

# Postpartum Ovarian Activities in Nigerian Donkeys

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**Abstract** This study was carried out to evaluate the ovarian activity of Nigerian jennies during the postpartum period. Fifteen (15) jennies aged  $4.5 \pm 1.5$  years and in their third trimester of gestation, were used in this study and they were brought into the experiment as they foaled. Five (5) ml of blood was obtained from each jenny via jugular veni-puncture on day of foaling, twice weekly until onset of oestrus. The blood was collected for extraction of serum, for progesterone estimation using Enzyme-Linked Immunosorbent Assays (ELISA). Two different progesterone profiles were observed in the postpartum studies, these varied in time when foal heat was observed in the jennies. In the first profile ( $n=10$ ), foal heat was observed at 28 days postpartum while in the second profile ( $n=5$ ), foal heat was observed at 35 days postpartum. Thereafter normal cyclical ovarian activity resumed at 56 to 63 days postpartum. The oestrous cycle length postpartum was 28 days. In conclusion, foal heat occurred between 28 to 35 days postpartum followed by a normal cyclical ovarian activity between 56 to 63 days in Nigerian indigenous jennies. Consequently, Nigerian jennies can be bred from day 56 to 63 days (8-9 weeks) postpartum so as to ensure optimum fertility.

**Keywords** Foal heat, Nigerian jennies, Oestrus, Postpartum, Progesterone

## 1. Introduction

Donkeys (*Equus asinus*) 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 burden, low social status and neglected by research and developmental organizations (Starkey, 1995).

The postpartum period is of great importance in management of reproduction in mares (Ginther, 1992). A good farm management programme cannot ignore the physiological interval within which the resumption of reproduction occurs with the appearance of the first heat after foaling, usually referred to as foaling heat (FH) (Iacono *et al.*, 1992). On the basis of currently available data, a fertile oestrus could appear in 5 to 13 days after foaling, this has been described in a widely variable range in mares and jennies (from 60% to 90%) (Mancuso *et al.*, 2004) followed by a second oestrus in 21 days (Pugh, 2002). Several factors may influence the onset of ovarian activity after parturition, in case of lactational anoestrus, mares fail to ovulate and/or show overt oestrus during the postpartum period (Allen 1985). Galisteo and Perez (2010) reported that, a foal-heat was detected after parturition in Spanish donkey on day  $13.2 \pm 2.7$  postpartum, after parturition, the interval between the first and second ovulations and the duration of oestrus

were prolonged to  $23.8 \pm 3.5$  and  $5.7 \pm 2.2$  days, respectively. To maximize the number of foals produced per dam lifetime and as a consequence, the economic return of broodmares of one foal per mare per year should be produced. This reproductive target could be achieved only if pregnancy, lasting 335 to 340 days, would start within 25 to 30 days after foaling (Pugh, 2002). The objectives of the study are to evaluate: the onset of oestrus and progesterone profiles of postpartum jennies.

## 2. Materials and Methods

### 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. Fifteen (15) jennies aged  $4.5 \pm 1.5$  years and in their third trimester of gestation, with mean body weight of  $119.6 \pm 26.5$  kg and mean body condition score of  $3.5 \pm 0.6$  were used for this study. The jennies joined the study as soon as they foaled. The jennies were kept outdoors in a group and fed grass, concentrate and hay, water was also provided *ad libitum*.

### Blood collection

Five (5) ml of blood was obtained from the jennies via jugular veni-puncture using a 5 ml syringe (18 Gauge needle) on day of foaling and thereafter twice weekly for progesterone profile, until the observation of overt oestrus behaviours. The blood samples were transported to laboratory on ice pack where they were centrifuged at

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2000×G to obtain serum. The serum samples were stored at -20°C until analysis for progesterone (P<sub>4</sub>) concentrations using Enzyme Linked Immunosorbent Assay (ELISA) kits from Monobind Limited, Lake Forest, CA 92630, USA.

### 3. Statistical Analysis

Data on progesterone profile values of postpartum were expressed as mean ± S.E.M. The data were considered significant when  $P < 0.05$  and not significant when  $P > 0.05$ . SAS system for windows 9.0 was used for the analysis.

### 4. Result

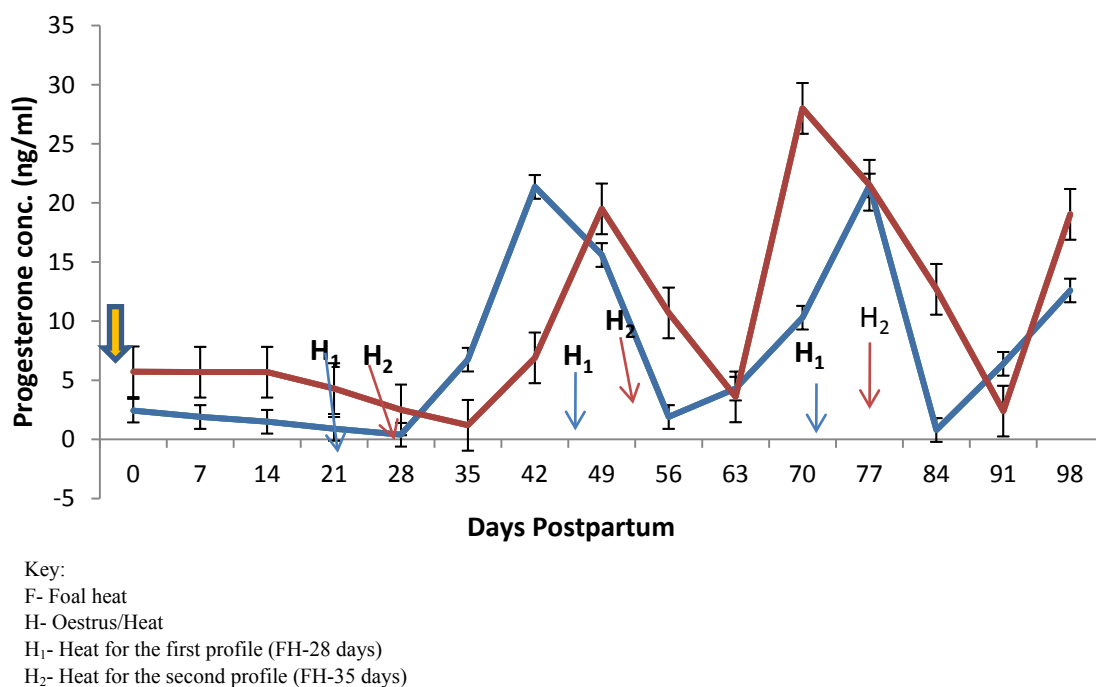
Progesterone profiles for jennies that exhibited foal heat at 28 and 35 days postpartum are presented in figure 1. P<sub>4</sub> levels for the 2 groups were not statistically different ( $P > 0.05$ ) mean serum progesterone (P<sub>4</sub>) concentration was  $2.44 \pm 0.05$  ng/ml (jennies with FH 28 days) and  $5.72 \pm 0.1$  ng/ml (jennies with FH 35 days) on day 0 postpartum, and then dropped to  $0.44 \pm 0.23$  ng/ml at 28 days and  $1.20 \pm 0.08$  ng/ml 35 days after parturition. P<sub>4</sub> concentrations increased to  $21.36 \pm 3.51$  ng/ml on day 42 and  $19.5 \pm 6.92$  ng/ml on day 49 for both groups then declined to  $1.9 \pm 0.2$  ng/ml on day 56 and  $3.6 \pm 1.2$  ng/ml on day 63, respectively. ( $P > 0.05$ ).

### 5. Discussion

This study has established progesterone assay, as an important tool in the determination of on-set of postpartum ovarian activity (PPOA) in jennies. Progesterone (P<sub>4</sub>) concentration declined from 2.44 ng/ml and 5.72 ng/ml on

the day of foaling to 0.4 ng/ml 28 days postpartum (10 jennies) and 1.2 ng/ml on day 35 (5 jennies) postpartum, respectively, indicating that after parturition Corpus luteum luteolysis results in removal of the negative feedback of progesterone on the hypothalamus causing folliculogenesis to resume, invariably causing progesterone decline on days 28 and 35 and foal heat on days 28 and 35 in the 2 groups of jennies, followed by a second oestrus between 56-63 days. This is in contrast to the reports by Pugh (2002) and Umberto *et al.*, (2013) who reported that foal heat in the jennies could appear in 5 to 13 days after foaling followed by a second oestrus in 21-35 days. This also differs from the works by Kalender, *et al.*, (2012) and Galisteo and Perez (2010). From this study, it was evident that the length of the oestrus cycle postpartum in Nigerian jennies is 28 days, which differed from the results reported by of Blanchard *et al.*, 1999, Nishikawa and Yamazaki, 1999 and Galisteo and Perez, 2010 who reported a shorter oestrus cycle length of 22.8, 23.3 and 23.8 days, respectively, in jennies. The difference between the results in this study and the earlier studies could be as a result of breed differences, environment (tropics and temperate) and nutrition. Galisteo and Perez (2010) reported that breed difference, different farm conditions under which animals are housed and the variable modalities used to collect reproductive parameters could cause a huge difference in the resumption of postpartum activities and postpartum oestrus cycle length in donkeys.

It was concluded from this study that foal heat occurred between 28 and 35 days and normal cyclical ovarian activity in indigenous jennies can occur between 56 and 63 days postpartum. Consequently, Nigerian jennies can be bred from day 56 to 63 days (8-9 weeks) postpartum so as to ensure optimum fertility.



**Figure 1.** Serum Progesterone profiles for jennies exhibiting foal heat at 28(10) and 35 days (5) postpartum

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