

*Original Research***Reproductive Performance of Gangatiri Cattle under Field Conditions****V. V. Potdar*, J. R. Khadse, S. A. Joshi, Y. S. Gaundare, N. L. Phadke, Marimuthu Swaminathan and A. B. Pande**

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Abstract

Gangatiri is a dual-purpose cattle breed, found in eastern Uttar Pradesh and western Bihar along the river Ganga. It is medium milk producer and possess good draft ability. These cattle are well adapted to low to medium input production system and produce about 2.5 to 8.0 Kg milk a day. The objective of the study was to identify the factors affecting variation in conception rate of Gangatiri cattle inseminated under field conditions. Total of 2362 artificial inseminations of Gangatiri cattle were studied in Ara, Azamgarh, Buxar district during period 2009 to 2013. In district wise study, conception rates in Ara, Azamgarh and Buxar districts were $54.98 \pm 3.72\%$, $67.78 \pm 2.31\%$ and $61.42 \pm 4.94\%$, respectively. In economic status wise study, it was found that conception rate was $60.56 \pm 3.00\%$ in above poverty line (APL) and $62.22 \pm 2.95\%$ in below poverty line (BPL). In parity wise study, in heifer, conception rate was $60.64 \pm 3.19\%$ while in first parity it was slightly higher (61.99 ± 3.20), while it was $62.73 \pm 3.39\%$ and 60.21 ± 3.82 in second and third parity, respectively. In year wise study, conception rate was 62.27 ± 4.52 in year 2009 and $59.11 \pm 2.81\%$ in 2010. It was $58.90 \pm 3.43\%$, $56.58 \pm 3.42\%$ and $70.11 \pm 3.89\%$ in 2011, 2012 and 2013, respectively. In seasonal study conception rate was higher in rainy season ($63.25 \pm 3.18\%$) followed by summer ($60.98 \pm 3.04\%$) and lowest in winter ($59.95 \pm 3.19\%$). In AI sequence wise study, conception rate was highest in first insemination ($63.93 \pm 2.12\%$) followed by in second ($63.33 \pm 3.19\%$) and lowest in third insemination ($56.92 \pm 5.98\%$). Out of all parameters, only district and insemination year were having significant effect.

Key words: Artificial Insemination, AI, APL, BPL, Conception Rate, Gangatiri**How to cite:** Potdar, V., Joshi, S., Phadke, N., Swaminathan, M., & Pande, A. (2019). Reproductive Performance of Gangatiri Cattle in Field Condition. International Journal of Livestock Research, 9(9), 161-167. doi: 10.5455/ijlr.20190629081539**Introduction**

Gangatiri is a medium size, good-looking dual-purpose cattle; its breeding tract is situated in eastern Uttar Pradesh and mainly reared by small, marginal and landless farmers for their livelihood security (Anonymous, 2006). As per report of BAHS (2012), Gangatiri breed has been recognised as a separate breed by NBAGR-ICAR in 2015. Gangatiri cattle are mostly reared on low or zero input system, mainly

on grazing. Gangatiri bullocks are very good for agricultural works and farmers earn income through selling of milk and milk products, drought power for agricultural operation, dung manure and dung cakes thereby securing their livelihood. This cattle breed is well adapted to local agro-climatic conditions. Resource poor farmers who cannot afford maintenance cost of exotic and crossbreed cattle, practicing Gangatiri cattle rearing because they can be easily maintained. As being indigenous cattle, it is less prone to reproductive and productive diseases and highly resistant to ecto and endo-parasitic infestation (Anonymous, 2006). So, keeping in view the above facts, the study was carried out to identify the factors affecting variation in conception rate of Gangatiri cattle inseminated under field conditions.

Material and Methods

Artificial insemination was provided as doorstep service by cattle development centres at BAIF's field AI centers. Total of 2362 artificial inseminations of Gangatiri cattle were studied in Ara and Buxar districts of Bihar and Azamgarh district of Uttar Pradesh. In Ara 307 inseminations, in Azamgarh 1937 inseminations and in Buxar 118 inseminations were done in Gangatiri cattle. The available data were classified on the basis of district, parity, AI sequence number, AI year and AI season. The lactation sequence ranged from heifer to third lactation. Conception rates (CR) were estimated from the proportion of pregnancies confirmed through 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 (Qureshi *et al.*, 2008).

$$\text{Conception Rate} = \text{Number of Cow Pregnant} / \text{Number of Cow Inseminated} \times 100$$

Insemination data was recorded using the electronic data loggers and stored in computer server. For each animal, the conception rate (CR) was defined as pregnant or not. Data was analyzed using standard statistical method. The data was analyzed using statistical methods, suggested by Snedecor and Cochran (1967).

Results and Discussion

Total of 2362 artificial inseminations in Gangatiri cattle were studied in Ara, Azamgarh, Buxar district during period 2009 to 2013. The total conception rate and the variation in relation to different parity, year of insemination, month of insemination, AI sequence were studied. Least square mean for overall conception rate was $61.39 \pm 5.37\%$. In district wise study, conception rates in Ara, Azamgarh and Buxar were $67.78 \pm 2.31\%$, $54.98 \pm 3.72\%$ and $61.42 \pm 4.94\%$, respectively. In economic status wise study, it was found that conception rate was $60.56 \pm 3.00\%$ in below poverty line (BPL) and $62.22 \pm 2.95\%$ in above poverty line (APL). In parity wise study, in heifer conception rate was $60.64 \pm 3.19\%$ while in first parity it

was slightly higher (61.99 ± 3.20) and it was $62.73 \pm 3.39\%$ and 60.21 ± 3.82 in second and third parity, respectively. In year wise study, conception rate was 62.27 ± 4.52 in year 2009 and $59.11 \pm 2.81\%$ in 2010. It was $58.90 \pm 3.43\%$, $56.58 \pm 3.42\%$ and $70.11 \pm 3.89\%$ in 2011, 2012 and 2013, respectively. In seasonal study, conception rate was higher in rainy season ($63.25 \pm 3.18\%$) followed by summer ($60.98 \pm 3.04\%$) and lowest in winter ($59.95 \pm 3.19\%$). In AI sequence wise study, conception rate was highest in first insemination ($63.93 \pm 2.12\%$) followed by in second ($63.33 \pm 3.19\%$) and lowest in third ($56.92 \pm 5.98\%$) insemination. Out of all parameters only district and insemination year were having significant effect.

Analysis of Variance

In this present study, district and AI year show significant effect over conception rate while economic condition, parity, AI sequence, AI season were not having significant effect. This is presented in ANOVA Table as mentioned below-

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

Source of Variation	Degree of Freedom	Means Square
District	2	15233.1816**
Lactation Number	3	608.0712NS
AI Sequence Number	2	1925.5271NS
AI Year	4	9285.4297**
AI Season	2	1925.5271NS
Economic Condition	1	1459.9020NS

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

District Wise Conception Rate

The Gangatiri cattle – a dual purpose cattle breed is mainly found around river Ganga in eastern Uttar Pradesh in Chandauli, Ghazipur and Ballia districts and adjacent Bhabhua (Kaimoor), Buxar, Arrah and Chhapra areas of Bihar state. The breeding tract of this breed includes mainly Ballia and Ghazipur districts of Uttar Pradesh and Rohtas and Shahabad districts of Bihar. Population of Gangatiri cattle in Uttar Pradesh is 364.81 thousand out of this population. In present study, Ara and Buxar districts of Bihar and Azamgarh district of Uttar Pradesh were included. In district wise study, conception rate in Ara was $54.98 \pm 3.72\%$, $67.78 \pm 2.31\%$ in Azamgarh and $61.42 \pm 4.94\%$ in Buxar. The individual farmers' management and agro-climatic conditions of respective district might be attributed to significant differences in conception rate of animals.

Table 2: District wise lease square means conception rate percentage with standard error

District	Number	Pregnant	Lease Square Means Conception Rate Percentage with Standard Error (LSM ± SE)
Ara	307	170	54.98±3.72
Azamgarh	1937	1337	67.78±2.31
Buxar	118	73	61.42±4.94
	2362	1580	61.39 ± 5.37

Parity Wise Conception Rate

In parity wise study, in heifer, conception rate was 60.64±3.19% while in first parity it was slightly higher (61.99±3.20%). It was 62.73±3.39% and 60.21±3.82% in second and third parity, respectively. Conception rate increase as increase in parity upto second parity, and in third parity, it decreases. The present study found the parity was significant. Khan *et al.* (2015) reported higher conception rate in cows at second and third parity than that of cows at zero parity (nulliparous). Conception rate in heifers was noticed to be lowest (50.33%) among other multiparous animals which might be due to the fact that farmers paid more attention to the instant productive animals. The findings of Gunasekaran *et al.* (2008), Razi *et al.* (2010), Bhagat and Gokhale (2016) and Pandey *et al.* (2016) supported the present investigation as they also noticed lowest conception rate in heifers whereas Potdar *et al.* (2016) reported highest conception rate in heifers. Detail parity wise conception rate is shown following Table 3.

Table 3: Parity wise lease square means conception rate percentage with standard error

Parity	Number	Pregnant	Lease Square Means Conception Rate Percentage with Standard Error (LSM ± SE)
Heifer (0)	872	584	60.64±3.19
1	846	572	61.99±3.20
2	402	269	62.73±3.39
3	242	155	60.21±3.82
	2362	1580	61.39 ± 5.37

Artificial Insemination Sequence Number Wise

In AI sequence wise study, conception rate was highest in first insemination (63.93±2.12%) followed by in second (63.33±3.19%) and lowest in third (56.92±5.98%). The conceptions recorded in first attempt were non-significant. These results corroborated with the findings of Shindey *et al.* (2014) who recorded significantly highest conception rate in first attempt. Detail parity wise conception rate is shown following Table 4.

Table 4: Artificial insemination sequence number wise lease square means conception rate percentage with standard error

AI Number	Number	Pregnant	Lease Square Means Conception Rate Percentage (LSM ± SE)
1	1979	1329	63.93±2.12
2	315	210	63.33±3.19
3	68	41	56.92±5.98
	2362	1580	61.39 ± 5.37

Artificial Insemination Year Wise

In year wise study, conception rate was 62.27±4.52 in year 2009 and 59.11±2.81% in 2010. It was 58.90±3.43%, 56.58±3.42% and 70.11±3.89% in 2011, 2012 and 2013, respectively. Detail parity wise conception rate is shown following Table 5.

Table 5: Artificial insemination year wise lease square means conception rate percentage with standard error

AI Year	Number	Pregnant	Lease Square Means Conception Rate Percentage (LSM ± SE)
2009	171	120	62.27±4.52
2010	839	528	59.11±2.81
2011	540	364	58.90±3.43
2012	514	335	56.58±3.42
2013	298	233	70.11±3.89
		1580	61.39 ± 5.37

Season Wise Conception Rate

In seasonal study, conception rate was higher in rainy season (63.25±3.18%) followed by summer (60.98±3.04%) and lowest in winter (59.95±3.19%). Bhagat and Gokhale (1999), (2013) and Shindey *et al.* (2014) also reported similar findings, while Potdar *et al.* (2016) noticed animals inseminated during summer season had higher conception rate. Detail parity wise conception rate is shown following Table 6.

Table 6: Season of AI wise lease square means conception rate percentage with standard error

Season	Number	Pregnant	Lease Square Means Conception Rate%
Rainy	675	462	63.25±3.18
Winter	704	465	59.95±3.19
Summer	983	653	60.98±3.04
	2362	1580	61.39 ± 5.37

Economic Status Wise

In economic status wise study, it was found that conception rate was $60.56 \pm 3.00\%$ in below poverty line (BPL) and $62.22 \pm 2.95\%$ in above poverty line (APL). The highest coverage of AI and significantly higher conception rate in BPL and weaker section of society reveals their major livelihood dependence on animals resulting in caring of animals in spite of less resources compared with APL group of farmers. Bhagat and Gokhale (2016) and Pandey *et al.* (2016) also noticed higher conception rate in animals owned by BPL category farmers.

Table 7: Economic status wise lease square means conception rate percentage with standard error

Economic Status	Number	Pregnant	Lease Square Means Conception Rate%
APL – (Above Poverty Line)	999	671	60.64 ± 3.19
BPL (Below Poverty Line)	1363	909	62.22 ± 2.95
	2362	1580	61.39 ± 5.37

Discussion

District and AI year, had significant effect on conception rate while economic status of farmers, parity, AI sequence and AI season did not significantly affect conception rate in rural animals across study. It was recommended that due consideration need be given to consider effect of significant factors affecting conception rates while planning for improving conception rate in rural animals. As for as the performance and profitability of Gangatiri cattle were concerned, most of the owners of Gangatiri cattle were fell into medium category, however, wide variation in the performance and profitability of Gangatiri cattle indicated good scope of improvement in all aspects of management. Therefore, it is suggested to take up programmes for genetic improvement of Gangatiri cows along with improvement in their health management.

Conclusion

It can be concluded that conception rate (CR) in Gangatiri cattle is influenced by district and insemination year. Rest of factors such as parity of animal, season of artificial insemination, economic condition of farmer, AI sequence were not influencing conception rate. While doing genetic study district and insemination year factor should be considered

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