

Effect of non-genetic factors on incidence of lameness in Karan Fries cross bred cows

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Lameness is one of the most critical health disorders in crossbred dairy cattle as it has a significant effect on economy of dairy industries, after mastitis and infertility (Chapinal *et al.* 2013). The lameness affected cow shows loss in body weight, abnormal gait, poor health; decreased reproductive efficiency as well as decrease in milk yield (Bicalho *et al.* 2008, Ouared *et al.* 2015). Further, these losses are aggravated by treatment, culling and replacement of the affected cows. It is a multi-factorial disorder and caused by various factors *viz.* genetic, nutritional, etiological as well as managerial practices, which interact in complex form and produce symptoms of lameness. Therefore, the present study was conducted to know the effect of non-genetic factors on incidence of lameness in Karan Fries (KF) cows.

Karan Fries cows (2,515) maintained during the past 12 years period (2000–2011) in Livestock Research Centre of NDRI (National Dairy Research Institute) were investigated for lameness. All the cows were maintained under standard management practices in loose houses (brick paved) adjacent to tandem milking parlour. Each individual's lameness incidence was recorded as one, and the recurrence of the same condition on same cow was not counted as a fresh incidence.

The records of cows with known pedigree and normal lactation were considered for this study. Culling, disposal in mid lactation, abortion, stillbirth, and other pathological abnormalities which affect the lactation yield were considered as abnormalities and hence such records were excluded from analysis. The records of cows with less than 500 kg of milk production and lactation length less than 100 days were discarded. To ensure the normal distribution, the outliers were removed and data within the range of mean $\pm$ 2SD were only considered for analysis.

The information such as lactation yield, lactation

number/parities, date and season of incidence of lameness, season of calving and stage of lactation of each cow were collected from health register and history sheets. The data were classified into four periods, eight parities (1–7 and ≥ 8), four seasons of calving *viz.* winter (December to March), summer (April to June), rainy (July to September) and autumn (October to November), 3 categories of lactation yield *viz.* high ($>5,000$ kg), medium (3,001–5,000 kg) and low ($<3,000$ kg) and seven stages of lactation (1st 60 d, 61–120d, 121–180d, 181–240d, 241–300d, >301 d and dry). The Chi-square (χ^2) test of independence of attributes was carried out to study the effect of non genetic factors such as period, parity, stage of lactation, season of calving and lactation yield on incidence of lameness.

The overall incidence of lameness during the study period in KF cows was 11.29% which was higher in comparison to KF cows at NDRI (Blahwar *et al.* 2003). Parity had no significant effect on incidence of lameness and results indicated that with increase in parity, incidence of lameness was also increasing and higher incidence was found during 3rd and 4th lactations, as crossbred cows achieved their peak lactation yield in third and fourth parity (Table 1). Results were similar to the findings of Kocak and Ekiz (2006) who reported a lower incidence in first parity (7.82%) as compared to second (11.34%) and third (10.87%) parities. Kougioumtzis *et al.* (2014) also reported that lameness problems in first parity were fewer before and immediately after calving, and increased as parity progressed.

Season of calving had significant ($P < 0.05$) effect on incidence of lameness. It was observed that lameness had seasonal incidence which was closely associated to the calving season and was higher in young cows. Highest incidence was found in rainy season followed by summer, autumn and winter had lower incidence (Table 1). This was in agreement with the previous findings of Onyiro *et al.* (2008) but contradictory to findings of Blahwar (2003) and Sanders *et al.* (2009) in Holstein Friesian cross bred cows. The reason for higher incidences between April to November might be due to higher calvings and also rainfall might have predisposed the cows to certain foot lesions because of wet conditions.

Though lactation yield had no significant effect on incidence of lameness, high yielders were most affected as

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Table 1. Effect of non-genetic factors on incidence of lameness

Non- genetic factors		df	Calculated χ^2	Lame	Healthy	Lameness %
Periods	2000-02	3	36.55*	38	578	6.16
	2003-05			90	504	15.15
	2006-08			100	578	14.75
	2009-11			56	571	08.93
Parity	1 st	7	1.28 ^{NS}	79	708	10.04
	2 nd			60	516	10.42
	3 rd			51	331	13.35
	4 th			36	229	13.58
	5 th			22	153	12.57
	6 th			15	110	12.00
	7 th			09	89	09.18
	>8 th			12	95	11.21
Season of calving	December to March	3	8.31 [†]	64	643	09.05
	April to June			72	555	11.46
	July to September			88	540	14.04
	October to November			60	493	10.85
Lactation yield (kg)	Low (<3000)	2	1.52 ^{NS}	85	625	11.97
	Medium (3001-5000)			141	1093	11.43
	High (>5000)			42	258	14.00

*Significant at 1% level ($P < 0.01$), [†]significant at 5% level ($P < 0.05$), ^{NS}Nonsignificant.

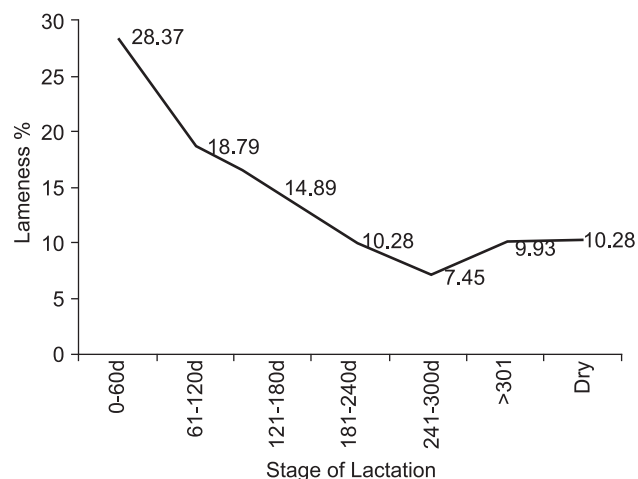


Fig. 1. Stage of lactation wise lameness incidence.

compared to low and medium yielders (Table 1). Similar observation was reported by Cobo-Abreu *et al.* (1979).

In the study, it was found that out of total lame cows (284) during early stage of lactation (first 60 days) cows were highly affected with lameness as compare to succeeding stages of lactations (Fig. 1). Lameness was maximum in first 2 months of lactation; this might be due to lactation stress in early lactating cows (Kocak and Ekiz 2006).

SUMMARY

Effect of period and season of calving had significant effect on incidence of lameness while effect of parity and lactation yield on incidence of lameness was not significant. It was found that high yielder cows and cows in early stage of lactation were highly affected with the lameness as compare to low yielder cows and cows in succeeding stages

of lactation. Though, non-genetic factors certainly have effect on incidence of lameness but better managerial interventions at farm level can play a key role in minimizing these effects.

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