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A Small Ruminant Herd Health Survey in Western Kenya: Research Data

Washington State University
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Introduction

Sheep and goats are an important component of the economy of small farmers in many of the developing countries because they provide a source of income and they supply animal protein, especially for children. Increasing the efficiency of goat meat and milk production, probably through crossbreeding exotic goats with native animals, would result in higher incomes and increased availability of animal protein. A constraint to the introduction of exotic goats, however, might be their greater susceptibility to enzootic diseases.

As a prelude to determining what strategies can be devised to reduce or eliminate disease problems in native livestock, specifically goats, and to anticipate health hazards resulting from the introduction of crossbred exotic goats, an in depth survey of the physical condition of a defined population of sheep and goats was conducted. While our primary interest was the goats in the region, the presence of sheep on many of the farms and the similar health problems faced by both animals dictated the inclusion of sheep in this survey.

Materials and Methods

Study Areas

The studies were conducted in two areas of Western Kenya where the Small Ruminant Collaborative Research Support Program (SR-CRSP) is engaged in a field project in cooperation with the Ministry of Agriculture and Livestock Development, Government of Kenya. Farms selected for study were visited during three distinct climatic periods of the year. The farms were located in Western Kenya in the districts of Kakamega, an area of high rainfall, ample forage, and high human population (described in Pratt and Gwynne) and the district of Siaya, an area with a high human population but less rainfall.

Selection of Farms

At the beginning of the SR-CRSP involvement in Western Kenya the study districts were subdivided using a combination of random number tables, human population numbers, and ecologic features. In this study the two districts were divided into three divisions and three locations were selected in each division. Sublocations were chosen and individual farms were selected with the assistance of the local administration. A bias in the final selection of farms was the insistence that livestock should be on the premises and that the farm contain no more than 12 head of cattle and at least two goats. A total of 69 farms in the 21 sublocations was selected (table 1; tables

2a and 2b). These farms contained 394 goats and 250 sheep, of which examinations and samplings were conducted on 316 and 179, respectively. All animals studied carefully were tagged with color coded ear tags. Fecal samples were taken when possible and studied using techniques described in Soulsby and in Wescott and LeaMaster.

Breeds and Husbandry Practices

Where clear evidence of breed was obtainable, 305 of 394 goats were identified as East African (table 5). Again where clear evidence of breed was obtainable, the predominant sheep population was East African fat-tail (163 of 250). The survey included five red Masai and five improved sheep. There was no statistically significant difference in numbers of the breeds of animals between the two districts.

Sheep and goats in the Siaya District are herded to browsing areas during the day and confined to bomas at night. (A boma is a small enclosed area for confining animals.) In the Kakamega District, the small ruminants are usually tethered in browsing areas during the day and confined to bomas at night.

Sampling Procedures and Sampling Times

The animals to be tested were weighed, aged by counting teeth, and given a physical examination by a veterinarian or animal technician (tables 6, 8a, 8b, 8c, and 8d). At each visit, samples of blood and feces were taken for each animal and external parasites were removed and stored. In some cases, specimens of excretions, secretions, and tissues were collected.

Each farm was visited three times at intervals roughly representative of the three seasons of the year in Kenya. The first round of observations was conducted in November-December 1980 and January 1981, the dry season. The second visit was conducted in March and April 1981, immediately preceding and during the rainy season. The third and last series of observations was conducted in July and October 1981 and centered around the short rainy season.

At the beginning of the study in the Siaya District, there was an average of 6.6 goats per farm, with a median of seven and a range of two to 15. In this district there was an average of 3.9 sheep per farm with a median of 5.5 and a range of two to 14. The average population of goats per farm in the Kakamega District was 4.5 with a median of 5.5 and a range of one to 14. For sheep, there was an average of 3.2 per farm and a median of five with a range of one to 10. During the approximately 11-month duration of the investigation, 295 small ruminants were lost to the study (tables 2a, 2b, 3a, and 3b).

The percentages of sheep and goats dead from various causes was, with minor variations, similar in both species and in both districts. The only major difference between the two districts was in the category "predator" and here a significantly larger number of both sheep and goats was lost in the Siaya District.

Sex and Age

The ratio of male to female goats at the November 1980 - January 1981 sampling was 1/3.2 and in the July - October 1981 survey was 1/5.7, ratios essentially similar to those of the sheep (table 4). The ratios seen in the November-January survey were similar for the two districts (1/2.5 for Siaya and 1/3.2 for Kakamega), but the July-October observations were 1/4 for Siaya and a major change in Kakamega to 1/11.

Of the population of 316 goats under observation during the November-January period, 56 were sucklings and the number of sucklings in the sheep population was 28 out of 179. There was a proportional drop in the number of sucklings in both the goat and sheep populations in March-April to 28 and 13 respectively with residual numbers of three and two present during July-October. While the number of sucklings dropped from 22 to 2 in Kakamega District between the first and second visits there was only a drop from 34 to 26 in the Siaya District. The Bondo Division accounted for this discrepancy.

Weight

Sheep and goats involved in the study were weighed during all three visits and the average weights were grouped by age, sex, species, and district (table 6). Those with none or one tooth were assumed to be up to one year old and not yet weaned, those with two or three teeth were classified as young animals one to three years old, and animals with four or more teeth were considered mature and older than three years.

Suckling animals generally experienced a significant increase in weight between the first and second visits, then their weights remained about the same when measured on the third visit. The exception was female goats in Kakamega, which experienced a sharp drop in weight between the second and third visits. Weights of suckling goats were similar in both provinces, but suckling sheep in Kakamega were significantly heavier than their counterparts in Siaya. Except for sheep in Siaya, male animals prior to weaning were always heavier than females.

Young animals displayed more stability in terms of weight, with certain notable exceptions. Female goats in Kakamega and male goats in Siaya both gained weight between the first and second visits, then dropped at the third visit to about the same average weight as at the

first visit. Male goats in Kakamega did the same thing between the second and third visits, but they were not available in sufficient numbers to obtain a meaningful average for the first visit. Sheep were even more stable than the goats with a steady increase from one visit to the next among males in Siaya the only evidence of changing weights. All of the animals showed similar average weights from one district to the next.

Weights of mature animals were generally stable among both sheep and goats. The only exception was male goats in Kakamega, which increased dramatically between the first and second visits then fell slightly. All of the other groups were stable from one visit to the next and between the two districts.

Births

Data on number of offspring for both sheep and goats are difficult to assess because of inconsistencies that probably result from eliciting data from farmers. Number of offspring per female varied so widely that the only reliable statement to be made is that no animals had three or more offspring. Neonatal mortality among 87 lambs was reported at 12.6 percent and among 152 kids it was 17 percent. For comparison, these same farms experienced the birth of 67 calves, of which 10.5 percent died before reaching maturity.

General Condition

Each goat was carefully examined by a member of the survey team to determine physical condition (table 10a.). Most of the goats were in normal to moderate condition in both districts throughout the study but with a marked shift from moderate to normal condition following the first visit. The numbers of goats in poor or emaciated condition was quite low, only 8.5 to 9 percent during the entire study, with little variation between seasons.

As with the goats, most of the sheep were classified as normal or moderate (table 10b). A larger percentage of the sheep was, however, in the poor and emaciated categories at the first and second visits (28 and 23 percent, respectively), then the figure fell to eight percent at the last visit.

Skin Condition

Virtually all of the goats had normal appearing skin (table 11a). The most prevalent abnormal skin condition seen was alopecia and nine out of ten such goats were seen in the Bondo Division of Siaya. Only four goats had skin condition that was classified as poor and even fewer were seen to have single or multiple abscesses.

The skin condition of the sheep could also be called normal (table 11b). No more than three were classified as poor and five had alopecia, again principally seen on sheep in the Bondo Division. Only one sheep was noted to have an abscess during the entire observation period.

Streptothricosis, also called cutaneous actinomycosis, is a seasonal dermititis seen principally in cattle but also in sheep and goats (tables 18a and 18b). Goats observed for the survey exhibited 16 cases of the ailment, twelve cases at the second visit in March-April and four at the last visit. Those goats with lesions at the second visit had no evidence of infection on the last visit. Sheep had only two cases, one each at the second and third visits. As with the goats, the animal with lesions at the second visit did not have any at the third visit. (See Hall for a description of streptothricosis.)

Reproductive System and Udder Condition

Significantly more goats than sheep were producing milk during all three visits and more goats were producing during the third visit in July-October than during the previous visits (tables 17a and 17b). Sheep followed the same patterns as goats in having a higher percentage of milk-producing animals in visit three than visit one and fewer during visit two than the other two visits. The condition of the udder among goats was generally very good. Only one goat had an indurated udder, another had a swollen udder and two had wounds.

Number of pregnant animals was determined by asking farmers, which might have resulted in inaccurate data. During the first visit, 79 goats and 56 sheep were reportedly pregnant, then the numbers fell to 58 and 25, respectively, at the second visit. The numbers fell even further during the third visit at which farmers claimed 51 goats and 21 sheep were pregnant. Such circumstances, if the numbers are accurate, should have resulted in an increase in young animals during the second and third visits, which did not occur.

Vaginal discharges and abortions were unusual in the animals in the study (tables 7a and 7b). During the entire observation period, only seven goats had vaginal discharges, one prolapse was observed in a sheep, and vaginal lesions were seen in one sheep and one goat. The only abortions occurred in three goats and one sheep, all reported during the first visit.

Appendages, Lymph Nodes, Eyes, Mucous Membranes, and Respiratory System

Observations on lymph node size were generally confined to palpatation of the prescapular nodes. Most of the goats had lymph nodes that were considered normal, that is, not larger than two centimeters (table 15a). Eight percent of the goats had lymph nodes two to four centimeters large during the first visit and figures increased to 16.5

percent and 16 percent, respectively, during the second and third visits. Only five goats had lymph nodes greater than four centimeters. Among sheep, enlarged lymph nodes were noted in only three animals during the entire observation period (table 15b).

Almost all of the animals in the study had normal eyes (tables 13a and 13b). The eyes of all the goats in Kakamega District were normal, but 12 of the goats in Siaya had either ocular discharges, keratitis, or blindness. One sheep had an ocular discharge, another had keratitis, and all the rest were normal.

Visual examinations were conducted on the ocular and buccal mucous membranes (tables 14a and 14b). During the time of the study, only four goats and three sheep had abnormal mucous membranes; in all cases, the abnormality was paleness.

Examination of the respiratory system consisted of visual observation of the nares, listening to respiration, and noting sneezing, coughing, and excessive nasal secretions. No more than 6.5 percent of the goats during any visit to a district exhibited any respiratory difficulties and that was during one of the three visits to Siaya (table 16a). Respiratory problems in Kakamega and the other two visits to Siaya ranged from none to five percent.

Sheep experienced significantly more respiratory ailments, particularly nasal discharges (table 16b). At the first visit, nasal discharges were seen in 15.5 percent of the sheep and the number dropped to 9.6 percent and four percent, respectively, during the second and third visits. The pattern of decline from one visit to the next was the same in both districts, but the percentage of sheep with discharges was substantially less in Kakamega than in Siaya.

Condition of Feces

The percentage of goats with loose or poorly formed feces differed significantly from one visit to the next and from district to district (table 12a). The percentage with unusual feces decreased from 19 percent at the first visit to 4.5 percent, then to 2.5 percent at the last visit. Somewhat more of the goats in Kakamega (24 percent) than in Siaya (16.5 percent) had loose feces at the first visit and the percentage of affected animals fell more precipitously in Kakamega than in Siaya. Animals in both districts, however, experienced significantly fewer problems with loose feces between the first and third visits.

The same pattern existed among sheep from one district to the other and from one visit to the next (table 12b). The overall percentage of sheep with loose feces fell from 13.5 percent at the first visit to 1 percent at the third visit. Siaya District also had a higher percentage of affected sheep (17 percent in the first visit) compared to Kakamega (10 percent at the same time). The overall percentage of sheep with loose feces fell from the first to the second

visit, but the number in Kakamega dropped to none, compared with 7.5 percent in Siaya. At the last visit, the feces of all sheep in Siaya were normal and only one abnormal feces was reported in Kakamega.

External Parasites

Tables 20a and 20b list the percentages of goats and sheep with no ticks, a few ticks (one to ten), a medium tick load (11 to 50), a high number of ticks, and a heavy tick load. Both sheep and goats had substantially more ticks during the first visit than the third and the fewest ticks during the second visit. The tick load of animals in Siaya was substantially greater than that of animals in the other district.

The number of fleas on animals was listed in the same way as number of ticks, that is, on a scale of none, few, medium, high, and heavy (tables 21a and 21b). All of the sheep and goats with fleas were in Siaya District. More animals had high or heavy infestations during the first visit than the other visits and the numbers with only a few fleas were relatively constant throughout the period of observation.

The only other external parasite observed was lice (table 22). They were seen on no sheep and only three goats, all in Siaya. Since lice can be difficult to recover unless exhaustive examinations are conducted, louse infestation might have been higher, but it was clearly at a low level.

Discussion

A population of sheep and goats was under observation for approximately one year in two ecologically different areas in the western part of Kenya. The reason for conducting this investigation was to assess the present status of the small ruminant population in the districts of Siaya and Kakamega, two areas where plans are being developed to introduce cross-bred goats. The study reported here was designed to examine the physical condition of the small ruminants, to determine the effects of environment and husbandry methods on the livestock, and to assess the animal health risks that might occur when exotic caprine germ plasm is introduced into these environments.

An unexpected problem in this study was the great loss of both goats and sheep during the course of the investigation, a problem shown graphically in tables 3a and 3b. Almost half of the original population was missing at some period after the first visit and to compound the problem the identities of several animals were lost when their ear tags became detached. In many instances it was possible to match an animal with an ear tag number, but it was, unfortunately, also sometimes impossible.

Two important differences between the two districts in regard to deaths of animals deserve comment. In the Siaya District more goats were listed in the "slaughtered" category compared with Kakamega. Also in Siaya, a greater percentage of animals was listed as killed by predators, which might have been caused by more wild animal predators in Siaya compared with Kakamega.

Only minor changes were noted in the weights of mature female goats between seasons and between the two districts, but younger animals were significantly heavier during the major rainy season of March and April. The population of female goats in this study was not stressed by continuous milk production, but perhaps putting them under the additional stress of producing milk beyond that needed for weaning kids might produce a weight loss among mature females similar to the one experienced by younger goats when food is in relatively short supply.

The animals, both sheep and goats, were generally in good condition, an observation that was somewhat surprising in view of the opportunities for infection with a variety of agents and the extent of the internal parasite loads. It appears that herd health is not a limitation on animal production. Determining the basis for the general good health of these animals will, however, be important in devising strategies for the introduction of exotic breeding stock. Whether resistance to enzootic diseases is genetic or acquired through passive transfer will be important in developing a plan to introduce exotic cross bred animals.

Observations of lymph nodes and tick loads (tables 15a, 15b, 20a, and 20b) raise questions about evidence of infection with such tick-borne diseases as heartwater. Goats in the Siaya District had both high tick loads and a consistently higher percentage of enlarged lymph nodes compared with Kakamega. It is possible that the enlarged lymph nodes are the only evidence of infection by tick-borne diseases. This hypothesis does not, however, explain why, in the same district, sheep with large numbers of ticks had normal lymph nodes.

The possibility that enlarged prescapular lymph nodes resulted from infection with caseous lymphoadenitis must also be considered. Evidence to the contrary is the seasonal increase in enlarged lymph nodes and absence of suppurating lymph nodes in the population under study.

The condition of the limbs of the majority of animals was normal with little or no evidence of foot rot (tables 19a and 19b). Several of the animals had fractures, particularly in Siaya District where animals are usually herded in the brush for forage. Animals in this district apparently have significantly more opportunity to injure themselves. Detection of symptoms of caprine arthritis encephalitis (enlarged capral joints or lesions on the knees) was not part of this

study, although had such symptoms been present, they would have been noted. Adams et. al. have described the presence of CAE in goats in Africa among imported animals only.

The fairly large percentage of animals with loose feces is evidence of a large internal parasite load (tables 12a and 12b). The dry season and the short rainy season are the two times of the year when the animals had more incidence of loose feces, which might indicate that they are picking up parasites when they graze close to the ground to eat scarce forage. If parasites are living near the base of the grass, this explanation is plausible because the animals would be eating the ends of lush forage during the long rainy season.

The greater number of sheep and goats infected with ticks in Siaya (tables 20a and 20b) is probably a result of the practice of herding animals in the brush where they would undoubtedly encounter more ticks. The custom in Kakamega is to allow the animals to graze while on tethers on land that is not very brushy. Siaya District has a much longer dry period, which would add to the tick load of animals in the district.

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Table 1

General Summary: Farm Practices by Area

Variable	Siaya	Kakamega
<u>Dipping Practices</u>		
Available vats in	44% Farms	70% Farms
Per year average dipping for farms which dip	58 times/year	59 times/year
Product used	35% Bacdip 31% Delnav	74% Bacdip
Pleased with results	76% Farms	85% Farms
Perceived product as safe	81% Farms	81% Farms
<u>Drenching Practices</u>		
Use drenching technique	6% Farms	20% Farms
<u>Vaccinations</u>		
Cattle		
Blanthrax	3% Farms	3% Farms
Rinderpest	3% Farms	0% Farms
Blanthrax and Rinderpest	48% Farms	72% Farms
Unspecified	39% Farms	24% Farms
Sheep		
None	61% Farms	76% Farms
Unspecified	39% Farms	24% Farms
Goats		
None	58% Farms	72% Farms
Blanthrax	3% Farms	3% Farms
Unspecified	39% Farms	24% Farms
<u>Diseases</u>		
Diarrhea		
Observed in last 6 months	59% Farms	60% Farms
Cattle		
# sick/farm	3.4 (17 Farms)	2.4 (16 Farms)
Total dead	7	3

Table 1

General Summary: Farm Practices by Area (continued)

Variable	Siaya	Kakamega
Diarrhea (continued)		
Sheep		
# sick/farm	2.4 (5 Farms)	1.3 (6 Farms)
Total dead	3	1
Goats		
# sick/farm	1.7 (3 Farms)	3 (3 Farms)
Total dead	1	1
Treatment		
None	50%	50%
Herbs	20%	22%
Effective?	90% Yes	89% Yes
Respiratory		
Observed in last 6 months	71% Farms	53% Farms
Cattle		
# sick/farm	2.1 (12 Farms)	3 (15 Farms)
Total dead	2	1
Sheep		
# sick/farm	2.6 (7 Farms)	2.3 (7 Farms)
Total dead	3	0
Goats		
# sick/farm	3.2 (5 Farms)	1.8 (5 Farms)
Total dead	2	1
Treatment		
None	64%	50%
Herbs	32%	31%
Effective?	75% Yes	63% Yes
Blood parasites		
Observed in last 6 months	40% Farms	23% Farms
Cattle		
# sick/farm	3.5 (6 Farms)	1.6 (5 Farms)
Total dead	1	1
Sheep		
# sick/farm	0	2 (1 Farm)
Total dead	0	2
Goats		
# sick/farm	0	0
Total dead	0	0

Table 1

General Summary: Farm Practices by Area (continued)

Variable	Siaya	Kakamega
Blood parasites (continued)		
Treatment		
None	50%	33%
Herbs	17%	67%
Burned glands	17%	
Effective?	67% Yes	50% Yes
Other abnormalities observed in last 6 months		
None	53%	80%
Blackquarter	15%	13%
Bloat	11%	
Hoof deformities	9%	7%

Table 2a

Number of Goats Sampled by Province, Visit, and Status

	Visit 1	Visit 2			Visit 3		
Province	Alive	Alive	Dead	Missing	Alive	Dead	Missing
Siaya							
Bondo	102	91	7	21	70	13	19
Yala	35	37	3	3	26	3	6
Boro	52	47	8	1	34	13	6
Subtotal	189	175	18	25	130	29	31
Kakamega							
Ikoromani	33	26	0	11	17	0	16
Malava	47	50	4	3	30	5	11
Butere	36	36	1	0	25	3	8
Subtotal	116	112	5	14	72	8	35
Total	305	287	23	39	202	37	66

Table 2b

Number of Sheep Sampled by Province, Visit, and Status

	Visit 1	Visit 2			Visit 3		
Province	Alive	Alive	Dead	Missing	Alive	Dead	Missing
Siaya							
Bondo	42	34	2	9	29	6	6
Yala	17	14	3	0	11	4	2
Boro	35	39	3	7	18	7	8
Subtotal	94	87	8	16	58	17	16
Kakamega							
Ikoromani	27	16	0	17	6	1	20
Malava	37	33	6	4	25	6	6
Butere	15	12	1	2	5	1	9
Subtotal	79	61	7	23	36	8	35
Total	173	148	15	39	94	25	51

Table 3a

Status of Goats by Area and Visit

	Siaya			Kakamega		
Status	Visit 1	Visit 2	Visit 3	Visit 1	Visit 2	Visit 3
Alive	189	175	130	116	112	72
Dead						
Slaughtered		6	8		3	2
Injury/trauma		1	2		0	0
Nutritional causes		0	1		0	0
Accidental		1	1		1	1
Predator		3	7		0	0
Other		1	1		0	0
Unknown		6	9		1	5
Total Dead	0	18	29	0	5	8
Missing						
Owner not present		0	2		0	0
Lost		3	5		1	2
Sold		10	20		6	18
Taken for service		0	1		0	0
No access/flooding		12	0		0	0
Owner uncooperative		0	0		0	3
Owner refused access		0	0		7	12
Unknown		0	3		0	0
Total Missing	0	25	31	0	14	35
Total	189	218	190	116	131	115

Table 3b

Status of Sheep by Area and Visit

	Siaya			Kakamega		
Status	Visit 1	Visit 2	Visit 3	Visit 1	Visit 2	Visit 3
Alive	94	87	58	79	61	36
Dead						
Slaughtered		0	3		2	3
Nutritional causes		0	1		0	0
Predator		4	7		1	1
Other		0	0		1	1
Unknown		4	6		3	3
Total Dead	0	8	17	0	7	8
Missing						
Owner not present		0	1		0	0
Stolen		0	1		0	0
Lost		0	0		2	1
Sold		10	14		15	19
No access/flooding		6	0		0	0
Owner uncooperative		0	0		0	4
Owner refused access		0	0		6	9
Unknown		0	1		0	2
Total Missing	0	16	17	0	23	35
Total	94	111	92	79	91	79

Table 4

Sex of Animals Sampled by Species, Province, Area, and Visit 1-3

Province and Area	Goats				Sheep			
	Male		Female		Male		Female	
	V1	V3	V1	V3	V1	V3	V1	V3
Siaya								
Bondo	23	10	79	60	12	7	30	22
Yala	8	3	27	23	4	1	13	10
Boro	16	8	36	26	9	3	26	15
Subtotal	47	21	142	109	25	11	69	47
Kakamega								
Ikoromani	9	2	24	15	6	0	21	6
Malava	9	4	38	26	8	3	29	22
Butere	6	3	29	21	2	0	13	5
Subtotal	24	9	91	62	16	3	63	33
Total	71	30	233	171	41	14	132	80

NOTE: Only living animals at end of data collection visit 3. Dead or missing animals not included.

Table 5

Breed Data: Visit 1

Province	Goats		Sheep				
	East African	Other	East African Hairsheep	East African Fat-tail	Red Masai	Persian Blackhead	Improved
Siaya							
Bondo	102	0	0	38	0	0	4
Yala	35	0	0	17	0	0	0
Boro	52	0	0	29	5	0	1
Subtotal	189	0	0	84	5	0	5
Kakamega							
Ikoromani	33	0	0	27	0	0	0
Malava	47	0	0	37	0	0	0
Butere	36	0	0	15	0	0	0
Subtotal	116	0	0	79	0	0	0
Total	305	0	0	163	5	0	5

NOTE: Breed data for Visits 2 and 3 are inconsistent in some cases with data for Visit 1.

Table 6

Average Weight (kg) of Animals Sampled by Species, Sex, Estimated Age (Number of Teeth), and Visit

Species, Area and Age	Visit 1		Visit 2		Visit 3	
	Male	Female	Male	Female	Male	Female
Goats						
Siaya						
Prior to weaning	15.6	14.4	22.1	17.2	22.6	16.0
Young animal	27.0	19.1	35.0	23.9	25.8	22.8
Mature animal	29.7	27.1	33.1	27.9	31.7	27.4
Kakamega						
Prior to weaning	17.1	14.9	21.0	16.4	19.7	11.3
Young animal	-	20.8	31.5	28.0	23.3	20.4
Mature animal	34.0	28.0	44.5	28.0	40.0	27.5
Sheep						
Siaya						
Prior to weaning	14.5	16.1	21.1	20.7	22.0	20.0
Young animal	21.0	20.8	23.0	19.8	27.0	24.1
Mature animal	27.0	24.6	24.8	25.1	23.7	24.9
Kakamega						
Prior to weaning	22.0	19.7	27.0	23.9	30.0	27.0
Young animal	23.5	25.0	25.0	25.8	25.5	24.8
Mature animal	28.7	26.9	33.0	28.6	-	27.2

NOTE: 0,1 teeth = Prior to weaning
2 teeth = Young animal
4 or more teeth = Mature animal

Table 7a

Reproductive Status of Female Goats by Province and Visit

	Visit 1						Visit 2						Visit 3					
Province	0	1	2	3	5	7	0	1	2	3	5	7	0	1	2	3	5	7
Siaya																		
Bondo	19	27	29	1	0	1	18	22	16	1	1	0	3	18	37	2	0	0
Yala	5	8	12	0	0	0	6	8	14	0	0	0	0	14	8	1	0	0
Boro	10	13	13	0	0	0	2	6	26	1	0	0	0	4	22	0	0	0
Subtotal	34	48	54	1	0	1	26	36	56	2	1	0	3	36	67	3	0	0
Kakamega																		
Ikoromani	5	6	13	0	0	0	1	12	5	0	0	0	0	5	10	0	0	0
Malava	7	21	8	0	0	2	1	8	20	0	0	0	0	6	20	0	0	0
Butere	10	4	15	0	0	0	0	2	25	0	0	0	0	4	16	1	0	0
Subtotal	22	31	36	0	0	2	2	22	50	0	0	0	0	15	46	1	0	0
Total	56	79	90	1	0	3	28	58	106	2	1	0	3	51	113	4	0	0

NOTE: 0 = Suckling
1 = Pregnant
2 = Non-pregnant
3 = Vulval discharge
5 = Other lesions
7 = Aborted

Table 7b

Reproductive Status of Female Sheep by Province and Visit

	Visit 1				Visit 2				Visit 3			
Province	0	1	2	7	0	1	2	4	0	1	2	5
Siaya												
Bondo	7	12	9	0	8	6	6	0	1	11	10	0
Yala	2	6	3	0	0	2	9	0	0	1	9	0
Boro	4	14	8	0	3	6	14	0	0	1	14	0
Subtotal	13	32	20	0	11	14	29	0	1	13	33	0
Kakamega												
Ikoromani	3	8	8	1	2	3	2	1	1	2	2	1
Malava	6	15	8	0	0	5	18	0	0	6	16	0
Butere	6	1	6	0	0	3	5	0	0	0	5	0
Subtotal	15	24	22	1	2	11	25	1	1	8	23	1
Total	28	56	42	1	13	25	54	1	2	21	56	1

NOTE: 0 = Suckling
1 = Pregnant
2 = Non-pregnant
4 = Prolapse
5 = Other lesions
7 = Aborted

Table 8a

Female Goats Sampled in Siaya by Estimated Age (Number of Teeth), Number of Offspring, and Visit

	Visit 1			Visit 2			Visit 3		
Number of Offspring	Prior to Weaning	Young	Mature	Prior to Weaning	Young	Mature	Prior to Weaning	Young	Mature
0	34	12	13	14	3	31	5	6	64
1	0	3	45	0	1	13	0	2	26
2	0	0	13	0	0	5	0	1	4
3	0	0	0	0	0	0	0	0	0
8	0	3	11	0	0	0	0	0	0

NOTE: Offspring 0-3 = Actual number
8 = Offspring died
Age 0,1 teeth = Prior to weaning
2 teeth = Young animal
3, 4, 5, 6, 7, 8 = Mature animals

Table 8b

Female Goats Sampled in Kakamega by Estimated Age (Number of Teeth), Number of Offspring, and Visit

	Visit 1			Visit 2			Visit 3		
Number of Offspring	Prior to Weaning	Young	Mature	Prior to Weaning	Young	Mature	Prior to Weaning	Young	Mature
0	26	4	5	13	5	38	4	8	35
1	0	7	34	0	1	3	0	2	12
2	0	0	8	0	0	5	0	0	0
3	0	0	0	0	0	0	0	0	0
8	0	0	1	0	0	0	0	0	0

NOTE: Offspring 0-3 = Actual number
8 = Offspring died
Age 0,1 teeth = Prior to weaning
2 teeth = Young animal
3, 4, 5, 6, 7, 8 = Mature animals

Table 8c

Female Sheep Sampled in Siaya by Estimated Age (Number of Teeth), Number of Offspring, and Visit

	Visit 1			Visit 2			Visit 3		
Number of Offspring	Prior to Weaning	Young	Mature	Prior to Weaning	Young	Mature	Prior to Weaning	Young	Mature
0	15	7	0	5	5	11	3	7	29
1	0	3	31	0	2	6	0	1	6
2	0	0	0	0	0	3	0	0	0
3	0	0	0	0	0	0	0	0	0
8	0	1	2	0	0	0	0	0	0

NOTE: Offspring 0-3 = Actual number
8 = Offspring died
Age 0,1 teeth = Prior to weaning
2 teeth = Young animal
3, 4, 5, 6, 7, 8 = Mature animals

Table 8d

Female Sheep Sampled in Kakamega by Estimated Age (Number of Teeth), Number of Offspring, and Visit

	Visit 1			Visit 2			Visit 3		
Number of Offspring	Prior to Weaning	Young	Mature	Prior to Weaning	Young	Mature	Prior to Weaning	Young	Mature
0	22	3	2	8	4	17	2	5	15
1	0	2	28	0	0	1	0	3	8
2	0	0	1	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0

NOTE: Offspring 0-3 = Actual number
8 = Offspring died
Age 0,1 teeth = Prior to weaning
2 teeth = Young animal
3, 4, 5, 6, 7, 8 = Mature animals

Table 9a

Number of Teeth for Male Goats by Province and Visit

	Visit 1							Visit 2							Visit 3						
Province	0	2	4	5	6	3,7	8	0	2	4	5	6	3,7	8	0	2	4	5	6	3,7	8
Siaya																					
Bondo	17	1	0	0	0	1	3	7	0	0	0	0	1	2	4	3	1	0	0	1	1
Yala	4	1	0	0	0	1	2	1	0	2	0	0	0	1	1	0	0	0	0	0	2
Boro	11	1	1	0	1	0	2	4	1	1	0	0	0	4	0	2	1	0	2	0	3
Subtotal	32	3	1	0	1	2	7	12	1	3	0	0	1	7	5	5	2	0	2	1	6
Kakamega																					
Ikoromani	9	0	0	0	0	0	0	3	1	0	0	0	0	0	1	0	1	0	0	0	0
Malava	6	0	2	0	0	0	1	5	1	0	0	0	0	2	1	1	0	0	1	0	1
Butere	5	0	0	0	0	0	1	4	0	0	0	0	0	0	1	2	0	0	0	0	0
Subtotal	20	0	2	0	0	0	2	12	2	0	0	0	0	2	3	3	1	0	1	0	1
Total	52	3	3	0	1	2	9	24	3	3	0	0	1	9	8	8	3	0	3	1	7

NOTE: 0 = Prior to weaning
2 = 2 teeth
4 = 4 teeth
5 = Aged
6 = 6 teeth
3,7 = Broken or missing teeth
8 = Full mouth

Visit 1 21.4% mature animals (4 teeth or more)
Visit 2 32.5% mature animals (4 teeth or more)
Visit 3 46.6% mature animals (4 teeth or more)

Table 9b

Number of Teeth for Female Goats by Province and Visit

	Visit 1							Visit 2							Visit 3						
Province	0	2	4	5	6	3,7	8	0	2	4	5	6	3,7	8	0	2	4	5	6	3,7	8
Siaya																					
Bondo	19	11	2	7	10	2	28	9	5	8	2	4	0	35	2	7	9	3	3	0	36
Yala	6	3	3	0	1	0	13	8	0	2	0	0	1	16	2	1	3	0	1	0	16
Boro	9	4	7	1	0	0	15	7	2	4	2	1	0	18	1	1	4	2	6	0	11
Subtotal	34	18	12	8	11	2	56	24	7	14	4	5	1	69	5	9	16	5	10	0	63
Kakamega																					
Ikoromani	6	3	0	0	2	0	13	3	2	0	0	1	0	11	1	2	1	0	1	0	10
Malava	10	7	1	2	0	0	18	4	3	6	0	1	0	18	0	4	3	1	0	0	17
Butere	10	1	1	0	2	0	14	11	1	2	0	1	0	13	3	4	2	0	1	0	11
Subtotal	26	11	2	2	4	0	45	18	6	8	0	3	0	42	4	10	6	1	2	0	38
Total	60	29	14	10	15	2	101	42	13	22	4	8	1	111	9	19	22	6	12	0	101

NOTE: 0 = Prior to weaning
2 = 2 teeth
4 = 4 teeth
5 = Aged
6 = 6 teeth
3,7 = Broken or missing teeth
8 = Full mouth

Visit 1 61.5% mature animals (4 teeth or more)
Visit 2 72.6% mature animals (4 teeth or more)
Visit 3 83.4% mature animals (4 teeth or more)

Table 9c

Number of Teeth for Male Sheep by Province and Visit

	Visit 1							Visit 2							Visit 3						
Province	0	2	4	5	6	3,7	8	0	2	4	5	6	3,7	8	0	2	4	5	6	3,7	8
Siaya																					
Bondo	6	2	1	0	0	0	3	1	1	1	0	0	1	5	1	2	2	0	0	0	2
Yala	3	0	0	0	0	0	1	2	0	0	0	0	0	1	0	0	0	0	0	0	1
Boro	9	0	0	0	0	0	0	6	0	0	0	0	0	1	2	0	1	0	0	0	0
Subtotal	18	2	1	0	0	0	4	9	1	1	0	0	1	7	3	2	3	0	0	0	3
Kakamega																					
Ikoromani	2	2	1	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
Malava	7	0	0	0	0	0	1	4	1	0	0	0	0	1	1	2	0	0	0	0	0
Butere	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	11	2	1	0	0	0	2	5	2	1	0	0	0	1	1	2	0	0	0	0	0
Total	29	4	2	0	0	0	6	14	3	2	0	0	1	8	4	4	3	0	0	0	3

NOTE: 0 = Prior to weaning
2 = 2 teeth
4 = 4 teeth
5 = Aged
6 = 6 teeth
3,7 = Broken or missing teeth
8 = Full mouth

Visit 1 19.5% mature animals (4 teeth or more)
Visit 2 37.0% mature animals (4 teeth or more)
Visit 3 43.9% mature animals (4 teeth or more)

Table 9d

Number of Teeth for Female Sheep by Province and Visit

	Visit 1							Visit 2							Visit 3						
Province	0	2	4	5	6	3,7	8	0	2	4	5	6	3,7	8	0	2	4	5	6	3,7	8
Siaya																					
Bondo	11	5	0	3	0	0	11	5	3	2	1	0	0	9	3	4	2	0	0	0	12
Yala	0	3	0	0	0	0	10	1	2	1	0	0	0	7	0	2	0	1	0	0	7
Boro	4	3	4	0	0	0	14	1	3	4	0	1	0	11	0	2	2	0	3	0	8
Subtotal	15	11	4	3	0	0	35	7	8	7	1	1	0	27	3	8	4	1	3	0	27
Kakamega																					
Ikoromani	6	4	0	0	0	0	10	3	0	0	0	1	0	5	2	0	0	0	0	0	4
Malava	9	1	0	0	0	0	19	5	2	1	0	0	0	16	0	5	2	0	0	0	15
Butere	7	0	0	0	0	0	6	4	2	0	0	0	0	3	0	3	0	0	0	0	2
Subtotal	22	5	0	0	0	0	35	12	4	1	0	1	0	24	2	8	2	0	0	0	21
Total	37	16	4	3	0	0	70	19	12	8	1	2	0	51	5	16	6	1	3	0	48

NOTE: 0 = Prior to weaning
2 = 2 teeth
4 = 4 teeth
5 = Aged
6 = 6 teeth
3,7 = Broken or missing teeth
8 = Full mouth

Visit 1 59.2% mature animals (4 teeth or more)
Visit 2 66.7% mature animals (4 teeth or more)
Visit 3 73.4% mature animals (4 teeth or more)

Table 10a

General Condition of Goats Sampled by Province and Visit

	Visit 1				Visit 2				Visit 3			
Province	0	1	2	3	0	1	2	3	0	1	2	3
Siaya												
Bondo	29	59	12	2	52	32	7	0	52	11	7	0
Yala	14	17	4	0	14	15	4	0	11	12	3	0
Boro	18	33	1	0	26	17	3	0	27	6	1	0
Subtotal	61	109	17	2	92	64	14	0	90	29	11	0
Kakamega												
Ikoromani	22	11	0	0	23	1	1	0	16	1	0	0
Malava	25	22	0	0	27	12	2	0	19	9	1	1
Butere	12	20	2	2	14	12	6	0	15	6	4	0
Subtotal	59	53	2	2	64	25	9	0	50	16	5	1
Total	120	162	19	4	156	89	23	0	140	45	16	1

NOTE: 0 = Normal
1 = Moderate
2 = Poor
3 = Emaciated

Means

	Visit 1	Visit 2	Visit 3
Siaya	.8	.5	.4
Kakamega	.5	.4	.4

Table 10b

General Condition of Sheep Sampled by Province and Visit

	Visit 1				Visit 2				Visit 3			
Province	0	1	2	3	0	1	2	3	0	1	2	3
Siaya												
Bondo	1	25	15	1	11	8	13	0	15	14	0	0
Yala	6	10	0	1	9	3	2	0	2	7	1	1
Boro	8	17	8	2	16	18	4	0	6	11	1	0
Subtotal	15	52	23	4	36	29	19	0	23	32	2	1
Kakamega												
Ikoromani	12	9	4	2	10	3	0	0	3	2	1	0
Malava	12	20	5	0	13	14	5	0	15	8	2	0
Butere	5	10	0	0	3	4	2	0	3	1	1	0
Subtotal	29	39	9	2	26	21	7	0	21	11	4	0
Total	44	91	32	6	62	50	26	0	44	43	6	1

NOTE: 0 = Normal
1 = Moderate
2 = Poor
3 = Emaciated

Means

	Visit 1	Visit 2	Visit 3
Siaya	1.2	.8	1.5
Kakamega	1.0	.7	.6

Table 11a

Skin Condition of Goats Sampled by Province and Visit

	Visit 1						Visit 2					Visit 3		
Province	0	1	2	3	4	6	0	1	3	4	5	0	2	5
Siaya														
Bondo	87	3	2	9	1	0	68	2	1	0	1	69	0	1
Yala	35	0	0	0	0	0	29	0	0	0	0	26	0	0
Boro	52	0	0	0	0	0	43	0	1	0	0	34	0	0
Subtotal	174	3	2	9	1	0	140	2	2	0	1	129	0	1
Kakamega														
Ikoromani	31	0	0	0	1	1	20	1	0	0	0	16	1	0
Malava	47	0	0	0	0	0	34	0	0	0	0	30	0	0
Butere	35	0	0	1	0	0	29	1	0	1	0	25	0	0
Subtotal	113	0	0	1	1	1	83	2	0	1	0	71	1	0
Total	287	3	2	10	2	1	223	4	2	1	1	200	1	1

NOTE: 0 = Normal
1 = Poor
2 = Wounds
3 = Alopecia
4 = Single abscess
5 = Multiple abscess
6 = Numerous abscesses

Table 11b

Skin Condition of Sheep Sampled by Province and Visit

	Visit 1			Visit 2			Visit 3	
Province	0	1	3	0	1	4	0	3
Siaya								
Bondo	36	2	4	29	1	0	29	0
Yala	17	0	0	13	0	1	11	0
Boro	34	0	1	27	0	0	17	1
Subtotal	87	2	5	69	1	1	57	1
Kakamega								
Ikoromani	25	1	0	9	0	0	6	0
Malava	37	0	0	26	0	0	25	0
Butere	15	0	0	9	0	0	4	1
Subtotal	78	1	0	44	0	0	35	1
Total	165	3	5	110	1	1	92	2

NOTE: 0 = Normal
1 = Poor
2 = Wounds
3 = Alopecia
4 = Single abscess
5 = Multiple abscess
6 = Numerous abscesses

Table 12a

Fecal Condition of Goats Sampled by Province and Visit

	Visit 1			Visit 2			Visit 3		
Province	0	1	2	0	1	2	0	1	2
Siaya									
Bondo	95	4	0	68	2	0	67	2[a]	0
Yala	16	13	0	18	6	0	26	0	0
Boro	31	11	1	41	1	0	34	0	0
Subtotal	142	28	1	127	9	0	127	2	0
Kakamega									
Ikoromani	22	7	0	21	0	0	13	2[b]	0
Malava	27	14	1	33	0	0	30	0	0
Butere	26	5	4	25	1	1	24	1[c]	0
Subtotal	75	26	5	79	1	1	67	3	0
Total	217	54	6	206	10	1	194	5	0

NOTE: 0 = Normal
1 = Loose feces
2 = Diarrhea

[a]These animals had worm counts of 700 and 1,000, coded normal for general condition on first animal and poor on second animal.

[b]These animals had worm counts of 400 and no data--both were coded normal for general condition.

[c]This animal had no data for worm count and was coded poor for general condition.

Table 12b

Fecal Condition of Sheep Sampled by Province and Visit

	Visit 1			Visit 2			Visit 3		
Province	0	1	2	0	1	2	0	1	2
Siaya									
Bondo	30	3	1	28	2	0	28	0	0
Yala	14	0	0	9	3	0	11	0	0
Boro	24	5	0	24	0	0	18	0	0
Subtotal	68	8	1	61	5	0	57	0	0
Kakamega									
Ikoromani	20	3	1	6	0	0	5	1[a]	0
Malava	24	5	0	22	0	0	24	0	0
Butere	8	3	0	8	0	0	5	0	0
Subtotal	52	11	1	36	0	0	34	1	0
Total	120	19	2	97	5	0	91	1	0

NOTE: 0 = Normal
1 = Loose feces
2 = Diarrhea

[a]This animal had a worm count of 0 and a general condition code of moderate.

Table 13a

Eye Condition for Goats by Province and Visit

	Visit 1		Visit 2				Visit 3			
Province	0	3	0	1	2	3	0	1	2	3
Siaya										
Bondo	102	0	69	2	1	0	67	2	1	0
Yala	35	0	28	1	0	0	26	0	0	0
Boro	50	2	42	0	0	2	32	0	0	2
Subtotal	187	2	139	3	1	2	125	2	1	2
Kakamega										
Ikoromani	33	0	21	0	0	0	17	0	0	0
Malava	47	0	34	0	0	0	30	0	0	0
Butere	36	0	31	0	0	0	25	0	0	0
Subtotal	116	0	86	0	0	0	72	0	0	0
Total	303	2	225	3	1	2	197	2	1	2

NOTE: 0 = Normal
1 = Ocular discharge
2 = Keratitis
3 = Blind

Table 13b

Eye Condition for Sheep by Province and Visit

	Visit 1	Visit 2		Visit 3	
Province	0	0	1	0	2
Siaya					
Bondo	42	29	1	29	0
Yala	17	14	0	11	0
Boro	35	27	0	17	1
Subtotal	94	70	1	57	1
Kakamega					
Ikoromani	27	8	0	6	0
Malava	37	26	0	25	0
Butere	15	9	0	5	0
Subtotal	79	43	0	36	0
Total	173	113	1	93	1

NOTE: 0 = Normal
1 = Ocular discharge
2 = Keratitis

Table 14a

Mucous Membrane Condition for Goats by Province and Visit

	Visit 1		Visit 2		Visit 3
Province	0	1	0	1	0
Siaya					
Bondo	102	0	72	0	70
Yala	35	0	27	2	26
Boro	52	0	44	0	34
Subtotal	189	0	143	2	130
Kakamega					
Ikoromani	33	0	21	0	17
Malava	47	0	34	0	30
Butere	34	2	31	0	25
Subtotal	114	2	86	0	72
Total	303	2	229	2	202

NOTE: 0 = Normal
1 = Pallor

Table 14b

Mucous Membrane Condition for Sheep by Province and Visit

	Visit 1		Visit 2		Visit 3	
Province	0	1	0	1	0	1
Siaya						
Bondo	42	0	28	2	29	0
Yala	17	0	14	0	11	0
Boro	35	0	27	0	17	1
Subtotal	94	0	69	2	57	1
Kakamega						
Ikoromani	27	0	9	0	6	0
Malava	37	0	26	0	25	0
Butere	15	0	9	0	5	0
Subtotal	79	0	44	0	36	0
Total	173	0	113	2	93	1

NOTE: 0 = Normal
1 = Pallor

Table 15a

Lymph Nodes for Goats by Province and Visit

	Visit 1						Visit 2		Visit 3			
Province	0	1	2	3	4	5	0	1	0	1	4	5
Siaya												
Bondo	86	13	0	1	1	1	54	18	51	17	1	1
Yala	34	1	0	0	0	0	26	3	25	1	0	0
Boro	50	2	0	0	0	0	41	3	31	3	0	0
Subtotal	170	16	0	1	1	1	121	24	107	21	1	1
Kakamega												
Ikoromani	29	2	0	0	0	1	20	1	17	0	0	0
Malava	47	0	0	0	0	0	34	0	30	0	0	0
Butere	35	0	1	0	0	0	31	0	25	0	0	0
Subtotal	111	2	1	0	0	1	85	1	72	0	0	0
Total	281	18	1	1	1	2	206	25	179	21	1	1

NOTE: 0 = 0-2 cm
1 = 2-4 cm
2 = 4-6 cm
3 = 6 or more cm
4 = Single enlargement
5 = Multiple enlargement

Table 15b

Lymph Nodes for Sheep by Province and Visit

	Visit 1		Visit 2		Visit 3	
Province	0	1	0	1	0	1
Siaya						
Bondo	41	0	29	1	28	1
Yala	17	0	14	0	11	0
Boro	34	1	27	0	18	0
Subtotal	92	1	70	1	57	1
Kakamega						
Ikoromani	27	0	8	0	6	0
Malava	37	0	26	0	25	0
Butere	15	0	9	0	5	0
Subtotal	79	0	43	0	36	0
Total	171	1	113	1	93	1

NOTE: 0 = 0-2 cm
1 = 2-4 cm

Table 16a

Respiratory Condition for Goats by Province and Visit

	Visit 1			Visit 2			Visit 3	
Province	0	1	2	0	1	2	0	1
Siaya								
Bondo	92	9	1	70	2	0	67	3
Yala	35	0	0	28	1	0	25	0
Boro	49	0	3	42	0	2	33	1
Subtotal	176	9	4	140	3	2	125	4
Kakamega								
Ikoromani	33	0	0	21	0	0	17	0
Malava	47	0	0	34	0	0	30	0
Butere	35	0	1	31	0	0	25	0
Subtotal	115	0	1	86	0	0	72	0
Total	291	9	5	226	3	2	197	4

NOTE: 0 = Normal
1 = Nasal discharge
2 = Cough/sneeze

Table 16b

Respiratory Condition for Sheep by Province and Visit

	Visit 1			Visit 2		Visit 3		
Province	0	1	2	0	1	0	1	2
Siaya								
Bondo	31	11	0	21	9	28	1	0
Yala	16	1	0	14	0	10	1	0
Boro	23	9	3	27	0	16	2	0
Subtotal	70	21	3	62	9	54	4	0
Kakamega								
Ikoromani	26	0	1	8	0	5	0	1
Malava	36	1	0	26	0	25	0	0
Butere	10	5	0	7	2	5	0	0
Subtotal	72	6	1	41	2	35	0	1
Total	142	27	4	103	11	89	4	1

NOTE: 0 = Normal
1 = Nasal discharge
2 = Cough/sneeze

Table 17a

Condition of Udder in Female Goats Sampled by Province and Visit

	Visit 1						Visit 2						Visit 3					
	0	1	3	5	6	8	0	1	3	5	6	8	0	1	3	5	6	8
Siaya																		
Bondo	20	30	1	0	0	25	18	25	0	1	1	16	27	28	0	0	1	4
Yala	10	6	0	0	0	11	9	9	0	0	0	7	7	15	0	0	0	1
Boro	13	7	0	0	0	16	11	15	0	0	0	8	14	9	0	0	0	3
Subtotal	43	43	1	0	0	52	38	49	0	1	1	31	48	52	0	0	1	8
Kakamega																		
Ikoromani	11	5	0	0	0	8	4	9	0	0	0	4	8	5	0	0	0	2
Malava	14	12	0	0	0	12	8	16	0	0	0	5	13	12	0	0	0	1
Butere	11	4	0	0	0	14	4	9	0	0	0	14	5	11	0	0	0	5
Subtotal	36	21	0	0	0	34	16	34	0	0	0	23	26	28	0	0	0	8
Total	79	64	1	0	0	86	54	83	0	1	1	54	74	80	0	0	1	16

NOTE: 0 = Normal
1 = Dry
3 = Indurated
5 = Swelling
6 = Wounds
8 = Immature

Table 17b

Condition of Udder in Female Sheep Sampled by Province and Visit

	Visit 1				Visit 2				Visit 3			
	0	1	2	8	0	1	2	8	0	1	2	8
Siaya												
Bondo	4	13	0	13	2	18	0	1	2	18	0	2
Yala	2	9	0	2	2	7	1	1	3	7	0	0
Boro	8	11	0	7	4	10	0	3	7	8	0	0
Subtotal	14	33	0	22	8	35	1	5	12	33	0	2
Kakamega												
Ikoromani	5	6	0	10	1	5	0	1	2	3	0	1
Malava	8	11	0	10	8	10	0	5	8	12	0	2
Butere	3	3	0	7	0	7	0	2	3	2	0	0
Subtotal	16	20	0	27	9	22	0	8	13	17	0	3
Total	30	53	0	49	17	57	1	13	25	50	0	5

NOTE: 0 = Normal
1 = Dry
2 = Altered milk
8 = Immature

Table 18a

Presence of Streptothricosis in Goats Sampled by Province and Visit

	Visit 1		Visit 2		Visit 3	
Province	Present	Absent	Present	Absent	Present	Absent
Siaya						
Bondo	0	102	5	67	1	68
Yala	0	35	2	27	1	25
Boro	0	52	0	44	0	34
Subtotal	0	189	7	138	2	127
Kakamega						
Ikoromani	0	33	1	20	0	17
Malava	0	47	0	34	2	28
Butere	0	36	4	27	0	25
Subtotal	0	116	5	81	2	70
Total	0	305	12	219	4	197

Table 18b

Presence of Streptothricosis in Sheep Sampled by Province and Visit

	Visit 1		Visit 2		Visit 3	
Province	Present	Absent	Present	Absent	Present	Absent
Siaya						
Bondo	0	41	1	29	0	29
Yala	0	17	0	14	0	11
Boro	0	35	0	27	0	18
Subtotal	0	93	1	70	0	58
Kakamega						
Ikoromani	0	27	0	9	0	6
Malava	0	37	0	26	1	24
Butere	0	15	0	9	0	5
Subtotal	0	79	0	44	1	35
Total	0	172	1	114	1	93

Table 19a

Limb Ailment for Goats by Visit and Province

	Visit 1			Visit 2				Visit 3		
Province	0	1	2	0	1	2	4	0	1	4
Siaya										
Bondo	101	0	0	63	0	2	7	68	0	0
Yala	29	0	1	14	2	2	7	15	0	6
Boro	51	0	0	38	0	0	1	27	0	1
Subtotal	181	0	1	115	2	4	15	110	0	7
Kakamega										
Ikoromani	32	1	0	14	3	1	3	16	1	0
Malava	47	0	0	33	1	0	0	30	0	0
Butere	35	0	0	30	1	0	0	24	1	0
Subtotal	114	1	0	77	5	1	3	70	2	0
Total	295	1	1	192	7	5	18	180	2	7

NOTE: 0 = Normal
1 = Deformity
2 = Foot rot
3 = Foot abscess
4 = Fracture

Table 19b

Limb Ailment for Sheep by Visit and Province

	Visit 1		Visit 2				Visit 3	
Province	0	1	0	1	2	4	0	1
Siaya								
Bondo	42	0	24	6	0	0	29	0
Yala	16	1	9	3	1	0	10	1
Boro	34	1	26	1	0	0	16	2
Subtotal	92	2	59	10	1	0	55	3
Kakamega								
Ikoromani	27	0	7	2	0	0	6	0
Malava	37	0	25	0	0	1	24	1
Butere	15	0	9	0	0	0	5	0
Subtotal	79	0	41	2	0	1	35	1
Total	171	2	100	12	1	1	90	4

NOTE: 0 = Normal
1 = Deformity
2 = Foot rot
3 = Foot abscess
4 = Fracture

Table 20a

Number of Ticks Counted on Goats Sampled by Province and Visit

	Visit 1					Visit 2			Visit 3		
Province	0	1	2	3	4	0	1	2	0	1	2
Siaya											
Bondo	1	42	46	12	1	5	60	7	2	41	27
Yala	15	11	7	2	0	8	19	2	5	16	5
Boro	3	34	15	0	0	11	33	0	2	30	2
Subtotal	19	87	68	14	1	24	112	9	9	87	34
Kakamega											
Ikoromani	33	0	0	0	0	14	6	0	16	1	0
Malava	43	4	0	0	0	30	4	0	26	4	0
Butere	11	22	2	0	0	20	11	0	22	3	0
Subtotal	87	26	2	0	0	64	21	0	64	8	0
Total	106	113	70	14	1	88	133	9	73	95	34

Note: 0 = None
1 = 1-10
2 = 11-50
3 = 50-100
4 =100 or more

Table 20b

Number of Ticks Counted on Sheep Sampled by Province and Visit

	Visit 1					Visit 2			Visit 3			
Province	0	1	2	3	4	0	1	2	0	1	2	3
Siaya												
Bondo	0	22	13	5	2	3	26	1	1	17	11	0
Yala	3	5	5	3	1	0	13	1	6	4	0	1
Boro	1	30	4	0	0	6	20	0	3	14	1	0
Subtotal	4	57	22	8	3	9	59	2	10	35	12	1
Kakamega												
Ikoromani	25	1	1	0	0	3	5	0	4	2	0	0
Malava	34	3	0	0	0	23	3	0	21	4	0	0
Butere	3	11	1	0	0	6	3	0	1	4	0	0
Subtotal	62	15	2	0	0	32	11	0	26	10	0	0
Total	66	72	24	8	3	41	70	2	36	45	12	1

Note: 0 = None
1 = 1-10
2 = 11-50
3 = 50-100
4 =100 or more

Table 21a

Number of Fleas Counted on Goats Sampled by Province and Visit

	Visit 1					Visit 2		Visit 3		
Province	0	1	2	3	4	0	1	0	1	2
Siaya										
Bondo	73	3	8	9	9	63	8	56	11	3
Yala	35	0	0	0	0	28	1	25	1	0
Boro	52	0	0	0	0	43	0	34	0	0
Subtotal	160	3	8	9	9	134	9	115	12	3
Kakamega										
Ikoromani	33	0	0	0	0	21	0	17	0	0
Malava	47	0	0	0	0	34	0	30	0	0
Butere	36	0	0	0	0	31	0	25	0	0
Subtotal	116	0	0	0	0	86	0	72	0	0
Total	276	3	8	9	9	220	9	187	12	3

Note: 0 = None
1 = 1-10
2 = 11-50
3 = 50-100
4 =100 or more

Table 21b

Number of Fleas Counted on Sheep Sampled by Province and Visit

	Visit 1					Visit 2		Visit 3	
Province	0	1	2	3	4	0	1	0	1
Siaya									
Bondo	30	5	4	2	1	26	4	23	6
Yala	17	0	0	0	0	14	0	11	0
Boro	35	0	0	0	0	26	0	18	0
Subtotal	82	5	4	2	1	66	4	52	6
Kakamega									
Ikoromani	27	0	0	0	0	8	0	6	0
Malava	37	0	0	0	0	26	0	25	0
Butere	15	0	0	0	0	9	0	5	0
Subtotal	79	0	0	0	0	43	0	36	0
Total	161	5	4	2	1	109	4	88	6

Note: 0 = None
1 = 1-10
2 = 11-50
3 = 50-100
4 =100 or more

Table 22

Data on Other Variables: Testicular Conditions, Lice, Keds, and ORF

A. Testicular conditions

All male goats and sheep in the sample for visits 1, 2 and 3 were marked as having normal testes.

B. Lice

No sheep in the sample and only 3 goats were marked as having lice. One goat in Bondo had 11-50 lice (visit 2) and two goats in Yala had 11-50 lice on visit 3.

C. Keds

No sheep or goats in the sample were marked as having any keds.

D. ORF

Two farms in Kakamega on visit 3 had a total of 17 cases of ORF (12 goats, 5 sheep).