SHORT AND ATYPICAL LACTATIONS IN NILI-RAVI BUFFALOES

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ABSTRACT

Data on 2704 lactations of 993 Nili-Ravi buffaloes were analyzed to investigate the extent and behavior of short and complete lactations. Lactation milk yield up to 44 weeks was used and lactations with less than eight weeks of duration were excluded. Fifty nine percent of the lactation records were shorter than 44 weeks. When minimum lactation length was required to be 26 weeks, 11% of lactations did not meet this criterion. Among 2107 lactations of < 308 days duration, reasons of drying were known for 534 lactations (25%). Out of these 31% had mastitis, 16% were shorter because buffaloes had been auctioned while she was in milk, 13% had bad temperament while the other 40% were short because of reproductive problems and other reasons such as death of calf, old age, disease etc. Lactation curves were different for first and later parities with lactations of different duration. About 10% of lactations were atypical, with first calvers having the highest frequency. Improvement in data recording will help explore lactation length problems more precisely in future.

Keywords: Short and atypical, lactations, Nili-Ravi

INTRODUCTION

Adequate lactation length in buffaloes is needed to get optimum production. Usually, a lactation length of 10 months (305 days) with a dry period of two months (to get a calving interval of one year) is considered ideal. In reality, however, it is never achieved especially when gestation period in the species is 10 months, a month more than that in cattle. A service period of two months is achievable but average is always higher than 60 days due to substandard management and lack of selection efforts. A genetic improvement program is being executed in Punjab since 1985 (Asghar, 1988). The data on milk production and other economical traits in these animals are being collected and production records are being standardized for lactation length. Lactations abandoned for abortion and sickness are, however, excluded from analysis considering that they are abnormal. In most studies where reasons of shorter lactation length are not clear, a cut off is assumed for including or excluding a particular lactation. Such a cut off has wide variation in literature and ranges from 28 to 285 days. Abnormal lactations abandoned due to abortion, sickness or other physiological reasons are still not included. Sometimes the lactation records between the cut off point and the standard point are considered the genetic potential of the buffalo (Khan, 1986) and thus are not corrected for lactation length. Van Vleck and Henderson (1961) have given a similar suggestion for Holsteins. A very high cut off point may also result in loss of enormous data collected at a very high cost. Including very short lactations on the other hand can influence variation in the trait and conclusions drawn can be quite different.

The objective of the present study was to measure the extent of shorter and atypical lactations in Nili-Ravi buffaloes and find reasons of them to be short.

MATERIALS AND METHODS

Weekly milk yield records of 993 Nili-Ravi buffaloes, maintained at Livestock Experiment Station, Bahadurnagar, Okara, from 1970 to 1998 were used for the present study. First and later parities were considered separately. A nonlinear model (Wood, 1967) was used to calculate different lactation curve parameters.

RESULTS AND DISCUSSION

Frequency distribution of lactations according to lactation length (or days in milk) is given in Table 1. Lactations with lactation length (LL) of less than 2 months (56 days) were not included in the data set and the values do not represent population average. Such lactations were less than 5% of the total lactations included the study period. Out of 2704 lactations having more than eight weeks of duration, 59.2% had shorter

lactation than 44 weeks of duration. If minimum lactation length was increased from eight to 16 weeks, this included 3.0% of all the lactations. Buffaloes with lactations of more than six months duration (>182 days) were 89.2% of the data set.

Among 2107 lactations of < 308 days, reasons of drying were known for 534 lactations (25%). Out of these, 31% had mastitis, 16% were shorter because buffaloes had been auctioned while animal was in milk, 13% were from buffaloes having bad temperament while the other 40% were short because of reproductive problems and other reasons such as death of calf, old age, and disease etc (Table 2). Lactations with duration shorter than 8 weeks were 112 (5.3%) and reasons were known for 84 (75%). Most common reasons reported were reproductive problems (32%) and mastitis (21%).

Cady *et al.* (1983) have discussed the issue of excluding lactations shorter than 60 days for Nili-Ravi buffaloes and have mentioned that such lactations were due to mastitis (10%), milk let down (10%), reproductive problems (10%) and other mixed causes (15%). Some of these reasons might influence lactations with >60 days in length but they argued that in lactations with these problems, milk yield was similar to normal lactations (not treated or with missing information on treatment). Minimum lactation length (cut off) used in buffalo data analysis is quite variable in the literature. The choice of the cut off point was arbitrary in most of the studies or at least logic for choosing a particular day for this purpose was not reported. Fewer number of observations before the cut off may be a popular cause, but using information beyond a certain point of the lactation curve (100 or 150 days) means loosing information about the important part of the curve.

For Egyptian buffaloes, Metry *et al.* (1994) used a cut off of four weeks for lactations to be included in their study (normal lactations). The logic for such a liberal cut off was not given but lack of information could be a possible reason. Although, choosing a cut off to declare a lactation normal depends on the objectives of the study, a wide range is available in the literature for buffaloes. Some of the issues for including a lactation in the analysis have been discussed by Khan (1996).

As expected, shorter lactations had lower milk yield as compared to the complete or longer lactations (Table 1). Milk yield averaged 1984.4 kg with a standard deviation of 773.43 kg when lactation length up to 44 weeks was used. Lactation length for such records averaged 266.6 days with a standard deviation of 55.15 days. The overall average lactation length in the data set was 289.6±82.12 days. Very short lactations (8-11 weeks in milk) had average milk yield of 347.1 kg with a standard deviation of 148.53 kg. Graphic representation of lactations with different days in milk is presented in Figure 1 for first and later parities. Curves for first and later parity buffaloes were different for varying lactation length. Most of the lactations with shorter lactation length seemed complete as the animals dried gradually.

To access the shapes of these lactation curve, for individual buffalo, coefficients of intercept (a), increase towards peak (b) and decline from peak (c) from a gamma type function (Wood, 1967) were calculated (Table 3). The focus was objective determination of the extent of lactations with atypical behavior. If 'b' was negative (instead of increase after the initial yield) or if 'c' was positive (instead of decline, there was increase after the peak), the lactations were called atypical. There were 253 such lactations (9.4%). Their distribution was different among different parities (Table 4) and ranged from 0.4% (in 6th and 7th parity) to 2.7% (in first parity). About 70% of the atypical lactations were in the first three parities while rest of the 30% were in the later parities. Such a behavior may be due to physiological or environmental factors such as disease, season, mistakes in recording, routine or occasional suckling by the calves etc. and the frequency of such curves may be reduced by improved management. Electronic data recording can further help the managers to identify such lactations while they are being recorded and then focus on individual buffaloes for remedial measures.

Coefficients of Wood's model for parities with different LL were different. Shorter and longer lactations had similar initial yields but shorter lactations had a higher rate of rise towards peak, lower peak and higher rate of fall from peak (Table 3). For first parity buffaloes lactations with ≤112 LL, values for a, b and c were 1.73 ±.222, .82 ± .293 and -.22± .066 compared to 1.80±.179, .32±.076, and -.03±.005, with >280 LL, respectively. Also, the behavior of lactation curves was similar for first and later parities (Figure 1) but first parity buffaloes had a lower peak.

Percentage of atypical lactations varies among studies on buffaloes. Mansour et al. (1992) reported that 3.5% of lactations in Egyptian buffaloes were atypical. For Pakistani Nili-Ravi, using complete lactations, percentage of atypical lactations is 4.6% (Khan and Gondal, 1996). Another study (Ali, 1996) reported that atypical lactations were 4.9% when complete lactations (≥280 days) were used from an other experimental herd of Nili-Ravi buffaloes. Occurrence of atypical lactations for Pakistani Sahiwal cows have been quite high (36%) as reported by Khan (1997). Comparing the results of the previous (Khan and Gondal, 1996) and the current study, it can be inferred that if lactation duration is not restricted to 308-days as was done in the study of Khan and Gondal (1996), more lactations would be atypical. In other words, shorter lactations were more likely to be atypical as compared to the longer lactations. Qualitative improvement in data recording is suggested for more precise studies in future.

Table 1: Frequency distribution of lactations by lactation length and averages (±SD) of milk yield and lactation length.

Lactation length (weeks)	N	%	Lactation length (days)	Milk yield (kg)
8-11	30	1.1	75.0±12.00	347.1±148.53
12-15	51	1.9	106.1±24.82	549.1±186.50
16-19	56	2.1	133.0±25.40	704.0±174.89
20-23	79	2.9	160.6±19.41	858.0±287.64
24-27	98	3.6	184.6±14.21	1066.3±308.29
28-31	207	7.6	213.0±11.12	1326.7±355.36
32-35	270	10.0	239.5±14.39	1694.6±471.03
36-39	422	15.6	267.8±09.26	1954.2±503.18
40-43	389	14.4	294.4±08.30	2198.2±622.37
≥ 44	1102	40.8	307.0±08.07	2453.5±618.78
OVERALL	2704	100.0	266.6±55.15	1984.4±773.43

Table 2: Distribution of reasons of drying for buffaloes with different lactation duration.

LL** (days)	N	Reasons for shorter lactations											% known*
		MT[1]	DD[2]	AC[3]	RP[4]	LD[5]	TP[6]	CD[7]	OD[8]	SK[9]	OT[10]	Total	
0-56	112	18	5	18	27	4	-	5	1	4	2	84	75.0
57-84	39	5	-	6	6	-	1	2	-	4	1	14	35.9
85-112	60	6	1	12	2	-	3	6	-	5	-	35	58.3
113-140	78	3	2	11	-	2	8	8	3	1	5	25	32.0
141-168	95	11	2	9	3	-	8	7	-	5	3	48	50.5
169-196	123	15	1	9	2	7	5	4	2	7	2	54	43.9
197-224	228	21	1	7	6	1	6	8	1	6	10	67	29.4
225-252	354	28	1	7	2	2	9	6	5	4	5	69	19.5
253-280	509	37	2	6	6	-	13	3	1	3	7	78	15.3
281-307	509	22	-	2	3	-	18	4	4	4	3	60	11.8
Total	2107	166	15	87	57	16	71	53	17	43	38	534	
Overall	(%)	31.1	2.8	16.3	10.7	3.0	13.3	9.9	3.2	8.1	7.1		25.3

**Lactation length; [1]dried due to mastitis; [2] died in milk; [3]auctioned in milk (due to disease, repeat breeding, poor production, old age etc.); [4]reproductive disorders (retention of placenta, pyometra, brucellosis, abortion etc.); [5]problem in milk let down; [6]dried due to bad temperament; [7]calf died; [8]old age; [9]sick (diseases other than mastitis or reproductive disorders); [10] others such as poor producer, change of milkman, change of location etc.; *percentage of records for which information on reasons of drying was available

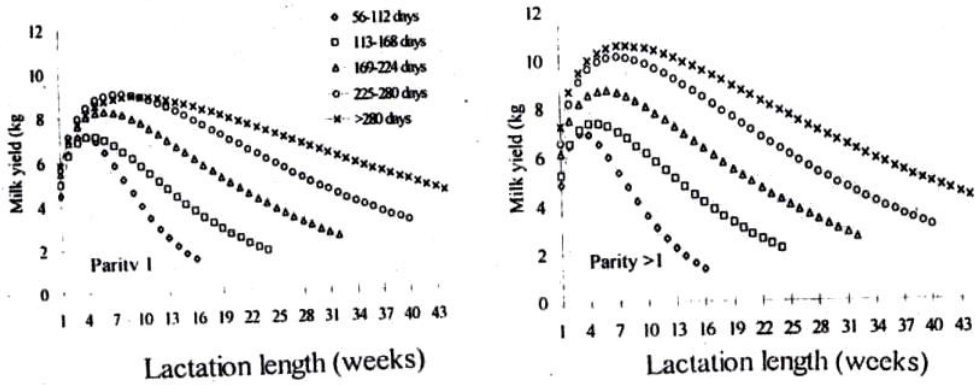

Fig. 1: Lactation curves of different duration for first and later parity buffaloes.

Table 3: Parameters of lactation curve* along with standard errors in Nili-Ravi buffaloes.

Parity	Lactation length (days)	a±SE	b±SE	c±SE
1	56-112	1.73±0.222	0.82±0.293	-0.22±0.066
	113-168	1.71±0.250	0.50±0.190	-0.11±0.026
	169-224	1.77±0.246	0.44±0.143	-0.07±0.014
	225-280	1.79±0.220	0.40±0.106	-0.05±0.009
	281-308	1.80±0.179	0.32±0.074	-0.03±0.005
2	56-112	1.80±0.282	0.73±0.374	-0.22±0.089
	113-168	1.76±0.261	0.47±0.194	-0.10±0.026
	169-224	1.88±0.241	0.40±0.138	-0.07±0.014
	225-280	1.94±0.223	0.40±0.107	-0.06±0.009
	281-308	2.03±0.179	0.31±0.073	-0.04±0.005

*Calculated using gamma type function (Wood, 1967);
a = initial milk yield, b = increase towards peak, c = decline after peak

Table 4: Frequency distribution of atypical lactations by parity in Nili-Ravi buffaloes.

Parity	No. of lactations	Atypical lactations		
		n	% of all lactations	% of atypical lactations[1]
1	705	71	10.1	28.5
2	561	62	11.1	25.3
3	457	41	9.0	16.2
4	348	29	8.3	11.5
5	248	16	6.5	6.7
6	164	10	6.1	3.9
7	108	10	9.3	3.9
≥8	113	14	12.4	5.5
Overall	2704	253	9.4	100.0

*a lactation was declared atypical if it had -ve value of 'b' (a decline in milk yield after calving instead of increase) or +ve value of 'c' (an increase after the peak instead of decline), where 'b' and 'c' are parameters of Wood's model (Wood, 1967); [1]out of 253 lactations

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