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### **INFECTIOUS AND NON INFECTIOUS DISEASES AS CAUSE OF MORTALITY IN SHEEP**

**D. M. Makhdoomi<sup>6</sup> and N. A. Tufani**

Teaching Veterinary Clinical Service Complex  
Faculty of Veterinary Sciences and Animal Husbandry  
Shuhama Alusteng Srinagar-190006 (J&K)

#### **ABSTRACT**

An investigation of perinatal mortality in Dachigam Sheep Breeding Farm,, Kashmir (India) was conducted from January 2002 to December 2009. The aim of the study was to determine whether lambs born in different seasons manifest a different diseases and mortality rate. The lambing seasons were grouped after birth month of lambs as winter (December-February), spring (March-May), summer (June-August) and autumn (September-November). A total of 1842 lambs were born during 2002-2009. A mortality of 9.77% (180 cases) was recorded due to infectious and non-infectious causes. Mortality due to infectious causes was higher (7.55%) than non-infectious causes (2.23%). Among the infectious causes mortality was higher due to pneumonia (3.75%) followed by enteritis (1.95%). Wild attacks (1.36%) and hypothermia (0.27%) was also an important cause of mortality during the study period. Seasonal impact on mortality was highest during winter (33.33%) and followed by summer (29.44%).

**Key words:** lamb, mortality, season

#### **INTRODUCTION**

Sheep is a species primarily reared for mutton purpose though wool production also adds to its economy. At the Sheep Breeding Farm Dachigam, sheep are primarily reared for breeding purpose with the intension of maintaining a superior flock for uplifting sheep in field conditions. For efficient sheep farming, the criteria is to fully utilize the genetic potential of the animals, adopt good managerial practices and at the same time keep the disease incidence at the minimum possible level. Disease conditions have a negative impact on the economy of sheep rearing in terms of treatment cost and sheep/lamb mortality.

The number of lambs born per ewe is certainly an economically important trait in a commercial sheep enterprise. However, profitability is largely determined by the number of lambs sold per ewe. Therefore, a great deal of effort should be put toward the care of pregnant ewes and their lambs before, during, and after birth. Knowledge of when and how lamb mortality occurs could be helpful to minimize mortality rate.

Perinatal mortality is a major cause of low productivity of sheep (Stamp, 1967). In Britain, the average annual rate of perinatal mortality may be 15% or more (Barlow *et al.*, 1987),

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<sup>6</sup> Professor and Head

and in Australia, lamb mortality of 15 to 20% has been reported, with 86.6% deaths occurring within the first three days of life (Dennis, 1974). Many infectious and non-infectious causes of perinatal mortality are incriminated. The aim of this study was to determine the prevalence of losses due to neonatal mortality to find out the causes of perinatal mortality in Kashmir.

## **MATERIALS AND METHODS**

A retrospective and prospective study was conducted on perinatal lambs mortality during 2002-2009 in a Govt run organized sheep farm, the Dachigam Sheep Breeding Farm, Srinagar Kashmir, located in the foothills of Zabarwan range of Himalyas inside the world famous Wild life sanctuary area having a flock size ranging from 600-1100 animals. The flock would invariably include 300-500 ewes. The number of pregnant ewes during the period of study included a total of 2317. The farm adopts completely controlled mating system. Mortality data based on 1842 lambs born over a seven years period were available. The deaths (180 cases) were grouped according to the causes of death into infectious and non-infectious causes. The atmospheric effects of seasons (winter, spring, summer and autumn) on mortality were studied. The data obtained were analyzed on % age basis.

## **RESULTS AND DISCUSSION**

It is observed from the analysis of data on lambs mortality presented in Tables1 & 2 that majority of deaths occurred due to infectious diseases. Among the infectious diseases, pneumonia and enteritis were the major ones that contributed 69 (38.33%) and 36 (20%) of deaths, respectively. Among the non-infectious disease, grass poisoning, urolithiasis and hypothermia were the major causes which contributed 8 (4.44%), 4 (2.22%) and 5 (2.78%) of lambs deaths, respectively. Mortality of lambs due to attack by various wild animals 25 cases (13.89%) were also a big threat to the sheep farm.

The lambing seasons were grouped after the birth month of lambs as follows: winter (December-February), spring (March-May), summer (June-August) and autumn (September-November). Perinatal lambs deaths, which occur around parturition time, result in significant lamb losses. Mendel *et al.* (1989) reported that Merino Landschaf ewes suffered lamb losses of 18.4%, while the corresponding value for the Bergschaf breed was 26.0%. The extent of perinatal mortality depends mostly on the management system, but the major factors affecting lamb survival include age of lamb, litter size, birth weight, nutrition and parity of the ewe and season of birth (Gatenby *et al.*, 1997; Ambruster *et al.*, 1991; Notter *et al.*, 1991). In the present study, season had significant influence on perinatal mortality. The greatest losses (33.33%) that observed for lambs born in winter, could be due to very low environment temperature. Similar results were observed during summer, when perinatal mortality was 29.44% which could be due to inclement weather. During spring and autumn, our results show a low lamb mortality of 21.67% and 15.56%, respectively.

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Mortality rates tend to increase at extremely low or extremely high birth weights (Mendel *et al.*, 1989; Notter and Copenhaver, 1980). Also, it has been reported that higher litter sizes have reduced birth weight and hence the survival of lambs (Turkson and Sualisu, 2005). Results of the present study partially support those findings, since during summer and winter, the highest and the lowest birth weights and relatively high perinatal mortality were found. As sheep production is directly influenced by the number of lambs born and reared from a flock at any given time, it is highly important to identify the cause of lamb loss and to take appropriate measures to reduce it. Apart from low birth weight, causes of early lamb losses could be stress, injuries, organ malfunction, starvation or mis-mothering. Some of these causes are closely connected to the season, since during different times of the year, sheep (and the newly born) are exposed to different environmental circumstances with regard to humidity and temperature.

**Table 1. Incidence of lamb mortality (%) in Dachigam Sheep Breeding Farm , during the period 2002 to 2008.**

Year	Flock size	No. of Rams	No. of ewes	No. of pregnant ewes	No. of lambs born	No. of lambs died	Mortality due to infectious diseases		Mortality due to non infectious diseases		Overall mortality
							Cases No.	%	Cases No.	%	
<b>2002-03</b>	1061	22	514	394	375	40	30	8	10	2.67	10.67
<b>2003-04</b>	877	22	505	364	350	28	17	4.86	11	3.14	8
<b>2004-05</b>	1081	25	605	465	451	29	22	4.88	7	1.55	6.43
<b>2005-06</b>	833	23	509	327	301	20	19	6.31	1	0.33	6.64
<b>2006-07</b>	870	23	497	361	350	28	25	7.14	3	0.86	8
<b>2007-08</b>	601	20	381	223	200	25	17	8.5	8	4	12.5
<b>2008 -09</b>	688	20	323	183	165	10	9	5.45	1	0.61	6.06
Total	-	-	-	2317	1842	180	139	7.55	41	2.23	9.77

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**Table 2. Incidence of lambs mortality due to various infectious and non infectious diseases during 2002 to 2008.**

Cause of mortality	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	%age-1	%age-2
<b>Pneumonia</b>	2.13 (8)	2.57 (9)	2.88 (13)	3.99 (12)	5.14 (18)	3.00 (6)	1.82 (3)	3.75 (69)	38.33 (69)
<b>Enteritis</b>	4.00 (15)	1.14 (4)	0.89 (4)	1.66 (5)	2.00 (7)	-	0.61 (1)	1.95 (36)	20.00 (36)
<b>Septicemia</b>	0.53 (2)	-	-	-	-	-	1.21 (2)	0.22 (4)	2.22 (4)
<b>Lung abscess</b>	0.53 (2)	-	-	0.33 (1)	-	1.00 (2)	0.61 (1)	0.33 (6)	3.33 (6)
<b>Grass poisoning</b>	0.26 (1)	-	-	-	0.57 (2)	2.00 (4)	0.61 (1)	0.43 (8)	4.44 (8)
<b>Clostridial diseases</b>	0.26 (1)	-	1.11 (5)	-	-	-	-	0.33 (6)	3.33 (6)
<b>Contagious ecthyma</b>	0.53 (2)	0.29 (1)	-	-	-	-	1.21 (2)	0.27 (5)	2.78 (5)
<b>Urolithiasis</b>	-	0.29 (1)	-	0.33 (1)	0.29 (1)	0.50 (1)	-	0.22 (4)	2.22 (4)
<b>Blue tongue</b>	-	0.29 (1)	-	-	-	-	-	0.05 (1)	0.56 (1)
<b>Wild attack</b>	2.13 (8)	2.29 (8)	1.11 (5)	0.33 (1)	-	1.50 (3)	-	1.36 (25)	13.89 (25)
<b>Hypothermia</b>	0.26 (1)	0.57 (2)	0.44 (2)	-	-	-	-	0.27 (5)	2.78 (5)
<b>Liver abscess</b>	-	0.29 (1)	-	-	-	-	-	0.05 (1)	0.56 (1)
<b>Encephalitis</b>	-	-	-	-	-	4.50 (9)	-	0.49 (9)	5.00 (9)
<b>Hydropericarditis</b>	-	0.29 (1)	-	-	-	-	-	0.05 (1)	0.56 (1)

%age-1 = Mortality with respect to total population (1842)

%age-2 =Mortality with respect to total mortalities (180)

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**Table-3. Effect of climatic conditions on lambs mortality due to various infectious and non-infectious diseases during 2002 -09.**

CAUSE OF MORTALITY	SPRING			SUMMER			AUTUMN			WINTER			Total
	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C	J A N	F E B	
Pneumonia	7	4		1	2				7	17	20	11	69
Enteritis	4	5	7	6	6	4	2			2			36
Septicemia			2	1	1								4
Lung abscess			1	1	2	1			1				6
Grass poisoning				3	4	1							8
Clostridial diseases				1	2	3							6
Contagious ecthyma		1	1					2	1				5
Urolithiasis	1								2	1			4
Blue tongue										1			1
Wild attack		1	4	5	2	6		3	4				25
Hypothermia										2	3		5
Liver abscess				1									1
Encephalitis									6	3			9
Hydroperi-carditis			1										1
TOTAL	12	11	16	19	19	15	2	5	21	26	23	11	180
% Mortality	<b>21.67</b>			<b>29.44</b>			<b>15.56</b>			<b>33.33</b>			

Therefore, for proper lambing management the season should be taken into consideration since it has great impact on birth weight and perinatal lamb mortality.

The animal should be born in enjoyment which is clean, dry, sheltered and conducive for the animals to get up after birth, suck the dam and establish bonding with the dam. No conventional area can be sterilized but it can be reasonably made clean to minimize the infection

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rate before colostrum is ingested and during the first few weeks of life when the new born is very susceptible to infectious diseases. If there is high animal population density and in presence of known diseases, it is necessary to transfer new born to non infectious environment either temporarily or permanently. This reduces the severity of the neonatal diarrhea and pneumonia. Without doubt, the first three weeks are the most critical in a lamb's life. If the lamb consumes enough colostrum and offers a good start his performance will be good. After birth the new born must ingest colostrum as soon as possible to provide the necessary immunoglobulin for uplifting the immune status of the new born. This is very important as there is no transfer of transplacental antibodies in animals as in ungulates. The specific resistance of new born to infectious disease may be enhanced by vaccination of the dam during pregnancy to stimulate the production of specific antibodies which are concentrated in the colostrum and transferred to the newborn after birth.

As sheep production is directly influenced by the number of lambs born and reared from a flock at any given time, it is highly important to identify the cause of lamb loss and to take appropriate measures to reduce it. The economics of a sheep farm depends on the lambing percentage and later on the survival of these lambs so that they can produce an adult stock for future. It is imperative to curb lamb mortality by various diseases. The lamb mortality may be expected as their under developed immune system in comparison to adults. Lambs are solely depending on colostrum antibody as they do not receive any antibodies through placenta in their perinatal life. Lambs depend on frequent intake of readily available carbohydrate to maintain energy and relative inefficiency in maintaining normal body temperature. This makes them more prone to hypothermia during winter which is one of the major causes of lamb mortality.

### **CONCLUSIONS**

Infectious diseases are the major cause of sheep mortality although; non-infectious causes such as injuries, snake bites, wild attacks are also common causes of sheep mortality at Dachigam Sheep Breeding Farm owing to the topography and location of the farm. At well managed farm, sheep mortality excluding the lamb mortality would be <1% while lamb mortality would be <5 %. At Dachigam Sheep Breeding Farm, a major setback to the efficient sheep farming in this location results of wild attacks and poisoning that reached alarming proportions. Although steps are being taken to ensure safety to animals from the above mentioned causes of mortality, these causes still seems to be major challenge for the management. Furthermore transportation and migration of animal's results in stress and subsequent mortality mostly due to pneumonia occurs. Management needs further measures to reduce the mortality due to above mentioned causes.

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