

SHORT COMMUNICATION

CAUSES TERMINATING LACTATION RECORDS IN HOLSTEIN-FRIESIAN x GUZERA CROSSES

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ABSTRACT

Causes terminating lactation records (CTR) were studied using 921 records of six Holstein-Friesian (HF) x Guzera crossbred groups kept in farms with high (HML) and low (LML) management levels. In the HML, percentages of lactations terminated because of "normal" reasons, because of calf loss or because of cow illness, injury or death, were, for groups with 1/4, 1/2, 5/8, 3/4, 7/8 and $\geq 31/32$ HF gene fraction, respectively: 95.0, 2.5, 2.5; 97.0, 1.2, 5.8; 85.4, 4.2, 10.4; 98.1, 0, 1.9; 90.7, 0, 9.3 and 98.0, 0, 2.0. Corresponding percentages in the LML were: 87.2, 11.7, 1.1; 90.8, 6.7, 2.5; 89.9, 2.9, 7.2; 85.4, 8.3, 6.3; 84.6, 3.8, 11.5 and 84.1, 3.2, 12.7. Chi-square for heterogeneity of the latter distribution among crossbred groups was highly significant ($P < 0.005$). Since "abnormal" CTRs are likely to affect milk yield, it was concluded that unbiased comparisons of breeds and crosses and estimates of inter-population genetic parameters for milk yield should be based on all available records and not only on those with "normal" CTRs.

INTRODUCTION

Decisions on procedures for handling records in genetic evaluation of individuals or groups or animals, depend on whether causes terminating lactations are genetically influenced or not. Thus, in situations where no genetic correlation between milk yield and cause for drying off may be assumed, it is justifiable to project short lactations to a standard duration yield, usually 305 days, as in the evaluation of dairy

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cows and bulls under intensive production systems (Wiggans, 1983). However, under tropical production systems, cause terminating record may depend on genotype. Loss of calf is a case in point, irrelevant under artificial rearing systems, but which would cause drying off in breeds needing the presence of the calf for milk let down, like the zebu or Criollo (Mahadevan, 1966, De Alba and Kennedy, 1985). Comparisons of breeds and crosses based on milk yield and related traits would be biased if genetically influenced short lactations were excluded from the analysis (Madalena *et al.*, 1987). Similarly, extending such records would reduce genetic variation in yield associated with lactation length (Madalena, 1988). Ngere *et al.* (1973) suggested extending lactations ended by loss of calf, which they considered an environmental effect in Hariana cattle. Evidence for the presence of genetic influences on the causes terminating lactation records is presented here, utilizing data from a more comprehensive trial on breeding strategies for the Southeast Region of Brazil (Madalena *et al.*, 1982).

MATERIAL AND METHODS

Lactation records (921) of six crossbred red and white Holstein-Friesian (HF) x Guzera groups were studied. These groups are designated by their expected HF gene fraction: 1/4, 1/2, 5/8, 3/4, 7/8 and HF ($\geq 31/32$). Genetic history of these animals was given by Lemos *et al.* (1985). Batches of contemporary heifers were distributed to commercial farms for further evaluation. Records were grouped into classes of high and low management level (HML and LML, with 7 and 59 farms, respectively), according to milk yield, age at first calving and subjective appraisal of husbandry practices. Lactations (1st. to 5th.) occurred between June 1980 and August 1985. Cows were milked in the presence of the calf. Other details are given by Madalena *et al.* (1982).

The following causes terminating records (CTR) were assigned by the authors upon examination of recorders' field reports:

Code	Cause
1.	Drying off to rest before next calving (RBC).
2.	Forced drying off because of low yield.
3.	Cow calved but did not milk at all.
4.	Natural (<i>i.e.</i> , not forced) drying off. Two records ended because of cow freshening without going dry were included in this code.
5.	Loss of calf.
6.	Drying off or culling because of mastitis or lost teat(s).
7.	Other illnesses or injuries.
8.	Cow died.

Cow culling based on production was not a CTR because, for experimental reasons, it was practised after the last lactation ended.

CTRs were grouped into the following classes for statistical purposes:

- Natural drying off: codes 3+4.
- “Normal” causes: codes 1+2+3+4.
- Illness, injury or death (IID): codes 6+7+8.
- “Abnormal” causes: codes 5+6+7+8.

Chi-square tests were performed on the two way contingency tables of classes of causes by six crossbred groups, separately for each management level class.

RESULTS AND DISCUSSION

CTR distributions are presented in Table I. “Normal” CTRs were more frequent in the HML than in the LML. The latter had a higher incidence of loss of calf CTR. For comparison, CTR percentages in the U.S.A., worked out from figures of Wiggans (1980), were: 91.8% 305-day records with “normal” CTRs and 8.2% terminated because of IID (1.7, 5.0 and 1.5%, respectively, for our codes 6, 7 and 8).

In the HML only 1/4, 1/2 and 5/8 cows had lactations ended due to loss of calf. In the LML groups 1/4, 3/4 and 1/2 had a higher incidence of loss of calf CTR, and groups HF, 7/8 and 5/8 had a higher incidence of CTR due to IID. The heterogeneity of the CTR distribution among crossbred groups was highly significant in the LML, although it was masked when grouping all “abnormal” causes together, due to compensation of CTR class frequencies (Table I).

Within the “normal” lactations class, CTR distribution was heterogeneous for crossbred groups in the HML, where a very low proportion of 1/4 and 5/8 cows had code 1 (RBC) (Table I). High incidence of short lactations in those 2 groups (Madalena *et al.*, 1987) resulted in frequent drying off because of low yield, before reaching the 2 months precalving date for RBC.

It is realized that ignoring possible sources of variation in CTR frequency, like parity, herd, year, season and cow, might induce wrong conclusions from two-way contingency tables analysis (Rutledge and Gunsett, 1982). However, further subdivision would not be warranted due to low cell numbers.

Because of the genetic variation in CTR frequency, exclusion of “abnormal” lactations would be expected to reduce between group variation in milk yield associated with CTR. De Alba and Kennedy (1985) reported an attenuation of Jersey x Criollo crossbred group effects, when “abnormally” short lactation records were edited out, which resulted in reduction of milk yield heterosis and heritability. Heterosis estimates for first lactation milk yield reported by Madalena *et al.* (1987)

Table I - Frequencies of causes terminating lactation records.

Cause terminating lactation record	Crossbred Group												Total	
	1/4		1/2		5/8		3/4		7/8		HF		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
High management level														
1. Rest before next calving	3	3.8	39	45.3	5	10.4	23	43.4	44	51.2	24	49.0	138	34.3
2. Low yield	70	87.5	36	41.9	30	62.5	25	47.2	32	37.2	21	42.9	214	53.2
3. Cow did not milk	0	0.0	0	0.0	1	2.1	0	0.0	0	0.0	0	0.0	1	0.3
4. Natural drying off	3	3.8	5	5.8	5	10.4	4	7.6	2	2.3	3	6.1	22	5.5
"Normal" (1+2+3+4)	76	95.0	80	97.0	41	85.4	52	98.1	78	90.7	48	98.0	375	93.3
5. Loss of calf	2	2.5	1	1.2	2	4.2	0	0.0	0	0.0	0	0.0	5	1.2
6. Mastitis/lost teat(s)	1	1.3	3	3.5	2	4.2	0	0.0	2	2.3	0	0.0	8	2.0
7. Other illness or injury	1	1.3	2	2.3	2	4.2	0	0.0	5	5.8	1	2.0	11	2.7
8. Cow died	0	0.0	0	0.0	1	2.1	1	1.9	1	1.2	0	0.0	3	0.8
IID (6+7+8)	2	2.5	5	5.8	5	10.4	1	1.9	8	9.3	1	2.0	22	5.5
Total	80	100.0	86	100.0	48	100.0	53	100.0	86	100.0	49	100.0	402	100.0
Low management level														
1. Rest before next calving	0	0.0	13	10.9	3	4.3	7	7.3	5	6.4	2	3.2	30	5.8
2. Low yield	48	51.1	50	42.0	38	55.1	50	52.1	31	39.7	29	46.0	246	47.4

Continued

Table I - Continued

Cause terminating lactation record	Crossbred Group												Total	
	1/4		1/2		5/8		3/4		7/8		HF		N	%
	N	%	N	%	N	%	N	%	N	%	N	%		
3. Cow did not milk	2	2.1	0	0.0	1	1.5	0	0.0	2	2.6	1	1.6	6	1.2
4. Natural drying off	32	34.0	45*	37.8	20	29.0	25*	26.0	28	35.9	21	33.3	171	32.9
"Normal" (1+2+3+4)	82	87.2	108	90.8	62	89.9	82	85.4	66	84.6	53	84.1	453	87.3
5. Loss of calf	11	11.7	8	6.7	2	2.9	8	8.3	3	3.8	2	3.2	34	6.5
6. Mastitis/lost teat(s)	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
7. Other illness or injury	0	0.0	0	0.0	1	1.5	3	3.1	4	5.1	3	4.8	11	2.1
8. Cow died	1	1.1	3	2.5	4	5.8	3	3.1	5	6.4	5	7.9	21	4.1
IID (6+7+8)	1	1.1	3	2.5	5	7.2	6	6.3	9	11.5	8	12.7	32	6.2
Total	94	100.0	119	100.0	69	100.0	96	100.0	78	100.0	63	100.0	519	100.0

* Includes one record terminated by calving during lactation.

Classifications		HML		LML	
		χ^2	P	χ^2	P
Normal vs Abnormal	$\chi^2_{(5)}$	9.73	P < 0.10	3.07	P < 0.75
Normal, Loss of calf and IID	$\chi^2_{(10)}$	-		22.72	P < 0.005
REC, Low yield and Natural	$\chi^2_{(10)}$	76.60	P < 0.005	17.03	P < 0.10

were reduced by 10 and 8%, respectively, in the HML and the LML, when "abnormal" lactations were edited out.

CONCLUSION

It is concluded that because Holstein-Friesian x zebu crossbred groups differ in the incidence of causes terminating lactation records, and because "abnormal" CTR are likely to affect milk yield, unbiased group comparisons and estimates of inter-population genetic parameters for milk yield should be based on all records available, and not only on those with "normal" CTR.

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RESUMO

Foram estudadas as causas de terminação da lactação (CTR) em 921 observações de 6 grupos de cruzamento de HVB x Guzera, em fazendas de alto (HML) e baixo (LML) nível de manejo. As percentagens de CTR "normais", por perda do bezerro e por (doença + acidente + morte), no HML, foram, para os "graus de sangue" 1/4, 1/2, 5/8, 3/4, 7/8 e $\geq 31/32$ HBV, respectivamente: 95.0, 2.5, 2.5; 97.0, 1.2, 5.8; 85.4, 4.2, 10.4; 98.1, 0, 1.9; 90.7, 0, 9.3 e 98.0, 0 e 2.0. As percentagens correspondentes no LML foram: 87.2, 11.7, 1.1; 90.8, 6.7, 2.5; 89.9, 2.9, 7.2; 85.4, 8.3, 6.3; 84.6, 3.8, 11.5 e 84.1, 3.2 e 12.7. O qui-quadrado para a heterogeneidade desta última distribuição entre os grupos genéticos foi altamente significativo ($P < 0,005$). Uma vez que a produção de leite seria provavelmente afetada nas lactações anormais, conclui-se que as comparações não viciadas de raças e cruzamentos e as estimativas de parâmetros genéticos entre populações para esta característica, deveriam ser baseadas em todas as observações disponíveis, e não apenas naquelas com CTR "normais".

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