Animal Reproduction Science 124 (2011) 148–154

Contents lists available at ScienceDirect

Animal Reproduction Science

journal homepage: www.elsevier.com/locate/anireprosci

Reproductive physiology in female Old World Camelids☆

Julian A. Skidmore

Camel Reproduction Centre, P.O. Box 79914, Dubai, United Arab Emirates

ARTICLE INFO

Article history:
Available online 3 September 2010

Keywords:
Reproduction
Follicles
Camels

ABSTRACT

This review summarizes the basic reproductive physiology of dromedary and Bactrian camels. Camels are seasonal breeders with a relatively short breeding season during the cooler months. The onset of the breeding season can be influenced by local environmental factors such as temperature and pasture availability although decreased libido of the male as the environmental temperature increases is also a factor. Oestrous behaviour is highly variable in duration and intensity and is therefore unreliable for the detection of oestrus and difficult to relate to follicular activity in the ovaries. Camels are induced ovulators and thus normally only ovulate in response to mating. In the absence of mating, ovarian follicles tend to regress after a period of growth and maturity, whereas if male and females are kept together the female gets mated when the dominant follicle measures between 1.3 and 1.7 cm in diameter and the corpus luteum that develops has a lifespan of only 10–12 days. Peripheral concentrations of oestradiol increase with increasing follicle diameter until the follicle reaches 1.7 cm in diameter at which time they start to decrease even if the follicle continues to grow. The concentrations of progesterone remains low in non-mated animals but in mated camels it increases 3–4 days after ovulation (day of ovulation = Day 0) to reach maximum concentrations on Days 8–9 before decreasing rapidly on Days 10–11 in the non-pregnant animal. Ovulation can also be reliably induced using either Gonadotrophin Releasing Hormone (GnRH) or human Chorionic Gonadotrophin (hCG) but only when the follicle measures between 1.0 and 1.9 cm in diameter. Ovulation does not typically occur from follicles that grow beyond 2.0 cm in diameter but these follicles typically develop echogenic strands of fibrin as the follicle degenerates. The gestation period of camels is 13 months but the time of resumption of follicular activity following parturition is highly variable and influenced by nutritional status and lactation. Females that lose their offspring or have offspring which are weaned have a mature follicle develop within 10–12 days whilst in well-fed lactating females mature follicles do not develop until 30–60 days postpartum.

© 2010 Elsevier B.V. All rights reserved.

1. Introduction

The Old World Camelids comprise two species: namely, *Camelus dromedarius* (dromedary or one-humped camel) and *Camelus bactrianus* (Bactrian or two-humped camel). The dromedary camel thrives in the hot dry climates of North Africa, Arabia and Southern Asia, whereas the Bactrian camels are found in colder more mountainous regions such as Southern Russia, China and Mongolia. For centuries camel have been important animals in the desert for its ability to provide meat, milk and transport in harsh dry conditions but until recently research into improving characteristics such as milk or meat production have been lacking. However, the development of camel racing in the Middle East has led to an increase in value of racing animals and, therefore, increased interest in improving reproductive efficiency.

☆ This paper is part of the special issue entitled: Reproductive Cycles of Animals, Guest Edited by Michael G. Diskin and Alexander Evans.

E-mail address: luluskidmore@yahoo.com.

0378-4320/$ – see front matter © 2010 Elsevier B.V. All rights reserved.
doi:10.1016/j.anireprosci.2010.08.023

The reproductive efficiency of the camel under natural conditions is considered to be poor. For example, in Tunisia an overall calving rate of around 40% for 30 herds and a mortality rate between birth and one year of age of 17% was reported by Djellouli and Saint-Martin (1992). In addition, Saley (1990) reported calving rates of only 45% in East Central Niger and mortality rates of 10–25% between 0 and 6 months of age. Some of the reasons for these poor reproductive rates include a delay in the onset of puberty, a gestation period of 13 months, a prolonged (8–10 months) period of lactation-related anoestrus when nutrition is suboptimal, a relatively short breeding season and a high rate of early embryonic mortality (Nawito et al., 1967). This is why it has become increasingly important to understand the physiology of reproduction in this species so that good management and the use of assisted reproductive techniques, such as embryo transfer and artificial insemination, can be used to try and improve their reproductive efficiency. This review describes the breeding season, puberty and oestrous behaviour of female camels and relates ovarian follicular dynamics to hormonal profiles during waves of ovarian follicular development. In addition there is included a discussion of exogenous hormonal control of the ovarian cycle and methods to synchronize stage of oestrus in large numbers of camels.

2. Breeding season

Both dromedary and Bactrian camels are regarded as seasonal breeders with a relatively short breeding season during the cooler months when better pasture conditions prevail (Chen and Yuen, 1979; Wilson, 1984). This has been based mainly on the fact that there is a seasonal distribution of the birth of the calves, and on the status of ovarian activity in slaughtered animals (Novoa, 1970). The breeding season has been reported to occur between December and April in Egypt (Shalash, 1965), December and March in Pakistan (Yasin and Wahid, 1957) and from November to April in most of Arabia (Abdel-Rahim and El-Nazier, 1990), whereas with the Bactrian camel in China, the breeding season is between mid January and mid April (Chen and Yuen, 1979). Outside of the breeding season mating activity ceases and the ovaries are inactive or show a limited number of small follicles with irregular or extended follicular wave patterns (Musa and Abusineina, 1978). In the United Arab Emirates observations indicate well-fed and watered females will show limited ovarian activity throughout the summer but the determinant factors of the observed seasonality in conception dates are due to a decrease in libido in the male as environmental temperatures increase and an increase in early embryonic death during the hot summer months. In many other domestic species photoperiod is known to influence the onset of the breeding season but in dromedaries near the equator, where there is not much difference in day length, other local environmental factors such as rainfall (Bono et al., 1989), environmental temperature, and nutrition (Mares, 1954) will supersede effects of photoperiod and influence the time of initiation of sexual activity and length of the breeding season (Merkt et al., 1990). Another factor that affects the onset of rutting behaviour in males is the presence of females in the same herd; the rut starts earlier in mixed herds than in bachelor groups (Wilson, 1984).

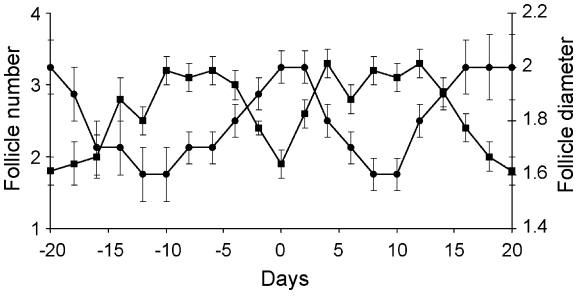

Fig. 1. Inverse relationship between the mean (±sem) number of follicles detected (■) and the mean (±sem) diameter (cm) of the largest follicle (•). Day 0 is the day the dominant follicle reached maximum diameter. Taken from Skidmore et al. (1995).

3. Puberty

Studies on puberty in the female dromedary are based on a few clinical and field observations (Wilson, 1986; Rai et al., 1991). Sexual activity starts as early as 2–3 years of age (Arthur et al., 1985) but in most management systems dromedaries are not bred until the female has almost reached her mature physical size at 4 years of age, resulting in an age at first calving of 5 years or more (Beniwal and Chaudhry, 1984). Several factors can affect the onset of puberty, but nutrition and adequate growth seem to be the most important factors. Those females raised under adequate nutritional conditions conceive and calve for the first time at an earlier age than those raised under more traditional management systems (Kamoun and Wilson, 1994). Growth and weight of young females also seem to be important factors in the onset of ovarian activity and influence the chances of conceiving and carrying a pregnancy to term. Kamoun and Wilson (1994) reported that the weight, height and girth of young females at first conception were 64%, 91% and 89%, respectively of the adult values, with the youngest female producing her first calf at 38 months. Breeding females before they reach 70% of adult weight can result in an increased rate of abortion (Molash, 1990).

4. Oestrous behaviour

Several authors have described signs of sexual receptivity or oestrous behaviour in dromedary camels such as chasing and mounting other females, restlessness, swelling of the vulva, straddling the hind legs and urination, vaginal mucus discharge and receptivity to the male (Novoa, 1970; Joshi et al., 1978; Wilson, 1984). When displayed, oestrous behaviour lasts on average 4–6 days but can vary from 1 to 21 days and can be observed up to 7 days after ovulation (Musa and Abusineina, 1978). However, as all these signs seem to be very variable in duration and intensity they are unreliable for the detection of oestrus. For example, in one behavioural study a male camel was kept with a group of females and their behaviour noted and related to ovarian follicular activity. Often the male was seen to follow

Download English Version:

https://daneshyari.com/en/article/2073571

Download Persian Version:

https://daneshyari.com/article/2073571

Daneshyari.com