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Economic damage for morbidity (Wool losses) in various age groups of Magra Sheep

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Abstract

"Evaluation of Mortality, Morbidity Pattern and Economical Losses in Magra Sheep in Arid Zone of Rajasthan" have been evaluated using the aid of information gathered from CSWRI, ARC, Bikaner throughout an eight-year period (2005-2006 to 2013-2014). Morbidity caused by various diseases was one of the characteristics that was being examined. Three to six years old (weaning), six to twelve years old (hogget), and above twelve months old (adult) were the various age groups. On the basis of body systems, the diseases found on the farm were classified underneath. Chi-square was used to determine the significance for different classes.

Keywords: Morbidity, body system, significance

Introduction

This study investigated the various factors that contribute to morbidity in sheep, including parasite infestations, dietary problems, unfavorable meteorological circumstances, and changes in management. Systematic investigations of the non-genetic factors affecting morbidity rate.

There are vaccines available in India to protect sheep against the three main viral diseases, sheep pox, foot and mouth disease, and rinderpest. Additional viral diseases that significantly impact the economic viability of sheep farming are blue tongue and PPR. Other common problems that cause production losses including enterotoxaemia, Johne's disease, parasite infestation, and diseases caused by nutritional deficiencies. The morbidity and decreased productivity of individuals result in production losses caused by parasite infection and nutritional deficiencies. Animal productivity is reduced by insidious effect on feed intake and consumption, which in term of live weight gain and reproductive efficiency.

There is no dispute that sheep produce lower wool when there are uncontrolled epidemics of violent foot rot. The best evaluation of the impact of endemic foot rot on the average annually wool production in an affected flock was probably Marshall *et al.*'s (1991) [5] estimate of an 8% reduction in wool weight by Marshall *et al.*'s (1991) [5].

Materials and Methods

Source of Data

The Central Sheep and Wool Research Institute in Bikaner's Arid Region campus provided the data for the current study, which was based on the health records of the sheep research project titled "Improving Magra sheep for carpet wool production under farm and field conditions."

Shearing

Animals were sheared twice a year, in April/May and October/November, using hand scissors. When the animal was around six months old, the first shearing was performed. Before being sheared, the sheep were dipped and thoroughly washed.

Description of Data

The current study includes Magra sheep data on morbidity percentages and economic losses at various lamb age groups from 2005 to 2014 (years of birth). The study also took into account the greasy fleece weight of the first and second clipping. The different age groups were birth to three (suckling), three to six (weaning), six to twelve (hogget), and above twelve months (adult).

Morbidity Rate

In the age group of 0-3, 3-6, 6-12, and above 12 months of age, the number of sick animals for the particular disease were recorded.

Greasy Fleece Weight

Sheep were sheared twice a year after being washed in clean water. The lambs were sheared for the first time at around six months of age and then again every six months. On a 5 kg dial balance, the wool weight was recorded with an accuracy of 10g, just like the body weight. Data for greasy wool weights were also classified as diseased lamb and healthy lamb for 1 and zero respectively.

Year of Morbidity

Data on lambs born between the years 2005 and 2014 were included in this study. From 2005 to 2014, a nine-year period was utilized to divide the morbidity. The total number of sheep available each year, divided by age group and year, were presented. Morbidity rates have been calculated individually for aged 0–3, 3–6, 6–12, and 12 months and above.

Classification of Data

The data on morbidity and death rate was divided into categories according to sex, disease sire year and season of birth. The rates of illness and mortality among sires were also estimated. The analysis did not include information on weather, feeding, housing, or different management practices for males and females because this information did not recorded on the farm.

Sex of lamb

In groups of 0-3, 3-6, 6-12, and above twelve months of age, morbidity and mortality rates for male and female lambs were estimated separately for each disease under this study.

Season of birth

The year was divided into two seasons on the basis of the month of lambing in order to evaluate the impact of climatic variations, such as temperature, humidity, rainfall, etc. on the incidences of morbidity and mortality.

The particular seasons were:

Sr. No.	Seasons	Months of year
1.	Major (First)	From January to June
2.	Minor (Second)	From July to December

Economic Losses due to Morbidity

The following formula was used to calculate the wool weight losses in the first and second clip due to morbidity from various causes:

$$ELWD = EVW [(WH - WD) * ND]$$

Here,

ELWD= economic losses in rupees due to reduced wool weight

EVW= economic value of 1 kg wool weight expressed as market price of one kg Magra wool weight.

WH= average wool weight of healthy lambs.

WD= average wool weight of diseased lambs

ND= number of diseased lambs

Results

The current study was conducted to determine the production losses caused on by morbidity in Magra sheep by various diseases. The following headings present and discussed the conclusions from the different analyses.

Loss due to wool weight

As a result of the morbidity caused on by various diseases, the sick lambs produced less wool, causing sheep breeders to suffer economic losses. Costs associated with morbidity were predicted to have reduced wool output at the first and second clip. Due to an outbreak of sheep pox at CSWRI, Avikanagar, Kushwaha *et al.* (1997) ^[4] predicted an economic loss. According to Sharma (2006) ^[8], in the suckling, weaner, hogget, and adult age groups, the total morbidity rates for Marwari sheep were 8.53, 6.21, 15.38, and 34.79 percent, respectively.

First clip

The least squares mean of the wool weight of the diseased lambs was 670.655.44 g, which is 38.64 g less than the average wool weight of the healthy lambs. Due to the 166 sick lambs' loss of 6414.24 g of wool, there was a financial loss of \$513.14.

In total, 109 male and 57 female lambs lost 6283.85 g and 238.26 g of wool due to disease; as a result, the economic losses were 502.71 and 19.06, respectively.

In terms of the total weight of the wool, the losses were 5072.46 g for 102 lambs in the major season and 464.0 g for 64 lambs in the minor season. Losses caused by morbidity were measured in rupees in the amounts of 405.80 and 37.12. The average weight loss of wool was significantly greater in the major season (49.73 g) than the minor season (7.25 g). (Table:1).

The greatest amount of wool was lost on average in the years 2011–12 (1907.60 g), 2018–19 (1132.78 g), and 2012–13 (1025.31 g).

The economic losses associated to these weight losses of wool for each year were Rs. 41.74, 23.38, 56.21, 2.61, 4.87, 90.62, 152.61, 82.02, and 5.68, respectively,

Second clip

The average wool weight for diseased lambs was 775.246.47 g, which was 20.95 g less than the average wool weight for healthy lambs (696.256.273 g), according to the least-squares mean. 566 sick animals contributed to a loss of 11857.70 g of wool, causing a 1482.21 economic loss (Table 2).

In all, 154 male and 412 female lambs lost 1204.28 g and 6793.88 g of wool due to sickness, resulting in economic losses of Rs. 150.53 and Rs. 849.24, respectively.

In terms of the total weight of the wool, the losses were 10809.45 g for 471 lambs in the major season and 1188.45 g for 95 lambs in the minor season. Losses resulting from morbidity were measured in rupees as 1351.18 and 148.56, respectively. The losses in the terms of total wool weight were 744.48 g for 88 lambs, 2492.10 g for 71 lambs, 244.40 g for 65 lambs, 1128.66 g for 39 lambs, 694.72 g for 32 lambs, 2148.46 g for 71 lambs, 3957.15 g for 69 lambs, 1207.25 g for 55 lambs and 1713.04 g for 76 lambs during 2005-06 to 2013-14, respectively.

From 2005–2006 through 2013–2014, the economic losses attributed to these wool weight losses were 93.06, 311.51, 30.55, 141.08, 86.84, 268.56, 494.64, 150.91, and 214.13, respectively.

Dimri *et al.* (1994) [3] estimated the loss due to pneumonia in sheep of CSWRI, Avikanagar as 3.7 per cent, body weight loss and 30 per cent decrease in wool yield in affected flock.

Economic Losses due to Morbidity

In the current study, economic losses associated with wool

weight in the age groups of 0-3, 3-6, 6-12, and above 12 months have been calculated using the current CSWRI prices (125/- Kg of wool). The average annual loss from sheep pox was estimated by Senthilkumar and Thirunavukkarasu (2010) [7] to be Rs. 2908.17, Rs. 4662.18, and Rs. 5599.06 in small, medium, and big farms, respectively.

Table 1: Economic loss caused by the first clip's morbidity

Effects	Healthy		Sick				
	Average wool weight at first clip(gm)	THA	Average wool weight (gm)	Average wool weight loss (gm)	TSA	Total wool weight Loss(gm)	Economic Loss Rs.
Overall	709.29±7.233	1920	670.65±5.441	38.64	166	6414.24	513.14
Male	762.36±10.432	941	704.71±8.928	57.65	109	6283.85	502.71
Female	648.95±9.155	979	644.77±6.621	4.18	57	238.26	19.06
Major	742.39±8.015	1252	692.66±6.447	49.73	102	5072.46	405.8
Minor	593.6±13.994	668	586.35±9.723	7.25	64	464	37.12
2005-06	936.34±18.861	152	910.25±13.744	26.09	20	521.8	41.74
2006-07	795±16.057	158	762.53±21.279	32.47	9	292.23	23.38
2007-08	915.6±11.222	194	815.23±22.175	100.37	7	702.59	56.21
2008-09	613.51±16.302	205	610.25±17.929	3.26	10	32.6	2.61
2009-10	499.08±11.055	268	495.5±15.095	3.58	17	60.86	4.87
2010-11	719.85±15.371	242	660.23±9.019	59.62	19	1132.78	90.62
2011-12	580.65±14.971	286	480.25±13.746	100.4	19	1907.6	152.61
2012-13	711.07±23.858	186	680±17.819	31.07	33	1025.31	82.02
2013-14	684.68±18.153	229	682.46±16.45	2.22	32	71.04	5.68

The economic loss was calculated using the current CSWRI rate of Rs. 125 per kilogram of wool weight.

Table 2: Morbidity-Related Economic Losses in Second Clip

Effect	Healthy		Sick				
	Avg. wool wt. of second clip(g)	THA	Avg. wool wt.(g)	Av. wool wt. loss (g)	TSA	Total wool wt. Loss(g)	Economic Loss Rs
Overall	796.19±9.481	831	775.24±6.479	20.95	566	11857.7	1482.21
Male	898.27±10.01	533	890.45±9.965	7.82	154	1204.28	150.53
Female	692.24±10.812	298	675.75±8.257	16.49	412	6793.88	849.24
Major	835.3±11.071	466	812.35±8.201	22.95	471	10809.45	1351.18
Minor	611.03±10.845	365	598.52±8.121	12.51	95	1188.45	148.56
2005-06	920.66±20.765	270	912.2±14.247	8.46	88	744.48	93.06
2006-07	936.44±25.977	253	901.34±21.077	35.1	71	2492.1	311.51
2007-08	1005.76±23.016	353	1002±29.392	3.76	65	244.4	30.55
2008-09	529.17±15.803	388	500.23±28.201	28.94	39	1128.66	141.08
2009-10	836.96±22.108	398	815.25±27.108	21.71	32	694.72	86.84
2010-11	730.46±20.573	389	700.2±11.487	30.26	71	2148.46	268.56
2011-12	599.59±13.042	342	542.24±12.892	57.35	69	3957.15	494.64
2012-13	681.82±17.916	413	659.87±20.37	21.95	55	1207.25	150.91
2013-14	756.44±18.783	368	733.9±13.105	22.54	76	1713.04	214.13

Economic loss was estimated based on the current CSWRI price of Rs. 125 per kilogram of wool weight.

Conclusions

1. The morbidity rate in the adult population is highly significantly influenced by the sex of the lamb, which suggests that males are healthier and disease-resistant than females.
2. Although there were more total female offspring in the flock, the average weight loss of the wool was higher in males, resulting into a higher economic loss in males as compared with females.
3. Female lambs were more susceptible to diseases, as indicated by the higher average weight loss of the wool and resulting economic loss in females as compared to males.
4. The morbidity rates were significantly influenced by the lambs' birth season, with lambs born during the main season showing greater morbidity rates. Cold tension and a sudden change in the weather could be cause for concern temperature during months of January - February. The average wool weight loss was more in the

major season than minor season due to more number of animals in major season.

5. Morbidity rates were significantly impacted by the year of diseases. It could be a result of the climate, the availability of food and fodder in pastures, or the occurrence of disease outbreaks in different years. Animals should be protected from weather extremes as a result, to lower morbidity. Furthermore, preventative therapies, supplemental feeding of concentrates and dry fodder during the lean period, and other measures could reduce morbidity.

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