OESTRUS BEHAVIOUR AND HORMONAL CHARACTERISATION OF THE OESTROUS CYCLE OF JENNIES SYNCHRONIZED WITH SINGLE TREATMENT OF $PGF_{2\alpha}$ (LUTALYSE®) AND JENNIES NOT SYNCHRONIZED, IN ZARIA NIGERIA.

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ABSTRACT
This study was carried out to evaluate oestrus behaviour and hormonal changes during the oestrous cycle of Jennies synchronized with single treatment of $PGF_{2\alpha}$ (lutalyse®) and Jennies not synchronized, in Zaria Nigeria. Eight (8) cycling Jennies aged 3.2±1.0 years were used for this study. The jennies were randomly assigned to 2 groups of 4 jennies each; Group 1 (n=4) Jennies not treated with any synchronizing agent; Group 2 (n=4) Jennies treated with a single injection of 10mg of Lutalyse®. The treated and untreated group were observed for behavioural oestrus three times daily (8-10 am, 12-2 pm and 4-8 pm) for two oestrous cycles. Blood was collected from the jennies for extraction of serum, for progesterone and oestradiol estimation using Enzyme-linked Immunosorbent Assays (ELISA). One-way ANOVA and T-test were used to analyze the results. The characteristic oestrus behaviour of jennies was; tail raising from the perineum, opening and closing of mouth (mouth clapping), flehmen and winking of the vulva. From this study it was established that the average oestrus period of Nigerian indigenous jennies was 8.0 ± 0.5 days and their average oestrous cycle length was 30.0 ± 5.0 days. It was concluded from this study that synchronization of Jennies is possible using exogenous $PGF_{2\alpha}$. This study has shown that, plasma progesterone and oestradiol analyses is a valuable tool for the study of fundamental reproductive endocrinology in Nigerian indigenous jennies.
Keyword: Nigerian Jennies, Oestrus behaviour, Hormonal characterization. Oestrus synchronization, Lutalyse.

INRODUCTION
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 Ademiluyu, 2004). Cross-border movements by the pastoral Fulani from Niger, Chad, Burkina Faso, Mali and Cameroon, have increased the number of donkeys in Nigeria (Blench, 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). Synchronizing oestrus is usually achieved by using luteolytic agents such as prostaglandin $F_2\alpha$ or one of its analogues. Examples of these products are sold under the trade names of Lutylase ®, Estrumate ® and Prostamate® (Howey *et al*., 1983). This study was carried out to evaluate oestrus behaviour and hormonal changes during the oestrous cycle of Jennies synchronized with single treatment of $PGF_{2\alpha}$ (lutalyse®) and Jennies not synchronized, in Zaria Nigeria.

MATERIALS AND METHOD
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 3.0 ± 1.0 years with mean body weight of 90.6 ± 6.5kg and mean body condition score of 3.5 ± 0.2 were used for this study. Cyclicity was determined based on two rectal palpations (30 days apart), ultrasound scans done twice and two blood samples were also obtained twice (30 days apart) to confirm

cyclicity. 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, 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

Day 0 → oestrus observation

Group 2: Four jennies were synchronized with a single treatment of 10mg of $PGF_{2\alpha}$ (Dinoprost tromethamine- Lutalyse®) intramuscular injection.

Day 0 ($PGF_{2\alpha}$ IM Injection) → oestrus observation

Oestrus detection

Following the administration of the injections of $PGF_{2\alpha}$, 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 the period of the experiment. Parameters evaluated were; lowered head with neck extended forward, opening and closing of the mouth, ears back against the neck, standing to be mounted, tail raised from the perineum, vulva winking, mucous discharge and presentation of the perineum toward the jack. In addition, Jennies were exposed to a jack to aid oestrus detection

Blood Sampling

Five (5) ml of blood was obtained from the jennies via jugular veni-puncture using a 5 ml syringe (18 Gauge needle) on the day of synchronization, then twice weekly for 8 weeks, to determine the progesterone and estradiol concentrations. The blood samples were decanted into vacutainers and transported to the laboratory. Blood samples collected were centrifuged at 2000×G and serum harvested. Serum samples obtained were appropriately stored at -20˚C until analysis for determining progesterone and estradiol concentrations using an Enzyme-linked immunosorbent assays (ELISA) technique.

Data analysis

Chi square was used to compare between the physical manifestations of oestrus and the different groups. Frequency of oestrus characteristics were expressed in percentage. Data on progesterone and oestradiol profile values were expressed as Mean ± S.E.M. Comparisons between the groups were carried out using one-way ANOVA and T- test. The differences were considered significant when $P < 0.05$, highly significant when $P<0.01$ and not significant when $P > 0.05$. SAS system for windows 9.0 was used for the analysis.

RESULT AND DISCUSION

Percentage frequency of oestrus characteristics in jennies treated with $PGF_{2\alpha}$

Parameters	Grp1 (NT)(%)	Grp2 (1LT)(%)	LS
Head lowering	60	40	**
Mouth clapping	70	50	**
Ears backward	60	50	*
Standing to be mounted	60	50	*
Tails raising	70	50	**
Vulva winking	60	40	**
Mucous discharge	20	10	*
Presentation of perineum	10	0	*
Flehmen	70	60	*

LS= Level of Significance.

Progesterone and Oestradiol Profiles for Group 1 (Not treated group)

The serum progesterone (P_4) and oestradiol (E_2) profiles for group 1 (jennies that served as control) to detect natural oestrus as shown in Figure 1.1. Mean P_4 concentration rose from 1.35±1.08 ng/ml on day 0 to 2.01±1.80 ng/ml on day 3 then declined to 0.18 ± 0.07 ng/ml on day 10 increasing to 2.44 ± 2.22 ng/ml on day 18, while E_2 concentration decreased from 11.81 ± 4.94 pg/ml on day 0 to 8.55 ± 1.63 pg/ml on day 14 then increasing to 11.10 ± 3.05 pg/ml on day 25.

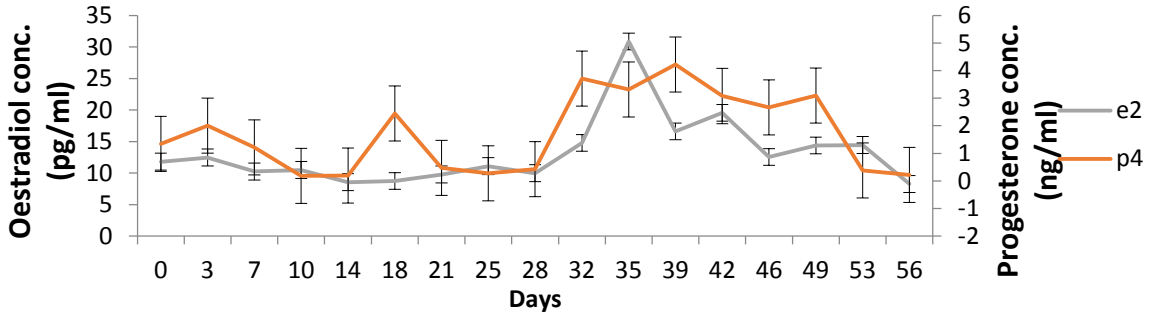

Figure 1.1 Progesterone and oestradiol profiles of jennies not treated.

Progesterone and Oestradiol Profiles for Group 2 (Single treatment lutalyse)

The serum progesterone (P_4) and oestradiol (E_2) profiles for group 2 (Single treatment lutalyse)as shown in Figure 4.8. The progesterone and oestradiol concentrations were inversely related. Mean serum P_4 concentration at the start of the study day 0, was 0.88 ± 0.61 ng/ml and mean serum E_2 concentration was 63.2 ± 49.94 pg/ml. The P_4 concentration rose to 6.45 ± ng/ml on day 3 after $PGF_{2\alpha}$ treatment and E_2 declined to 62.71 ± 45.79 pg/ml.

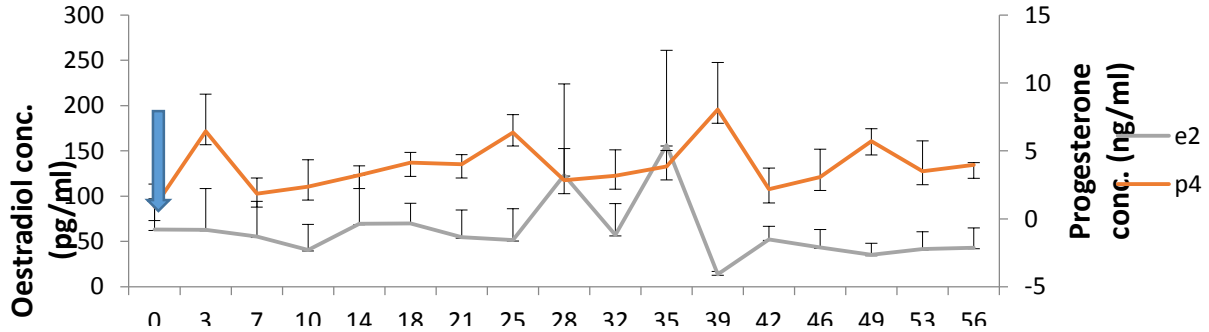

Figure 1.2 Progesterone and oestradiol profiles of jennies treated with a single injection of 10 mg of $PGF_{2\alpha}$
Key: Day 0= Day of first injection of 10mg of Lutylase

It was observed that tail raising, opening and closing of mouth (mouth clapping), flehmen and winking of the vulva were the most consistently observed signs of oestrus in jennies from all the groups, corroborating the works of Vandeplassche *et al*., (1981), Henry *et al*., (1991) and Taberner *et al*., (2008).

It was established from this study that the oestrus period of groups 1 and 2 were both 8 days, respectively. The oestrus cycle length of groups 1 and 2 was 25 and 35 days respectively. these findings are similar to the work of Henry *et al*., (1987), established that the oestrus period can occur between 6 to 8 days, and the oestrus cycle from 25 to 26 days.

CONCLUSION AND RECOMMENDATION

Synchronization of jennies is possible using exogenous $PGF_{2\alpha}$. However, it is recommended that single injections of Dinoprost tromethamine (Lutalyse®) can be used for oestrus synchronization in jennies but, there was no significant difference in the oestrus behaviors and hormonal profiles between the synchronized and un synchronized jennies.

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