MORTALITY AND DISEASES OF GOATS IN WEDZA COMMUNAL AREA OF ZIMBABWE

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Summary
A study was conducted to evaluate the extent and causes of mortality and diseases affecting goats in Wedza Communal Area. Mortality ranged from 16% in adult stock to 40% in pre-weaned kids. Kid mortality was higher during the rainy season than the dry season, but this pattern was not evident in adult animals. Mortality was from unknown causes (47.4%), infectious diseases (17.1%), predation (17.1%), diarrhoea (5.2%), starvation (3.4%), and other causes (9.8%). Diseases identified included pneumonia, orf, pulpy kidney, heartwater and foot rot. Infection by helminths showed a distinct seasonal pattern. It was high during the rainy season and low during the dry season. The main ectoparasites found were Rhipicephalus evertsi, Amblyomma hebraeum, Demodex caprae, Sarcoptes scabiei and Ctenocephalides felis. It is inferred that poor health management of goats in Wedza Communal Area negatively affects productivity because of high kid mortality. It is concluded that pre-weaned kids need more veterinary attention during the rainy season than the dry season.

Introduction
Goats form an important and integral component of agriculture in Zimbabwe, especially for communal farmers in the drier parts of the country as well as in crop-livestock production systems. The goat population is estimated to be more than 4.7 million (Central Statistical Office, 1997) with about 97 to 99% owned by smallholder farmers (Kusina and Kusina, 1998). The goats play an essential role in the sustenance of the socio-economic livelihood and food security of the rural population through sale, slaughter and provision of manure for cropping. Goats also serve in various socio-cultural ceremonies.

Despite the abundance of this livestock resource in rural communities and its envisaged potential contribution to rural economies, there are a number of factors that limit optimal productivity. Communal area goat farming faces large losses from heavy kid mortality, often exceeding 50% (Bome and Monicat, 1991a, b; Ndlovu and Sibanda, 1991; Pandey et al., 1994). These losses have a deleterious long-term impact on overall flock dynamics and productivity. The high mortality recorded in a number of studies in some communal area flocks has been attributed
to various factors, with complex interactions at various levels (CARD, 1992). These include poor nutrition that weakens animals and predisposes them to disease. However, the effect and types of diseases that might be responsible for the mortality have not been clearly established.

The objective of this study was to provide more information on mortality in goats and the epidemiology of diseases affecting the goats in a communal area in Zimbabwe.

Materials and Methods

Study site

The study was conducted in Wedza District in Mashonaland East Province of Zimbabwe. The district lies between 31°00'E and 32°00'E longitude and 18°30'S and 19°15'S. Agricultural production in Wedza comprises a mixture of crop and livestock production under smallholder management and semi-intensive farming (Mazaiwana, 1998). A substantial number of goats is found in this area. The other livestock species present are cattle, poultry, sheep, pigs and donkeys. The main crops that are grown are maize, groundnuts, cotton, sunflower and sorghum.

The study was conducted in two adjacent sites, namely Chigodora and Goneso Wards. Both sites engage in crop and livestock production and receive mean annual rainfall totals of 650 to 1000 mm. The sites are in Natural Regions II and III respectively.

Data collection

Data were captured through a monitoring study during the period December 1995 to November 1997. During the study, animal deaths were recorded once every month in a population of about 250 to 300 goats in 35 flocks, equally divided between the two wards. Prior to monitoring, farmers were handed notebooks and were trained to record any events that occurred within their flocks. Data that were recorded by farmers were also verified every month when the animals were weighed. Data collected included birth, sales, purchases, disease incidences and deaths. Causes of death were ascertained from the farmers and resident agricultural and extension officers. Whenever possible, during the course of monitoring, samples were collected from the goat carcasses for laboratory diagnosis in Harare.

For endo- and ecto-parasite identification, data were collected and analysed as described by Kusina et al. (1999). Worm egg counts in faecal samples were determined by the modified McMaster method for trichostrongylids and Moniezia sp. and the sedimentation technique for trematodes (Thienpont et al., 1979). Ectoparasites were collected following procedures described by Kruse and Pritchard (1982). Ectoparasites were collected following procedures described by (Kruse and Pritchard, 1982). Alopecic areas with crustations were scraped and material digested in 2% KOH. Ectoparasites found were transferred to 70% alcohol for later identification.

Data analysis

All data were stored in data sets created with the Panacea software package (Pan Livestock Service). Preliminary data analysis showed no differences between the two wards. As a result, the data sets were pooled for further analysis. The results presented in this study were generated from 35 flocks with a total population of 256 goats.

The animals were divided into three main categories: kids (pre-weaning, birth to six months), rearing (post-weaning but pre-pubertal) and mature (breeding) [Table 1].

Table 1: Categories and numbers of goats monitored during the period December 1995 and November 1997 in Wedza Communal Area

<table>
<thead>
<tr>
<th>Animal category</th>
<th>Numbers</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kids</td>
<td>72</td>
<td>Female and male progeny up to six months of age</td>
</tr>
<tr>
<td>Rearing females</td>
<td>42</td>
<td>Weaned pre-pubertal females</td>
</tr>
<tr>
<td>Rearing males</td>
<td>20</td>
<td>Weaned pre-pubertal males</td>
</tr>
<tr>
<td>Breeding females</td>
<td>117</td>
<td>Females that have given birth once</td>
</tr>
<tr>
<td>Breeding males</td>
<td>4</td>
<td>Any intact male animals above the age of rearing</td>
</tr>
<tr>
<td>Adult castrated males</td>
<td>1</td>
<td>Mature males that had been castrated</td>
</tr>
<tr>
<td>Total</td>
<td>256</td>
<td></td>
</tr>
</tbody>
</table>

Mortality within animal category was determined according to analytical procedures for dynamic populations (Rothmans, 1986) using Panacea. Probabilities of mortality estimates were calculated as daily incidence rates derived from monthly incidence rates. Next, incidence rates were converted to annual incidence rates. The latter were finally expressed as probability (Rothmans, 1986).

Differences in mortality between ages (animal category), sexes and seasons were analysed using ANOVA in Statistical Analysis Systems Institute (SAS) software.

Results

Overall flock size remained static during the two-year monitoring period. Mortality, however, was high, ranging from 16% in breeding females to 40% in pre-weaning kids (Table 2). Mortality was higher (p<0.001) during the rainy season (November to April) than the dry season (49% vs. 27%, respectively) in pre-weaning kids (Figure 1). However, season had no effect (p>0.05) on the mortality of rearing and adult stock.

The causes of mortality varied (Table 3). Approximately 47% of goats died...
Figure 1: Seasonal pattern of kid mortality in 35 flocks monitored from December 1995 to November 1997 in Wedza Communal Area.
Table 2: Probability of mortality in different categories (%) of goats in 35 goat flocks monitored from December 1995 to November 1997 in Wedza Communal Area

<table>
<thead>
<tr>
<th>Animal category</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kids</td>
<td>40</td>
</tr>
<tr>
<td>Rearing females</td>
<td>16</td>
</tr>
<tr>
<td>Breeding females</td>
<td>18</td>
</tr>
<tr>
<td>Rearing males</td>
<td>32</td>
</tr>
<tr>
<td>Breeding males</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

from unknown causes, while predators and infectious diseases accounted for approximately 17% each of total flock losses. The diseases identified included pulpy kidney, pneumonia, foot rot, orf, heartwater and diarrhoea. The major predators were baboons, hyenas, dogs and man. The mountainous terrain provided ideal cover for hyenas and as a result hyenas were a menace. Endo- and ectoparasites identified in the two sites have been reported earlier (Kusina et al., 1999). However, the ecto-parasites Rhipicephalus evertsi, Amblyomma hebraeum, Demodex caprae, Sarcopes scabei and Ctenocephalides felis persisted throughout the monitoring period.

Table 3: Causes of mortality and proportion (%) of total goats lost in 35 goat flocks monitored from December 1995 to November 1997 in Wedza Communal Area

<table>
<thead>
<tr>
<th>Cause of mortality</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown</td>
<td>47.4</td>
</tr>
<tr>
<td>Infectious diseases</td>
<td>17.1</td>
</tr>
<tr>
<td>Predators</td>
<td>17.1</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>5.2</td>
</tr>
<tr>
<td>Starvation</td>
<td>3.4</td>
</tr>
<tr>
<td>Others</td>
<td>9.8</td>
</tr>
</tbody>
</table>

Discussion

The results of this study show that the goat farmers in Wedza Communal Area experience large losses in the current traditional goat production system. This in turn negatively affects overall productivity. Further, the results clearly show that the losses are incurred through reduced survival of kids, particularly during the pre-weaning stage. Kid mortality was the highest during the rainy season. However, during the dry season and after weaning, most goats survive and contribute to breeding and slaughter stock.
High kid mortality has been reported in various parts of Zimbabwe (CARD, 1992). The results obtained from this study confirm the fact that kid mortality is a major constraint to improved goat productivity in Zimbabwe's communal areas. With a 40% loss in kid numbers prior to puberty, the breeding stock and potential stock for sale is markedly reduced.

Mortality was higher in the rainy season than the dry season in pre-weaned kids. Similar results have been reported in a number of studies (Haile, 1986; Honhold et al. 1988a, b; Sikosana, 1992; Pandey et al., 1994). Some workers have suggested that high incidences of diseases and parasites, particularly during the rainy season, are the major causes of death in communal areas. In this study, unknown causes (which could probably be diseases), identified diseases and diarrhea accounted for approximately eighty percent of the losses. In addition, farmers rarely used any veterinary remedies to treat diseased animals. It is therefore obvious that farmers are not intervening in health management of their flocks. Mortality is highest during the rainy season, a time when farmers are concentrating on cropping activities, thereby exposing the animals, particularly kids, to poor management. The goats are further exposed to cold, windy and muddy conditions since goat housing in Wodza is standard. Invariably, goats, especially kids, succumb to pneumonia, diarrhea and some would be expected to die of exposure. There is therefore need for research to identify the causes of death and to address the health management of the pre-weaned kids to ensure that they are protected from infectious diseases and endo-parasite infection.

From a parallel study, the major endo-parasites that were identified in the same flocks monitored for this study were trichostrongylids, amphistomes, Haemonchus contortus and Fasciola gigantica. It is highly likely that some of the "unknown causes" are acute endo-parasite infestation, particularly in kids. The situation is most critical during the rainy season. Such infestations result in goats being emaciated as was observed during the course of the monitoring.

On the farmers' concern that veterinary care for goats is "expensive and uneconomic", endo-parasitic infection can be controlled and reduced by improving housing for goats. Poor housing of goats exposes them to muddy conditions which predisposes them to a number of diseases such as pneumonia and foot rot. Improving housing reduced kid mortality by 50% during the rainy season without recourse to veterinary intervention (Matika and Sibanda, 1993). Alternatively, strategic dosing should be encouraged.

An alternative strategy to reduce kid losses during the rainy season, and therefore, defray projected high veterinary costs is through controlled breeding. For progressive farmers and those who can afford it, controlled breeding can be instituted through oestrus synchronisation. Concentration of kidding during the dry season will ensure that kids reach puberty prior to the beginning of the next wet season. By then, the pubertal kids will have developed sufficient immunity to withstand the common health challenges and, therefore, have a better chance of survival.
Depending on location and physical geography, predation can substantially increase losses for goat farmers.

Conclusion
The results show that pre-weaning kid mortality in goat flocks in Wedza Communal Area is very high. It is concluded that better health management, in conjunction with improvement in goat housing, will enhance goat productivity in Wedza communal area that in turn will allow farmers to realise better revenue from sales. There is a need to develop "affordable" strategic control mechanisms to reduce endo-parasitic infestation. In addition, there is need for training of the farmers on health management of their goats.

References


