Continental J. Veterinary Sciences 2: 33 - 37, 2008

INCIDENCE OF FOOTROT INFECTION IN SHEEP AND GOATS IN MINNA

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ABSTRACT
The incidence of footrot infection in sheep and goats was studied in the University Research Farm, Federal University of Technology, Minna, Nigeria for a period of one year. The percentage number of animals affected in the herd was 32.6% and 32.4% for both sheep and goats respectively. Infection was found to be more prevalent during the wet season of the year. The source of infection was linked to different market areas within Niger state where the animals were purchased and brought to the farm at different times. All the animals used in the experiment were managed through semi-intensive system. The experiment tends to reveal that through supplementary feeding coupled with the treatment, the weight of the animals appreciated. It was discovered that treatment methods using antibiotics, like penicillin-streptomycin at a higher dose combined with feet trimming gave the best result of 62.5% and 66.6% cure respectively, while the other method using same antibiotic at a lower dose combined with foot bath gave a lower result of 28.5% and 50% cure for both sheep and goats respectively.

KEYWORDS: Footrot, penicillin-streptomycin, feet trimming, foot bath, supplementary feeding, 10% copper sulphate, Gram stain.

INTRODUCTION

Footrot is an infectious disease of ruminants particularly sheep, cattle and goats which causes severe lameness and economic loss from decreased flock production.

It is caused by an interaction of two anaerobic gram negative (G-ve) bacteria, *Bacteroides nodosus* (formerly *Fusiformis nodosus)* and *Fusobacterium necrophorum* (formerly *Spaherophorus necrophorus). Fusobacterium necrophorum* is a normal inhabitant of the ruminant digestive tract and in wet weather may interact with another organism, *corynebacterium pyogenes*, to produce foot scald, an infection of the skin between the toes. This infection sets up the foot for invasion by *bacteroides nodosus*, which working in conjunction with the *fusobacterium*, produces the condition referred to as footrot.

Footrot is a costly disease in ruminant livestock population particularly during the wet season. Treatment, costs of labour, drugs and equipment, decreased flock productivity, losses from sales of breeding stock etc make this disease of economic importance for producers (Dee, 1996).

Introducing an infected animal into a non-contaminated herd can create herd contamination. The causative agents can also be carried to the soil on visitors' boots. The disease causes stress to the animals and can affect weight gain, reproductive rates and wool production. Therefore, such conditions as this which tend to limit livestock production ought to be given adequate attention in terms of control and preventive measures such that livestock production particularly in Niger State will be able to meet up the protein needs of the society (FDLPC, 1992).

This study was therefore carried out to determine the best treatment approach to footrot and equally to observe the response of the animals to supplementary feed, as indicated by Said and Tolera (1993) that good quality roughage and legume tends to increase intake, and digestibility (Roger *et al.*, 1999).

MATERIALS AND METHODS

This study was carried out in the University Research Farm, Federal University Technology, Minna, Nigeria from May, 2007 to April, 2008. The animals were purchased from Beji, Mariga and Tunga Mallam livestock markets in

Niger state. The animals were managed through semi intensive system. They were usually released for grazing from 10am to 3.30pm and returned to their pens daily and supplementary feed was usually supplied ad-libitum along with salt licks. The pen was well ventilated through side windows and illumination was enhanced by use of electricity. The animals were routinely dewormed using albendazole.

A total of 46 sheep (Yankasa breed) and 37 goats (Sokoto brown breed) were kept in the farm. Each specie of animals were kept separately in different pens. The floors of the pens were not (cemented as such they were muddy particularly during the raining season.

In all these animals, particular attention was paid to the following clinical signs, limping, holding of limbs above the ground, reluctance to walk, presence of pus and foul smell from the interdigital spaces and possible loss of appetite. Samples of pus obtained from the interdigital spaces were taken to the state veterinary centre Bosso, Minna for bacteriological examination using Gram stain method. The affected animals were culled from the various pens and divided into two treatment groups. Each of the treatment group was further divided into two replicates. 15 sheep were divided into two replicates of 8 and 7 sheep while 12 goats were divided into two replicates of 6 goats each.

Two treatment methods were used in the management of the affected animals using penicillin-streptomycin (4ml/10kg body weight) combined with feet trimming and at (3ml/10kg body weight) of the same drug combined with foot bath using 10% $CuSO_4$ respectively for 2 weeks. Responses to treatment were monitored for about 4 weeks in order to assess the level of response of the animals to each of the treatment methods.

At the end of the experiment, the results obtained were subjected to descriptive statistical analysis using percentage to determine the extent of cure of each of the treatment methods.

Table 1 Composition of Supplementary Feed

Ingredients	% Level of Inclusion
Groundnut hay	25
Maize bran	35
G/N cake	10
Beans haulms	30
Total	100kg

Table 2 Average Feed Intake of Sheep and Goats (kg)

GRP A (Sheep)					GRP B (Goats)			
Period	R1	R2	$\bar{X}$	FCE	R1	R2	$\bar{X}$	FCE
1st Week May-July	4.1	3.9	4.0	0.30	3.1	2.8	2.95	0.32
2nd Week Aug. – Sept.	5.2	5.4	5.3	0.38	4.2	4.2	4.2	0.44
3rd Week Nov. – Jan.	6.5	6.6	6.6	0.48	4.3	4.4	4.35	0.43
4th Week Feb. – April	8.3	8.4	8.35	0.59	5.6	5.7	5.65	0.54
Total	24.1	24.3	24.2	0.31	17.2	17.1	17.15	0.30

Key

R1 = Replicate 1, R2 = Replicate 2, GRPA = Sheep, GRPB = Goats, $\bar{X}$ = Average

Table 3 Average Weekly Weight Gain (kg)

GRP A (Sheep)				GRP B (Goats)		
Period	R1	R2	$\bar{X}$	R1	R2	$\bar{X}$
1st Week May-July	13.1	13.20	13.15	9.01	9.10	9.10
2nd Week Aug. – Sept.	13.80	13.70	13.75	9.40	9.50	9.45
3rd Week Nov. – Jan.	14.4	14.1	14.25	10.01	10.03	10.02
4th Week Feb. – April	14.7	14.5	14.6	10.30	10.40	10.35

RESULTS AND DISCUSSION

The response of the animals in terms of feed intake and feed conversion efficiency is shown in Table 2. It revealed that as the treatment progresses feed intake progressively increased. This agrees with the findings of Ayoade *et al* (1999) that goat's performance is enhanced when fed solely or partially on legume feed or forage allowance.

Table 3 revealed that as the feed conversion efficiency amongst the animals tends to increase in this experiment, it thus translates to weight increase relatively, such that, for the sheep it increase from the initial weight of 13.15kg to 14.6kg, while for the goats it increase from 9.10kg to 10.25kg, this positive response might be similar to the findings of Galyean and Goestsch, (1993), that legume digestibility might be attributed to histological make up of legumes in that the majority of cell wall matrix of legumes are easily degraded and penetrated by microbial enzymes than that of the grasses which constitute majority of the feed picked up by the animals when released.

The result of the bacteriological examination obtained in Table 4 is similar to the earlier findings reported (Gyang *et al*, 1986), in which *fusobacterium* spp was observed from the pus that was cultured using Gram stain method.

The results of the two treatment methods used in this study for sheep and goats affected with footrot were expressed in simple percentages (Table 5). The use of penicillin-streptomycin at 4ml/10kg body weight combined with feet trimming gave the best result of 62.5 and 66.6% cure for sheep and goats while the use of the same antibiotic combined with foot bath using 10% $CuSO_4$ gave a lower result of 28.5% and 50% cure for sheep and goats respectively. The above findings agrees with earlier reports (Casey, 1988; Leite-Browning, 2007), that keeping feet trimmed of overgrown tissues will reduce mud and manure packing and decrease the chances of the survival of microorganisms since anaerobic environment will develop. Therefore, combining feet trimming with high dose of antibiotic at 4ml/10kg body weight has proven to give the best result. However, Helen (1990) reported that approximately 75% of the affected feet of sheep were completely healed when given antibiotic treatment without feet trimming with in 4 weeks.

Since the animals used in the study were purchased form different sources and introduced into the farm at different times, the infection might have been introduced through infected animals from where such animals may have been in the last 2 weeks before purchase (Egerton *et al*, 2002).

Environmental factors of rainfall, topography and soil type are known to influence the outbreak of footrot. The situation is such that the research farm is located in a muddy soil environment and the incidence of the disease was found to be high during the raining season which is in agreement with earlier findings (Dee, 1996), that footrot outbreaks occur often during persistent raining weather along with high temperature, when animals walk across wet pastures and muddy soil which are favourable for microbial growth and possible transmission.

Table 4 Morphological and Biochemical characteristics of Bacteria Isolates Found in Pus

					Sugar					
Morphology	Colour	Gram rxn	Catalase	Coagulase	Lactose	Sucrose	Glucose	Fructose	Maltose	organisms
Cocci in shape	Grayish	+	-	-	A	A	A	A	A	Streptococus spp
Long rod in chain and single	Whitish and pink	+	+	-	+	-	+	-	+	Lactobacillus spp
Cocci in cluster	Yellowish	+	+	+	+	A	A	A	A	Staphylococcus spp
Rod shaped	Reddish	-	+	-	A	A	A	A	A	Fusobacterium spp
Short rod	Grayish white	-	+	-	AG	A	AG	AG	A	e. COLI

Key: + = Positive Reaction, - = Negative Reaction, A = Acid Production, AG = Acid and Gas Production

Table 5 The Response of Sheep and Goats to Two Treatment Methods

Animal sp	Total No Herds	Total affected	Penstrep + hoof trimming Grp A	Penstrep + Foot bath. Grp B	No cured Grp A	No cured Grp B	% cured Grp A	% cured Grp B
Sheep	46	15	8	7	5	2	62.5	28.5
Goats	37	12	6	6	4	3	66.6	50

In conclusion, with the influx of livestock population, particularly small ruminants into Niger state from semi arid regions of the country as a result of desertification, more research efforts are needed in order to curb the rate of spread of diseases of economic importance such as footrot within the state thereby creating an enabling environment for optimal performance in livestock production.

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ACKNOWLEDGEMENT

Special acknowledgement goes to my research partner as well as Mal. Danjuma, the Head of Livestock Research Farm for the co-operation received throughout the period of this study.

Received for Publication: 03/11/2008
Accepted for Publication: 15/12/2008

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