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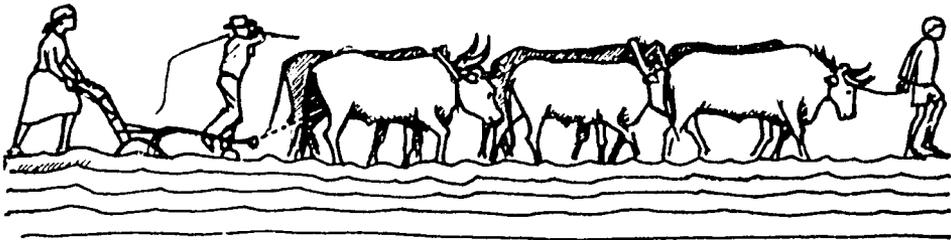
CAUSES OF DISEASE AMONG GOATS IN THREE VILLAGES
IN THE TUTUME AGRICULTURAL DISTRICT, 1988-1990

BY

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PREFACE

ATIP working papers are prepared and circulated to make ATIP research findings easily available to Government of Botswana personnel and researchers interested in Botswana farming systems. This working paper has been reviewed internally by ATIP staff and by the Chief Animal Production Research Officer, DAF, Dr. L. Setshwaelo.

This paper presents information from a researcher managed and implemented (RMRI) study of the causes of sickness and death of goats in three villages in the Tutume Agricultural District from September of 1988 through February 1990.

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ABSTRACT

Diagnoses of diseases were made on 1530 goats over a nineteen month period. These were both clinical and post-mortem diagnoses. The 40 different diseases diagnosed were arranged in the prevalence of occurrence both in cases and individual animals. A discussion of the importance of these diseases and their relationship to management and husbandry is included.

INTRODUCTION

Death loss in goat herds on village farms has been recorded as running from a low of 9 per cent to over 60 per cent per year (Senyatso, 1987; Gray, 1987; Gray and Baathodi, 1988). The diseases responsible for this mortality have not been seriously investigated, primarily due to the remoteness of villages and the shortage of veterinary staff, both professional and para-professional. When investigations were made they were usually on animals submitted to veterinary assistants with only samples being forwarded through veterinary officers to the central laboratory. Rarely was the herd of origin involved, and seldom was a clinical work-up, either medical or post-mortem, performed.

It was felt that if a conscious effort were made to examine as many sick and dead goats, as possible, in each of the three villages in the Tutume Agricultural District in which ATIP works, some insight into the common causes of morbidity and mortality could be obtained. This study, covering 19 months, was an attempt to accomplish this goal.

OBJECTIVE

The objective of this researcher managed and implemented (RMRI) study was to make clinical examinations of as many sick goats as possible, and to perform post-mortem examinations on all dead goats that villagers presented, in an effort to enumerate those diseases causing morbidity and mortality in the three villages studied in the Tutume Agricultural District.

JUSTIFICATION

Death losses in goats vary in severity from year to year and have been reported from 9 percent to 62 percent by both APRU (Senyatso, 1987) and ATIP (Gray, 1987; Gray and Baathodi, 1988). Where small ruminants are concerned, very little specific information is known about disease incidence at the village level, as there are few contacts between village farmers and veterinarians. Those diagnoses that are made contain much bias in that only those goats which a farmer wants examined are ever presented to a veterinary assistant (VA). The VA, in turn, only forwards on those cases he feels are necessary to the Veterinary Officers, who decide which cases to send to the central diagnostic laboratory. In most instances the farmers only present cases that are particularly curious to them, as most of the time they eat the dead carcass and don't want it disturbed by the VA. This procedure is complicated by distances, lack of refrigeration for dead animals and samples, as well as constraints in communication and transportation.

To better understand the disease processes that occur in goats, and the relationship and

importance of these diseases to both the losses associated with morbidity and mortality, this study was undertaken to examine as many individual goats as possible in three villages.

APPROACH

Initially the study was to look only at dead kids, i.e., animals less than a year old, owned by cooperating farmers. It was found that farmers were reluctant to bring in dead carcasses as the post-mortem procedure rendered the carcass undesirable to eat in the eye of the farmer. It was obvious that if any data were to be accumulated, all sick goats regardless of age would have to be examined, and the post-mortem procedure would have to be modified so that the carcass was not unduly damaged. The scope of the investigation was also changed at this point to include all goats presented regardless of age or ownership.

This investigation started in August 1988 and continued through February 1990, covering a period of 19 months. During this period of time, 148 medical cases were examined and 33 dead goats were submitted for post-mortem examination. Three cases reported by farmers, which had accurate histories and which were related to other diagnoses, were also included. This makes a total of 184 submittals (cases). In addition to the 20 smallstock farmers cooperating with the ATIP programme in Matobo, Mathangwane, and Marapong, animals were solicited from any farmer who asked for assistance in these villages. The cooperating farmers were selected several years ago by a previous animal scientist on the project. They do not represent a random sample nor were they selected because of their managerial ability or socio-economic status. They are, however, well scattered in each village and it was felt that their herds represent the typical disease status in the villages.

For those animals presented, a fairly complete post-mortem was performed in the field without destroying the carcass. This modification to the post-mortem procedure was necessary to get farmers to submit carcasses. Tissue was submitted to Sebele, to the National Animal Disease Diagnostic Laboratory if a diagnosis could not be made from clinical and post-mortem evidence. Routine submissions were not made due to distance, inability to ship fresh specimens and work load of the laboratory.

Sick animals presented were examined, treated, and a follow-up on their condition was made, if possible, to ascertain if the animal lived or died. If it died, an effort was made to conduct a post-mortem examination on it. Therefore the examination of animals was influenced by whether or not the owner presented them, consequently the results of this study are subject to some bias.

Some cases submitted had several animals involved, up to the number in the complete herd. Also in several instances up to five diagnosed conditions were seen in a single case. Therefore, there were many more animals and diagnoses than cases submitted.

Records of each sick or dead animal were maintained and analyzed by computer.

RESULTS

Over the 19 month period 184 cases were submitted for evaluation. Each case varied in number from a single animal up to a complete herd of 69 animals. Overall, 1530 animals were affected by the 40 diagnoses that were made. These 40 diagnoses were made 253

times.

Samples of tissue for histopathology or bacteriology examinations were sent to the National Animal Disease Laboratory at the Sebele Research Station from 46 cases. Of these, fifteen confirmed the clinical diagnosis (33 percent) and the remaining 31 cases either did not support the clinical diagnosis or no results were obtained.

The distribution of the 184 cases from the district were; from the village of Matobo, 44 cases; the village of Mathangwane, 71 cases; and the village of Marapong, 62 cases.

When only cases were considered and not number of animals involved, the listing in order of occurrence and percentage of total cases is as given in Table 1. It is interesting to note the number of management-related diseases in the first 10 occurrences. External parasites and diseases they transmit, lice (15.4 percent), heartwater (10.3 percent), and ticks (7.5 percent), comprised 33.2 percent of all submissions. When malnutrition (7.2 percent), and internal parasites (4.7 percent) were added, the total reached 45.1 percent of all cases. These management-related cases totaled two-thirds of the ten most common diagnoses.

TABLE 1 MOST COMMON DISEASES DIAGNOSED BY CASES

DISEASE	NUMBER CASES	PERCENT OF DIAGNOSES
LICE	39	15.4
HEARTWATER	26	10.3
TICKS	19	7.5
CASEOUS LYMPHADENITIS	18	7.1
KERATOCONJUNCTIVITIS	16	6.3
CONTAGIOUS ECTHYMA	14	5.5
GASTROINTESTINAL HELMINTHASES	12	4.7
RESPIRATORY INFECTION	10	4.0
MALNUTRITION -- KIDS	10	4.0
MALNUTRITION -- ADULTS	8	3.2
RUMEN ACIDOSIS	7	2.8
CONJUNCTIVITIS	7	2.8
DISLOCATION -- FRACTURE	5	2.0
STOMACH IMPACTION	5	2.0
ANEMIA -- SEVERE	5	2.0
DERMATOPHILOSIS	4	1.6
CONGENITAL CONDITIONS	4	1.6
DERMATOPHYTES	4	1.6
COCCIDIOSES	4	1.6
NODULAR WORMS	4	1.6
TRAUMA -- AUTOMOBILE	4	1.6
ABORTION/STILLBIRTH	3	1.2
NO DIAGNOSIS	3	1.2
MASTITIS	3	1.2

Infectious diseases were the second most important. Included were: caseous lymphadenitis (7.1 percent), keratoconjunctivitis (6.3 percent), contagious ecthyma (5.5 percent), and respiratory infections (4 percent), which constituted 22.9 percent of the total. It is also interesting to note that, in this group, only contagious ecthyma has a prophylactic agent commercially available, and that management practices could help in reducing the incidence in all of these diseases.

All other diagnosed diseases consisted of less than one percent of the total diagnoses. These are listed in no particular order. They were enterotoxemia, trematode infection, perinatal deaths, umbilical hernia, mange, nodules on the udder, undiagnosed central nervous system

disorders, pyelonephritis, rabies, gangrenous mastitis, warts, cancer, dystocia, lacerations, diarrhea of unknown cause, and aberrant nose bots.

The disease incidence was also ranked by the number of animals affected. Table 2 lists these diseases in their order of decreasing incidence by number of animals affected.

TABLE 2: RANKING OF DISEASES BY THE NUMBER OF GOATS AFFECTED^a

DIAGNOSIS	NUMBER AFFECTED	PERCENT
LICE	688	45.0
TICKS	469	30.7
CONTAGIOUS ECTHYMA	74	4.8
CASEOUS LYMPHADENITIS	36	2.4
KERATOCONJUNCTIVITIS	35	2.3
HEARTWATER	31	2.0
GASTROINTESTINAL HELMINTHASES	30	2.0
MALNUTRITION -- KIDS	27	1.8
RESPIRATORY INFECTIONS	15	1.0
MALNUTRITION -- ADULT	13	0.8
SKIN INFECTIONS	13	0.8
MASTITIS	13	0.8
DERMATOPHILOSIS	10	0.7
RUMEN ACIDOSIS	8	0.5
CONJUNCTIVITIS	7	0.5
COCCIDIOSIS	6	0.4
HIT BY CAR	6	0.4
DISLOCATION -- FRACTURE	5	0.3
STOMACH IMPACTION	5	0.3
ANEMIA -- SEVERE	5	0.3
NODULAR WORMS	4	0.3
CONGENITAL CONDITIONS	4	0.3
ABORTION/STILLBIRTH	3	0.2
NO DIAGNOSIS	3	0.2
ENTEROTOXEMIA	2	0.1
TREMATODE INFECTION	2	0.1
PERINATAL DEATHS	2	0.1
ABERRANT NOSE BOTS	2	0.1

a. All other diseases had only one case each constituting only 0.1 per cent of the total. These were umbilical hernia, mange, nodules on the udder, undiagnosed central nervous system disease, ascending pyelonephritis, rabies, gangrenous mastitis, warts, cancer, dystocia, lacerations, and diarrhea of unknown cause.

It is interesting to note that the same ten diseases appeared at the top of the list, in a somewhat different order, but this time equaling 92.8 per cent of all animals infected. Again management and husbandry-related diseases were by far the most prevalent and important of this group.

It is also interesting to note that all forms of internal parasite disease totalled 2.8 percent of all animals affected, while lice and tick infestation comprised 75.7 percent. If all forms of external parasites and diseases transmitted by them were considered, the total increased to 78.6 percent of all animals affected.

When considering the post-mortem diagnosed cases, Table 3, heartwater submittals amounted to 42.4 percent, with one-half of those being confirmed. Management-related diseases again were very important as a cause of death. Heartwater positives, heartwater suspects, malnutrition, lice, acidosis, foreign bodies in the stomach (plastic bags in the omasum), and automobile trauma amounted to 81.8 per cent of all deaths. Even if the unverified heartwater cases were discounted, 60.6 per cent still remained as management-related cases.

TABLE 3: DISEASES IN ORDER OF OCCURRENCE WHEN DIAGNOSED BY POST-MORTEM EXAMINATION

DISEASE	NUMBER	PER CENT
HEARTWATER -- POSITIVE	7	21.2
-- UNSUBSTANTIATED	7	21.2
MALNUTRITION	7	21.2
GASTROINTESTINAL HELMINTHIASIS	3	9.1
ENTEROTOXEMIA	2	6.1
LICE -- PARASITES AND ANEMIA	2	6.1
ACIDOSIS	2	6.1
FOREIGN BODY -- PLASTIC BAG -- STOMACH	1	3.0
AUTOMOBILE TRAUMA	1	3.0
COCCIDIOSIS	1	3.0
TOTALS	33	100.0

CONCLUSIONS

Disease and death loss is of vital importance to small farmers in rural Botswana. Much of this loss is currently being salvaged as most of these animals are eaten by their owners regardless of cause of death. This is a serious and dangerous practice. With increasing population of humans and animals it is unlikely that disease incidence will decrease. Modern management and disease control will become necessary if the numbers of animals are to remain high enough to feed the population and not damage the environment.

It appears that there is a strong need to increase the awareness of animal management and nutrition as it relates to the village farmer. This should be done through an extension effort and should include programmes on pasture or range management, fodder production, fodder preservation and storage, basic management, nutrition, disease prevention, and their interrelationships. Control of external parasites needs to be stressed. Control of internal parasites should not be ignored, but relegated to its proper place of emphasis, i.e., below external parasites and nutrition management.

Fortunately very few zoonotic diseases were found in this study. It is likely however, that these will increase in importance and number as human and animal populations expand. Programmes to educate the rural population to the dangers of consuming animals killed by disease, and the best procedures for preserving or keeping meat fresh, should be initiated as soon as possible. The changing of this behavior will not be easy and will take a good deal of effort over a long period of time by those agencies responsible for these programmes.

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