



Original Research

Milking Behaviour Responses of Primiparous and Multiparous Gir Cows in Early Lactation

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Abstract

The main objective of this study was to examine effect of parity over dairy temperament and milk yield and milk let down time. 6 multiparous and 6 primiparous Gir cows were involved in the research conducted on Bhestan farm, Surat. Milking temperament was scored by direct human observation on 5-point scale during milking. Multiparous cows (1.29 ± 0.10) showed docile dairy temperament than primiparous cows (1.79 ± 0.13). Milk yield in kilogram was recorded twice daily, throughout the experiment with addition of milk suckled by Gir calf. Milk yield (kg.) of multiparous was significantly ($p < 0.05$) higher in multiparous cows (6.81 ± 0.41) as compared to primiparous cows (5.63 ± 0.13). The milk let down time (sec.) was significantly ($p < 0.05$) higher in primiparous cows (71.78 ± 0.76) as compared to multiparous cows (57.25 ± 1.04). Milking temperament was negatively correlated with milk yield but positively correlated with the milk let down time. Moreover, milk yield was negatively correlated with milk let down time.

Key words: Dairy Temperament, Gir Cow, Milk Yield, Milk Let Down Time, Multiparous, Parity, Primiparous

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Introduction

India mostly remained traditional in their approach to dairy production activities, which is mainly due to their social, economical and ecological compulsions. Livestock plays a central role in the natural source based livelihood for the vast majority of the population, which is mostly confined to rural areas (Samal and Pattanaik, 2014). The dairy sector of India is continuously growing over the past years. In total milk production India ranks 1st among all milk producing country with 176.35 million tonnes during 2017-18. In dairy farming housing and milking methods or technology mainly takes part into welfare of dairy





animals. Dairy cows can reach up to their full production potential only in adequate environment, in which they feel more comfortable. According to Bruckmaier (2005) milking process itself as well as presence of human induces stress in cows due to discomfort which leads to milk ejection and production problems and this also makes cows difficult to handle (Rushen *et al.*, 1999). Rousing *et al.* (2004) reported that there is a complex relationship between behavior during milking, reaction to human, daily milk yield, milking system, parity and health status of dairy cows.

Gir is one of the best milking breed among indigenous cows. Total population of Gir cattle in our country is 51.12 lakh which contributes 3.38% of total indigenous cattle population (GOI, 2013). Gir is considered to be one of the most gentle among the indigenous breeds with average lactation yield is 1930 litres; Average milk yield per day of Gir cow is 4.98 litres. (Gaur *et al.*, 2003). Several studies had shown that primiparous has higher milk production as compared to multiparous cattle (Wondifraw *et al.*, 2013 and Verma *et al.*, 2016). According to some research parity has significant effect over milk let down time (Mondal, 1999) and some research shows no effect of parity over milk let down time (Murthy *et al.*, 2000) has observed. The milking behavior of dairy animals in a herd is an essential component to know the fact of production and its welfare issues. Temperament of dairy animals is a factor which affects the milk yield of a herd (Barman *et al.*, 2018). Milking temperament of cow varies with individual, breed, situation, human interactions, parity, genetic factors and milking method. Level of comfort during the milking process is mainly determines mainly by milking temperament. Problems like injuries of handler, low milk production and loss of profit can be avoided by understanding the milking behavior of cows which help us to make milking procedure easier and quicker. Temperament is generally described in terms of the type of animal behavioural response to handling by human or to an environment (Sutherland *et al.*, 2012). Dairy temperament expresses the sensibility of cows to stressors. To identify cows milking behavior different scoring systems has been used in a milking parlor (Tulloh, 1961; Visscher and Goddard, 1995; Lewis and Hurnik, 1998; Sewalem *et al.*, 2011). Mondal (1999) reported that primiparous animals had higher milking temperament scores in comparison to multiparous and it was negatively correlated with the milk yield and milking rate. Jash (2008) reported that the lowest milk yield of 2.83 ± 0.04 litres per milking with highest temperament score of 2.37 ± 0.03 was found in the primiparous cows, while the highest milk yield of 4.34 ± 0.04 litres per milking with lowest temperament score of 1.03 ± 0.03 was observed in the multiparous cows.

Materials and Methods

6 primiparous and 6 multiparous Gir cows were randomly chosen from a Nandini Bhestan farm (Private), Surat, Gujrat, which were calved between August to December, 2017 were used in this experiment. All cows were managed in cattle shed which has tail to tail pakka concrete floor. All the multiparous and



primiparous Gir cows were fed on TMR, as per the feeding schedule twice daily (morning and evening). Milking was done twice daily (morning and evening) at 2:30 AM and 2:30 PM hours by full hand milking method. Milking was done at the place itself where the experiment was conducted. The experimental period was 2 months post-partum.

Milk Yield

Milk yield of individual Gir cattle was suggested by Bea1 *et al.* (1990), Milk yield recorded at daily basis starting from day 7th till entire study period (up to 2 months). Milk yield (kg.) was recorded daily i.e. morning and evening, throughout the experiment by using electronic weighing balance with addition of milk suckled by their calf. For that, suckling Gir calves of all the experimental animals were weighed at fortnightly interval during morning and evening milking time before and after suckling on digital weighing balance. The Gir calves were permitted to suckle for few minutes before let down of milk and few minutes after each milking. The difference in body weight was considered as the amount of milk suckled by the Gir calves. The sum of amount of milk suckled by each Gir calf during morning and evening milking gave the amount of milk that Gir calf had suckled from its dam on that day. The value of milk suckled was considered as the amount of milk suckled Kg/Gir calf/day.

Milking Temperament

For the observation of dairy temperament in lactating Gir cows the technique suggested by Tulloh (1961) was followed. In rating the temperament of dairy animals the categories were classified as docile, slightly restless, restless, nervous and aggressive and numerical rating scale was fixed 1, 2, 3, 4 and 5 respectively. Adopting the rating scale method, each cow was rated twice in a month. The score sheet according to which rating was done is given in Table 1.

Let Down Time

The time (sec.) required from touching of teat by a calf or manual massage to the first drop of milk drawn in the pail. It was recorded with the help of stop watch. Milk let down time for each cow was observed every week during experimental period.

Statistical Analysis

The data on milk yield and milking temperament were subjected to statistical analysis by using SPSS (Statistical Package for Social Sciences, Version 20.0) software. Descriptive statistics specifying Mean \pm S.E was calculated for each group. One way ANOVA procedure was undertaken to compare means. Post Hoc multiple comparisons were made using Duncan Multiple New Range Test (DMNRT). Independent sample t-test was used for two group comparisons. Correlation between data of every fortnight observation of milk

yield, milking temperament and milk let down time were calculated by using Pearson correlation in SPSS software.

Results and Discussion

The effect of parity on milk yield in Gir cows during experiment at fortnight interval under study is presented in Table 1. There was significantly higher milk yield observed in multiparous cows (6.81 ± 0.41 kg.) as compared to primiparous cows (5.63 ± 0.13 kg.). The maximum mean of milk yield obtained on 4th fortnight in both groups. The minimum mean of milk yield obtained on 1st fortnight in both groups. Moreover, the mean of milk yield gradually increases from 1st fortnight to 4th fortnight after parturition in both the groups. While comparing within the group the milk yield of Gir cows no significant difference ($p > 0.05$) was observed. Similar finding of significantly higher milk production in multiparous cow has been reported by Licitra *et al.* (1990), Wondifraw *et al.* (2013) and Verma *et al.* (2016). The higher milk yield in multiparous cow might be due to increase in age, parity, metabolic activity and increase in size of animal.

Table 1. Effect of parity on milk yield (kg.) of Gir cows

Period (Fortnight)	N	Primiparous (Group - 1)	Multiparous (Group - 2)	t value	p value
1	6	5.33 ± 0.53	6.73 ± 0.96	-1.275	0.231
2	6	5.62 ± 0.09	6.82 ± 1.01	-1.184	0.264
3	6	5.76 ± 0.05	6.83 ± 0.77	-1.383	0.197
4	6	5.79 ± 0.07	6.85 ± 0.73	-1.445	0.179
Overall	24	5.63 ± 0.13	6.81 ± 0.41	-2.753	0.008

Mean with superscript (a, b) in a column differs significantly within groups and conditions respectively at $p < 0.05$.

The effect of parity on milking temperament in Gir cows during various fortnights under study is presented in Table 2. Considering all observation during milking, dairy temperament was significantly ($p < 0.01$) higher in primiparous cows (1.79 ± 0.13) as compared to multiparous cows (1.29 ± 0.10).

Table 2: Effect of parity on milking temperament of Gir cows

Period (Fortnight)	N	Primiparous (Group - 1)	Multiparous (Group - 2)	t value	p value
1	6	$1.50^a \pm 0.22$	1.33 ± 0.21	0.542	0.599
2	6	$2.33^b \pm 0.21$	1.33 ± 0.21	3.354	0.007
3	6	$1.67^a \pm 0.33$	1.00 ± 0.00	2	0.073
4	6	$1.83^a \pm 0.17$	1.33 ± 0.21	1.861	0.092
Overall	24	1.79 ± 0.13	1.29 ± 0.10	3.042	0.004

Mean with superscript (a, b) in a column differs significantly within groups and conditions respectively at $p < 0.05$.

While comparing within a group no significant difference ($p > 0.05$) was observed in multiparous cows but in primiparous cows significant ($p < 0.05$) difference was observed. In present study overall milking temperament in primiparous was significantly higher than the multiparous; because it takes time for dairy

cows to habituate to the milking routines and technology. Similar to present finding with respect to milking temperament has also been reported by Mondal (1999), Jash (2008) and Shehar *et al.* (2011).

The time elapse between start of suckling or milking stimulus to the udder till the onset of milk ejection is known as milk let-down time. Quick and efficient milk let-down reduces the time of milking process. The effect of parity on milk let down time in Gir cows during various weeks under study is presented in Table 3.

Table 3: Effect of parity on letdown time (sec.) of Gir cows

Period (Week)	n	Primiparous (Group - 1)	Multiparous (Group - 2)	t value	p value
1	6	72.1 ^{bc} ±1.81	55.07±1.68	6.891	0
2	6	73.43 ^{bc} ±1.23	58.11±3.68	3.952	0.003
3	6	65.17 ^a ±3.03	58.93±3.79	1.287	0.227
4	6	73.47 ^{bc} ±2.25	55.07±1.68	6.549	0
5	6	73.67 ^{bc} ±2.12	55.07±1.68	6.873	0
6	6	67.33 ^{ab} ±2.86	62.60±5.84	0.728	0.483
7	6	74.68 ^c ±1.62	55.15±2.24	7.07	0
8	6	71.88 ^{bc} ±0.44	56.25±1.87	8.143	0
9	6	74.27 ^c ±1.67	59.02±3.72	3.738	0.004
Overall	54	71.78±0.76	57.25±1.04	11.268	0

Mean with superscript (a, b, c) in a column differs significantly within groups and conditions respectively at $p < 0.05$

Considering all observation during milking, milk let down time was significantly ($p < 0.01$) higher in primiparous cows (71.78±0.7.6 sec.) as compared to multiparous cows (57.25±1.04 sec.). The maximum mean let down time obtained on 7th and 6th week in group – 1 and 2 respectively. The minimum mean let down time noticed on 3rd week in group – 1 and 1st, 4th and 5th week in group – 2. While comparing within the group the letdown time no significant difference ($p > 0.05$) was observed in multiparous cows but there is significant difference ($p < 0.05$) seen in primiparous cows.

In present study overall let down time in group – 1 was significantly higher as compared to the group – 2. Similar finding with respect to let down time after parturition has been reported by Mondal (1999) and Hasmukh *et al.* (2017). However, Murthy *et al.* (2000) reported that parity has non- significant ($p > 0.05$) effect over the milk let down time. Rangel *et al.* (2014) reported that primiparous Murrah buffaloes were more reactive and produced less milk and had slightly higher let down time, which did not vary in comparison with multiparous females. High let down time in first lactation cows in the experiment might be due to less acquaintance of cows with milking routine which decreases as the parity advances. For correlation among milk temperament, milk yield and milk let down time fortnight observation was taken during entire period of the experiment and the result of these given in Table 4. Considering to all observation, during experimental period milking temperament was negatively associated (-0.242) with milk yield of the Gir cows, although it was not significant. In case of milking temperament and milk let down

time of Gir cows, positive association (0.265) was observed during the experimental period; although it was not significant. Correlation between milk yield and milk let down time significant at the 0.01 level with negative association (-0.403).

Table 4: Correlation among milk temperament, milk yield and milk let down time

Parameter-1	Parameter-2	Correlation Coefficient	p- value
Milking temperament	Milk yield	-0.242	0.098
Milk yield	Milk let down time	-0.403**	0.005
Milk let down time	Milking temperament	0.265	0.068

**Correlation is significant at the 0.01 level (2-tailed)

As similar our findings, Nkrumah *et al.* (2007), Lallawmkimi and Singh (2009), Prasad *et al.* (2011), Prasad and Laxmi (2014), Patel *et al.* (2016), Choudhary *et al.* (2017), found out that the milking temperament has negative correlation with the milk yield. Shehar *et al.* (2011) and Szentléleki *et al.* (2015) found out that the milk let down time was positively correlated with milking temperament which is similar to our finding.

Conclusion

Milk yield was significantly ($p < 0.01$) higher in multiparous cows as compared to primiparous cows and it was gradually increasing from 1st to 4th fortnight. Dairy temperament score was significantly ($p < 0.01$) higher in primiparous cows as compared to the multiparous cows. Let down time of milk was significantly ($p < 0.01$) higher in primiparous cow as compared to multiparous cow. There was negative correlation between milking temperament and milk yield observed during our experiment. Milk yield and milk let down time was also negatively correlated and the correlation was significant at the 0.01 level. Positive correlation was observed between milk let down time and milking temperament in Gir cows during our experimental period.

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