

## ESTIMATION OF ECONOMIC LOSSES ON NEMATODE INFESTATION IN GOATS IN SRI LANKA

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### ABSTRACT

Goat husbandry is one of the main income generating sources in livestock farming population in Sri Lanka. It is high income enterprise with minimal inputs especially in dry zone of Sri Lanka. Recent livestock development program have highlighted the potential of goat rearing as an alternative to meet the short fall of meat supply in the country. Nematode infestation is an important parasitic problem and gives substantial losses in goats in Sri Lankan farms. It was reported that the gastro intestinal nematode infestation was a common condition in kids (89%), young goats (94%) and adult goats (84%). Further, it was estimated that 14 percent of the total cost of the government goat farm was spent control of nematode infestation. In this study the economic losses on nematode infestation in goat industry in Sri Lanka in year 2004 were estimated using previous research findings and the available data. The main direct economic loss was the losses in weight gain and it was estimated as 170 million rupees per year. Economic losses due to mortality in kids are estimated as 59 million rupees per year. A total of about 230 million rupees are lost per annum and it is much more higher when account the other direct losses on common signs as reduction of milk production, low kidding index, high return rate, high rate of abortions and still births in infected goats. Additionally cost on veterinary services and drugs, decreasing quality in animal product such as carcasses and hides, some residual nervous signs, resistance against broad spectrum antihelmintic groups' synergies the economic losses on nematode infestation. In conclusion nematode infestation causes over 230 million rupees loss in Sri Lankan livestock sector and in need of immediate attention.

**Keywords:** goats, nematodes, economic losses

### INTRODUCTION

Goat husbandry is one of the main income generating sources in livestock farming population in Sri Lanka. It is high income enterprise with minimal inputs especially in dry zone of Sri Lanka. Recent livestock development program have highlighted the potential of goat rearing as an alternative to meet the short fall of meat supply in the country. About 75 percent of the meat goat population is concentrated in dry and dry intermediate zones of Sri Lanka (C&S, 2004). Studies on birth weight revealed that the average birth weight was 2.69 kg for Kottukachchiya breed (Premasundara *et al*, 1993) and that of single born Jamnapari (J), Kottukachchiya and their crosses (KJ) are 3.2 kg, 2.18 kg, 2.65 kg respectively (Premasundara *et al*, 1993). Further, it was

recorded that the average birth weight of Betal goat was 3.48 kg in state farms (Jayaruban, 1992). Premasundara *et al*, (1993) has reported that the range of mature body weights of Kottukachchiya breed females and males are 35–40 and 40–50 kg respectively at Kottukachchiya farm and mean total of milk production during the first 40 days were 15.3, liters. But the analysis of data on birth weights and mature weights of goats in small scale farms at field level shows that the average birth weight was around 1.5 kg and the body weight of adult male was around 25 kg and adult female was 20 kg (DAPH, 2004) and the average milk production was around 10 liters for first 40 days in dry zone of Sri Lanka. Therefore, it is clear that the weight gain and milk production in goats at field level was lower than in the state farm condition. The factors viz. genetic, management (feeding) and diseases are the main causes for low production performance. Nematode infestation is an important disease condition that causes economic losses in goat industry in the country. It was estimated that 14 percent of the total cost of the government goat farm was spent control of nematode infestation (Jayasinghe, 1993).

The economic importance varies between countries and region depending on climate and intensiveness of farming in the area. However losses due to parasitic diseases are greater in tropical countries than in temperate countries because the parasites are much more numerous and abundant in tropical environment. This is mainly because of the higher temperatures in the tropics that favor the rapid multiplication and propagation of the free living stages which are the mainly responsible for the dissemination of the parasites. There are several types of nematodes in gastrointestinal tract, respiratory tract and central nervous system in goats in Sri Lanka (Seneviratne, 1955, Senadeera, 1967, Faizal, 1995). It was reported that gastro intestinal nematode infestation was a common condition in kids (89%), young goats (94%) and adult goats (84%) and causes losses in weight gain (Faizal *et al*, 1999). Therefore, this study is an attempt to estimate the economic losses on nematode infestation in Sri Lanka using available statistics and previous findings.

## MATERIALS AND METHODS

### Sources of data

#### Livestock statistics

Livestock statistics on goat population and slaughter were obtained from the Department of Census and Statistics (2004), Sri Lanka. The farm gate goat price of live animals was taken from MLD & EI data (2004).

#### Incidence rate

The incidence of nematode infestation was calculated using previous publications (Welgama *et al*, 1975, Fizal and Jayasinghe, 1996, Fizal *et al*, 1997, Fizal *et al*, 1999). It was reported that there is an influence of rain fall in the presence of larvae in pasture and young goats are more susceptible for parasitism. The presence of *Heamonchus contortus*, *Ostertagis spp*, *Trichostrongylus spp* and *Oesphagostomum spp* were 61.5%,6.3%,16.9%,9.3% respectively in untreated faecal samples in goats. Gastro intestinal nematode infestation was a common condition in kids (89%), young goats (94%) and adult goats (84%) and causes losses in weight gain (Faizal *et al*, 1999). Therefore, the prevalence rate was taken as 70% in this study.

### Production and reproduction parameters

Previous research on production and reproduction aspects findings and the data used in estimation is given below.

1. Kidding rate varies with the breed reared in the farm. Although the year round kidding took place, the frequency of kidding showed bimodal pattern with a peak of (72%) during December to March. Boer gave the highest twinning rate(38–50%) and Boar cross gave the lowest twinning rate(3%) with a mean litter size of  $1.13 \pm 0.12$  (Jayaruban and Weerasekara, 1993). The kidding rate was taken as 1 per year in this study.
2. Kidding interval was reported as the 304,309 and 321 days for Beetal, Boar crosses and Jamnapari respectively (Jayaruban and Weerasekara, 1993). Kidding interval was taken as one year (365 days) in the estimation.
3. Premasundara *et al*, (1993) has reported that the range of mature body weights of Kottukachchiya breed females and males are 35–40 and 40–50 kg respectively at Kottukachchiya farm. Body weight of adult animal was 36.34 kg, 36.20 kg when the population size was 60 and 120 respectively in goat herd in dry zone of Sri Lanka (Jayaruban and Zuhry, 1998). The body weight was taken as the 35 kg of an adult animal.
4. Kid mortality rate due to parasitism and in dry zone goat farms in Sri Lanka studied and reported as 15% (Seneviratne, 1964) and 27% (Wijewardna, 1992). The kid mortality due to nematode infestation was assumed as 20%.
5. Weight loss is the major loss which is difficult to estimate on parasitic infestation. The cause of anathematic treatment in rainy season increased the body weight by 37% according to the study of Fizal *et al*, (2001). It was taken the weight loss as 37% in this study.
6. The farm gate of an adult animal varied from Rs.4000–1650 and of weaned kid from Rs.1250.00 – Rs. 1650 (MRD & EI, 2004). The price was taken as Rs. 3000.00 per adult animal and Rs.1500 per weaned kid in the estimation.
7. Annual off take of the animals was assumed as 20% of the female population and 50% of the male population (DAPH, 2004).

### Analytical methods

The major losses were divided in to two main sources viz. direct losses and indirect losses. The apparent losses such as deaths and insidious losses such as loss of weight, infertility, low kidding index, high rate of abortions and still births in infected goats etc were taken as the direct losses. The losses due to expenses on veterinary drugs, quarantine measures, etc were taken as the indirect losses. The direct losses were estimated using above assumptions. The loss of fertility could not estimate due to absence of research findings on that aspect.

#### Direct losses

**Loss of kids (Mortality) was estimated using following formula**

#### Economic losses on kid mortality

No. of kids born per year = Female breed able goat population X kidding rate .....(1)

No. of deaths of kids per year = (1) X mortality rate.....(2)

Estimated losses per year = (2) X Average cost per kid per year .....(3)

**Loss of weight****Economic losses on weight loss was estimated using following formula**

Total weight of animals = Goat population X average weight of the animal....(4)

Weight loss per year = (4) X take off X weight loss .....(5)

Estimated losses per year (Rs) = (5) X average price per live weight kg ... (6)

Weight loss per year = (7) X off take X weight loss .....(7)

Estimated losses per year (Rs) = (8) X average price per live weight kg .....(8)

Total loss per year (Rs) = (3) + (8)

**Indirect losses**

Cost on veterinary services and drugs, decreasing quality in animal product such as carcasses and hides, some residual nervous signs, resistance against broad spectrum antihelmintic groups (Jayasinghe,1996) synergies the economic losses on nematode infestation.

**RESULTS AND DISCUSSION**

The main losses viz. kid mortality and weight loss were calculated using above assumptions and data sources for the year 2004 and presented in the table 1.

**Table 1.** Estimated cost on nematode infestation in goats per year(2004)

Type of loss	Quantity	Cos Cost (Millions)
		SLR
1.Kid mortality	39547.4 kids	59.32
2.Weight loss (adults)	1417.94 MT	170.15
<b>Total loss</b>		<b>229.48</b>

The loss of kids was estimated as 39547.4 animals per year due to nematode infestation. It was 59.32 million Sri Lankan rupees (SLR) per year in monetary value (Table 1). The table 1 shows about 1417.94 MT of mutton has been lost due to nematode infestation in Sri Lanka. It was 170.15 million in Sri Lankan rupees (SLR). The total loss was estimated as 229.48 million Sri Lankan rupees in monetary value. The value should be much more higher when incorporate the cost of infertility, milk loss and veterinary charges. Development of resistance to some anthelmintics complicates the problem and increases the cost.

**CONCLUSION**

Sri Lankan livestock industry losses a large amount of currency due to nematode infestation annually. Immediate attention is needed in feeding management and prophylactic treatments to overcome the problem.

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