The Indian Journal of Animal Reproduction; 25(2): 116-119; December 2004

Study on incidence of anoestrus and blood biochemical constituents in non cyclic and cyclic crossbred cows*

Y.P. YADAV[1], A.P. SINGH[2†], VIVEK KUNJ[3] ,M.H. AKHTAR[4], G.P. ROY[5] AND C.SINGH[6]

Deptt. of Animal Reproduction, Gynaecology & Obstetrics
Bihar Veterinary College, Patna - 800 014

Received : November 16, 2002
Accepted : May 24, 2004

ABSTRACT

Incidence of anoestrus in crossbred cows (263) having reproductive disorder was studied during different seasons brought to the outdoor clinic of Gynaecology department of Bihar Veterinary College, Patna. The data showed the non-significant effect of season and month on anoestrus condition in cows. Overall percentage of anoestrus cows was found to be 30.42%. The highest incidence (47.62%) was recorded in March and lowest (14.28%) in May. During the study 10 normal cycling and 30 anoestrus cows were selected randomly for study of biochemical profile blood glucose and serum alkaline phosphatase from the blood sample collected on 0,15th and 30th day. The observation revealed that significant difference ($P<0.05$) was found in serum calcium, serum inorganic phosphorus, total serum protein and blood glucose level between cycling and non-cycling crossbred cows. Alkaline phosphatase level did not differ significantly between cyclic and non cycling animals. The incidence of anoestrus cows was observed to be major factors responsible for infertility in cows and it was independent of the effects of season and months.

Key words : Crossbred cows, cycling, anoestrus, blood biochemical constituents

Anoestrus is a multifactorial syndrome which includes the factors like age, breed, environment, nutritional status, etc., Nayak and Mohanty (1985) reported anoestrus to be as high as 57%. Various etiological factors have been ascertained, nutritional factor is one among them. Biochemical profile can indicate the nutritional status of the animals and thus help in diagnosis and management of anoestrus.

MATERIALSAND METHODS

Information on incidence of anoestrus cases were obtained from the cases having reproductive disorder taken from Gynaecological records of crossbred cows for the period from July, 1998 to June, 1999 brought to Gynaecology department, Bihar Veterinary College, Patna. Monthwise and seasonwise incidence were recorded. The seasons were obtained by grouping months (Singh *et al.*, 1987).

Autumn : August, September and October.
Winter : November, December and January.
Spring : February, March and April.
Summer : May, June and July.

For the estimation of blood biochemical profile a total of 40 cows were taken up. Ten cows were normal cycling and 30 were anoestrus. Anoestrus animals were selected on the basis of anoestrus for 90 days or more and also by rectal palpation. All of these animals who were having smooth, soft and pliable ovaries without CL or follicle and devoid of genital abnormalities were selected for the study. Blood samples were collected aseptically from jugular vein on 0, 15th and 30th day to estimate the level of various serum constituents and compared with normal cycling animals. Biochemical consitutents like blood glucose (Folin and Wu, 1920), serum protein (Reinhold's, 1953), serum calcium (Clark and Colip, 1925) and serum inorganic phosphorus (Fiske and Subbarow, 1925) and serum alkaline phosphatase by Murtuza (1998) based on Kind and King (1954) were estimated. All data were subsequently analysed by standard statistical method (Snedecor and Cochran, 1967).

RESULTSAND DISCUSSION

Out of 263 cases of reproductive disorders reported during the period 80 (30.42%) cases of anoestrus were reported. The highest insidence (47.62%) was recorded

*Part of M.V.Sc. Thesis submitted by first author to Rajendra Agricultural University, Bihar, Pusa.

[1-5]Department of Animal Reproduction, Gynaecology and Obstetrics, Bihar Veterinary College, Patna - 14.
[6]Deptt. of Veterinary Physiology, Bihar Vety. College, Patna - 14.

†Corresponding author

during March and lowest in May (14.28%). The highest incidence was recorded in spring and lowest in summer. Chi-square test revealed non-significant effect of season and months. The present finding in crossbred cows is in close agreement with the report of Iyer *et al.* (1992). A low incidence of anoestrus with a range of 10-20% has also been reported (Chetty and Rao, 1987; Hussain, 1987). However, Roine (1973) reported highest incidence from Feb to March and lowest in May and June. The present finding showed non-significant effect of season on the incidence of anoestrus which is in line with the report of Singh and Vadnere (1987).

The blood glucose levels of normal cycling crossbred cows in present experiment were found to be 62.31 ± 0.91, 63.035 ± 0.8 and 62.44 ± 0.95mg% on day 0, 15th and 30th (Table - 2). These values are similar to the value reported by (Sharma *et al.*, 1984, Nair *et al.*, 1987) in normal cycling crossbred cows. Higher value of blood glucose (84.54 ± 3.3 mg%) has been reported by Agarwal *et al.* (1985) in crossbred cows.

In anoestrus crossbred cows, blood glucose values were found to be 49.44 ± 0.75, 53.16 ± 0.95 and 53.96 ± 0.91 mg% on 0, 15th and 30th day (Table - 2). These findings were identical to the concentration reported by Nair *et al.* (1987) in anoestrus crossbred cows. However a lower values have also been reported by Naidu and Rao (1982), Prasad *et al.* (1984a), Reddy (1984) and Sharma *et al.* (1984) in non cycling cows. Higher blood glucose levels have also been reported by some investigators (Prasad *et al.*, 1984a; Agarwal *et al.*, 1985). The mean value of blood glucose (mg/100ml) of normal cycling crossbred cows did not differ significantly upto 30 days. However, the mean values of blood glucose among anoestrus crossbred cows on day 0 differed significantly ($P<0.05$) from 15th day and 30th day and also the mean value of blood glucose on 15th day differ significantly ($P<0.05$) from 30th day. There was significant difference ($P<0.05$) between the blood glucose level of anoestrus and normal cycling crossbred cows. A similar finding was reported by Agrawal *et al.* (1985); Nair *et al.* (1987); Dutta *et al.* (1988); Naidu and Rao (1982); Ramakrishna (1997).

The mean value of serum calcium in normal cycling crossbred cows was found to be 10.96±0.15, 11.00±0.13 and 11.10±0.093 mg% and in anoestrus crossbred cows 10.29±0.097, 10.314±0.10 and 10.48±0.115 mg% on 0, 15th and 30th day respectively (Table - 2). The findings of cyclic cows is comparable with the finding of Naidu and Rao (1982), Sharma *et al.* (1984), Dabas *et al.* (1987) and Dutta *et al.* (1988) who reported 10.14±1.72, 10.69±2.05, 11.5±0.3 and 11.02 mg% respectively. The findings of anoestrus cow are in agreement with the report of Nayak and Mohanty (1985) and Dutta *et al.* (1988). There was significant difference ($P<0.05$) between serum calcium value of anoestrus and normal cyclic crossbred cows. Significant difference was reported by Prasad *et al.* (1984b). Sharma *et al.* (1984), Osman *et al.* (1985) and Ali *et al.* (1991). Deficiency of calcium does not have direct bearing on reproduction (Morrow, 1977). However,

Table 1. Monthwise prevalence of anoestrus in crossbred cows

Months & year	Total no. of cases of Reprod. Disorders	No. of anoestrus animals	Calculated Chi-square value
July, 98	26	9 (34.61)	
Aug., 98	20	6 (30.00)	
Sept., 98	24	10 (41.66)	
Oct., 98	19	4 (21.05)	
Nov., 98	27	5 (18.51)	
Dec., 98	26	6 (23.07)	x^2 11 df – 13.81^{NS}
Jan., 99	21	9 (42.85)	
Feb., 99	30	12 (40.00)	
Mar., 99	21	10 (47.62)	
Apr., 99	16	3 (18.75)	
May, 99	14	2 (14.28)	
June, 99	19	4 (21.05)	
Total	263	80 (30.42)	

Figures in parentheses indicate percentage of anoestrus animals
NS = Indicates non-significance

Table 2. Mean±SE and CV% of various blood biochemical profile in normal cycling and anoestrus cows

Status of animal	Total No.of animals	Serum Calcium mg/100 ml	Serum inorganic phorphorus mg/100 ml	Total protein g/100 ml	Blood glucose mg/100 ml	Alkaline phosphatase KAU/100 ml
Normal cycling						
0 day	10	10.96±0.15^{a} (4.46)	5.495±0.144^{a} (8.32)	6.78±0.20^{a} (9.47)	62.31±0.91^{a} (4.63)	8.73±0.59^{a} (21.63)
15th day	10	11.00±0.13^{a} (3.79)	5.839±0.191^{ab} (7.94)	7.16±0.14^{a} (8.11)	63.035±0.88^{a} (3.76)	9.23±0.61^{a} (20.76)
30th day	6	11.10±0.093^{a} (12.06)	5.97±1.93^{a} (7.94)	7.30±0.24^{a} (8.11)	62.44±0.95^{a} (3.76)	8.71±0.56^{a} (17.95)
Anoestrus						
0 day	30	10.29±0.097^{b} (5.17)	3.273±0.084^{c} (14.05)	5.16±0.15^{b} (16.58)	49.44±0.75^{b} (8.36)	8.18±0.15^{a} (10.24)
15th day	30	10.314±0.10^{b} (5.42)	4.061±0.063^{d} (8.49)	5.76±0.14^{c} (13.39)	53.16±0.95^{c} (9.80)	8.40±0.29^{a} (17.52)
30th day	18	10.48±0.115^{b} (4.68)	4.48±0.063^{a} (6.02)	6.18±0.18^{c} (12.83)	53.96±0.91^{d} (6.97)	8.55±0.32^{a} (15.90)

Figures in parenthesis indicate co-efficient of variation percentage
Means with different superscript taken column wise separately differ significantly ($P < 0.05$)

Moddie (1965) reported that calcium has a definite role in sensitizing the tubular genitalia for the action of hormone.

The finding of serum inorganic phosphorus level in anoestrus and cycling crossbred cows detected on 0, 15th and 30th day in anoestrus cow (Table -2) was comparable with the result of Samad *et al.* (1980); Kumar *et al.* (1986); Ali *et al.* (1991); Ramakrishna (1997). Serum inorganic phosphorus level in normal cycling cows differed significantly ($P<0.05$) with anoestrus cows.

The mean value of total protein in cycling and anoestrus crossbred cows on 0,15th and 30th day (Table 1) were in agreement with those of Samad *et al.* (1980); Kavari *et al.* (1987). Analysis of variance showed significant ($P<0.05$) decrease in total protein level in anoestrus cows as compared to normal cyclic animals was observed which is in agreement with the findings of Kawanit *et al.* (1987); Dutta *et al.* (1988). It is well known that the protein is very much important for the release of amino acids required for synthesis of protein hormone responsible for augmentation of reproduction in animals. Low intake of protein therefore will put the animal in negative nitrogen balance and continued status of such nitrogen deficiency obviously will effect the phenomenon.

The serum alkaline phosphatase in normal cycling cattle and anoestrus animal did not differ significantly. The value is in agreement with the findings recorded in young and adult Hariyana cow (Goswami *et al.*, 1971) and in non-descript cow (Rico *et al.*, 1977; Putmen *et al.*, 1986). However, Dhoble and Sharma (2000) have reported a higher serum alkaline phosphatase in normal cycling cows.

BIBLIOGRAPHY

Agarwal, S.K., Pandey, N.N. and Umashankar (1985). Serum protein, inorganic phosphorus and blood glucose in relation to different phases of reproduction in crossbred cattle. Indian J. Anim. Reprod., **6**: 23-25.

Ali, M.D.M., Kanjilar, B.C., Bandopadhyay, S.K., Roy Chaudhari, R. and Ghosh, B.B. (1991). Serum calcium, inorganic phosphorus and serum calcium phosphorus ration in anoestrus rural crossbred heifers. Indian J. Anim. Reprod., **12**: 65-68.

Chetty, A.V. and Rao, A.R. (1987). Incidence of infertility among crossbred cattle of chittor district. Livestock Adv., **12**: 45-48 (Cited from Vet. Bull. 58.5/3880).

Clark, E.P. and Colip, J.B. (1925). J. Bio. Chem., **63**: 461 [Cited from Oscar, B.L. (1976). *Hawk's Physiological Chemistry*. 14th Ed. Tata McGraw-Hill, Publishing House Co., New Delhi].

Dabas, Y.P.S., Singh, S.P. and Saxena, O.P. (1987). Serum concentration of certain minerals in anoestrus cows and buffaloes. Indian J. Anim. Reprod., **8**: 98-101.

Dhoble, R.B. and Sharma, N.C. (2000). Serum phosphatase and transference enzymes in normal cycling and repeat breeder cattle. Indian J. Anim. Reprod., **21**: 16-18.

Dutta, J.C., Baruah, R.N., Dutta, L. and Talikdar, S.C. (1988). Blood biochemical studies in anoestrus and normal cyclic cattle. Indian Vet. J., **65**: 239-241.

Fiske, C.H. and SubbaRow, Y. (1925). Calorimetric estimation of inorganic phosphorus. J. Bio. Chem., **66**: 375 [Cited from Oscar, B.L. (1976). *Hawk's Physiological Chemistry*. 14th. Ed. Tata McGraw Hill publishing House Co., New Delhi].

Folin, I. and Wu, H. (1920). Simplified and improved method for determination of sugar. J. Bio. Chem., **41**: 367-374 [Cited from Oscar, B.L. (1976). Hawk's Physiological Chemistry, 14th Ed. Tata McGraw Hill Publishing House Co. New Delhi].

Goswami, D.B.; Eapen, K.S. and Purohit, V.D. (1971). Difference in serum alkaline phosphatase activity and serum cholesterol level in young and adult Hariyana cattle. Indian Vet. J., **48**: 244.

Hussain, P.M. (1987). Infertility problems in bovine of northern Karnataka. Indian Vet. J., **64**: 529-530.

Iyer, C.P.N., Nair, K.P., Sudarsan, V., Madhwan, E., Mothai, E. Nair, M.S., Vijai, K.V. and Joseph, M. (1992). Reproductive disorders of crossbred cows in Kerala. Indian J. Anim. Reprod., **13**: 64-68.

Kavani, F.S.; Sharma, V.K.; Siddiquee, G.M. and Vadodaria, V.P. (1987). Serum proteins, Ascorbic acid and total cholesterol in anoestrus Kankrej heifers. Indian J. Anim. Reprod., **8**: 148-150.

Kind, P.B.N. and King, E.J. (1954). J. Clin. Pathol., **7**: 322-26 (Cited by Murtuza, 1998).

Kumar, S. Agarwal, S.K. and Purbey (1986). Studies on reproductive disorders in non-descript cattle. Indian Vet. Med. J., **10**: 174-175.

Moddie, E.W. (1965). Hypocalcaemia and hypomagnesaemia. Brit. Vet. J., **121**: 338.

Morrow, D.A. (1977). Nutrition reproduction relationship in dairy cattle. Papers contributed to the first all India symposium on Animal Reproduction. Punjab Agricultural University, Ludhiana.

Murtuza, M. (1998). *Practical Biochemistry*. Alpha Publication, Patna-1.

Naidu, K.V. and Rao, A.P. (1982). A study on the etiology of anoestrus in crossbred cows. Indian Vet. J., **59**: 781-784.

Nayak, H.B. and Mohanty, B.N. (1985). Studies on certain blood constituents of anoestrus crossbred cattle. Indian J. Anim. Reprod., **6**: 198.

Nair, S., Kharchi, K.G. and Shrivastava, O.P. (1987). Study on blood glucose and cholesterol in normal and abnormal cycling crossbred cows. Indian J. Anim. Reprod., **8**: 12-13.

Osman, A.M., EL-Naggar, M.A., Farrag, A.A. and Shehata, S.H.M. (1985). Ovarian activity among Egyptian cows and buffaloes. Blood Analysis. Assuit. Vet. Med. J., **14**: 219-223.

Prasad, R.S., Kharche, K.G. and Shrivastava, O.P. (1984a). Studies on blood glucose cholesterol and total leucocyte count in anoestrus crossbred cows. Indian J. Anim. Reprod., **4**: 10-14.

Prasad, R.S., Kharche, K.G. and Shrivastava, O.P. (1984b). Studies on blood calcium and phosphorus in anoestrus crossbred cows. Indian J. Anim. Reprod., **5**: 74-77.

Putman, A.R., Qualis, C.W., Rice, L.E., Dawson, K.J. and Edwards, W.C. (1986). J. Anim. Vet. Med. Assoc., pp 189-77.

Ramakrishna, K.V. (1997). Comparative studies on certain biochemical constituents of anoestrus crossbred Jersey red cow. Indian J. Animal Reprod., **18**: 33-35.

Reinhold, J.G. (1953). Standard Methods in Clinical Chemistry. (Ed.) Reinfer, M. Vol. **1**, Academic Press, New York, p. 88.

Reddy, V.L. (1984). Studies on blood glucose cholesterol, total protein, ascorbic acid and inorganic phosphorus in cycling oestrus cows, anoestrus cows and anoestrus heifers. Thesis Abstract, **10** : 93.

Rico, A.G., Bram, J.P., Benard, P.C., Ek-Hassan, A.I. and Cazieux, A. (1977). Equine Vet. J., **9**: 100.

Roine, K. (1973). The most frequent reproductive disorders in cow and their seasonal variation. Anim. Breed. Abst., **42**: 21-24.

Samad, A., Ali, K.M. and Rahman, A. (1980). Studies on certain blood constituents of anoestrus cattle. Indian Vet. J., **57**: 909-912.

Sharma, M.C., Umashankar, Gupta, O.P., Verma, R.P. and Mishra, R.R. (1984). Biochemical studies in cyclic anoestrus and repeat breeding crossbred cows. Indian J. Anim. Reprod., **4**: 51-53.

Singh, Jaswant, Singh, B.K. and Sinha, M.P. (1987). Incidence of anoestrus among crossbred cattle (Holstein x Local) of Chotanagpur Region. Indian J. Anim. Reprod., **8**: 105-107.

Singh, S. and Vadnere, S.V. (1987). Induction of estrus by supplementation of deficit minerals in post partum anoestrus crossbred cows. Indian J. Anim. Reprod., **8** : 46-49.

Snedecor, G.W. and Cochran, W.G. (1967). *Statistical Methods*. 6th edn. Oxford and IBH Publishing Co., Calcutta.