

5th WORLD BUFFALO CONGRESS

PROCEEDINGS

[Handwritten mark]

Halley



ROYAL PALACE
CASERTA ITALY
OCTOBER 13-16, 1997

PROGESTERONE PROFILES THROUGH THE POSTPARTUM PERIOD IN MILK BUFFALOES UNDER POOR MANAGEMENT CONDITIONS

by SOUZA, H.E.M., SILVA, A. O. A., SOUSA, J.S., VALE, W. G.¹

Abstract

Studies were undertaken with buffalo (Mediterranean x Murrah) females to determine the postpartum ovarian activity and the main causes that affect reproductive performance of this specie raised on the Amazon. A group of 13 buffalo cows were milked twice a day and grazed under improved pasture of koronovia grass *Brachiaria humidicola* and received twice a day an irregular supplement of energy and protein in two portions of 1.5 kg. Sequential rectal examinations were performed once a week, to assess the degree of the morphological pattern of the uterus and the development of ovarian structures. Intensive observation of estrous symptoms was performed by personal visualization and using teaser bulls mating records, which were compared with the P₄ profiles. Among the 13 females observed through 100 days of PPP, 53.8% (n=7) showed ovarian activity with the P₄ levels between 1.31 to 3.25 ng/ml, however in 46.1% (n=6) of the animals, it was observed P₄ levels not higher than 0.03 ng/ml which was associated to an anoestrus, moreover in 38.5% (n=5) which presented cyclic activity through 210 days of PPP it was observed abnormal cycles, short and long, with duration of 14 and 28 days, respectively, and silent heat without any expression of oestrus symptoms.

Key words: postpartum, management, buffalo

Introduction

A temporary suppression on the turnover of the dominant follicle occur through the postpartum period (PPP) followed by a period of ovarian inactivity and sexual rest. In buffaloes as well as in bovine the return of normal ovarian activity and reestablishment of sexual functions is often quite variable, especially when animals are reared under harsh tropical environment or under poor management (1) and (2). For buffaloes the ideal calving interval must be between 12 to 13 months however when

1. Centro de Pesquisa Agroflorestal da Amazônica Oriental & Empresa Brasileira de Pesquisa Agropecuária, CPATU/EMBRAPA, Tv. Dr. Enéas Ribeiro, s/n, CEP 66.077-530, Belém, PA, Brazil & Laboratório de Reprodução Animal-LARA & Central de Biotecnologia de Reprodução Animal - CEBRAN Universidade Federal do Pará, 66.075-900, Belém, Brazil.

buffalo cow is not observed in oestrus by 100 PPP, the condition is defined as **post-partum anoestrus** which can be included cycle or non-cycle cows. If the female is not observed in estrous either because she has not come into estrous -non-cycle cows, or because the estrous was not detected, -cyclic cows, she will be in anoestrus, but if she does not come into estrous due -inactive ovaries she is in **true anoestrus** or if she has a normal cycle activity, but she is not observed in estrous due to weak estrous behavior, or insufficient observation she is in a -sub-estrous (3).

Material and Methods

A group of 13 buffalo cows Mediterranean X Murrah upgrade, were followed between February 1995 through January 1996. The animals were raised under an semi-extensive management and grazed on improved pasture of koronovia grass ***Brachiaria humidicola***, with commercial mineral supplementation. In addition 1.5 kg of supplementary concentrate and forage was offered twice a day, however the frequency was rather irregular. Sequential rectal examinations were performed once a week, to assess the degree of the morphological pattern of the uterus and the development of ovarian structures. Intensive observation of estrous symptoms was performed by personal visualization and using teaser bulls mating records, which were compared with the P_4 profiles. For determination of P_4 concentration it was used the RIA method in solid phase through kits supplied by FAO/IAEA, Seiberdof, Austria, according to the routine used at the RIA Section of Animal Reproduction Laboratory of Universidade Federal do Pará.

Results and Discussion

Return of ovarian activity up to 100 days post partum period

Taking into consideration the individual values of lacteal P_4 used to construct the profile of each animal and considering the rise of this hormone as a reflection of functional activity of the ovaries during puerperium, ovarian activity in the 13 female buffalo studied was re-established in 53.84% (n=7) on or before 100 days post partum. Maximum concentration of milk P_4 in these animals, at the peak of the cycle, varied from 1.31 to 3.35 ng/ml. Within the above percentage 30.76% (n=4) within the total number of females were detected in estrous by the teaser bull, with P_4 levels below 0.5 ng/ml. The remaining 3 females probably presented silent heat. It was observed that one female only short term manifested luteal activity around the 63rd day of post partum, with milk P_4 at the peak of the cycle of 1.31 ng/ml without any external expression of heat, afterwards entering into aneustrus. Through rectal exam it was observed in this animal the presence of corpus luteum in the right ovary from the 71st day PPP, remaining present until approximately the 210th day with a typical characteristic of a nonfunctional corpus luteum with milk P_4

levels within 0.1ng/ml (Fig.1). Such phenomenon was also describes by others (1) which in spite of the presence of a corpus luteum the concentrations of P₄ in milk did not reach levels higher than 0.5 ng/ml.

Non-return of ovarian activity after 100 days post partum period

The milk P₄ levels above 0.5ng/ml without any estrous after 100 days of PPP, was observed in 46.16% (n=6) of the females. Of the above mentioned percentage, one female presented ovarian cyclicity after 150 days of post partum with manifestation of two estrous detectable by teaser bull which was inseminated in the second estrous and became pregnant (Fig 2). The average concentration of milk P₄ found at the peak of luteal phase in the two cycles which resulted in conception was 3.53 ± 0.08 ng/ml. Moreover among the six females in anestrus, 3 were in true anestrus and the P₄ milk concentration below 0.03ng/ml, after 100 days PPP. Furthermore, the ovaries of the females in anestrus did not present any palpable structure to the period cited which were characteristic of inactive ovaries causing a true anoestrus, however around 150 days PPP they manifested a discreet development of follicles that entered into atresia. Changes in the P₄ levels, both in the blood and milk has been linked to ovarian structure change diagnosed by means of rectal palpation (4) which is a signal of the return of ovarian activity in the PPP. Of course the rise of this hormone is due to the follicles that ovulates with or without manifestation of estrous which forming an active corpus luteum producing P₄ (4 and 5), to others the transitory rise of this hormone is probably due to follicular luteinization or adrenal secretion, that justifies the slight rise before the establishment of normal cyclicity (6).

Considerations on ovarian disorders in the post partum period

Considering the rise in the milk P₄ of the 13 female studied, 5 animals manifested cyclic luteal activity between the 20th and 210th day of PPP, presenting normal cycles (21 days) intercalated by short and prolonged cycles 14 to 28 days, Fig 3. An average of six P₄ peaks during different luteal phases were observed for each animal, considering the possibility of each phase was proceeded by an estrous, which was for each individual animal during 210 day period. Before and after the first detectable estrous there were manifestations of irregular cycles without external expression, silent heat, followed later absence by the absence of luteal activity, an indicative that that such female was in a transitory period of anestrus (Fig. 3). These findings are in agreement to previous report (7) were the ovarian activity in PPP was associated to the occurrence of short term luteal phases followed by long lasting phases, before the appearance of the first detectable estrous. Short cycles at the recommencing of ovarian activity has been a common description in female buffalo (2, 7, 8, 9), although short cycles in bovines are incompatible with pregnancy (5). Such phenomenon may physiologically be related

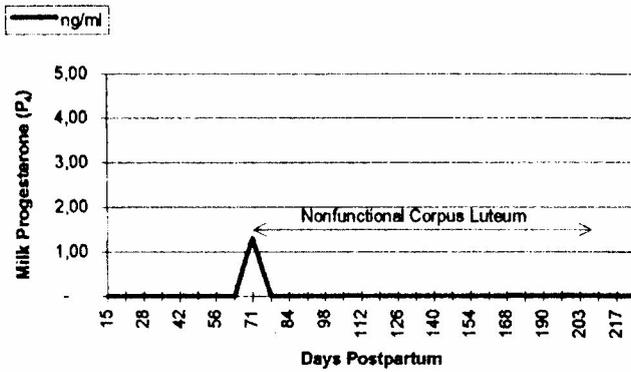


Fig 1. - Milk progesterone levels through the puerperium in an anoestrus cow with the presence of an afunctional corpus luteum after a single cycle of short duration.

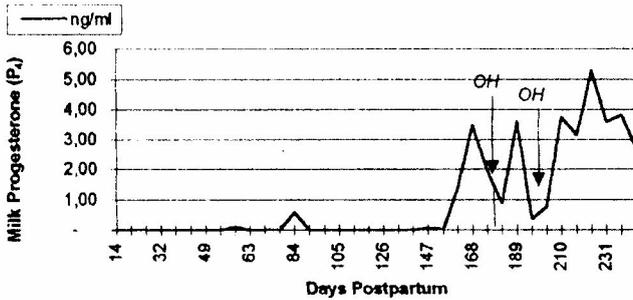


Fig 2. - Milk progesterone levels through the puerperium in a buffalo cow which shown two observed oestrus (OH) after 150 days of the postpartum period and become pregnant after first insemination.

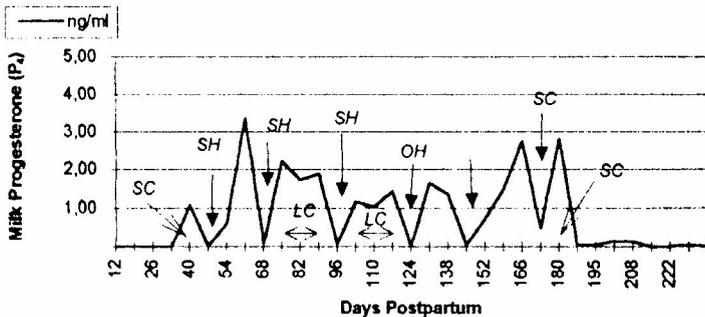


Fig 3. - Milk progesterone levels through the puerperium in a buffalo cow with short (SC) and long cycles (LC) as well as silent heat (SH) after the onset of a observed heat (OH).

to deficient secretion of estradiol by the mature follicles or due to the need of a threshold for this hormone in the central nervous system at a determined time to produce the symptoms characteristic of heat (10). Under Amazon tropical conditions, silent heats are quite common and high and related to management and nutritional deficiencies in particular energy, protein and minerals (9). Furthermore, it is well known that luteal phases of PPP with low P₄ concentration may be critical for activation of the hypophyse-gonadal-hypothalmus axis (6). Irregular cycles (short or prolonged), silent heat, presence of dysfunctional or corpus luteum persistent, inactive ovaries or ovarian dystrophy are common causes disturbance on the estrus cycle, affecting the fertility due the difficult of heat detection, with low conception rates and consequently lengthening the post partum period. Also the lack of cyclicity during the PPP is related to inadequate frequency of LH pulses, affecting the capacity of estrogen synthesis resulting in low production of estradiol and atresia of the dominant follicle as well as the stimulus for milk let down allied to the period of negative energy balance suppress the frequency and the LH pulse. In the present study, considering the individual profile of milk P₄ and management and comparing such findings to previous reports in the literature concerned to the re-initiation of ovarian activity in the PPP, for both bovines and buffaloes it should be consider that management and feeding faults are responsible for the occurrence of subestrus and irregular cycles, silent heat, as well as prolonged period of anestrous observed through the PPP. Finally, it is recommended to carry out an intensive study to obtain more knowledgement on the nutritional conditions and its influence on the return of ovarian activity in PPP as well as possible influences of others environmental factors.

References

1. Barkawi, A.H., Shafie, M.M., Mekawy, Y., Aboul-Ela, M.B. (1986). The use of serum and milk progesterone concentration to monitor post-partum ovarian activity in Egyptian buffaloes. *Buffalo, J.*, 2, 125-134.
2. Baruselli, P.S. Atividade ovariana e comportamento reprodutivo no período pós-parto em búfalos (*Bubalus bubalis*). São Paulo. Faculdade de Medicina Veterinária e Zootecnia da Universidade de São Paulo. (1992). 91 Dissertação. (Mestrado em Medicina Veterinária).
3. Edqvist, L. E. (1984). Short Oestrus Post-Partum In Cattle. In: The Use Of Nuclear Techniques To Improve Domestic Buffalo Production In Asia. Proceedings Of The Final Research Meeting, 30 Jan-03 Fev, Manila, Philipines. P.51-56. Fao/laea. Vienna.
4. Jainudeen, M.R., Sharifuddin, W., Yap, A., Bakar Dahari, A. (1984). Postpartum Anoestrus In The Suckled Swamp Buffalo. In: The Use Of Nuclear Techniques To Improve Domestic Buffalo Production In Asia. Proceedings Of The Final Research Meeting, 30 Jan-03 Fev, Manila, Philipines. 51-56. Fao/laea. Vienna.
5. Nasir Hussain Shah, S. Prolonged calving intervals in the Nili-Ravi buffalo. Utrecht, (1990), 162. Tese (Doutorado) - Rijksuniversitert te Utrecht.

6. Perera, B.M.A.O., Kuruwita,V.Y., De Silva, L.N.A. Endocrinology of the postpartum period in buffaloes. In: World Buffalo Congress, 1, Cairo, (1985). Anais. 3, 559-62.
7. Roberts, S.J. (1986). Veterinary obstetrics and genital diseases. (Theriogenology). 3. ed. Michigan: Edwards Brothers,. 955.
8. Sharma, Y.P., Kaker, M.L. (1990). Monitoring ovarian cyclicity in postpartum Murrah buffalo Through milk progesterone enzymeimmunoassay. Theriogenology, 33, 915-923.
9. Vale, W.G. (1994). Reproductive management of water buffalo under amazon conditions. Buffalo J., 2, 85-90.
10. Willense, A.H. (1993). Pathophysiology, Diagnosis and therapy of ovarian disorders postpartum in dairy cattle. Improving the productivity of indigenous African livestock. Proceeding, Vienna, 127-130.