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POST-PARTUM ANESTRUS AND SEASONELITY IN PRIMIPAROUS EGYPTIAN BUFFALOES

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ABSTRACT

Twelve primiparous Egyptian buffalo cows were used in this study during the period from July 2001 to April 2003 to investigate the post partum anestrus. The animals had 3.75 years of age with an average weight 435.41± 5.32 kg. The average length of post-partum anestrus was 62±3.33 days. Buffaloes calved during cold season (Nov. to April) had longer (75.25±7.70 days) post-partum anestrus than those calved during hot season (May to Oct.) 46.86±4.25 days. Overall mean of progesterone concentration during the entire length of post-partum anestrus was 0.16±0.29 ng/ml.

53.33% of animals exhibited either seasonal or long-term anestrus or both through the study. Progesterone levels during anestrus (post-partum, seasonal and long-term) were basal 0.6 to 0.42 ng/ml. The overall lengths of seasonal and long-term anestrus were 122±5.75 and 48.13±4.42 days, respectively. Progesterone profiles showed that tow thirds of the animals (66.67%) had post-partum anestrus continued with either seasonal anestrus or long-term anestrus or both of them along period of the study. This phenomena is considered to be a serious problem because it decreased the percentage of buffaloes that hastened their ovarian activity during the first 40 days after calving.

Keywords: Postpartum , Anestrus , Seasonality , Egyptian buffaloes.

INTRODUCTION

Poor reproductive performance of buffalo herds may be due to functional disorders and/or managerial defects (El-Sheikh and El-Fouly, 1971). Water buffaloes, like cattle are polyesterus and breed throughout the year. Seasonal calving patterns reported in many countries have been attributed to ambient temperatures. Photoperiod effect on estrus (Hafez, 1987). Analysis over 20.000 record of subfertile buffaloes reveled an incidence of 56.36% ovarian inactivity leading to anestrus (Rao and Sreemammarayna, 1982). Although buffaloes are polyoestrus, their reproductive efficiency show wide variation throughout the year as reported by different authors (Shah *et al.*, 1989; Singh and Lal, 1994; Zicarelli *et al.*, 1997; Srivastava and Sahni, 1999). Buffalo cows exhibit a distinct seasonal change in displaying oestrus, conception rate and calving rate. Also, Jain (1989) reported that in buffaloes, ovarian inactivity lead to anestrus are more prevalent in hot months. The ovaries in anestrus buffaloes are mostly very small in size and smooth. The failure of estrus expressivity in buffaloes leading to anestrus may be physiological, seasonal, nutritional, pathological and genetic causes. Kaur and Arora (1984) stated that under nutrition coupled with high environmental temperature may be responsible for the observed long seasonal anestrus period in buffaloes. Hussein (2000) concluded that ovarian hypoplasia in buffaloes is considered to be a serious

problem because it increased the length of post-partum anestrus and decreased the percentage of buffaloes which showed faster resumption of ovarian activity during the first 40 days after calving. Malhado *et al.*, (2004) noticed seasonal reproductivity with favorable sexual activities from Feb. to Jan. of three dairy buffaloes in Brazil.

This work focused on post-partum anestrus and seasonality of ovarian activity in buffaloes.

MATERIALS AND METHODS

1- Animals and housing:

Twelve primiparous buffalo cows were chosen randomly at random from the buffalo heard of Faculty of Agriculture, Ain-Shams University and used for the purpose of the present study during the period from July 2001 to April 2003. The animals had 3.75 years of age with an average weight 435.41± 5.32 kg. All buffaloes were left without services for one year (four seasons) to study the ovarian activity. Buffaloes were allowed to suckle their calves twice daily at 7a.m. and 2 p.m. up to weaning (100kg body weight). Buffaloes checked for heat symptoms two times daily at 8 a.m. and at 3 p.m. by using a fertile buffalo bull. The animals were kept tied in a semi-sheltered barn. and were loosened at time of watering, milking and blood sampling.

2- Feeding and watering:

Animals were fed according to their live body weight and milk production using the requirements adopted by the Animal Production Department of this Faculty. Rations included a concentrate mixture, rice straw and berseem (*Trifollium alexandrinum*) during winter and spring season or berseem hay during summer and autumn seasons. Fresh drinking water was available *ad lib.* three times daily.

3- Blood sampling and progesterone assay:

Jugular blood samples (8 ml) were collected three times weekly in EDTA. Na2 supplemented tubes of 07.00 to 08.00 h. month before calving till next pregnancy. The blood samples were centrifuged at 4000 rpm for ten minutes within half an hour after blood collection. The plasma was stored at -20oC till progesterone analysis.

Blood plasma progesterone (P_4) was detected by a direct radioimmunoassay procedure adopted for standers (0.2-28 ng/ml) prepared in blood plasma of estrus buffaloes. 1 ^{125}-progesterone (100 µl) and antiprogesterone serum (100 µl) were added (tube for non specific binding received no antiserum). The mean inter-assay coefficient of variation was 8.4% (n=30) with inter-assay coefficients of variation of 11.8% (n=13), 8.2% (n=13) and 5.1% (n=13) at low (0.60 µg/ml), medium (3.02 µg/ml) and high (6.49 µg/ml). The mean value for recovery was 98.5% with a range of 92-106% for different increments of progesterone standard added to plasma sample with, medium and high including analysis of variance, correlation coefficients and progesterone level.

The binding percentage was calculated by dividing the net counts per minute of assay tube by average net counts per minute of zero standard times 100. Logit-Log paper was used to plot the standard curve and to determine progesterone concentrations of unknown samples.

The following definitions and terms were used:

a- Post-partum anestrus : The period from calving until the start of the minor rise in progesterone concentration of the short low-peak progesterone cycle or the start of the major rise, in case of the absence of the short low-peak progesterone cycle. The major rise may be for regular ovulatory cycle.

b- Seasonal anestrus; This interval is characterized by the absence of cyclicity plasma (progesterone concentrations were basal) and coincided with the hot season of the year (April to September). Post-partum anestrus may be continuous with seasonal anestrus.

c- Long-term anestrus: Any type of true anestrus rather than post-partum and seasonal anestrus was referred to be long-term anestrus.

For the purpose of the study the year was arbitrary divided into two major seasons namely the hot season (May to Oct.) and the cold season (Nov. to April).

4- Statistical procedures:

Statistical analysis of the data were carried out according to SAS (1993). For statistical purposes, non-detectable progesterone values were considered equal to zero.

RESULTS AND DISCUSSION

1- Post-partum anestrus

The overall length of post-partum anestrus interval was 62±3.33 days (n= 15) and ranged from 8 to 189 days (Table 1). The length of post-partum anestrus interval reported here is longer than that reported by Youssef (1992) 26.9 days and Barkawi *et al.* (1996) 25.6 days for this trait and shorter than that (115-216 days) reported by Perera (1981) for Murrah buffaloes and 33.29±12.3 days reported by Hussein (2000) for suckled Egyptian buffaloes. Post-partum ovarian cyclicity was initiated after 60 days in 11 buffaloes, while the remaining were acyclic during this period. Buffaloes calved during cold season (Nov. to April) had longer (75.25± 7.7 days) post-partum anestrus interval (n=8) with range from 24 to 189 days. However, buffaloes calved during hot season (May to Oct.) had shorter post-partum anestrus interval (46.86±4.25 days), which ranged between 8 to 88 days (n=7). Similar results were reported by El-Wishy and El-Sawaf (1971), that post-partum anestrus being long in winter and short in autumn. El-Fouly *et al.* (1976) noticed post-partum anestrus for buffaloes calving during temperature season (113.3 days) and shorter for that calving during hot season (96.1 days). Also, Ahmed *et al.* (1983) reported that post-partum anestrus was longer during spring and winter than that during summer and autumn. This may be due to the animals which calved during cold season feeding dry ration after finishing their

suckling period (three months). On the contrary, the animals which calved during hot season feeding green fodder after finishing their suckling period (three months). However, Gangwar (1988) concluded that post-partum anestrus period was 43 days in buffaloes calved in winter and 57 days for those calved in summer.

The overall mean of progesterone concentration during the entire length of post-partum anestrus was 0.16±0.029 ng/ml with ranged 0.06 - 0.42 ng/ml (Table 1). This is a very low level for progesterone, that may imply a state of post-partum acyclicity. Jainudeen *et al.* (1981) found that progesterone concentration during post-partum anestrus was 0.2 ng/ml for Swamp buffaloes. Perera (1981) reported that progesterone concentration was (>0.25 ng/ml) in Murrah buffaloes during 115 days post-partum anestrus. Also, Prakash and Madan (1985) found low progesterone concentration (>0.4 ng/ml) during post-partum anestrus.

It should be clear in mind that post-partum anestrus reported in this study is a well-defined state of true anestrus characterized by the absence of regular ovarian cyclicity.

On the day of calving or one day post calving (day 1), the overall mean progesterone concentration was 0.5±0.179 ng/ml decreased to 0.10±0.020 ng/ml by day 7 post-partum (Table 1). Four out of 15 buffaloes had progesterone values between 0.46 and 2.0 ng/ml on day 0 or day one post-partum. This may indicated that corpora lutea of previous pregnancy were still secreting progesterone at a low rate. The remaining buffaloes (73.33%) had basal progesterone level (>0.4 ng/ml). By day 7 after calving the progesterone concentration was basal (between undetected and 0.27 ng/ml). Jainudeen *et al.* (1982 and 1983) found that complete regression of corpora lutea of previous pregnancies lasted 10 days post partum . Also, Madan (1985); Youssef (1992) and Hussein (2000) reported hat progesterone values were less than 0.5 ng/ml during day 7 post-partum.

Table (1): Means length of post-partum anestrus (days), progesterone concentrations (ng/ml) during the entire post-partum interval and at day 0 or 1 and day 7 post-partum.

Parameters	Duration of post-partum anestrus (days)	Progesterone concentration during the entire post-partum anestrus	Progesterone concentration at calving day or day 1 post-partum	Progesterone concentration at during 7days post-partum
No of samples	12	475	12	12
X ± S.E.	66.08±4.62	0.16±0.029	0.51±0.179	0.10±0.20
(Range)	(8-189)	(0.06-0.42)	(0.0-0.20)	(0.0-0.27)

2- Seasonal anestrus and long-term anestrus:

Eight buffalo cows showed long-term or seasonal anestrus. Thus, 66.66% of the animals manifesting true anestrus. The lengths of anestrus period for seasonal and long-term anestrus were 122±5.75 and 48.13±4.42 days, respectively.

Progesterone profiles of the animals which were left without services for one year showed that 33.33% had post-partum anestrus and regular cyclicity around the year of the study (Fig.1). However, post-partum anestrus may be continued with either seasonal anestrus (26.67% of animals) Fig.2 or long-term anestrus (26.67% of animals) Fig. 1 or both of seasonal and long-term anestrus (13.33% of animals) as illustrated in Fig. 3 & 4. Also, the progesterone profiles in this study showed only the long-term anestrus between cycles for two cows even the animals were in cyclicity as in Fig. 1.

Progesterone levels during seasonal or long-term anestrus were basal intervened with short low peak progesterone cycles that failed end the state of anestru (Fig. 2). Hafez (1954) reported that the percentage of 15.1% for truly a cyclic buffaloes. El-Fouly *et al.* (1976) showed that ovarian activity is related to day length and ambient temperature, being less during the hot season of the year (May-Oct.). Kaur and Arora (1984) demonstrated the interaction between hot season and level of nutrition on the occurrence of long-term anestrus. The exist reason for long-term anestrus is not known as it was manifested during the temperate season of the year (Youssef, 1992). The present result showed that This phenomena is considered to be a serious problem because it decreased the percentage of buffaloes that hastened their ovarian activity during the first 40 days after calving.

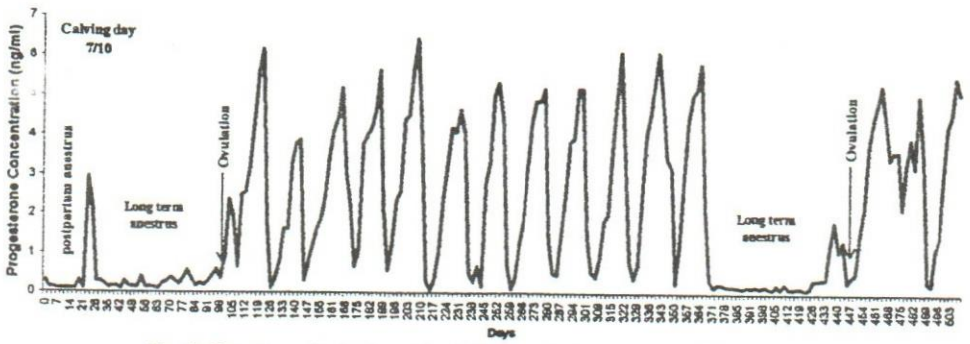

Fig. (1): Progesterone levels after calving indicate postpartum anestrus and long term anestrus.

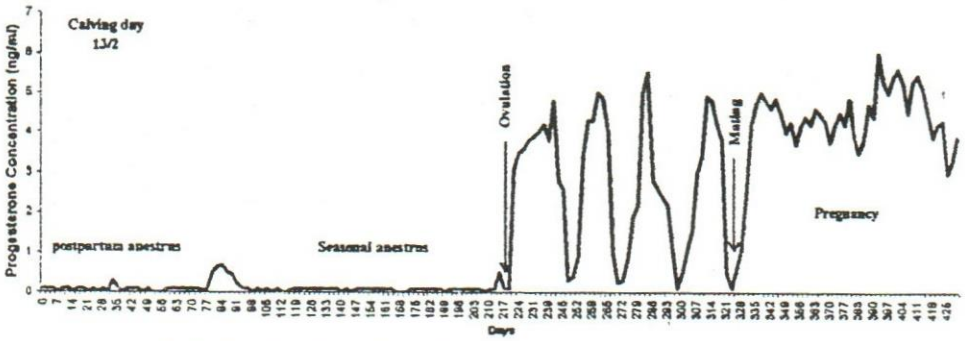

Fig. (2): Progesterone levels after calving indicate postpartum anestrus and seasonal anestrus.

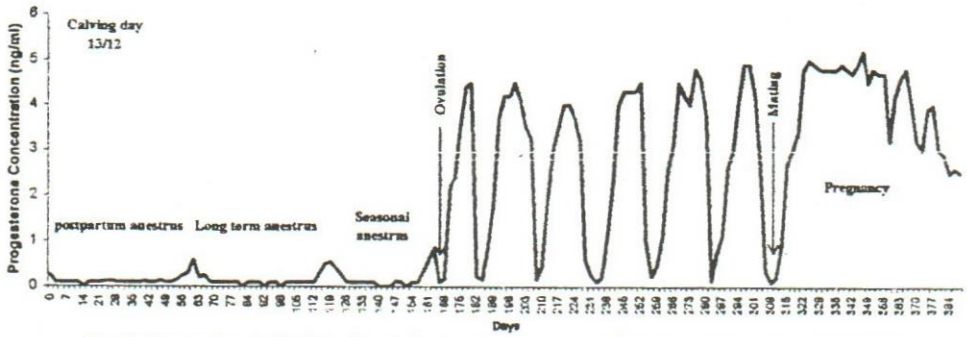

Fig. (3): Progesterone levels after calving indicate postpartum anestrus, long term anestrus and seasonal anestrus.

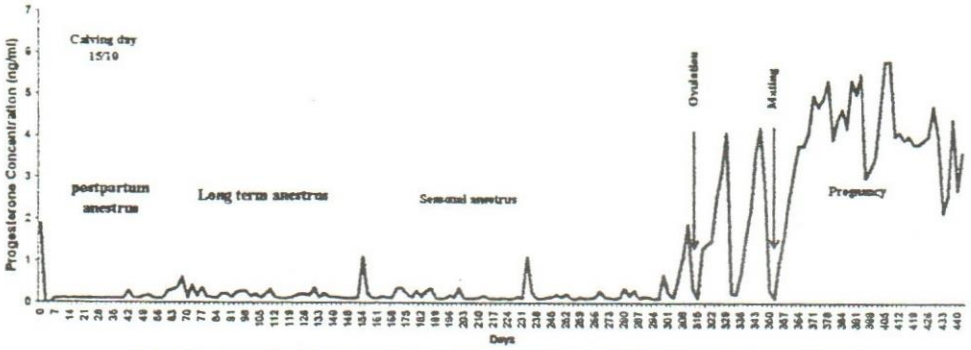

Fig. (4): Progesterone levels after calving indicate postpartum anestrus, long term anestrus and seasonal anestrus.

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غياب الشياع وموسميته بعد الولاده لعجلات الجاموس المصرى

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هدف البحث الى دراسة ظاهرة غياب الشياع و موسميتة لعجلات الجاموس المصرى بعد الولادة. أستخدم اثنى عشر عجلة بعد الولادة الأولى بمتوسط عمر ٣,٧٥ سنة و متوسط وزن٤٣٥،٤١ ±٥،٣٢ كج واستمرت التجربة من شهر يوليو ٢٠٠١و حتى أبريل ٢٠٠٣. كان متوسط طول فتره غياب الشياع بعد الوضع ٦٢ ±٣,٣٣ يوم .العجـــلات التى ولدت اثناء موسم البرد (من نوفمبر وحتى ابريل) كان لها غياب الشياع بعد الوضع ٧٥,٢٥ ± ٧,٧ يوما اطول من التى ولدت اثناء موسم الحر (من مايو وحتى اكتوبر) ٤٦,٨٦± ٤,٢٥ يوما .كان متوسط تركيز هرمون البروجستيرون خلال فتره غياب الشياع بعد الوضع ٠,١٦ ±٠,٢٩ نانوجرام / مل. ٥٣,٣٣ % من اثنا عشر عجله جاموس مصريه اظهرت خمول مبيضى اماموسمى اوطويل الامد اوالاثنين معا (الموسميه) طوال فتره الدراسه (عام كامل) . كانت تركيزات هرمون البروجستيرون خلال فتره غياب الشياع (سواء بعد الوضع او الخمول المبيضى الموسمى او الخمول المبيضى طويل الامد) قاعدى .

بلغت متوسطات فترات الخمول المبيضى الموسمبه او طويله الامد ١٢٢±٥,٧٥ و ٤٨,١٣±٤,٤٢ يوما على التوالى .اظهرت الخرائط البروجستيرونيه للحيوانات ان فتره غياب الشياع بعد الوضع لثلثى الحيوانات (٦٦،٦٧%) قد تمتد اما بخمول مبيضى موسمى او خمول مبيضى طويل الامد او كلاهما معا طول فترة الدراسة.و تعتبرهذة مشكلة خطيرة في عجلات الجاموس المصرىو ذلك لأنها تقلل نسب الحيوانات التى لها نشاط مبيضى خلال الأربعين يوما الأولى من الولادة.