Vol. XV (1-2), 1978

STUDY ON MILKING PATTERN AND BEHAVIOUR IN SAHIWAL COWS AND NILIRAVI BUFFALOES

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Milk let-down time, milking time, stripping time and milk yield were recorded for 436 milkings in Sahiwal cows and 363 in Niliravi buffaloes at the University of Agriculture, Livestock Experiment Station Dairy Unit at Faisalabad. The average let-down time was 62.89 and 164.40 seconds, milking time 297 and 498 seconds, stipping time 49.31 and 60.13 seconds, and milk yield 5.51 and 10.11 Lb, for cows and buffaloes, respectively. Correlation coefficients between different variables indicated the presence of highly significant ($P<0.01$) relationship between let-down time and stripping time, between milking time and milk yield, and between milking time and stripping time, in both cows and buffaloes. Highly significant correlations ($P<0.01$) also existed between stripping time and milk yield in cows and between let-down time and milking time in buffaloes. Correlation between let-down time and milk yield was significant ($P<0.05$) in cows only. No association existed between let-down time and milking time in cows, between let-down time and milk yield and between stripping time and milk yield in buffaloes. All four characteristics studied revealed highly significant differences between cows and buffaloes, indicating that the two species had different milking pattern and behaviour.

INTRODUCTION

It is generally believed that different breeds of cattle and buffaloes have different milking pattern and behaviour. As far as ascertained from the literature, no information is available on the time involved in milk secretion during the process of milking for Sahiwal cows and Niliravi buffaloes. Such an information would be important for use in selection of future dams for herd replacement with regard to the milking time. These data on milking were also necessary for working out farm labour requirements, and for their requisite time and space studies. Furthermore, the information could be of help for any future attempt on the use or manufacture of milking machines in this country.

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The present investigation was designed to find out: (1) the stimulation time required for milk let-down, and its effect on the yield; (2) the milking time; (3) the stripping time; (4) correlations, if any, between let-down and milking time between let-down and stripping time, between let-down any yield, between milking time and yield, between milking time and stripping time, and between stripping time and yield; (5) the comparative behaviour of cows and buffaloes in their milking pattern.

MATERIALS AND METHODS

Twenty two Sahiwal cows and nineteen Niliravi buffaloes that were in milk at the University of Agriculture Dairy Farm, Faisalabad during the course of this investigation, which covered a three-month period of may to July, were used in this study. Data were recorded on 436 and 363 milkings of cows and buffaloes, respectively. Stop watch was used during the collection of experimental data.

The following observations were recorded :-

a) Let-down time (stimulation time): The time was recorded when the milker first touched the teat till let-down and the start of milking.

b) Milking time : The time that was required for milking an individual animal, and did not include stripping.

c) Stripping time : The time that was taken for the let-down of stripping, which denoted the interval between milking and second let-down known as stripping.

d) Milk yield: Total production of milk by the animal including stripping at one time.

RESULTS AND DISCUSSION

The mean, standard deviation and coefficient of variation of let-down time, milking time, stripping time and milk yield for cows are given in Table 1 and those for buffaloes in Table 2. The results show large differences between cows and buffaloes in various timings studied. The average milking time for cows was 297.00 ± 101.40 seconds, and that for buffaloes was 498.00 ± 151.80 seconds. These findings seem to be in agreement with Zuravok (1969) who observed a milking time of 310 seconds by machine milking and 330 seconds by hand milking in cows. The present results are

Table 1. *Mean, standard deviation and coefficient of variation of let-down time, milking time, stripping time and milk yield in Sahiwal cows.*

Character		Mean	Standard deviation	Coefficient of variation
Let-down time	(seconds)	62.89	1.54	0.024
Milking time	(seconds)	297.00	101.40	0.342
Stripping time	(seconds)	49.31	1.91	0.038
Milk yield	(lbs)	5.51	2.35	0.426

Table 2. *Mean, standard deviation and coefficient of variation of let-down time, milking time, stripping time and milk yield in Nilravi buffaloes.*

Character		Mean	Standard deviation	Coefficient of variation
Let-down time	(seconds)	164.40	1.58	0.576
Milking time	(seconds)	498.00	151.80	0.304
Stripping time	(seconds)	60.13	38.73	0.644
Milk yield	(lbs)	10.11	2.75	0.254

also inconformity with those obtained by Dobicki *et al.*, (1969), who found a milking time of 292 seconds while milking cows by hand. However, there are repotts which show wide difference in milking time as compared to the present results. Rice and Pegg (1955) reported that average milking time for cows in their study was 498 seconds by machine milking and 552 seconds by hand milking. The higher milking time is known to be associated with the higher milk yield (Garjkavyi, 1967; Mezale and Garkavijs, 1967; Andreev, 1969). It seems that higher milking time for cows, as reported by Rice and Pegg (1955), was in part a result of higher milk yield by the experimental cows. It would, therefore, be obvious that the difference in milking times obtained in various studies cannot be viewed as a discrepancy or as an unusual phenomenon.

The coefficient of variation of milking time in the present study was 0.342 in cows and 0.304 in buffaloes. It varies slightly from the finding of Soloviov *et al.*, (1970) who have reported the coefficient of variation of milking time as 0.402.

Simple correlation coefficients between different variables were estimated for cows and buffaloes, and are shown in Table 3.

Table 3. *Correlations between different variables studied in Sahiwal cows and Niliravi buffaloes.*

Variables	*Correlation coefficient*	
	Cows	Buffaloes
Let-down time and milking time	0.086	0.573**
Let-down time and stripping time	0.319**	0.885**
Let-down time and milk yield	0.134*	0.002
Milking time and stripping time	0.413**	0.197**
Milking time and milk yield	0.603**	0.387**
Stripping time and milk yield	0.222**	0.025

* Significant at 5 per cent level of probability.

** Significant at 1 per cent level of probability.

There was no relationship between let-down time and milking time in Sahiwal cows. However, a correlation of 0.573 was found between these variables in Niliravi buffaloes which was statistically highly significant ($P<0.01$). The correlation between let-down time and stripping time for both Sahiwal cows (0.319) and Niliravi buffaloes (0.885) was found to be highly significant ($P<0.01$). This indicated that lesser the time required for udder stimulation the lesser would be the time required for stripping, in both the species.

The correlation between let-down time and milk yield for Sahiwal cows was low (0.134) but statistically significant ($P<0.05$). No correlation existed between these variables for Niliravi buffaloes. The correlation between milking time and stripping time for Sahiwal cows (0.413) as well as for Niliravi buffaloes (0.197) was highly significant ($P<0.01$). Similarly, the correlation between milking time and milk yield, in both cows (0.603) and buffaloes (0.387) was highly significant ($P<0.01$). This shows the existance of an association between the milking time and the yield of milk. The existance of positive correlation between milking time and milk yield has also been demonstrated by other workers. Garjkavyi (1967), Mezale and Garkavijs (1967) and Andreev (1969) have reported a correlation of

0.46, 0.58 and 0.71, respectively, for cows. The present results confirm the earlier findings, including that of Rice and Pegg (1955) which exhibited a strong indication for the presence of such a phenomenon.

The relationship between stripping time and milk yield was also statistically highly significant in case of Sahiwal cows ($P<0.01$), the correlation coefficient being 0.222. The correlation between these two variable in Niliravi buffaloes was, statistically non-significant, indicating that longer stripping was not associated with an increased yield of milk.

Table 4 shows difference between Sahiwal cows and Niliravi buffaloes in various characteristics measured in the present study. Student's "t" test was applied in comparing the two species (Snedecor, 1956.) The comparison was made for let-down time, milking time, stripping time, and milk yield. Differences between cows and buffaloes were statistically highly significant for each of the four characteristics ($P<0.01$). These results, and those presented in Tables 1 and 2, point to the existance of quite different milking behaviours in cows and buffaloes. The differences between species can be attributed to the direct and indirect causes associated with the hereditary make-up as for as the various time traits are concerned. These genetic factors may include differences between cows and buffaloes in the composition of milk. Buffalo milk has higher, fat, solids-not-fat and total solid contents than cow milk. It would appear to be of interest to have a study designed to obtain information on such relationships that might exist.

Table 4. *Comparison between cows and buffaloes for various characteristics.*

Characteristic	Degree of freedom	Difference between means		Calculated "t" value
Let-down time	797	101.51	(seconds)	914.5**
Milking time	797	201.00	(seconds)	21.49**
Stripping time	797	10.72	(seconds)	5.32**
Milk yield	797	4.60	(lb)	26.14**

** Significant at the 1 per cent level of probability.

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