

## IDENTIFICATION OF PREDISPOSING FACTORS RELATED TO FEEDING ON THE OCCURRENCE OF HOOF PROBLEMS IN CROSSBRED CATTLE

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### ABSTRACT

The present study was conducted to identify feeding related predisposing factors of hoof problems in crossbred dairy cattle. The study was conducted in 45 private farms in Thrissur and Palakkad districts. This study covered small (1-2 cows), medium (3-10 cows) and large scale farms (>10 cows) of both districts. The study revealed that the stall fed animals were having significantly ( $p<0.05$ ) more incidence of hoof problems compared to those under a combination of grazing and stall feeding. The animals fed with less than 15 kg green fodder per day were found to have significantly ( $p<0.01$ ) more hoof disorders (77.8 per cent) compared to those fed with more than 15 kg green fodder. The incidence of hoof problem was 51.9 per cent when dry fodder supply was 1-2 kg per day and 33.5 per cent in those fed with 3-5 kg of dry fodder and 12.5 per cent in those fed with greater than 5 kg dry fodder. The quantity of unconventional feed was found to be the major predisposing factor for the occurrence of hoof problems. The incidence of hoof problem was 80.0 per cent in animals which were not supplemented with vitamins and minerals, compared to 23.8 per cent in the animals

which were supplemented with minerals and vitamins. The results of this study indicate that hoof problems are a major problem among crossbred cattle and proper implementation of feeding practices are essential for reducing incidence of hoof problems among the crossbred cattle.

**Keywords:** Hoof problems, dairy farms, feeding management

### INTRODUCTION

Hoof problems are most significant health problems in crossbred cattle. Cattle suffering from hoof disorders have decline in milk yield, lower reproductive performance and decreased life span. The occurrence of hoof problems may be related to feeding and nutrition, housing conditions, environmental factors, management practices, or a combination of any or all of these (Greohn *et al.*, 1992). Hoof problems lower the cattle's ability to forage or graze, which lead to reduction in milk production and body condition and affect the mothering ability and fertility. For all these reasons, timely detection and treatment of hoof problem should be the first priority in all cattle operations. Most of the developed countries have

recognized that hoof problems are of supreme importance to commercial dairy production, but in our country little attention is paid to this problem owing to a variety of reasons (Bielfeldt *et al.*, 2005) Hence the dairy farmer has to implement optimal management practices especially related to feeding for minimizing hoof problems in crossbred cattle.

### MATERIALS AND METHODS

Two districts of central Kerala namely Thrissur and Palakkad were selected for evaluating the performance of the animals at field level. A survey was conducted at Chalakkudy town, Panancherry and Paralam panchayaths and Ollukkara and Cherppu blocks of Thrissur district and Puthur and Puthussery panchayaths of Palakkad district, which constitute the unorganized farms. A stratified random sampling technique was used for the present study to identify the farmers from the dairy co-operatives and from those who had enrolled in the direct benefit transfer scheme of the government of Kerala. The farms were categorized into small (1-2 cows), medium (3-10 cows) and large farms (more than 10 cows). Out of these farms, 15 each of small, medium and large farms were selected. Observations were made over a period of four months during which all the routine feeding management practices were examined. The association between occurrence of hoof problems and feeding management practices were studied.

The data obtained on various parameters were statistically analysed using techniques like mean, percentage, frequency, Pearson's chi-square test, Fisher's exact test and logistic regression. The whole data were

analysed using Statistical Product and Service Solutions (SPSS) version 24.0.

### RESULTS AND DISCUSSION

The incidence of hoof problem was 36.8 per cent in stall feeding alone (small farms 8.8%, medium farms 12.6% and large farms 15.4%) compared to zero per cent when combination of grazing and stall feeding was practiced. The system of feeding was found to have significant ( $p < 0.05$ ) influence on hoof problem (Table 1). Haskell *et al.* (2006) noted that the lameness and knee swelling were more in zero grazing farms than in grazing farms.

The incidence of hoof problem was 77.8 per cent (small farms 20.0%, medium farms 22.8% and large farms 35.0%) in animals fed with less than 15 kg green fodder per day compared to 18.4 per cent in animals fed with greater than 15 kg green fodder per day (small farms 3.4%, medium farms 5.0% and large farms 10.0%). This shows that as quantity of green fodder increased the incidence of hoof problem was reducing. The incidence of hoof problem was 51.9 per cent (small 6.9%, medium 20.0% and large 25.0%) while giving 1-2 kg dry fodder per day compared to 33 per cent incidence (small 4.5%, medium 12.0% and large 17.0%) when 3-5 kg of dry fodder was fed per day (Table 2). The effect of quantity of green fodder and dry fodder on the hoof problem was found to be statistically significant ( $p < 0.01$ ). This report suggests that optimum fibre content should be maintained in the diet to reduce the incidence of hoof problem by promoting cud-chewing and saliva production (Leach *et al.*, 2005)

The incidence of hoof problem increased numerically when quantity of concentrate

in the diet increased. By giving more than five per cent concentrate, the incidence of hoof problem was increased to 53.0 per cent compared to 33.3 per cent incidence while feeding 3-5 kg of concentrate and 12.5 per cent incidence while feeding 1-2 kg of concentrate (Table 2). This is in accordance with the findings of Manson and Leaver (1988) who reported that whenever cattle were provided with more concentrate feed, the incidence of lameness was high. Similarly, Wells *et al.* (1995) reported that causes which trigger lameness in cattle include quantity of concentrate and roughage fed to the animal, moisture in the stall and provision of exercise.

The Table 2 of this article reveals that the occurrence of hoof problem was significantly ( $p < 0.01$ ) higher in animals fed with more than 5 kg unconventional feed ingredients (57.9%) compared to animals fed with less than 5 kg unconventional feed (3.8%). The result is in accordance with Amory *et al.* (2005) who reported that feeding of high amount of unconventional feed alters the fermentation process in rumen leading to metabolic disorders

leading to increase in acidity and reduce the development of hoof horn.

The incidence of hoof problems was significantly higher ( $p < 0.05$ ) that is 80 per cent (small 17%, medium 23% and large 40%) in animals which were not given with vitamins and minerals supplementation compared to 23.8 per cent of incidence (small 10.3%, medium 5% and large 8.5%) in the animals supplemented with vitamins and minerals (Table 3). This result is in accordance with the finding of Hedges *et al.* (2001) who suggested that the incidence of hoof problems in cattle supplemented with vitamins and minerals was lower than the non-supplemented ones. The cows which were supplemented with vitamins like biotin had less lameness problem. The lameness risk for cows owing to white line separation was reduced to nearly half when biotin was supplemented in the diet. The vitamin and minerals are needed for epidermal differentiation, keratinization process, intracellular cementing in horn cells, to reduce digital lesions and also to maintain horn quality (Potzch *et al.*, 2005).

**Table 1.** Influence of feeding system on hoof problem

Feeding system	Frequency of hoof problem (%)				p-value
	Small	Medium	Large	Total	
Stall feeding	9(8.8)	7(12.6)	7(15.4)	25(36.8)	0.042 <sup>s</sup>
Grazing and stall feeding	0(0.0)	0(0.0)	0(0.0)	0(0.0)	

**Table 2.** Influence of feed type on hoof problem

Feed type	Quantity(kg)	Frequency of hoof problem (%)			Total	p-value
		Small	Medium	Large		
Green fodder	<15	8(20.0)	5(22.8)	10(35.0)	23(77.8)	0.001 <sup>s</sup>
	>15	7(3.4)	10(5.0)	5(10.0)	22(18.4)	

Dry fodder	1-2	7(6.9)	8(20.0)	5(25.0)	22(51.9)	0.010 <sup>s</sup>
	3-5	8(4.5)	7(12.0)	10(17.0)	27(33.5)	
Concentrate	1-2	3(1.5)	2(3.0)	5(8.0)	10(12.5)	0.190 <sup>ns</sup>
	3-5	4(7.8)	6(10.5)	3(15.0)	13(33.3)	
	>5	8(10.0)	7(21.0)	7(22.0)	24(53.0)	
Unconventional feed	<5	0(0.0)	0(0.0)	9(3.8)	9(3.8)	0.01 <sup>s</sup>
	>5	0(0.0)	5(24.9)	8(33.0)	13(57.9)	

**Table 3.** Influence of vitamin cum mineral supplementation on hoof problem

Supplementation	Frequency of hoof problem (%)			Total	p-value
	Small	Medium	Large		
Yes	5(10.3)	6(5.0)	5(8.5)	16(23.8)	0.022 <sup>s</sup>
No	10(17.0)	9(23.0)	10(40.0)	29(80.0)	

All the significant parameters were analysed as per logistic regression and the factors are categorized considering the Exp (B) value (odd's ratio) and presented in Table 4. The Exp (B) value greater than

one indicates positive correlation and less than one indicates negative correlation. Here the highest value is for quantity of unconventional feed thereby it is the most affecting factor.

**Table 4.** Logistic regression analysis of incidence of hoof problem on different predisposing factors related to feeding

Sl. No.	Variable	B value	Walds ratio	p-value	Exp(B)
1	Quantity of unconventional feed	3.537	9.963	0.002	34.375
2	Vitamin and mineral supplementation	-2.549	4.706	0.030	0.078
3	Quantity of green fodder	-1.525	7.367	0.007	0.218

## SUMMARY

This study indicates that the incidence of hoof problems is a major problem in crossbred cattle. The incidence of hoof problem was more in animals which were stall fed, fed with less green grass, less dry fodder, more unconventional feed and also fed without vitamins and minerals.

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