

Advances in Dairy Farming Technologies and Multiplication of Vrindavani Cattle for High Fat and Clean Milk Production

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Abstract

At ICAR-Indian Veterinary Research Institute, Izatnagar, Bareilly, UP, India at Cattle and Buffalo Farm the opening balance of Vrindavani cattle as on 01-04-2011 was 500 heads (95 males and 405 females). Additions in the herd were due to birth of 82 female and 93 male calves (175 heads). The closing balance of the Vrindavani cattle herd as on 31-03-2012 was 358 heads (46 males and 312 females). The overall mortality per cent was 5.78%. The overall female mortality was 5.95%, whereas for males it was 5.32%. The overall culling per cent was 27.56 with respective values for male and female culling % as 25.00 and 28.54, respectively. Vrindavani cattle produced 536846.0 kg milk during the current year. On an average, 78.8% of the total adult Vrindavani females were in the milk during the year. Means for overall wet and herd averages were 10.53 and 8.31 kg, respectively. The Fat, SNF and Total solids were 4.30%, 8.76 and 13.06%, respectively. The LSM's for total lactation milk yield, total lactation length, 305 days milk yield, milk yield per day of 305 days lactation period, peak yield, days to attain peak yield and weight at calving were 3499.48±38.11 kg, 316.33±3.81 days, 10.74±0.14 kg/d, 3492.63±73.59 kg, 11.46±0.24 kg/d, 18.41±0.26 kg, 71.42±7.91 days and 405.96±4.23 kg respectively. The least squares' means (LSM) for overall live body weights at birth, 3, 6, 12, 18 and 24 months of age were 22.25±0.33, 45.23±0.95, 90.92±1.59, 150.15±3.22, 246.23±3.53 and 300.08±4.06 kg., respectively. Vrindavani cattle produced for 305 days as lactation period. The herd strength of Vrindavani as on 01/04/2010 was 532 heads (74 males and 458 females). Vrindavani cattle produced 6,18,684 kg milk during the current year. On an average 71.03% of the total adult Vrindavani females were in the milk during the current year. Means for overall wet and herd average were 10.82 and 7.75 kg, respectively.

Keywords: Vrindavani, cattle, milk, management, herd, female, fat

1. Introduction

According to NSSO 66th Round Survey (July 2009-June 2010) on Employment and Unemployment, 15.60 million workers as per usual status (Principal status plus subsidiaries status) were engaged in farming of animals, mixed farming and fishing. Whereas as per estimate of NSS 68th Round (July 2011-June 2012) survey on Employment and Unemployment, 16.44 million workers as per usual status (Principal status plus subsidiaries status) were engaged in the activities of farming of animals, mixed farming and fishing. Animal Husbandry and Dairying activities, along with agriculture, continue to be an integral part of human life since the process of civilization started. These activities have contributed not only to the food basket and draught animal power but

also by maintaining ecological balance. Owing to conducive climate and topography, Animal husbandry and Dairying Sectors have played prominent socio-economic role in India. Traditional, cultural and religious beliefs have also contributed in the continuance of these activities. They also play a significant role in generating gainful employment in the rural sector, particularly among the landless, small and marginal farmers and women, besides providing cheap and nutritious food to millions of people. Livestock production and agriculture are intrinsically linked, each being dependent on the other, and both crucial for overall food security. Livestock sector is an important sub-sector of the agriculture of Indian economy. It forms an important livelihood activity for most of the farmers, supporting agriculture in the form of critical inputs, contributing to the health and nutrition of the household, supplementing incomes, offering employment opportunities, and finally being a dependable “bank on hooves” in times of need. It acts as a supplementary and complementary enterprise.

2. Materials and Methods

Under ICAR-IVRI Research Projects various experiments have been conducted on Cattle and Buffalo farm. There are more than 1100 animals on the C&B farm. Under animal nutrition Fodder farm and Feed plant are main source of green and dry feed, concentrate supply to these animals. A team of Animal Breeders, Animal Nutrition expert, Reproduction Scientists, Medicine-Surgery scientists and livestock production scientists and including one Agronomy Scientist work together under the Vrindavani, Tharparkar cattle improvement and Murrah buffalo improvement net work project under ICAR-IVRI funded research projects. The projects are in long term basis. During 2009-10 and 2011-12 major findings have been observed which may bring advancement in dairy farming and milk production industry.

3. Results and Discussion

Tecnological Advancement: The findings under project on Vrindavani cattle are given below as an advancement in clean and high milk production.

Opening Balance of Vrindavani Herd: The opening balance of Vrindavani cattle as on 01-04-2011 was 500 heads (95 males and 405 females). Addition in the herd were due to birth of 82 females and 93 male calves (175 heads). The closing balance of the Vrindavani cattle herd as on 31-03-2012 was 358 heads (46 males and 312 females).

Mortality Minimised: Effect of health management practices: The overall mortality percent was 5.76%. The overall female mortality was 5.95%, whereas for males it was 5.32%. The overall culling percent was 27.56 with respective values for male and female culling % as 25.00 and 28.54, respectively (Singh et al., 2011).

Conception Rate Increased: AI and health management effect: The overall conception rate in Vrindavani cattle herd was 52.33%. The figures in heifer and adult groups were 60.97 and 49.08%, respectively. The overall calving abnormalities were 30.29%, which included 8.00% abortions, 6.29% unseen abortions, 1.71% dystokia, 6.29% retained placenta, 5.14% premature births, 1.14% prolapse, 1.14% still births. The least squares means (LSM) for age at first calving, service period, dry period and calving interval were 989.44±17.95 days, 102.83±5.87 days, 97.50±22.39 days and 445.21±24.08 days, respectively. Similar findings were reported by Bhadauria et al. (2011).

Vrindavani Produced Higher Milk: Genetic breeding improvement effect: Vrindavani cattle produced 536846.0 kg milk during the current year. On an average, 78.80% of the total adult Vrindavani females were in the milk during the current year. Means for overall wet and herd averages were 10.53 and 8.31 kg, respectively. Results are on the line as reported by Singh et al. (2011).

Advancement in Fodder Development Technologies: It is observed that the fodder farm of the Institute comprises 140 hectares of fertile land. The land is divided into 12 plots inter-connected with underground irrigation channels with underground irrigation channels and concrete roads. Most of the plots have quick and efficient drainage system of run-off for rain water.

Crop Rotation and Cropping Scheme: The fodder farm produces quality green fodder of HYVs released under different fodder crops by ICAR and SAUs time to time. Sorghum (single & multi-cut crops), Maize Makchari, Bajra, Cowpea, Oat and Berseem fodder crops are grown at the farm round the year (Singh et al., 2012).

Livestock Farm: The fodder farm supplies green fodder daily to the institute's Cattle & Buffalo farm (LPM) and more than 20 experimental animal sheds of various divisions. The surplus green fodder is also conserved at the farm in the form of “Hay” & “Silage” for its utilization in the lean period.

No Loss of Irrigation Water: The fodder farm of institute has three under ground silos. These silage pits are permanently covered by tubular steel and G.I. sheet structure to ensure availability of safe and secure storage even during rainy season.

Road side Farm Forestry: Farm is maintaining about 5000 teak plants along the farm road sides and at field No. 13. Plantation of poplar trees in the 25 acres of farm land at Field No.-18 and 19 are being managed nicely by farm management. This fodder farm is also managing 200 Kinno plants along the farm road sides (Singh et al., 2012).

Mechanisation for Timely Operations: Fodder farm is equipped with 10 tractors, 9 deep irrigation tube-wells and adequate agricultural machineries. All the irrigation tube-wells are interconnected by underground irrigation channels (Hume pipes) spread throughout the farm area for better application and utilization of available irrigation potential.

Advancement in Feed Technology Development: There have been changing in feed processing technologies. At the institute feed technology unit prepares and supplies about 16000 quintals of animal feed required for animals use for research experiments like cows and buffaloes, sheep and goats, pigs and laboratory animals of Izatnagar and Mukteshwar campuses.

Automated Plant-Balanced Ration: The unit has automatic feed ingredient loading and lifting unit, grinding unit (Hammer mill), mixing unit, conveyor elevator unit, dust separation and collection unit, go-downs and office-cum-feed plant building.

Feed Blocks: Easy Storage and Transportation- Under new technology generation on the cattle and buffalo farm, nutrition expert designed feed block machine to condense feed materials into a condensed feed block (Singh et al., 2012).

This year, the Unit has fabricated 5 Nos. Machines named "Pashu Chokalater" (UMM block making machine) to facilitate efficient mass production of Pashu Chocolates and thereby popularizing their use among animal farmers and dairy entrepreneurs.



Photo 1. (a) Vrindavani bull alongwith other farm breeds; (b) Feed plant unit; (c) Feeding of Vrindavani cattle

Advancement in Milk Production Technologies Development: Various technologies pertaining to increase milk production were developed.

Genetic Improvement: It is found in recent findings that In Vrindavani cattle and Murrah buffaloes, the involuntary disposal (mortality and transfer) of females should be as low as possible to maximize genetic improvement.

Table 1. Dairy farm cattle and buffalo herd, milk yield (kg) performance during 2010-11

Breed (Cattle/Buffalo)	Herd/Head	Female Nos.	Conception %	Milk Yield (Kg)	Mean Wet (kg)	Mean Herd (kg)	Fat %	SNF %	Total Solid %
Vrindavani	532	458	41.34	618684	10.82	7.75	4.42	8.82	13.24
Tharparkar	143	120	41.46	38001	3.86	1.50	4.52	8.84	13.36
Murrah	224	170	38.09	118150	5.75	3.36	7.78	9.06	16.84

Table 2. Dairy farm cattle and buffalo herd, milk yield (kg) performance during 2011-12

Breed (Cattle/Buffalo)	Herd/Head	Female Nos.	Conception %	Milk Yield (Kg)	Mean Wet (kg)	Mean Herd (kg)	Fat %	SNF %	Total Solid %
Vrindavani	500	405	52.30	536846	10.53	8.31	4.30	8.76	13.06
Tharparkar	154	124	64.78	21679	3.39	1.48	4.34	8.77	13.12
Murrah	223	161	50.00	111895	5.82	3.39	8.08	9.67	17.76

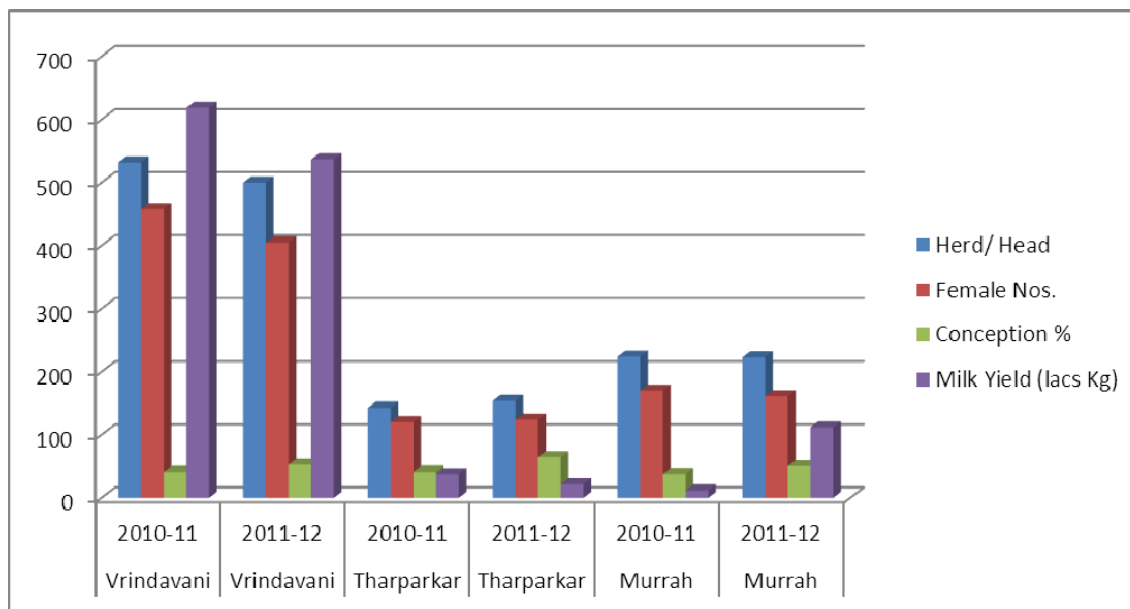


Figure 1. Herd strength on 01-04-2011, 01-04-2012, female Nos., conception %, milk yield (kg)

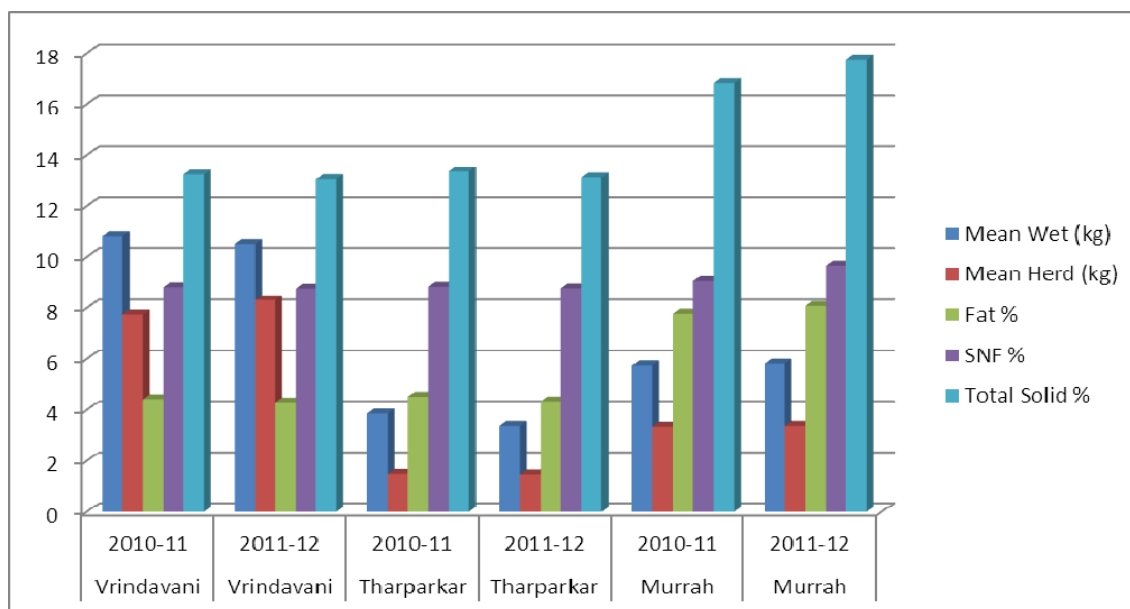


Figure 2. Mean milk wet (kg), herd (kg), fat %, SNF %, total solid % in cattle and buffalo milk

Involuntary Culling: It was recorded that at the same time, involuntary culling based on stunted growth, off breed characteristics, unknown pedigree, serious health problems, congenital/physical abnormalities in females should be done as early as possible.

Female Replacement: For genetic improvement in case of availability of sufficient female replacement stock, cows beyond 6th parity having teat/udder problems, erratic reproductive status may be culled at the earliest.

Abnormal Calving: Data at CBF shows that in crossbred cattle, abnormal calvings had depressing effect on milk production and milk production efficiency traits.

First Lactation Milk Yield: Under research project for optimization of first lactation milk yield, the lactation lengths should be standardized to 300 days. It was observed that for ensure maximum returns from heifers first lactation, they must conceive before 500 days of age and a live body weight around 225-250 kg.

Prediction of First Lactation Milk Yield: It has been observed that in Vrindavani cows and Murrah buffaloes, the part 305day first lactation milk yield could efficiently be used for prediction of 305 days first lactation milk yield and in this way the maximization of genetic gain in lactation milk yield by progeny testing could be achieved.

Winnig VS Sucling Effect on Calves Mortality: Dr. S. S. Hanah (2009) worked with C&B Farm.

From findings it is recorded that in Vrindavani, Tharparkar and Murrah calves, the mortality rates were very high in suckling calves groups of Tharparkar and Murrah calves, as compared to weaned groups.

Low Susceptibility to Pneumoniya and Dairreha in Thier Pedigries: Sires preferred for Breeding: Data Reprts shows that at the same time sires expressing low incidence of Pneumonia and diarrhea in their pedigrees may be preferred for breeding as compared to high incidence groups. Similar results reported by Sinha et al. (2010).

Less Susceptibility in Murrah Male Calves: It has also been observed that highest susceptibility to Pneumonia and diarrhea was in Murrah calves followed by Tharparkar and Vrindavani male calves.

Winter Born Calves Were Found Heaviest at Birth and Better Producer: Dr. (Ms.) Pragya Bhadauria (2010) worked at C&B farm.

It is concluded that in Vrindavani cows and Murrah buffaloes, the winter born calves were heaviest at birth and heavier calves expressed better growth and production through out their life as compared to lighter calves.

5th Lactation Effect on Lifetime Production Observed: It was recorded in research that the number of female calves born up to 5th lactation gradually increases with increase in lifetime production at the CBF of the institue.

Technologies for Evaluation of Dams Developed: In genetic resource improvement that is for evaluation of dams, BLUP was best followed by STS (Single trait selection), EBV and MPPA. This was highly significant result in milk yield production technologies.

Weaning in Murrah Buffalo Calves Developed: Dr. K. J. Kantharaja (2011) worked at C&B farm.

To make dairy farming profitable and economic the new tchnology ie weaning (at birth) in Murrah buffalo calves could successfully be done with no adverse effect on growth of calves or mortality. This will increase quality and quantity of the milke industry.

Weaning Enhaced Conception Rates of Dams: Scientistific data shows that weaning has also been found good observation that weaning effect can enhance the conception rates of dams and reduce the service period. This advancement will add new dimentions in dairy farming and milke production technologies in future in India.

4. Conclusion

The overall conception rate in Vrindavani cattle herd was 52.33%. The figures in heifer and adult groups were 60.97 and 49.08%, respectively. The overall calving abnormalities were 30.29%, which included 8.00% abortions, 6.29% unseen abortions, 1.71% dystokia, 6.29% retained placenta, 5.14% premature births. 1.14% prolapse, 1.14% still births. The least squares means (LSM) for age at first. calving, service period, dry period and calving interval were 989.44±17.95 days, 102.83±5.87 days, 97.50±22.39 days and 445.21±24.08 days, respectively. The opening balance (herd strngth) of Vrindavani as on 01/04/2012 was 358 heads (46males and 312 females). Vridavani cattle produced 475242.0 kg of milk during current year. On an average, 84.41% of the total adult females were in in milk. Means for overall wet and herd averages were 9.21 kg and 7.80 kg, respectively.

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