Factors Influencing Dry period and Calving Interval in Different grades of Buffaloes.

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Abstract :	Data on 920 buffaloes were analyzed for Dry period and Calving interval consisting of three Genetic groups viz.Graded Murrah, Diara buffaloes and Non-descript buffaloes. Buffaloes were enumerated from 145 dairy units located in and around Patna Bihar. Genetic Groups had shown highly significant ($p<0.01$) influence on both the traits. Dry Period varied as 130(days) in Graded Murrah, 151(days) in Diara buffalo and 150(days) in non-descript ones. Farming system and location did not significantly influence these traits. Lactation Order had highly significant effect on these traits. Dry period varied from157days in first lactation to 140 days in fourth lactation while calving interval varies 466 days in first lactation to441 days in fourth lactation.

Keywords :	Dry period ,Calving Interval, Buffaloes, Genetic Effect, Non genetic effect

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ABSTRACT

Data on 920 buffaloes were analyzed for Dry period and Calving interval consisting of three Genetic groups viz.Graded Murrah, *Diara buffaloes* and Non-descript buffaloes. Buffaloes were enumerated from 145 dairy units located in and around Patna Bihar. Genetic Groups had shown highly significant ($p<0.01$) influence on both the traits. Dry Period varied as 130(days) in Graded Murrah, 151(days) in *Diara* buffalo and 150(days) in non-descript ones. Farming system and location did not significantly influence these traits. Lactation Order had highly significant effect on these traits. Dry period varied from157days in first lactation to 140 days in fourth lactation while calving interval varies 466 days in first lactation to441 days in fourth lactation.

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INTRODUCTION

Dry period is a directly observed economic trait of very high practical significance in dairy farming. Calving interval is the indicator of sound reproductive status of milch animals. A period of 12-13 months has been recommended as an ideal calving interval in cows and buffaloes. A milch animal is supposed to be economical, if she has shorter dry period and lower calving interval. Thus Dry period and Calving interval are the important economic traits that determine the milk production efficiency of buffaloes. Considering the role of these two traits the present investigation was carried out to study the effect of various genetic and non-genetic factors on these two traits.

MATERIALS AND METHODS

The present study was conducted on altogether 920 buffaloes consisting of 331 Graded Murrah, 221 *Diara* and 368 Non-descript buffaloes which were enumerated from 145 dairy units located in and around Patna district of **Bihar, India**. The different genetic groups (i) *Punjabiya* (Graded Murrah) having Murrah germplasm in their ancestry ,spiral orientation of the horn, relatively lesser clearance of the body from the ground, small and typical face cut and jet black skin colour. (ii) *Deshila* (*Diara*) true breeding population evolved in Tal and Diara area of North and South Gangatic plain of Bihar around Patna and (iii) Non-descript (other than above two types). The whole area under study was divided into three distinct zones considering geographical attributes as, Zone – I:North West Patna , Zone - II :South West Patna, Zone – III: East Patna. The enumerated dairy units were grouped according to the farming system adopted by the farmers which are Mixed farming (Animal husbandry integrated with agriculture) and only Animal husbandry practices. Records on dry period (days) and calving interval(days) of the buffaloes were classified into four groups on the basis of sequence of lactation up to four parity. The data were subjected to least squares analysis (Harvey, 1975). Duncan Multiple Range Test as modified by Kramer (1957) was used to examine the pair wise comparison among least squares means.

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Result and Discussion

Dry period The overall least squares mean was found to be 144.34±0.77 days (Table 2) for dry period in three genetic groups of buffaloes which was higher than the optimum range . The reason behind it could be the taking out of milk by the private khatal owners from the animals in late gestation and the indiscriminate use of oxytocin for letting down of milk which interfere with the subsequent pregnancy of the animals. Similarly longer dry periods was reported by Rao et al. (1995), Sethi (1996-97) and Yadav et al. (2003) in Murrah, by Pathodiya et al. (1998) and Yadav (1995-96) in Surti, by Paliwal (1994) in Mehsana and Chawla (1996-97) in Nili-Ravi buffaloes. Shorter dry periods have been reported by Dev Raj and Gupta (1994) in local buffaloes of Rajasthan and by Sinha (2006) in buffaloes consisting of three different genetic groups in and around Barh (Bihar) Genetic group and order of lactation had significant ($P<0.01$) while location and farming system had non-significant influence on dry period(Table 2).

Genetic group The least squares means 0f Graded Murrah had the shortest dry period (130.48±1.32 days) which was significantly ($P<0.05$) lower than the Diara and Non-Descript buffaloes by 21.12 and 20.45 days respectively(Table-2). Diara buffaloes though had the longest dry period (151.60±1.30 days) but did not differ significantly from Non-descript type. Alth ough dry period is supposed to be influenced by non-genetic causes but in the present study the genetic divergence between Graded Murrah, Diara and Non-descript buffaloes might have resulted into expression of genetic effect on dry period to be significant. Simmilarly Sinha (2006) who observed the effect of genetic constitution on dry period in buffaloes to be significant. Much variation in dry period reported by various workers (Siddiquee et al., 1984, Singh, 1992, Dev Raj and Gupta, 1994, Pathodiya et al., 1998 and Kumar, 2004) for different breeds of buffaloes may be indicative that genetic constitution of the animals might be a considerable factor for variation in dry period.Contrary to the findings of the present study, Priya Raj (2002) did not record the significant effect of genetic group on dry period in cows.

Location The animals located in different zones did not differ significantly among themselves with respect to their dry periods and the effect of location contributed only 0.56% to the total variation in this trait (Table 2). However, the least squares mean for average dry period was the longest (145.09±1.40 days) for the animals located in the khatals in East Patna followed by those located in North West (144.85±1.25 days) and South West (143.07±1.29 days) zones (Table-2). Srivastava et al. (1998), Rao et al. (2000), Priya Raj (2002) and Kumar (2004) also reported this effect to be non-significant in cows and buffaloes under private sector.

Farming System The farming system did not have significant effect on dry period (Table 2). As evident from table-2, the animals managed in both the units had almost the same duration of dry periods. The average estimates of dry period in the units involved dairy farming alone and those maintained in the units integrated with agriculture farming were 144.58±1.11 and 144.10±1.05 days respectively.

Parity Highly significant (P<0.01) effect of parity on dry period (Table 2) showed a definite trend was in the variation of dry period. The average dry period was found to be the longest (157.85±1.39 days) in first calvers followed by second (143.57±1.33 days) and third (135.65±1.50 days) calvers (Table-2). The average dry periods in second, third and fourth calvers were found to be decreased significantly (P<0.05) by 14.28, 22.20 and 17.58 days respectively than the first calvers. The average dry period of fourth calvers was recknoned to be increased by 4.62 days than the third calvers but did not differ significantly. Singh (1992) also observed the similar trend to that of present study. Contrary to the report of Singh (1992), significant effect of parity was reported by Kumar (2004) in cows and buffaloes in private dairy units but he did not find a definite trend as observed in the present investigation.

CALVING INTERVAL The overall least squares mean for calving interval in buffaloes consisting of three genetic groups viz. Graded Murrah, Diara and Non-descript types, in and around Patna, was observed to be 450.24±1.53 days (Table-2) which was longer than the optimum range desirable for profitable milk production but close to the estimates reported by Dev Raj and Gupta (1994), Kumar (2004) and Sinha (2006). The higher estimates of calving interval in comparison to the findings of the present study has been reported by Johari and Bhat (1979), Rao et al. (1995) and Yadav et al. (2003) in Murrah buffaloes and Siddiquee et al. (1984) and Singh (1992) in Mehsana buffalo. Least squares analysis of variance (Table2) revealed that genetic constitution of the animals and order of lactation had significant (P<0.01) effect on calving interval. The effects of zone and farming system were not significant statistically.

Genetic group Genetic group had highly significant (P<0.01) influence on calving interval and its contribution to the total variation in calving interval was the highest which is accounted to be 77.61% (Table2). As evident from table-2, the Graded Murrah had the shortest calving interval (424.32±2.60 days) which was significantly (P<0.05) lesser than the estimates of Diara and Non-descript buffaloes by 39.89 and 37.87 days respectively. Diara buffaloes had the longest inter calving period (464.21±2.57 days) but did not differ significantly from Non-descript types. Calving interval is supposed to be influenced by non-genetic causes but in the present investigation the genetic divergence between Graded Murrah, Diara and Non-descript buffaloes might have resulted into expression of genetic effect to be significant. Singh et al. (2000) and Kumar (2004) also reported the effect of genetic group on calving interval to be statistically significant in the case of crossbred cows and buffaloes in private dairy units. Significant effect of genetic group on calving interval in buffaloes maintained in private dairy units was also reported by Sinha (2006). But the longest and shorter calving intervals respectively in Non-descript and Graded Murrah reported by him was contrary to the findings of the present study.

Location The animals located in different locations did not differ significantly with respect to their calving interval and the effect of location contributed to the total variation for this trait was only 0.57% (Table2). The animals located in North-West zone of Patna had the longest inter calving period (452.17±2.46 days) followed by those animals located in East (450.13±2.75 days) and South West (448.50±2.55 days) zones. Srivastava et al.

(1988), Rao et al. (2000), Priya Raj (2002) and Kumar (2004) also reported this effect to be non-significant in cows and buffaloes maintained in private dairy units.

Farming system The farming system did not have significant influence on calving interval and the contribution of the farming system to the total variation was reckoned to be 1.66% (Table2). As evident from table-19, the animals maintained in the units involved dairy farming alone exhibited lower calving interval (448.34±2.07 day) than the animals managed in the units integrated with agriculture farming (452.14±2.18 days). However, the animals maintained under two different farming systems did not differ significantly with respect to this traits. Johari and Bhatt (1979) reported highly significant effect of farms and periods on calving interval in buffaloes.

Parity As evident from table 2, the influence of order of lactation on calving interval was highly significant ($P<0.01$) and its contribution to the total variation for this trait was next to the effect of genetic group, which is accounted to be 19.16%. A definite trend was observed in the variation of calving interval from parity to parity. The average first calving interval was found to be longest (466.70±2.74 days) followed by second (453.98±2.61 days) and third (438.56±2.96 days) calving intervals (Table-2). The average estimates of calving interval in second and third parities were found to be decreased significantly ($P<0.05$) by 12.72 and 28.14 days respectively than the first calving interval. The fourth calving interval was found to be increased by 13.16 days than the third parity but did not differ significantly. The significant effect of parity on calving interval was also reported by Singh (1992) and Kumar (2004) in cows and buffaloes maintained in private dairy units. The trend of decreasing calving interval from first to third parity as observed in the present study was also reported by Singh (1992). However, Siddiquie et al. (1984), Tailor and Jain (1986) and Rahejha (1992) reported non-significant effect of parity on calving interval.

Diara buffaloes though had significantly ($P<0.05$) higher Dry period and Calving Interval in comparison to Graded Murrah but *non significantly higher* over Non-descript types in respect to these traits .There is non-significant effect of location and farming system was observed in this study.Therefore similar type of work may be repeated in the entire Tal and Diara areas of the river Ganges, Gandak and Sone pertaining to Bihar(India) to identify and enumerate the number and performance status of *Diara* buffaloes so that a suitable breeding plan can be chalked out for improvement of *Diara* buffaloes

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Table 1 : Least squares means±SE and CV% of Dry period (days) and Calving interval (days) of buffaloes in and around Patna.

Particulars	Dry period (days) Mean ± S.E.	Calving interval (days) Mean ± S.E.
Overall Mean(μ)	144.34±0.77 (9.34)	450.24±1.53 (5.95)
Factors		
Genetic group	**	**
Graded Murrah	130.48[a]±1.32 (10.11)	424.32[a]±2.60 (6.12)
Diara	151.60[b]±1.30 (8.66)	464.21[b]±2.57 (5.59)
Non Descript	150.93[b]±1.30 (8.82)	462.19[b]±2.55 (5.65)
Location	NS	NS
1. North West Patna	144.85±1.25 (9.13)	452.17±2.46 (5.75)
2. South West Patna	143.07±1.29 (9.28)	448.42±2.55 (5.85)
3. East Patna	145.09±1.40 (9.10)	450.13±2.75 (5.76)
Farming System	NS	NS
1. Animal husbandry alone	144.10±1.05 (9.21)	448.34±2.07 (5.84)
2. Mixed farming	144.58±1.11	452.14±2.18

	(9.31)	(5.84)
Lactation order	**	**
1st	157.85[a]±1.39 (8.30)	466.70[a]±2.74 (5.53)
2nd	143.57[b]±1.33 (9.07)	453.98[b]±2.61 (5.63)
3rd	135.65[c]±1.50 (9.64)	438.56[c]±2.96 (5.88)
4th	140.27[bc]±1.93 (9.33)	441.72[c]±3.80 (5.83)

- **Means with different superscripts (column-wise) differed significantly (P<0.05)**
- **Values in parentheses are CV%**

Fig 1. Changes in Dry Periods (days) due to different factors.

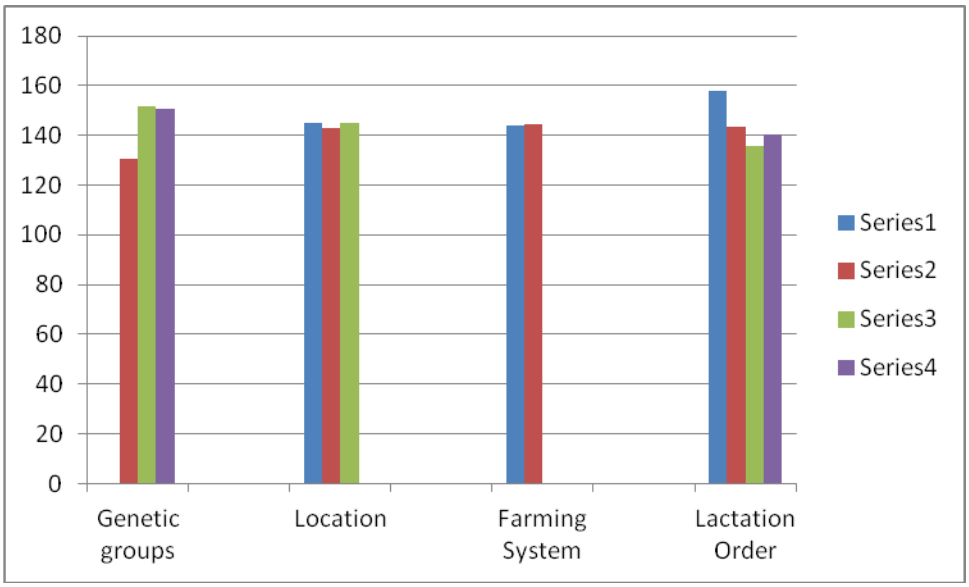
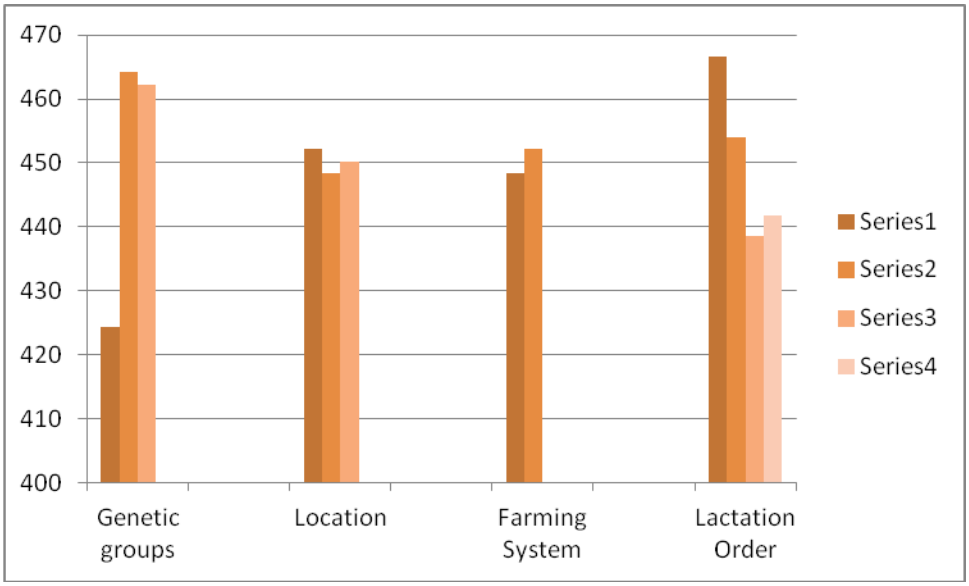


Fig 2. Changes in Calving Intervals (days) due to different factors.


470
460
450
440
430
420
410
400
Genetic groups
Location
Farming System
Lactation Order
Series1
Series2
Series3
Series4