



Factors Affecting Conception Rate in Dangi Cattle

V. V. Potdar*, Y. S. Gaundare, J. R. Khadse, Sachin Joshi, Marimuthu Swaminathan,
A. B. Pande and N. L. Phadke

Central Research Station, BAIF Development Research Foundation

*Corresponding Author E-mail: vinod.potdar@baif.org.in

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ABSTRACT

The objective of this study was to study the factors affecting the conception rate in small scale dairy farms after artificial insemination (AI) in rural areas of Maharashtra state in dangi cattle. Dangi cattle is well known for its hardy nature and its ability to work hard under heavy rainfall conditions. The study was carried out during the period from June 2010 to May 2015 in Nashik & Jalgaon regions of Maharashtra. In total, 3093 dangi cattle in good health were inseminated by centre in charge at different cattle development centres of BAIF at door step of farmer as the AI protocol. Pregnancy diagnosis was done per rectal palpation after 60 to 90 days. Least Square mean for overall conception rate was 48.09 ± 6.51 percent. All intrinsic factors namely parity, AI sequence number, body condition, AI year and AI season has a significant effect on conception rate while heat stage and economic condition was not having any significant effect. Heifers were having lower conception rate 42.48 ± 3.06 percent than cattle in first parity 50.87 ± 3.10 percent, second parity 50.39 ± 3.18 percent, third parity 46.09 ± 3.37 percent, fourth parity 49.41 ± 3.75 percent & fifth parity 49.31 ± 3.69 percent. Higher conception rate in first AI 55.95 ± 2.32 percent than second 50.08 ± 3.07 percent and third AI 38.24 ± 4.45 percent. The highest conception rate was observed in winter season 51.57 ± 2.87 percent while the lowest conception rate was observed in summer 44.59 ± 3.00 percent. Animals with no visible ribs were having lowest conception rate 41.54 ± 3.05 percent while highest conception rate was observed in animals with percent one rib exposed 53.26 ± 3.29 . In year wise study lowest conception rate 38.82 ± 3.84 percent was observed in year 2010 while highest conception rate 55.60 ± 3.29 percent was observed in year 2012. In heat stage wise study highest conception rate was observed in early heat stage 50.07 ± 3.09 while in mid heat stage it was 47.48 ± 1.92 and lowest was in late heat stage 46.73 ± 5.84 . In economic status wise conception rate show higher conception rate in APL – (Above Poverty Line) 49.62 ± 2.75 percentage while in BPL (Below Poverty Line) it was 46.56 ± 2.86 .

Key words: Artificial Insemination, Conception, Cattle development centre, Parity

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INTRODUCTION

Cattle in the country are one of the major contributors in the livestock population. As per 19th Livestock census 37.28 % of the livestock population belong to cattle. The Dangi cattle is a draught breed of Maharashtra with Accession number INDIA_CATTLE_1104_DANGI_03004. Estimated Livestock Population Breed Wise Based On Breed Survey Government Of India Ministry Of Agriculture & Farmers Welfare Department Of Animal Husbandry, Dairying & Fisheries (Animal Husbandry Statistics Division) Krishi Bhawan, New Delhi 2013. Dangi Pure (no.) was 1,19,373 while Graded (no.) 74,407 and Total (no.) 1,93,780. Percentage share with respect to total 0.13%. Dangi animals are mostly found in Akole taluka of Ahmadnagar district, Sinner, Igatpuri taluka of Nashik Districts of Maharashtra and Dangs district of Gujrat It is also found nearby Thane district of Maharashtra. Generally these animals are found near the hilly tract where forest is available in the ranges of Sahyadri. The animals are adapted to heavy rainfall conditions. The skin exudes an oily secretion which protects from heavy rain Dangi cattle are extensively used for ploughing, harrowing and other field operations, and also for carting timber from forest area. The breed is well known for its excellent working qualities in heavy rainfall areas, rice fields and hilly tracts. In Marathi Dang means Mountains and these animals are living in mountains. Hence these are called Dangi. Some believe that this originates from the Dangs district in Gujarat.. Since success of any breed improvement programme is highly dependent on the conception rate of the cattle, therefore the present study was undertaken to analyze the conception rate (C.R.) in rural cattle due to various genetic and non-genetic factors.

MATERIAL AND METHODS

The data of 3093 Artificial Inseminations pertaining to 1949 dangi cattle from 109 villages of Nashik and Jalgaon region were collected from ---- AI centers from June 2010

to May 2015. The available data were classified on the basis of parity, AI sequence number, body condition, AI year and AI month. The lactation sequence ranged from heifer to fifth. Body condition score (BCS) were categorized from 1 to 4, where BCS1 being physically poor and BCS4 being over-condition. The number was an indicator of comparative body condition score in ascending order. Conception rates (CR) were estimated from the proportion of pregnancies confirmed by the rectal palpation of the genital tract between 90 to 120 days of post-insemination among the total number of animals inseminated artificially with frozen semen in a specified period of time. The conception rate was estimated by using the following formula:

Conception rate = number of cow pregnant/number of cow inseminated X100

Insemination data was recorded using the electronic data loggers and stored in SQL server. For each animal, the conception rate (CR) was defined as pregnant or not. Data was analyzed using standard statistical method

RESULTS AND DISCUSSION

The total conception rate and the variation in relation to different parity, year of insemination, month of insemination, AI sequence and body score condition are shown in Table 1 and 2. Least Square mean for overall conception rate was 48.09 ± 6.51 percent which was in agreement with Potdar *et al.*⁹, who reported highest conception rate in Dangi cattle in comparison with other cattle breeds. National Dairy Research Institute (NDRI) 2015 has also reported higher conception rate in herd of Sahiwal, Tharparkar, Karan Swiss and Karan Fries maintained at NDRI, Karnal 42.94 per cent, 45.88 per cent, 28.26 per cent and 32.64 per cent respectively.

Analysis of variance

In this present study lactation number, artificial insemination sequence number, body condition of animals AI year and AI season show significant effect over conception rate while heat stage and economic condition was not having significant effect. This is presented in table 1 and 2.

Table 1: Analysis of variance for conception rate in Dangi cattle

Source of variation	Degree of freedom	Means Square
Lactation Number	5	6784.4273*
AI Sequence Number	2	27706.4961**
Body Condition	3	12940.8789**
Heat Status	2	983.3108 ^{NS}
AI Year	2	16830.8844**
AI Season	5	11442.3604**
Economic Condition	1	5946.4775 ^{NS}

* p< 0.05, ** p<0.01 NS- Non Significant

Parity wise conception rate –

Heifers were having lower conception rate 42.48 ± 3.06 percentage than cattle in first parity 50.87 ± 3.10 percentage, second parity 50.39 ± 3.18 percentage, third parity 46.09 ± 3.37 percentage, fourth parity 49.41 ± 3.75 percentage & fifth parity 49.31 ± 3.69 percentage. Over all heifers show less conception rate than older cattle. The present study found the parity was significant. Khan *et al.*⁸, reported higher conception rate in cows at second and third parity than that of cows at zero parity (nulliparous). Barcellos *et al.*¹, also reported a higher conception rate in multiparous cows than that in primiparous cows. There is also report that conception rates in cows at their first three parties are higher than that of their later parities¹¹. Further, Hla *et al.*⁵, reported an increased conception rate with advancing parity from parity 2 up to 6 and then declined at parities 7 and 8. In the present study, the maximum recorded parity of cows was 5 and most of the cows were belonged to 1-2 parities which may be considered as the parity of grown cows. Although there was significant variation in pregnancy rate of cows was obtained among different parity groups, obtaining lower pregnancy rate (44.94 ± 3.3) in heifer (nulliparous) cows supports the earlier finding reported by Khan *et al.*⁸,

Conception rate by Heat Stage – There was no significant difference effect due to heat stage of animal over conception rate. In heat stage wise study highest conception rate was

observed in early heat stage 50.07 ± 3.09 while in mid heat stage it was 47.48 ± 1.92 and lowest was in late heat stage 46.73 ± 5.84 . Potdar *et al.*⁹, observed same results in their study.

Conception rate by Body Score Condition –

Animals with no visible ribs were having lowest conception rate 41.54 ± 3.06 percentage while highest conception rate was observed in animals with one rib exposed 53.26 ± 3.29 percentage. Animal with two rib and three rib visible were having 48.95 ± 2.56 percentage and 48.61 ± 4.77 percentage conception rate respectively. The variation in conception rate among cows of different Body Score Condition was highly significant ($p < 0.05$). Potdar *et al.*, who reported highest conception rate in animal with one rib exposed (44.90%) with slightly lower in animal with no rib exposed (44.11%). Conception rate in animal exposed three rib exposed was (43.45%) while lowest conception rate was observed (41.25%) in animal with two rib exposed. Haque *et al.*⁴, reported highest pregnancy rate in cows of BCS 3-4 (58.04%) while lowest pregnancy rate in cows of BCS 1.5-2 (35.00%). The variation in pregnancy rates among cows of different BCS was significant ($p < 0.05$).

Conception rate by Artificial Insemination Sequence No-

Sequence of A.I. had highly significant effect on conception rate higher conception rate was observed in first AI 55.95 ± 2.32 than second 50.08 ± 3.07 and third AI 38.24 ± 4.45 . Potdar *et al.*, reported highest conception rate in first

and second attempt and later on it decline in third attempt.

Year wise Conception rate –

In year wise study lowest conception rate 38.82 ± 3.84 percent was observed in year 2010 while highest conception rate 55.60 ± 3.29 percent was observed in year 2012. In year 2011 conception rate was 42.66 ± 3.45 percent; it was 48.86 ± 3.20 in year 2013 and 50.78 ± 3.42 percent and 51.83 ± 3.19 percent in year 2014 & 2015. The lower rate of conception in first year might be because of the initiation of the AI work in that particular area.

Season of AI wise Conception rate –

Season of AI wise conception rate study was highly significant. Highest conception rate was

observed for AI in winter season 51.57 ± 2.87 percent while lowest conception rate was observed in Summer season 44.59 ± 3.00 percent. It was 48.11 ± 2.90 percent in rainy season. The CR of cows markedly reduced when a higher temperature prevails for two days before insemination to 4-6 days after insemination³. Higher temperature and relative humidity¹⁰. and poor management affect on fertility of cattle.

Economic status wise Conception rate –

Economic status wise conception rate show higher conception rate in APL – (Above Poverty Line) 49.62 ± 2.75 percentage while in BPL (Below Poverty Line) 46.56 ± 2.86 .

Table 2. Least square means of Conception rate with standard error			
Sr. No.	Parameters	No. of Observations	Gestation period
1	Overall mean	3093	48.09 ± 6.51
2	Order of lactation **		
	Heifer (0)	807	42.48 ± 3.06
	1	602	50.87 ± 3.10
	2	602	50.39 ± 3.18
	3	470	46.09 ± 3.37
	4	295	49.41 ± 3.75
3	Body score condition ***		
	No rib exposed	704	41.54 ± 3.05
	one rib exposed	449	53.26 ± 3.29
	two rib exposed	1799	48.95 ± 2.56
	three rib exposed	141	48.61 ± 4.77
4	Season of Calving ***		
	Rainy	1108	48.11 ± 2.90
	Winter	1046	51.57 ± 2.87
5	Heat Stage wise (NS)		
	Early	531	50.07 ± 3.09
	Mid	2484	47.48 ± 1.92
6	Year wise conception rate ***		
	2010	330	38.82 ± 3.84
	2011	583	42.66 ± 3.45
	2012	661	55.60 ± 3.29
	2013	568	48.86 ± 3.20
	2014	428	50.78 ± 3.42
7	Artificial Insemination Sequence Number***		
	1	2436	55.95 ± 2.32
	2	490	50.08 ± 3.07
	3	167	38.24 ± 4.45
8	Economic Status (NS)		
	APL – (Above Poverty Line)	874	49.62 ± 2.75
	BPL (Below Poverty Line)	536	46.56 ± 2.86

* p< 0.05, ** p<0.01 NS- Non Significant

DISCUSSION

It was concluded from above investigations that for improvement in conception rate in dangi cattle, reproduction attributes like parity specially management of heifers, body condition of animal, heat stage, AI sequence number factors need to be considered.

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