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A note on Conception Rate in Animals of Wardha District in Vidharbha Region of Maharashtra State

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ABSTRACT: *Data on 23,381village level Artificial Inseminations (A.I.) performed during 4 years (from January 2010 to December 2013) on 18,117 animals (cattle 17,260 & buffalo 857) owned by 11,554 farmers from Wardha district of Vidhrabha region of Maharashtra state revealed overall mean conception rate as 46.97±0.32 per cent for both the species (cattle & buffalo) and individually it was recorded as 47.29±0.33 per cent for cattle and 39.38±1.57 per cent for buffalo. The conception rate was significantly affected by year of A.I., inseminator native, inseminator training, animal breed and lactation number in cattle, irrigation facility in buffalo and Cattle Development Centre (CDC) opening period and A.I. sequenceinfluenced the conception rate in both the species (cattle & buffalo). However,season of A.I. did not significantly influencedthe conception rate either in cattle or buffalo in farmer animals of Wardha district of Vidharbha region of Maharashtra state.*

Key Words: *Reproduction performance, field animals, Wardha district, Vidharbha region,*

INTRODUCTION

Reproduction performance in village animals is principally accountable for fertility efficiency of dairy animals. Low conception rate and increased number of services per conception leads to increased age at first calving, service period, calving interval and ultimately affects the overall life time productivity of animal and leads animal owner to run his business on unaffordable cost.Lower estimates of heritability and repeatability of reproductive performance indicates greater influence of environment and farmer'smanagement practices on this trait, suggestingscope for improvement; further,since the conception rate affects the profitability of farm enterprises, increasing it to optimum level is desirable to achieve the maximum profitability. Many factors (genetic and non-genetic), viz. year of insemination, animal exotic blood level,lactation number, irrigation facility, A.I. season, A.I. sequence etc., have direct influence on conception rate. The present study was planned with the aim to evaluate genetic and environmental effects affecting conception rate in cattle and buffalo in Wardha district of Vidharbha region of Maharashtra state.

MATERIALS AND METHODS

Wardha district covers geographical area of6,309 sq.km inhabiting 1.3 million population consisting 67.46 per cent (8.7lakh) ruralpopulation as per 2011 census. The agro-climatically it is hot, dry and sub humid with dry summers and mild winters. During the period from1966 to 2006 average annual mean rainfall has been 1041.10 mm (Rukmani and Manjula, 2009). The *kharif* (Mid June to December) and *rabi* (October to February)are two agricultural seasons,*kharif* beingimportant seasongrowing cotton, sorghum, pulses and recently soybean, while *rabi* season for wheat and gram. Lower industrial development and uncertain remunerations for agriculture labor in the district leads to livestock as one of the main important activity for livelihood.

Data on 23,381 Artificial Inseminations (A.I.) performed at 13 Cattle Development Centres (CDC) during 4 years (from January 2010 to December 2013) on 18,117 animals (cattle 17260 & buffalo 857) owned by 11,554 farmers were compiled for present investigation. The animals were individually maintained and reared by farmers. The housing ranged from open to permanent constructed sheds. Animals were mostly reared on free grazing and

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partly stall fed with dry and green fodder mainly jowar (sorghum), bajara (pearl millet), maize, hybridnapier, local grasses etc. along with concentrate for buffaloes and crossbreed milch animals. The calls for artificial insemination were received through mobile phones and animals were inseminated with frozen semen at doorstep of farmers. Cows not repeated within 60 to 70 days and buffaloes 90 to 100 days post insemination were examined by rectal palpation for pregnancy confirmation. Theconception rate was calculated by following formula (Qureshi *et al*. 2008).

$$Conception\ Rate\% = \frac{Number\ of\ cows\ detected\ pregnant}{Number\ of\ cows\ tested\ for\ pregnancy} \times 100$$

The information on species (Cattle, Buffaloes), year of insemination (2010-2013), name of block (Aravi, Devali, Seloo,Wardha), Insemination center opening year (2007 & 2010), native place of in-charge (local & outside), Inseminator training (Institutional& other), irrigation facility (irrigated & non irrigated), animal breed (HFx, Jr.x, indigenous, non-descript), lactation number (heifer, 1, 2, 3, 4, 5, 6&above), season of A.I. (summer-February-May, Rainy-June-September, Winter-October-January) and sequence of A.I. (1, 2, 3 & above)were compiled for studying effectof these factors on conception rate in rural animals. The data wasanalyzed using statistical methods suggested by Snedecor and Cochran (1967) and significance within subgroups was tested by Duncans Multiple Range Test as modified by Kramer (1957).

RESULTS AND DISCUSSION

Overall average conception rate was recorded as 46.97 ± 0.32 per cent (cattle 47.29 ± 0.33% & buffalo 39.38 ± 1.57%). Bhagat and Gokhale (2013) noticed similar (46.40±0.19%) while slightly lower conception rate (45.16±0.46) has been reported by Bhagat et. al. (2008) in field crossbreed animals.The conception rate recorded by Gokhale 2012 in Jharkhand state for cattle and buffalo was much higher (cattle 52.62±0.2% & buffalo 54.14±0.9%) compared with recorded in present investigation. The figures reported in present investigation were much higher than those reported by other researchers like 29.00% in Pakistan (Anzar *et al.*, 2003), 35.50% in Malaysia (Nordin *et al.*, 2004) and lower to that of Ethiopian cattle (48.30%) reported by Woldu *et al.* (2011). The different factors associated with conception rate in animals of Wardha district are depicted in table 1.

Year of A.I: Year to year variations were noticed important and significantly affectedconception rate in cattle as well as pooled data for cattle and buffalo but not in buffalo. The conception rate in cattle was recorded significantly lowerin 2012 compared to other years of inseminations.Ricord et. al. (2004)noticed that number of inseminations performed and conception rate are negatively correlated. In buffalo it was observed that both coverage of A.I. and conception rate was highest (39.48% & 43.31±2.54%, resp.) in the same year (2012)however, the difference was statistically in-significant.

Block/Tehsil: Four blocks of the district were under study and it was noticed that block to block differences in conception rate were not important either within or between species, however marginalsignificance (P<0.05%)was noted when the data were pooled.Wardha tehsil recorded lowest conception rate (43.41±0.52%) having highest A.I. coverage compared with other tehsils under study. Larger set of data may however will be required for bringing out the clear trend.

CDC opening period: Out of 13 CDC's under study, 9 started functioning during 2007 and remaining CDC's were opened during 2010. The CDC opening period had significant effect on both species as well as on pooled data. It was observed that during initial period, buffalo A.I. coverage was minimum (7.67%) and later on increased but conception rate recorded significantly lowered (36.81±1.61%) compared with initial period of 2007 (70.27±5.35%). Reverse observations were recorded in cattle where conception rate increased with increase in period of functioning.

In-charge Native: Promotion of self-employment for A.I. technology in rural areas necessitate consideration of residential location of the inseminator and his operational modality. General tendency of reluctance of inseminators to leave their native village jurisdiction could have differential effect on their performance. Among those employed, although many of them prefer to work in their native village jurisdiction, owing to frequent transfers but somehad opt for working in area away from their home area jurisdiction. It was noticed that native place of inseminator significantly affected conception rate in cattle and pooled data but did not had any effect in buffalo which might be due to lesser number of observations. Scrutiny of the pooled data revealed that more thanhalf of the fraction (50.31%) of inseminations performed by inseminators living outside their respective native place recorded higher (50.81±0.46%) conception rate compared to local inseminators whose native and working jurisdiction was same, but revere trend was observed in cattle.

Table 1
Different Factors Associated with Conception Rate of Animals in Wardha District of Vidharbh Region

Category	*Particulars*	*Cattle*			*Buffalo*			*Total*		
		N	*%*	*CR %*	*N*	*%*	*CR %*	*N*	*%*	*CR %*
Year of A.I.	2010	976	4.35	50.61±1.60^{a}	53	5.49	28.30±6.24	1029	4.40	49.47±1.55^{a}
	2011	7065	31.52	46.14±0.59^{b}	226	23.42	36.73±3.21	7291	31.18	45.85±0.58^{b}
	2012	9784	43.65	44.26±0.50^{c}	381	39.48	43.31±2.54	10165	43.48	44.22±0.49^{bc}
	2013	4591	20.48	54.82±0.73^{d}	305	31.61	38.36±2.78	4896	20.94	53.80±0.71^{d}
Block / Tehsil	Aravi	5457	24.34	53.97±0.67	1	0.10	0.00±0.00	5458	23.34	53.96±0.67^{a}
	Devali	4079	18.20	46.58±0.78	819	84.87	39.93±1.71	4898	20.95	45.47±0.71^{b}
	Seloo	3817	17.03	47.79±0.80	125	12.95	33.60±4.24	3942	16.86	47.34±0.79^{ab}
	Wardha	9063	40.43	43.39±0.52	20	2.07	55.00±11.41	9083	38.85	43.41±0.52^{c}
CDCO pening period	2007	17697	78.95	49.91±0.37^{a}	74	7.67	70.27±5.35^{a}	17771	76.01	49.99±0.37^{a}
	2010	4719	21.05	37.49±0.70^{b}	891	92.33	36.81±1.61^{b}	5610	23.99	37.38±0.64^{b}
In-charge Native	Local	11377	50.75	43.25±0.46^{a}	240	24.87	35.00±3.08	11617	49.69	43.07±0.45^{a}
	Outside	11039	49.25	51.46±0.47^{b}	725	75.13	40.83±1.82	11764	50.31	50.81±0.46^{b}
Inseminator Training	Institutional	18899	84.31	46.77±0.36^{a}	722	74.82	40.72±1.83	19621	83.92	46.55±0.35^{a}
	Other	3517	15.69	50.10±0.84^{b}	243	25.18	35.39±3.07	3760	16.08	49.15±0.81^{b}
Irrigation facility	Irrigated	11018	49.15	46.15±0.47	20	2.07	55.00±11.41^{a}	11038	47.21	46.17±0.47
	Non Irrigated	11398	50.85	48.39±0.46	945	97.93	39.05±1.58^{b}	12343	52.79	47.68±0.45
Animal Breed	HFx	8219	36.67	45.30±0.54^{a}	0	0.00	0	8219	35.15	45.30±0.54^{a}
	Jr x	7089	31.62	48.26±0.59^{b}	0	0.00	0	7089	30.32	48.26±0.59^{b}
	Indigenous	68	0.30	55.88±6.06^{c}	0	0.00	0	68	0.29	55.88±6.06^{c}
	Non-Descript	7040	31.41	48.57±0.59^{b}	0	0.00	0	7040	30.11	48.57±0.59^{b}
	Buffalo	0	0.00	0	965	100.00	39.38±1.57	965	4.13	39.38±1.57^{d}
Lactation Number	Heifer	4259	19.00	46.40±0.76^{a}	126	13.06	39.68±4.37	4385	18.75	46.20±0.75^{a}
	1	2749	12.26	48.74±0.95^{b}	205	21.24	45.85±3.48	2954	12.63	48.54±0.92^{b}
	2	4181	18.65	47.14±0.77^{bc}	269	27.88	38.29±2.96	4450	19.03	46.61±0.74^{ac}
	3	5433	24.24	49.64±0.67^{d}	237	24.56	37.13±3.14	5670	24.25	49.12±0.66^{d}
	4	3198	14.27	45.00±0.88^{ce}	90	9.33	31.11±4.90	3288	14.06	44.62±0.86^{ce}
	5	1440	6.42	46.67±1.31^{abde}	23	2.38	39.13±10.40	1463	6.26	46.55±1.30^{bdef}
	6 & above	1156	5.16	43.77±1.46^{cf}	15	1.55	53.33±13.33	1171	5.01	43.89±1.45^{ae}
A.I. season	Summer	8610	38.41	49.04±0.53	237	24.56	39.24±3.17	8847	37.84	48.77±0.53
	Rainy	6414	28.61	46.13±0.62	164	16.99	33.54±3.69	6578	28.13	45.82±0.61
	Winter	7392	32.98	46.27±0.58	564	58.45	41.13±2.07	7956	34.03	45.90±0.55
A.I. sequence	1	17260	77.00	50.13±0.38^{a}	857	88.81	37.11±1.62^{a}	18117	77.49	49.51±0.37^{a}
	2	4215	18.80	39.98±.75^{b}	100	10.36	58.00±4.96^{b}	4315	18.46	40.39±0.74^{b}
	3 & above	941	4.20	28.06±1.46^{c}	8	0.83	50.00±18.90^{bc}	949	4.06	28.24±1.46^{c}
Over all		22416	100	47.29±0.33	965	100	39.38±1.57	23381	100	46.97±0.32

Means having same superscripts within columns did not differ significantly (P<0.01)

Inseminator Training: Technical skill of self-employed youth desiring to be an inseminator depends on his training in A.I. Generallyrigorous training in undertaking artificial insemination and pregnancy diagnosis for the period of at-least six months duration is imparted before independent assignment of A.I. work responsibility is given, although such training depends upon individual skill and how fast somebody acquiresrequired knowledge. An attempt was made to study the difference in conception rate between institute trained and those taking training from outside. The results indicated that type of training had significant effect on conception ratein cattle and on pooled data. It was further noticed that 83.92 per cent inseminations (cattle 84.31%& buffalo 74.82%) were performed by inseminators who took training from parent institute and conception rate recorded was lower (46.55±0.35%) compared with other inseminators (49.15±0.81%). Although conception rate of outside trained inseminator was higher; A.I. coverage was only 16.08 per cent. Maximum inseminations and lower conceptions were indicated that insemination work load and conception rate negatively correlated which was noticed by Ricord *et al.* (2004).

Irrigation facility: The area under study was divided into irrigated and non-irrigated based on crop irrigation facilities available. Irrigation had significant effect on conception rate in buffalo and in-significant in cattle and pooled data. The conception rate in buffaloes from irrigated area was recorded significantly higher (55.00±11.41%) compared with non-irrigated area, but per cent A.I. coverage was only 2.07. Reverse trend was observed in cattle and pooled data but it was in-significant. The significant effect in buffalo might to due to lesser A.I. coverage and that too uneven distribution (irrigated 2.07% & non irrigated 97.93%).

Animal breed: Animal breed had significant effect on conception rate in cattle. The highest conception rate (55.88±6.06%) was recorded in indigenous animals followed by non-descript, jersey cross and lowest in HF crossbreed animals (45.30±0.54%). These results are corroborative to the finding of Gokhale (2012) who noticed that conception rate from 64,677 inseminations of local cattle was better than Jersey and Holstein crossbreed animals in Jharkhand state. Miah et. al. (2004) in Bangladesh also recorded highest (46.14%) conception rate in indigenous local cows and lowest (35.39%) in HF crossbreed animals but the differences were non-significant. However results reported by Woldu et. al. (2011) for Ethiopian cattle indicated higher conception rate (58.60%) for crossbred and lower (32.80%) for indigenous Zebu cattle.

Lactation number: Lactation had significant effect on conception rate in cattle and pooled data but non-significant in buffalo. These results are in disagreementwith the observations made by Woldu *et al.* (2011) in Ethiopian cattle who did not notice any parity effect on conception rate.In cattle highest conception rate (49.64±0.67%) was recorded for animals of 3rd lactation and lowest (43.77±1.46%) for 6th and above lactation. These results are in agreement with Miah *et al.* (2004) who also observed significantly lowest conception rate in 5th lactation. In heifers 46.40±0.76% conceptions were recorded which was at par with that of 5th lactation animals. The per cent coverage of A.I. was highest (24.24%) in 3rd lactation, followed by heifers, second, first, fourth, fifth and above sixth lactation.

***A.I. season*:** Assessment of effect of season is important since it might be due to changes in nutrition, environmental temperature, over-all climate effect and photo period.In the present investigation, although the per cent inseminations and conception rate was highest in summer for cattle (38.41% & 49.04±0.53%, resp.) and in winter for buffalo (58.45% & 41.13±2.07%, resp.) the A.I. season had non-significant effect on conception rate in both species as well as in pooled data.

A.I. sequence: Sequence of A.I. had significant effect on conception rate in both cattle and buffalo and it was observed that highest coverage of A.I. (77.00%) and conception rate (50.13±0.38%) was recorded in first attempt in cattle but in buffaloes highest conceptions (58.00±4.96%) were recorded in second attempt but per cent A.I coverage was 10.36 compared with 88.81 per cent for first attempt.

CONCLUSIONS

It was concluded that factors like year of A.I., , in-charge native, inseminator training, animal breed and lactation numberin cattle, irrigation facility in buffalo and A.I. sequence and CDC opening period in both the species (cattle &buffalo)are needed to be considered for conception rate improvement in field animals of Wardha districts in Vidharbha region.

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