Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
JEZS 2019; 7(2): 524-528

Received: 04-01-2019
Accepted: 08-02-2019

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Influence of non-genetic factors on lactation period and dry period in Gangatiri cattle breed at organized farm, Arajiline, Varanasi

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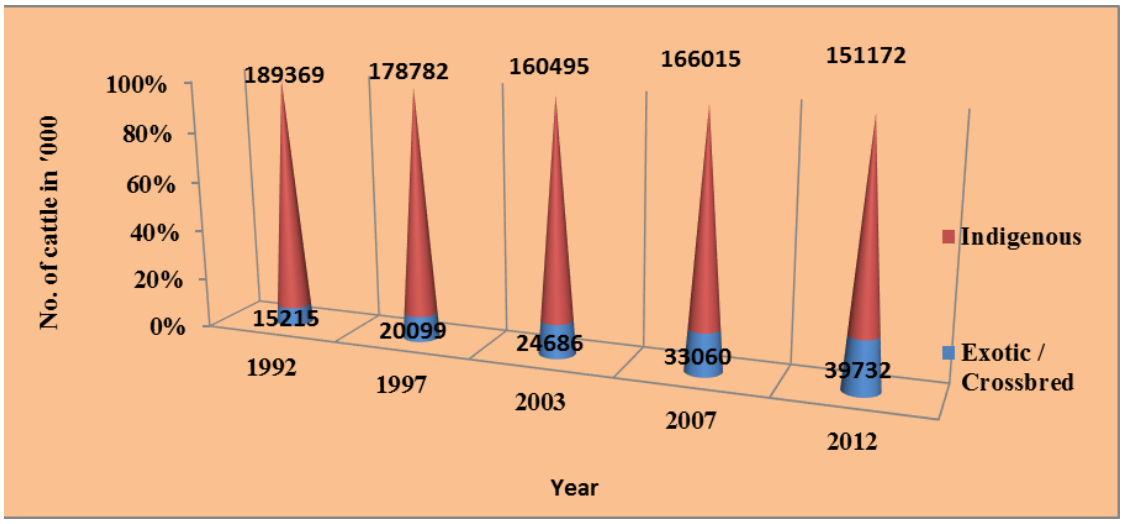
Abstract
The present study was conducted on "Influrnce of non-genetic factors on lactation period and dry period in Gangatiri cattle breed at organized farm, Arajiline, Varanasi". The data were collected from the history sheets of 40 cow maintained in State Livestock Cum Agricultural Farm Arajiline, Varanasi, for the period from 2003 to 2010 to determine the effect of period of birth and effect of season of birth on lactation period and dry period. There is no significant effect of period of birth on lactation period and dry period. Similarly non-significant effect of season of birth on lactation period and dry period.

Keywords: Gangatiri cow, period of birth, season of birth, lactition period, dry period

Introduction
India is a rural based country, two third of its population resides in rural areas. The rural economy mainly depends on agriculture. Animal husbandry and Dairy plays a prominent role in the rural economy through supplementing the income of rural households, particularly, the landless, small and marginal farmers in India. Animal husbandry and Dairy also provides subsidiary occupation in semi urban areas and more so for people living in hilly, tribal and drought-prone areas where crop output may not sustain the family. In India, animal husbandry is an integral part of the agriculture and among livestock, cattle occupy central position and considered as backbone of rural population by providing nutritional and livelihood security. India is a country with diversified agro-climatic condition where agriculture is the main occupation of over three fourth of the Indians. Mostly farmers are engaged in agriculture operations for about 8 to 9 months of the year. To the marginal farmers and landless, it is advantageous to rear a cow, buffalo and / or other livestock as a source of additional income.
There are 190.9 million cattle (about 16 percent of the world's total cattle population) and 109.7 million buffaloes (more than half the world's buffalo population) mostly of non-descript variety, which forms 82% of the cattle population in the country but produces only 8% of the total milk production. The annual milk production has touched an estimate of 76 million tones. This increase in milk production has increased the daily availability of milk per capita 302 gms (19th Livestock Census). To supply the minimum requirement of milk, production of milk in the country needs to be increased to about nearly two and half times. The demand of milk can be met by increasing the production per animal and that can only be achieved by improved breeding and feeding practices. According to recent estimates, India ranks first, however, the per capita availability of milk/person/day is very low as compared to the recommended level 302 gms. The reason of this wide gap between the availability and recommendation is the low milk production potential of indigenous cattle. Therefore, there is great task before the scientists to evolve the means and technique with available limited resources to bridge up this gap to meet the growing demand of increasing population.
Various indigenous breeds of cattle in country are the result of thousands of years of selection, evolution and development from wild species in the process of domestication to the local agro climatic conditions. These breeds are now losing ground due to intense competition to other breeds and risk of economic viability under the present system of management.



(*Source*: www.fao.org)

Fig 1: Exotic / crossbred and indigenous population during 1992-2012.

There are 33 well-defined breeds of cattle apart from several nondescript types and some lesser-known breeds (Chand, 2011) [3]. An average cow of improved zebu breed produces on an average 1800 kg milk in a lactation, while a non-descript cow yield only 173 kg. This yield is very low as compared to the yield of *Bos taurus* in advanced countries where they yield many times more than the dairy animals of India. The main components of low productivity of cattle in India is more insemination per conception, low daily milk yield, short lactation period, wider dry period, long calving interval and late age at first calving. The milk production of cattle is largely governed to a large extent by the genetic makeup. The value of milch animal is dependent not only upon quantity of milk she produces, but also the number of days she remains in milk and dry. This performance is affected by certain physiological as well as environmental factors. Milk production considered to be one of the most important traits in selection. There are many factors that cause narration in milk production, which can be classified into two main factors i.e genetic and environmental. The first factor include all differences which are attributed to heredity, genetic constitution and the phenotypic expression of gene while the second comprises all other causes of variations between as well as within individuals and reveal the climatic effect and manage mental practices given to the livestock.

More emphasis should be given to improve both the factors viz. genetic as well as non- genetic. The genetical improvement can be brought by selecting and breeding of superior stock having superior germplasm (genes) and non-genetical improvement can be obtained by providing the better climate as well as feed and health care.

Gangatiri is an indigenous cattle breed of India, known to be originated in the region along the banks of Ganga river in eastern Uttar Pradesh and western parts of Bihar state. This is an important dual purpose breed of North India. The cows are fairly good milk yielders. Gangatiri is also known as Eastern Hariana or Shahabadi. The breeding tract includes Bhojpur district of Bihar and Varanasi, Mirzapur, Ghazipur and Ballia districts of Uttar Pradesh. The animals of this breed are medium milk producers and possess good draft ability also. The color is complete white (Dhawar) or Grey (Sokan). The horns are medium sized and emerge from side of the poll behind and above eyes in outward and curving upwards and inwards ending with pointed tips. The forehead is prominent, straight and broad with shallow groove in the middle. Eyelids, muzzle, hooves and tail switch are generally black in color. The average milk yield in a lactation is around 1050 Kg, varying from 900 to 1200 Kg with an average fat of 4.9 %, varying from 4.1 to 5.2 %.

The low level of productivity of indigenous cattle is attributed to several reasons. The reproductive efficiency in cow is so alarmingly low that it causes very serious economic problem to farmers as well as to animal husbandry professionals. Poor productivity potential of cow is reflected by its low efficiency due to higher age of puberty, longer dry period, short lactation length, long calving interval. The reproductive traits are believed to be governed by both genetic and non-genetic factors such as breed, environment, feeding and management.

Improvement in breed, environmental conditions, better feeding and sound managemental practices may result in better productive & reproductive efficiency of animals. To study about lactation period and dry period and whether these factor (lactation period, and dry period) are also influenced by period of birth and season [July -Oct. (rainy), Nov.-Feb. (winter), march-June (summer)] of birth.

Materials and Methods

The present investigation “Influence of non-genetic factors on some productive & reproductive traits in Gangatiri cattle breed at organized farm, Arajiline, Varanasi”. The herd was established in 1955 (First Five Year Plan).

Site selection for the study

The data of this study were obtained from the history and pedigree sheets maintained at State Livestock Cum Agricultural Farm pertaining to the period for 2003-2010. All the animals were reared, feed and managed under similar conditions.

Sample size of the Cattle

A total of 40 records of milch animals were randomly selected for study. The record of cow having lactation days of 150 or below considered abnormal and hence not included in study.

Measurement of the traits:

The data pertaining to parameters viz. lactation period (days) and dry period were collected, tabulated and analyzed for study.

Period-wise: according to the year of birth the data were divided into different periods on the basis of date of birth.
To carry out the analysis, the data thus obtained were classified into various group as follows:

Period of birth:

	Year	Code
a)	2003-2004	P1
b)	2005-2006	P2
c)	2007-2008	P3
d)	2009-2010	P4

Season wise: The year was divided into three seasons.

Season Code

a. November- February (Winter) S1
b. March- June (Summer) S2
c. July- October (Rainy) S3

Statistical analysis

The raw data were entered and sorted into MS Excel sheet then transferred to the analytical Web Based Agricultural Statistics Software Package (WASP-2.0) for descriptive result.
The fixed effects considered were year of birth and season of birth. All data were entered into Microsoft Excel spreadsheets and after deleting incomplete records, a total of 40+40 (period wise and season wise) records for Lactation period and Dry period were used for analyses.
Birth year of 2003-2004, 2005-2006, 2007-2008 and 2009-2010 and season Winter, Summer and Rainy were taken for data analysis.

Results and Discussion

Lactation Period

Milk production often ceases several months before next calving and before the depressing effect of gestation on milk production is noticeable. Length of lactation, therefore, is not so greatly influenced by calving interval. The lactation period is highly dependent on how soon the cow becomes pregnant again after calving. Information on first lactation traits serves as early guidelines for selection of animal for further retention in the herd. Since the cow proves more profitable when she freshens every year and produce one calve thereby keeping lactation period to an optimum of 300-310 days.
The overall least square mean lactation period was 322 ± 07 days. Highest value of lactation period is reported by Acharya (1989) [1]. Lower estimate then the present finding was reported by Herbert and Bhatnagar (1989) [7] in karan-swiss cattle.
The analysis of variance showed that the effect of period were found non-significant on lactation period. According to the period of birth, the lactation period in four period of birth P1(2003-2004), P2(2005-2006), P3(2007-2008) and P4(2009-2010) were 331 ± 17, 300 ±14, 325 ±16 and 331 ± 15 days respectively. The lactation period was lowest in period P2 and highest in period P1 and P4 may be due to better feeding and scientific management during this time. The results are similar with those reported by Manoj *et al.* (2012) in Sahiwal when compared period of birth P1, P2, P3 and P4. P1 with P2, P2 with P3 and P3 with P4 does not differ significantly.

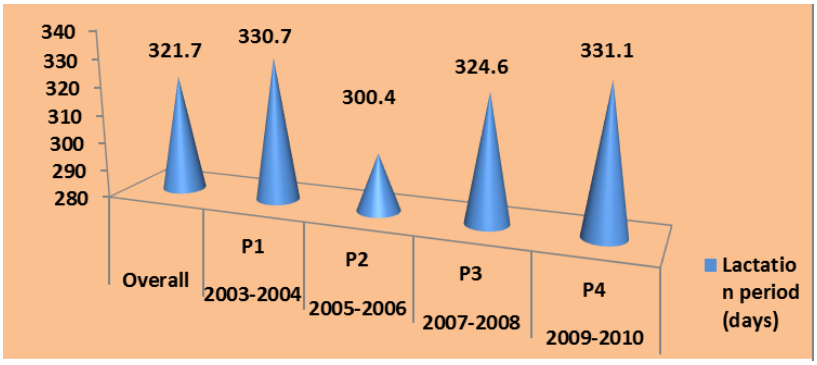


Fig 2: Period wise least square mean of lactation period (days).

The analysis of variance showed that the effect of season of birth were found non significant on lactation period. According to season of birth, the lactation period in seasons S1 (winter), S2(summer) and S3(rainy) were 330 ± 12, 323 ± 17 and 305 ± 11 days respectively. The lactation period was lowest in season S3 (July-October) and highest in season S1 (November- February). The least square mean value of lactation period was highest in S1 (winter) which might be due to better feeding and scientific management during this time. Comparison of S1 with S2, S2 with S3 and S3 with S1 does not differ significantly.

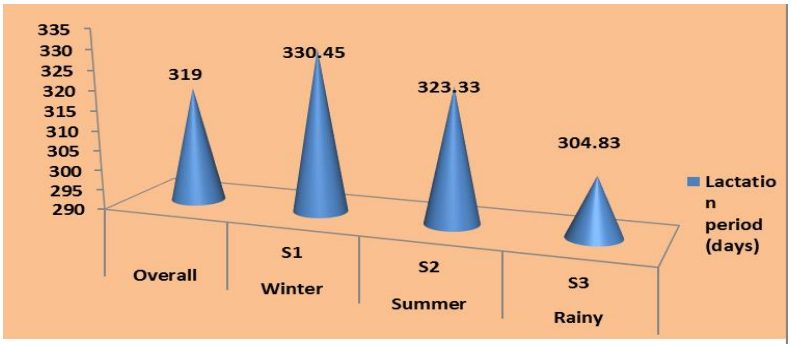


Fig 3: Season wise least square mean of lactation period (days).

Dry Period

A dry period of dairy cows is historically seen as a period during which the cow can restore its body condition and regenerate its mammary epithelium in order to be high yielding in the successive lactation. The dry period is a directly observed economic trait of very high practical significance in dairy farming.

The overall least square mean lactation period was 163 ± 22 days, which is higher than average value of 123.00± 14.00 days reported by Gaur *et al*. (2003) [6]. The analysis of variance showed that the effect of period was found not significant on dry period.

According to the period of birth, the dry period in four period of birth P1(2003-2004), P2(2005-2006), P3(2007-2008) and P4(2009-2010) were 175 ± 37, 184 ±24, 157 ±18 and 134 ± 20 days respectively. The dry period in this case was lowest in period P4 and highest in period P2 may be due to better scientific management during this time. When compared period of birth P1, P2, P3 and P4. P1 with P2, P2 with P3 and P3 with P4 does not differ significantly.

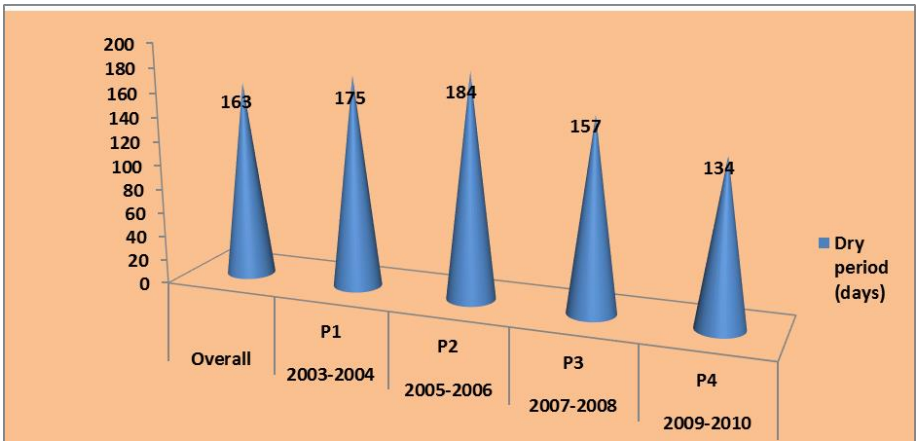


Fig 4: Period wise least square mean of dry period (days)

The analysis of variance showed that the effect of season of birth were found non-significant on dry period. According to season of birth, the dry period in seasons S1(winter), S2(summer) and S3(rainy) were 160 ± 15, 157 ± 18 and 169 ± 32 days respectively. The dry period in the case was lowest in season S2 (March-June) and highest in season S3 (July-October). Comparision of S1 with S2, S2 with S3 and S3 with S1 does not differ significantly.

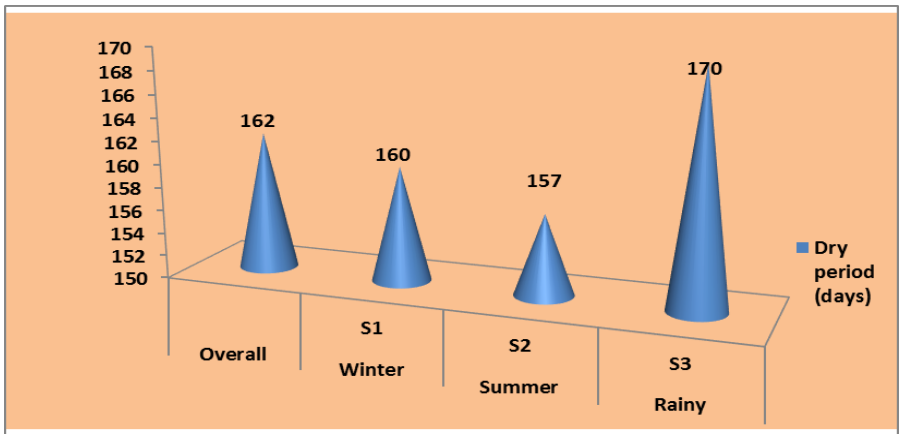


Fig 5: Season wise least square mean of dry period (days)

Conclusion

The analysis of variance showed that the effect of period of birth were found non-significant on lactation period. According to the period of birth, the lactation period in four period of birth P1(2003-2004), P2(2005-2006), P3(2007-2008) and P4(2009-2010) were 331 ± 17, 300 ±14, 325 ±16 and 331 ± 15 days respectively. The lactation period was lowest in period P2 and highest in period P1 and P4 may be due to better feeding and scientific management during this time. The analysis of variance showed that the effect of season of birth was found non-significant on lactation period. According to season of birth, the lactation period in seasons S1(winter), S2(summer) and S3(rainy) were 330 ± 12, 323 ± 17 and 305 ± 11 days respectively. The lactation period was lowest in season S3 (July-October) and highest in season S1 (November- February). The least square mean value of lactation period was highest in S1 (winter) which might be due to better feeding and scientific management during this time.

The overall least square mean lactation period was 162 ± 37 days. The analysis of variance showed that the effect of period of birth were found non significant on dry period. According to the period of birth, the dry period in four period of birth P1(2003-2004), P2(2005-2006), P3(2007-2008) and P4(2009-2010) were 175 ± 37, 184 ±24, 157 ±18 and 134 ± 20 days respectively. The dry period was lowest in period P4 and highest in period P2 may be due to better scientific management during this time. The analysis of variance showed that the effect of season of birth were non-significant on dry period. According to season of birth, the dry period in

seasons S1(Winter), S2(Summer) and S3(Rainy) were 160 ± 15, 157 ± 18 and 169 ± 32 days respectively. The dry period in the case was lowest in season S2 (March-June) and highest in season S3 (July-October).

Since period of birth and season of birth had non significant influence on lactation period and dry period which may indicates the feeding and managemental facilities during specific period of time hence, emphasis should be given to management and feeding practices.

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