

DELAYED AGE OF PUBERTY IN BUFFALO HEIFER

S.G. Hassan

National Research center. Dokki, Cairo. Egypt; E. mal Hassan 9372003@yahoo.com

The onset of puberty is an indication that an animal has attained adult life, sexual maturity precedes full physical development and under condition of domestication its onset often occur while females are still very young and quite immature physically. This is most noticeable in cattle which often lead to difficult birth (Arthur, 1975).

Studies concerning puberty in buffaloes stimulated the interest of many investigators, (Zaki *et al.* 1963) who reported that the onset of first heat in Egyptian heifers, occurred at age of 665.8 ± 10.01 days, while El.Itriby (1964) reported average age of puberty between 405 and 630 days, and Taha (1975) recorded 453.56 ± 13.82 days. And the onset ranging from 265 to 644 days.

Concerning age of maturity

Taha *et al.* (1976) showed that the average age of sexual maturity is 670.5 ± 15.23 days and it ranges from 491 to 817.

With regard to delayed age of sexual maturity different approaches were done to throw light on some factors that may enhance the age of sexual maturity.

1- Nutritional factors

A- Before weaning Asdell and Bearden (1959) and van demark and Manger (1964) showed that the low level of nutrition during early life retards the onset of puberty in cattle.

At the same time EL-Nouty (1971) stated that the average age and weight at puberty for heifers raised on high and control levels of nutrition were 12.5 month, with average weight 228.08kg and 13.10 months, and 214.46kg for age and weight of high and control group respectively. The average age and weight at first conception were 23.70 months, 370.75kg and 22.80 months, 347.53 kg for the high and control levels respectively. Taha (1976) noticed in the experiment during preweaning period the effect of three levels, of nutrition on age at puberty, weight and age at first conception. It was shown that the complete suckled heifers reached puberty at 316.62 ± 15.16 days, the half suckled 383.5 ± 39.75 day. and the quarter suckled 467.66 ± 100.20 days. The average weights at three ages were 222.75 ± 7.50 , 251.00 ± 19.23 and 238.00 ± 22.40 kg respectively. Also he noticed that the average age at 1st conception in three levels were 582.13 ± 37.88 , 602.62 ± 23.40 and 610.66 ± 43.07 days respectively.

B-Post weaning

Borghese *et al* (1997) carried out experimental trial on 27 Mediterranean buffalo heifers in 3 group with initial age of 8.2-9.0 months and raised on maize silage, pasture and unified this investigation showed that age of puberty in 3 system of nutrition as reported (603.7 , 569 and 532 days) respectively.

Arora and Harijit Kaur (1986), reported that under feeding slows down the rate of growth, and maturity is delayed. Under feed buffaloes slow not only poor growth but also prolonged anoestrus in summer

Dame and Pimentel (1994) in two exp. trials on buffalo heifers aged 9 months old weighing 232 kg in average. They reported the mean age at puberty in exp. 1 (26. 5 months compared to 14.2 months in exp. II).

Borghese *et al.* (1994), carried out the experiment on 24 Italian buffalo heifers, nine months old raised on two diets according to standard requirement (low diet group and high diet ones). The high diet group achieved puberty at 24.5 months of age while the low diet group achieved puberty at 25.5 months of age with average weights 410.3 and 387.7kg respectively. In this experiment it was also noticed that the season of birth affect pubertal age i.e. birth from October to February achieved pubertal age earlier than those born after may until December, (22 months compared to 27 month).

Companile *et al.* (1991) carried out exp on 90 animals, in three farms in Italy. Its results showed that the percentage of ovarian activity increased particularly after 501 days (75% of animals on farm C a higher percentage was noted at this age (91%). Also it is noticed the progesterone values $P_4 > \text{ng/ml}$ appeared later than other ovarian activity indicators. In conclusion the weight more than age was important to stimulate puberty appearance.

2. Hormonal factors

El- Amrawi *et al.* (1997), applied single injection of L.tyrosine (100 mg/kg body weight) in heifers (14) not seen in estrus in site of their ages ranged between 30-36 months and their weight were between 275-300kg. The result showed that 12 (86%) buffalo heifer came in heat within 3-4 days after treatment. All animals were bred and 10 of them were proved to be pregnant at 42 day post service.

Abdoon *et al* (1994), studied the effect of ear implant (synchro-mate B) + PMSG on the treatment of delayed puberty in buffalo heifers (aged 22 months with body weight ranged between 240-280 kg) this study revealed that five out of six buffalo heifer returned to estrus after 13.20 ± 3.63 day short estrous cycle. Moreover, one buffalo heifer had conceived

following the second estrus giving 33.33% conception rate. They concluded that ear implant plus PMSG regime induce ovulatory estrus in buffalo heifers

El-Battawy and Hassan (1998) unpublished data on eight non pubertal buffalo heifers aged more than 30 months exposed for more long photoperiod during mid-July to the end of September. The experimental group were injected I.M with 18 mg melatonin as single shot day at 16 h from mid. July to the end of September. The plasma progesterone levels in melatonin treated heifer were significantly higher than that of the control (0.505 ± 0.124 mg/ml compared to 0.093 ± 0.009 mg/ml).

3- Environmental factors

Trails of melatonin treatment

Photoperiod is recognized to be of critical importance for the process of maturation in a variety of mammalian species (Foster, 1980 and Reiter, 1986). Exogenous melatonin treatment increased circulating melatonin which conveyed information about day length and this information is used to control the onset of puberty in sheep (Yellen and Foster, 1986 and Ebling, Clay pool and Foster 1988) and in cattle (Kennaway, 1984).

Melatonin levels in buffalo heifers

Borghese *et al* (1995) claimed that the plasma melatonin concentration were significantly higher in September either on day or night than any other months of the year. The authors attributed these higher values of melatonin to the closeness of onset of puberty and the role of melatonin enhancement of puberty.

Modification of photoperiod

El. Battawy *et al* (2000). On four buffaloes open days more than 120 days proved to be anoestrus by rectal examination twice weekly with measurement of progesterone values. The animals were housed in a darkened room at 16.00 h each after noon and released at 8.00h each morning to modify the prevailed long photoperiod during the experimental period to artificial short photoperiod (8L:16D). It is noticed that modification in photoperiod enhances the estrus exhibition and conception rate with 50 %.

Conclusion:

Further studies on large numbers of an estrus buffaloes during summer season to generalize the results of modified photoperiod and apply the trials on buffalo heifers specially those born during summer season to justify the delayed age of puberty in buffalo heifers to save the productive life span of these animals

References

1. Arthur, G.H. (1975): *Vet. Reproduction and obstetrics 4th.*
2. Abdoon, A.S.S, Younis, A.A. and Omayma M. Kandil IV world Buffalo conrgr. June, 1994 SAO Paulo, Brazil.
3. Arora, S.P. (1988) II world Buffalo congress, New Delhi, India
4. Arora, S.P. and Harjit Kaur (1986): *nuclear Agric. Biol. 15:241*
5. Asdell, S.A. and Bearden, H.J. (1959) *Rep. Offfarm Animal cornel univ agric. Exp. Sta. Bull. 305:15.*
6. Borghese, A., Terzano, G.M., Barile, V.L. and parneagiani, A. (1994). IV world Buffalo cong. June, 1994 SÃO Paulo- Brazil.
7. Companile, G.; shehu, D.; Esposito, L., Dipalo, R Montemurro, N., Zicarelli, L. and Terzanu, G.M. third world Buffalo. Congress. Bulgaria, Varna May, 1991.
8. Dame and pimental (1994) IV world Buffalo cong. June, 1994 SÃO Paulo, Brazil.
9. E. EL. Amrawi, G.A.; Hussein , F.M.; El. Bawab, E. and Zakaria, A.D. (1997). 5th world Buffalo congress. Caserta, Italy October, 1997.
10. El-Itriby, A.A. (1964): 11 Nea East Reg. Meet. Anim. Prod., Health, Leban. Cited by oloufa (1968) Ebling, E.J.P., clay pool, L.E. and Foster, D.L. (1988) *Neuroendocrine responsiveness to light during the neonatal period in sheep. J. Endoc. 283-293.*
11. El-Battawy, K. El Menoufy, A.A; Hassan, S.G.; khattab, R.M. and Younis, M. 14th Intern. Congr. Animal Reproduction Stockholm, July 2000.
12. El. Nouty, F.E. (1971). M.SC. Thesis, Fac. Agric., Ain shams univ., Cairo . Egypt.
13. Foster, D.L. (1980) *Inc. lauza and A.w Root (Editors) Problems in Pediatric Endocrinology. Academic press, London, PP. 193-210.*
14. Kennaway, D.J. (1984): *Pineal resanch Reviews, 2: 113-140.*
15. Reiter, R.J. (1986): *In. Advances in Pineal Research vol. 1 pp 77-87*
16. Taha, A. (1976): *Ph. D. thesis. Physiology Academy of Agric krakow, Poland.*
17. Van-Demark, N.L. and Manger, R.E. (1964) *J.Dairy Sci. 47:798.*
18. Yellen, S.M. and Foster, D.L. (1986) *Endocr. 119, 44-49.*
19. Zaki, K. Soliman, F.A. and Ramsess, G. (1963) *Arab vet. J. 361-374*