



Factors affecting pre-weaning mortality in *Gaddi* goats of Western Himalayas under transhumance production system

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Abstract

The migratory/transhumance system of goat production traditionally followed by tribal '*Gaddi*' community of Himachal Pradesh is generally associated with slower growth rate, high mortality and low survivability of kids which are main limiting factors in profitable goat husbandry. By analyzing different causes of mortality, it is possible to develop appropriate remedial strategies to improve productivity, reduce production losses due to ailments and mortality and increase overall profitability of this avocation. The present study was, therefore, conducted to analyze various factors associated with pre weaning mortality under migratory rearing of *Gaddi* goats. Pre weaning mortality incidence was studied in three field units under different migratory routes over a period of 3 years in relation to various predisposing factors and causes of mortality. The participatory rural appraisal technique and routine flock visits were adopted to collect the data on field units. The study revealed that weaning is practiced at 4-5 months of age and sub-optimal management practices were adopted for care and management of pregnant/lactating does and new born kids of *Gaddi* goats. Overall kid mortality incidence of 11.5 % and survival rate of 88.5 % up to weaning was recorded. Overall pre weaning mortality in base line (1st), 2nd & 3rd year were obtained as 15.70%, 10.83% and 8.67 % respectively. Progressive reduction in mortality was observed over the years in different units that could be attributed to better management practices. From the study, it is evident that causes of pre weaning mortality were multifactorial and can be resolved by developing suitable and effective interventions.

Key words: *Gaddi* goats, pre- weaning mortality, migratory rearing.

Introduction

Transhumance/migratory rearing is a necessary husbandry practice in goats in response to the ecological demands and mutual adjustments between herding to insure against specific seasonal risks and enhancing preparedness against general uncertainty at different elevations, as high as 5000 m above msl (Inder *et al.*, 2003) due to the adverse

climatic conditions prevalent in most areas of the natural habitat. In pastoral rearing of goats, *Gaddi*'s transhumance system is being practiced since centuries and will continue as long as it is economically profitable (Bimal Misri, 2003), although the younger generation is somewhat reluctant to adopt this profession as evident from many socio-economic studies conducted in recent past. One of the most peculiar characteristics of

migratory goat rearing system is high mortality and low survivability of young stock/ kids, resulting in low weaning percentages and losses of growing and adult animals (Sebei *et al.*, 2004). The system is further constrained by slow growth rate in surviving kids. Kidding percentage is the measure of kids born per doe in a flock, which governs the flock composition (Donkin, 1993; Mammabolo, 1999). Kid mortality has direct bearing on genetic progress by its effect on selection pressure (Girma *et al.*, 2011). Therefore, it is imperative to provide incentives in terms of production inputs, technological support and skill up gradation of traditional livestock owners in scientific management. The analysis of different factors affecting mortality incidence in pastoral goat rearing will be helpful in developing appropriate strategies for enhancing productivity and profitability from migratory *Gaddi* goats. Therefore, the present study was carried on with the aim to analyze some factors associated with pre weaning mortality and to develop strategies for controlling it under migratory conditions of *Gaddi* goats.

Materials and Methods

Three *Gaddi* goat units from different migratory routes were studied over a period of three year for different causative factors of pre weaning mortality. The migratory route of first unit started from high ranges of Batal (Lahaul Spiti) during summers and ended at lower hills of Majhin (Hamirpur) during winters. The second unit migrated from Lahaul Spiti to Dada Siba (Kangra), and the third one from Holi (Chamba) to Bhakhra (Una). All the animals were ear tagged for proper identification. The flock size of all the selected units was around 300-350. During first year of study, all the units were monitored for different parameters to generate base line information and then from second and third year onwards provided strategic inputs in the form of proper health check up, better management practices

and nutritional supplementation. The data recording was done by adopting Participatory Rural Appraisal (PRA) method through routine visits in farmer's flock in their migratory tract and the feedback from each farmer was recorded on specially designed questionnaire to obtain information on birth/ loss of the kids and the factors responsible for losses. Each unit was visited twice a month during their migration in lower hill region and once in month while in upper hills for data recording and monitoring. The main factors influencing mortality/ survivability of *Gaddi* kids under migratory system of rearing were ranked according to their economic importance. The data so generated was recorded in MS excel and statistically analyzed and the results expressed as percentages for years and causative factors. The data generated was subjected to chi-square test to visualize the year wise and year with in units differences.

Results and Discussion

Post natal death of young stock /kids of *Gaddi* goat recorded over the entire duration of study period was considered as kid mortality with the number of kids died shown as proportion of total kids born estimating the % mortality incidence during the year. The total kid mortality (death of kids due to any cause up to weaning period in all three units over entire period) was 171 kids (11.50 % of total kid born) and the survival rate up to weaning was 88.50%. The overall pre- weaning mortality in base line (1st), 2nd & 3rd year was obtained as 15.70, 10.83 and 8.67%, respectively (Table 1). Analysis of mortality percentage in different units (Table 1 & 2) indicated year wise progressive reduction in pre-weaning mortality ($p < 0.05$). It was further revealed that there was progressive reduction in kid losses in years within units, but the differences were statistically significant for first unit only ($p < 0.05$), which may be attributed to individual unit managerial & environmental differences. There was also gradual improvement in kid birth weight over the base year

Table 1. Unit and year wise pre weaning mortality in migratory *Gaddi* goats in H.P.

Year	Unit	Total kids born	Kids died	Pre weaning mortality (%)
2010-11	First	147	28	19.04
	Second	124	19	15.32
	Third	181	24	13.25
	Overall	452	71	15.70
2011-12	First	154	16	10.38
	Second	129	13	10.07
	Third	197	23	11.67
	Overall	480	52	10.83
2012-13	First	186	16	8.6
	Second	153	13	8.4
	Third	214	19	8.9
	Overall	553	48	8.67
Total (3 Year)		1485	171	11.5

(2.70 in first year 2010-11 to 2.91 kg in 2012-13), which may be correlated with decrease in kid mortality, as significant effect of birth weight on mortality has been reported by Girma *et al.* (2011). Better care and nutritional supplementation of lactating and pregnant ewes in the selected flocks may be associated with reduction in mortality, as the possible association of low nutritional status of pregnant and lactating dams with high kid mortality has been reported in Osmanabadi goats (Barbind and Dandewar, 2004). From the findings, it can be visualized that better management practices adopted by the farmers and periodical health check up and nutritional supplementation helped in reducing the overall pre weaning mortality of *Gaddi* kids. The detailed analysis of mortality indicated that there was reduction in pre weaning losses due to diarrhoea, pneumonia and parasitic infestation, which can be addressed effectively through management intervention while mortality/loss due to other factors like wild animal attack remain more or less same as compared to base year as they are difficult to control

especially under migration in forest areas.

Observing different migratory units over the period, it was seen that flock size under migratory system was high (200-300 heads/ flock) and difficult terrain during migration hindered the proper attention towards does and kids during kidding season. Natural weaning occurred at approximately 4 to 5 months of age. The farmers seldom used proper care and supplementary feeding of pregnant does, since it was not feasible to carry out these activities during migration. Secondly, appreciable time was spent in organizing the herd for grazing and monitoring, so little time was left for care of new born kids. It was a routine practice to leave the new born kids alone, under temporary wooden basket/fabricated small enclosures, while the farmer and flock proceeded for grazing. Feeding of kids was done early morning before the flock leave for grazing and again after returning from grazing. Primitive housing for new born kids exposed them to adverse environmental fluctuations resulting in pneumonia and parasitic load as evident from the necropsy conducted during

Table 2. Year & years within unit kid survivability in migratory *Gaddi* goats in H.P.

	Kids survived	Kids died
	N (%)	N (%)
Year		
2010-11	381(84.3)	71(15.7)
2011-12	428(89.2)	52(10.8)
2012-13	505(91.3)	48(8.7)
	p = 0.02*	
Unit (year wise)		
First (2010-11)	119(80.9)	28(19.1)
First (2011-12)	138(89.6)	16(10.4)
First (2012-13)	170(91.4)	16(8.6)
	p=0.05*	
Second (2010-11)	105(84.7)	19(15.3)
Second (2011-12)	116(89.9)	13(10.1)
Second (2012-13)	140(91.6)	13(8.6)
	p=0.17(ns)	
Third (2010-11)	157(86.7)	24(13.3)
Third (2011-12)	174(88.3)	23(11.7)
Third (2012-13)	195(91.1)	19(8.9)
	p=0.38(ns)	

Figures in parentheses indicate percentage of affected/non-affected animals in corresponding group/classification

migration at the farmer's flock of *Gaddi* goat.

Perusal of different causes of kid mortality (Table 3) indicated diseases (diarrhoea, suspected pneumonia and parasitic infestation) are the main cause of early kid losses but some other factors like wild animal (predators), accidents during migration and incidence of thefts also contributed towards early kid losses, which are generally rare in intensive and semi-intensive system of rearing. Therefore, these factors must be addressed while developing suitable extension strategies or improvement programmes for migratory *Gaddi* goat rearing. The mortality observed under transhumance system is higher than in intensive system, because under migratory system variety of predisposing factors attribute to pre

weaning mortality like poor housing, less mothering care and nutrition. Similar observation for variety of predisposing factor and comparatively higher mortality has been reported in communal grazing/extensive system by Sebei *et al.* (2004) in South African region.

Conclusion

The findings of the present study suggest that the causes of pre weaning mortality of *Gaddi* kids were many, some of which especially those associated with sub optimal health management can be resolved by developing suitable and effective extension interventions. The problem of diarrhoea

Table 3. Various factors causing kid mortality in *Gaddi* goat under migration in Himachal Pradesh

Causes of loss/mortality	Year			Overall Number
	2010-11*	2011-12*	2012-13*	
	N (%)	N (%)	N (%)	
Unknown causes	16 (3.53)	18(3.74)	15 (2.71)	49 (3.29)
Wild animal attack	12(2.65)	13 (2.70)	14(2.52)	39 (2.62)
Diarrhoea	18 (3.98)	9 (1.87)	8(1.45)	35 (2.36)
Suspected Pneumonia	11(2.43)	5 (1.04)	3 (0.54)	19 (1.28)
Suspected Parasites	8 (1.8)	3 (0.62)	4 (0.72)	15 (1.01)
Sudden accident	2 (0.44)	2(0.42)	1(0.18)	5 (0.34)
Missed/Theft	4 (0.88)	2(0.42)	3(0.54)	9 (0.61)

* No. of kids born during 2010-11, 2011-12 and 2012-13 were 452, 480 and 553, respectively

Figures in parentheses indicate the year wise per cent mortality due to corresponding cause

and internal parasite can be controlled by periodic deworming and other managerial interventions. There is need to encourage the traditional migratory *Gaddi* goat farmers to adopt optimal management practices which are already developed for profitable migratory goat rearing.

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