Conception Rate of Pabna Cows and Heifers Bred Under Artificial Insemination and Natural Service

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ABSTRACT: A study on the conception rate of 885 cows and heifers bred under artificial insemination (AI) and natural service was carried out at AI sub-centers. A high conception rate was observed at first service in all breeding methods. It was revealed that the conception rates in AI with liquid semen (LS) were found to be 25. 08, 18.58, 12.69, and 2.48% after 1, 2, 3 and 4 services, respectively.

Inseminations of cattle with frozen semen (FS) were found to achieve 42.15, 14.46, 5.85, and 2.46% conception rates after 1, 2, 3, and 4 services, respectively. In natural service, conception rates were found to be 62.45, 6.75, 5.91, and 4.64%, respectively, after 1, 2, 3, and 4 services. Insemination of cows and heifers at mid-cycle had significantly ($p < 0.05$) higher conception rate as compared to early and late cycles. The existing AI machineries and breeding management need to be improved to achieve higher conception rate of dairy cattle under AI.

(**Key Words**: Conception Rate, Pabna Cows and Heifers, Artificial Insemination, Natural Service)

INTRODUCTION

Conception rate in dairy cattle reflect the reproductive efficiency of the herd. The conception rate following AI with frozen semen in different breeds of dairy cattle has been reported by Bhatnagar et al. (1978), Qureshi (1979) and Prakash and Saini (1987). In Bangladesh, conception rate of cattle bred with frozen semen was reported by Shamsuddin et al. (1987) and Das et al. (1933) in cross-bred and Zebu cows, respectively. However, there is no comprehensive report available for Pabna dairy cows. The present study was undertaken to determine the conception rates in cross-bred and Pabna dairy cows and heifers bred naturally and artificially with liquid and frozen semen.

MATERIALS AND METHODS

The study was conducted during January. 1994- June, 1995 at Baghabari milk shed area, Shahajadpur, Shirajgonj and Bera. AI with liquid semen and frozen semen was performed in Pabna cows and heifers. A total of 323 cows and heifers were studied for artificial insemination (AI) with liquid semen (LS). AI with frozen semen (FS) for 325 cows and heifers were performed. The registered animals were examined before they were inseminated. All the inseminated animals were followed up through 24 days postinsemination to findout the return to heat.

A total of 237 heifers and cows of different locations were studied for natural service. The animals were observed from the time of service to 24 days to findout the repeatation of estrus. Information regarding estrus cycle, services, history of bull, history of the inseminated animals were recorded by interviewing the owners. All inseminated non-returned cows and heifers were rectally examined for pregnancy between 60-90 days post-insemination as described by Ball (1980). In this study, it was considered as early, middle, and late estrus, respectively, when the insemination was done within 12, 12-18, and 18-24 hours after the onset of estrus signs in the study animals.

Liquid and forzen semen samples were evaluated for motility of sperm cells (Hafez, 1987). Egg yolk citrate was used as diluent for liquid semen while tris two phase for frozen semen. The plastic straws of 0.25 ml size containing frozen semen were stored in cannisters kept in liquid nitrogen at −196℃. Liquid semen samples were stored in glass vials of 1 ml size at 4℃ before they were used on their first day or second day life. Each dose of frozen, and liquid semen that was inseminated contained, respectively, 30, and 20 million spermatozoa. Frozen semen was examined before insemination. A drop of semen was kept on a warm slide and sperm motility was

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noted. A drop of frozen semen was also mixed with Eosin-Nigrosin solution and abnormalities and livability of the spermatozoa were noted.

Management of animals

All the animals were maintained as per standard practice of grazing and feeding. Concentrate, rice straws and green grasses were fed to them.

Statistical analysis

All the data were analyzed using SAS (Statistical Analysis System) package at Bangladesh Livestock Research Institute computer centre (SAS/Statistics for Personal Computers Guide, 1988) by General Linear Model Procedure. Comparisons based on least significant difference at p=0.05 were done between the means of different breeding methods. The conception rate was analyzed using Chi-square ($p < 0.05$).

RESULTS AND DISCUSSION

There were significatn ($p < 0.05$) differences in conception rates among three breeding methods. Results showed that 62.45% of animals conceived following first service, while 6.75, 5.91, 4.64%, after 2nd, 3rd and 4th services, respectively (table 1). The results in this study were consistent with the findings of Sprecher et al. (1995) who found that bull-to-cow ratios and availability of bull restricted to improve the conception rate in natural service. The first service higher conception rate was consistent with the general assumption that estrus detection was not a problem in natural service.

Table 1. Conception rate under different breeding methods

Breeding method	Animal (%) conceived with services				Overall(%)
	1st	2nd	3rd	4th	
Natural service (n=237)	62.45[a]	6.75[c]	5.91[b]	4.64[a]	79.75[a]
AI with LS (n=323)	25.08[c]	18.58[a]	12.69[a]	2.48[b]	58.83[c]
AI with FS (n=325)	42.15[b]	14.46[b]	5.85[b]	2.46[b]	64.92[b]

In the same column with similar superscripts are not significantly ($p > 0.05$) different. AI=Artificial Insemination, LS=Liquid Semen, FS=Frozen Semen.

Results showed that 25.08% of animals conceived with one service, while 18.58, 12.69, 2.48% required 2, 3, and 4 services, respectively, following AI with LS (table 1). Data indicated that 42.15% of animals conceived after first insemination. while 14.46, 5.85, 2.46% following 2nd, 3rd and 4th inseminations, respectively, in AI with FS (table 1). In the present study, the overall conception rate (64.92%) for AI with FS was in agreement with Bhatnagar et al. (1978), Tomar (1981) and Das et al. (1993), where 60.60, 61.30 and 62.51% conception were observed, respectively. However, this rate was higher than that reported by Nair (1975), Prakash and Saini (1987), Shamsuddin et al. (1987) and Qureshi (1979).

Results showed significant ($p < 0.05$) differnces in conception rates among the sevices in early, middle and late estrus as 61.54, 69.01 and 34.88% in AI with first day LS and 60.87, 66.67 and 30.95% in AI with second day LS, while 57.61, 72.20 and 35.71% in AI with FS, respectively (table 3). Results in this study were consistent with the findisgs of Das et al. (1993) who obtained 58.80, 69.70 and 33.80% conception rate in Zebu cattle in early, middel and late estrus, respectively. Similar results were reported by Bach (1983) who obtained highest (79.00%) and lowest (61.80%) conception rate when cows were inseminated at strong and weak estrus signs, respectively. Conception rates in dairy herds vary widely. In the developed countries, conception rate at first service varied from 38 to 60% (Schels and Mostafawi, 1987; Lee et al., 1983; Phatak et al., 1986). In this study, first service conception rates obtained were much more lower than the rates prevail in developed countries.

The most common problems related to the conception failure were identified during the study (table 4). Specific problems identified included errors which resulted in inaccurate estrus detection (29.94%), delayed insemination (35.03%) and miscellaneous causes (22.11%) which include errors in artificial insemination (AI) technique, semen handling, cold chain, semen quality. These results were consistent with the findings of Fields et al. (1992). Finally, it may be concluded that estrus detection, correct timing of insemination, maintenance of proper cold chain of liquid and frozen semen, proper handling of semen with veterinary control, would enable to achieve higher conception rates.

Table 2. Results of evaluation of semen at different AI sub-centres

Age of semen	Abnormal spermatozoa %	Motility %	% live sperm
1st day LS (n=48)	4.85	59.85[a]	75.54[a]
2nd day LS (n=46)	5.69	52.35[b]	66.37[b]
Frozen semen (n=21)	5.35	62.75[a]	76.63[a]

In the same column with a superscripts are not significantly ($p > 0.05$) different.
LS=Liquid Semen.

Table 3. Conception rate (%) at different stages of the estrus cycle under different breeding methods

Breeding method	Early estrus	Middle estrus	Late estrus
AI with 1st day LS	61.54[b] (n=52)	69.01[a] (n=71)	34.88[c] (n=43)
AI with 2nd day LS	60.87[b] (n=46)	66.67[a] (n=69)	30.95[c] (n=42)
AI with FS	57.61[b] (n=92)	72.20[a] (n=205)	35.71[c] (n=28)

In the same row with similar superscripts are not significantly ($p > 0.05$) different.
AI=Artificial Insemination, LS=Liquid Semen, FS=Frozen Semen.

Table 4. Problems related to conception failure (%) following breeding under artificial insemination with liquid and frozen semen

No. animal observed	Errors in estrus detection	Delayed insemination	Abnormal cervical and uterine secretion	Cystic ovaries	Miscellaneous causes
511	29.94	35.03	9.98	2.94	22.11

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