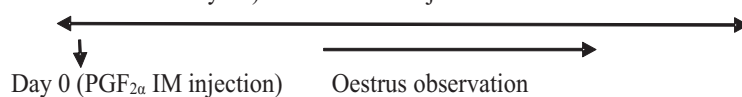
#### ***Experimental design***

The animals were randomly assigned to 2 groups of 4 jennies each

**Group 1:** Four jennies were used to detect natural oestrus and were not synchronized



**Group 2:** Four jennies were synchronized with a single treatment of 10mg of PGF<sub>2 $\alpha$</sub>  (Dinoprost tromethamine- Lutalyse<sup>®</sup>) intramuscular injection.



#### ***Oestrus detection***

Following the administration of PGF<sub>2 $\alpha$</sub> , treated and untreated jennies were observed for behavioral oestrus beginning from day 0 when the experiment commenced. Jennies were observed for oestrus behaviors for two hours, three times daily (8-10 am, 12-2 pm

and 4-8 pm) for four weeks.

#### ***Parameters measured***

Duration of oestrus (DOO) was obtained as the time interval between the first and last standing oestrus; Time to onset of oestrus (TOO) was the time interval from PGF<sub>2 $\alpha$</sub>  administration to the time when the jennies

first expressed standing oestrus; Oestrus response rate (ORR) - Number of jennies that were visually observed to be mounted by a jack as compared to the total number of jennies injected.; Intensity of synchronization (IS) - Number of jennies in oestrus as a result of synchronization within the set time limits.

#### Data analysis

Oestrus response rate (ORR) and intensity of synchronization (IS) were expressed as

percentages, Data on duration of oestrus (DOO) and time to onset of oestrus (TOO), were expressed as Mean  $\pm$  S.E.M., Comparisons between the groups were carried out using T- test of SAS package and the differences were considered significant when  $P < 0.05$ , highly significant when  $P < 0.01$  and not significant when  $P > 0.05$ .

#### Results and discussion

**Table 1: Oestrus characteristics of jennies in the two treatment groups.**

Parameters	Group 1	Group 2
TOO (hours)	2.34 $\pm$ 0.32	10.07 $\pm$ 4.91
DOO ( hours)	48 $\pm$ 24.0	24.0 $\pm$ 0.0
ORR (%)	50	25
IS (%)	50	50

TOO- Time to Onset of Oestrus; DOO- Duration of oestrus; ORR- oestrus response rate; IS- Intensity of synchronization

In this study, luteolysis and onset of oestrus was earlier in group 1 (2.34 $\pm$ 0.32) compared to group 2(10.07 $\pm$ 4.91). It was established that onset of oestrus in the two groups in this study were shorter than induction of heat at 86.4 hours and 105.6 hours, respectively post PGF<sub>2 $\alpha$</sub>  (5mg Dinoprost tromethamine) administration reported by Blanchard *et al.* (1999) and Getachew (2014). the observed variation could be attributed to the differences in dosage of PGF<sub>2 $\alpha$</sub> , protocols used, breed differences and also the sensitivity of the corpus lutea to the treatment. The duration of oestrus was 48 and 24 hours in Groups 1 and 2, respectively. This differs from the report of Meira *et al.* (1995) and Henry *et al.* (1991) who reported a longer duration of oestrus. This finding also differs from the earlier report of Blanchard *et al.* (1999) who established a longer duration of oestrus of 134.4 hours after PGF<sub>2 $\alpha$</sub>  treatment using 150mg PGF<sub>2 $\alpha$</sub>  and 10mg estradiol -17 $\beta$ . The difference in the duration of oestrus

between the report in this present study and the report from the other studies could be as a result of different dosages used in the studies and also the species differences. The 50% oestrus response rate and intensity of synchronization in this study differ from the findings of Ozturkler *et al.*, (2003) and Godfrey *et al.*, (1997), who observed 100% oestrus response rate in ewes treated with PGF<sub>2 $\alpha$</sub> .

#### Conclusion and recommendation

Synchronization of jennies is possible using exogenous PGF<sub>2 $\alpha$</sub> . However, oestrus response rate and intensity of synchronisation showed no statistical significant differences between the two groups but Time to onset of oestrus and Duration of oestrus had significant differences. In conclusion, single treatment of PGF<sub>2 $\alpha$</sub>  injection did not improve. Oestrous response rate and Intensity of synchronization , however, more than a single treatment of PGF<sub>2 $\alpha$</sub>  injection is recommended for effective

oestrus synchronization in jennies. It is however recommended to use double treatment of synchronizing agent.

Synchronization of jennies is possible using exogenous PGF<sub>2α</sub>. However, oestrus response rate and intensity of synchronisation showed no statistical significant differences between the two groups but TOO and DOO had significant differences.

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