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NUTRIENT DIGESTIBILITY, HAEMATOLOGY AND CARCASS EVALUATION OF INDIGENOUS WILD GUINEA FOWL (*NUMIDA MELEAGRIS GALEATA PALLAS*) FED GRADED LEVELS OF PROTEIN UNDER INTENSIVE MANAGEMENT.

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ABSTRACT
Nutrient digestibility, haematology and the carcass of indigenous wild guinea fowl reared under intensive management were evaluated for 20 weeks. The guinea fowl keets were randomly allotted to 4 treatments groups (designated as T_1, T_2, T_3 and T_4) of 2 replicates each. They were fed on a common starter diet containing 24%CP during the brooding period which lasted 8 weeks. After 8 weeks, the birds were fed diets containing 18%, 22%, 24% and 26%CP representing the various treatments. The keets fed the 24%CP diet were used as the control after the brooding period. Results show that the treatment significantly affected ($p<0.05$) dry matter (DM), crude protein (CP) and ether extract (EE) digestibility while crude fibre (CF) and Nitrogen free extract (NFE) digestibility were not affected ($p>0.05$) at the end of the experiment. The haematological indices measured were not affected ($p>0.05$) by the treatments. Evaluation of the cut-up parts of the carcass showed that the neck, drumstick, thigh, leg and head were not significantly affected ($p>0.05$) while the live weight, slaughtered weight, dressed weight, back, wing and breast were affected ($p<0.05$) by the treatment. It was concluded that feeding indigenous wild guinea fowls kept under intensive management graded levels of protein led to marked differences in their ability to utilize nutrients, their blood constitution as well as their carcass quality.

KEYWORDS: Nutrient digestibility, haematology, carcass, guinea fowl, graded level of protein, intensive management.

INTRODUCTION

Guinea fowl usually obtained from the wild are cherished and widely eaten by Nigerians mainly because of the distinctive flavour of both its meat and eggs (Ayeni and Ayanda, 1982; Okaeme, 1982). It is indigenous to West Africa mostly found north of the equatorial forest where they occupy the guinea savanna region. With an estimated population of 43 million in captivity in Nigeria (Ayeni, 1980) it represents a great potential as a source of meat and egg especially as the nation strive towards a speedy bridging of the protein deficiency inherent in its population. The bird is socially accepted and there is no religious taboo against its consumption. Its meat has a higher protein content (about 28%) compared to the 20% of the domestic fowl (Ayeni, 1980).

Guinea fowls are mostly kept under semi-intensive management. Ayeni (1980) opined that keets managed this way grow best on 20-24%CP diet and that it could be further reduced to 18%CP from the 8th week of age. Rearing guinea fowl commercially under semi-intensive management however exposes the keets to a lot of hazards. The intensive production of guinea fowls in Nigeria which is just beginning is likely to be accelerated as the birds' potential as an easy and quick grown source of meat and egg becomes more fully realized. Research into its biology and performance will provide opportunities for an increase in the commercial production of the bird (Ayorinde and Ayeni, 1983; Ayorinde and Okaeme, 1984). Most of the works carried out using guinea fowls are in the southern part of the country. There is a dearth of information therefore on how the birds will react to confinement in other parts of the country. This study was undertaken therefore to investigate the effect of feeding graded levels of protein on nutrient digestibility, haematology and carcass quality of indigenous wild guinea fowls reared under intensive management.

MATERIALS AND METHODS

The experiment which lasted 20 weeks was conducted in the poultry unit of the Department of Animal Production, School of Agriculture and Agricultural Technology of the Federal university of Technology Minna, Niger State, Nigeria. Minna lies within the southern guinea savanna area of Nigeria with an average annual rainfall of 1200mm.

Table 1: Dietary composition of experimental feed (%).

	Starter diet	Finisher diet			
		T_1	T_2	T_3	T_4
Ingredients	24	18	22	24	26
Maize	47.71	69.93	53.11	47.71	42.33
GNC	34.54	18.32	29.14	34.54	39.92
Rice bran	5.00	5.00	5.00	5.00	5.00
Fish meal	1.00	1.00	1.00	1.00	1.00
Blood meal	5.00	5.00	5.00	5.00	5.00
Oyster shell	2.50	2.50	2.50	2.50	2.50
Bone meal	3.50	3.50	3.50	3.50	3.50
Salt	0.50	0.50	0.50	0.50	0.50
Premix	0.25	0.25	0.25	0.25	0.25
Total	100.00	100.00	100.00	100.00	100.00
CP%	24.00	18.00	2.00	24.00	26.00
Energy (Kcal/kg)	3,100	3,100	3,100	3,100	3,100

Table 2: Average feed intake, body weight, body weight gain and feed Conversion efficiency of indigenous wild guinea fowl keets during brooding on starter diet.

Weeks	Average feed intake (g)	Average body weight (g)	Average body weight gain (g)	Feed conversion (%)
1	21.74	44.20	11.40	1.91
2	39.51	56.10	11.90	3.32
3	57.63	78.60	22.50	2.56
4	79.60	116.00	37.40	2.13
5	88.40	166.60	50.60	1.74
6	81.94	195.83	29.60	2.77
7	119.72	230.99	35.16	3.41
8	165.67	268.87	37.67	4.40

Source of feed and experimental diet

All the materials used for the experiment were sourced locally. These include: maize, groundnut cake (GNC), fish meal, bone meal, oyster shell; premixes were obtained from Pfizer feed. Four different isocaloric diets were formulated using these ingredients. These are a starter diet (with 24%CP) fed to all the keets from day old to 8 weeks and finisher diets made up of 18%, 22%, 24% and 26%CP respectively. The graded protein levels represent the different treatments. The compositions of the experimental diets are as shown in Table 1.

Housing

The birds were raised on deep litter. At 8 weeks, the birds were divided into 4 treatments with 2 replicates each in a completely randomized design. Prior to the arrival of the birds, the pens were cleaned, washed, disinfected and the floor covered with wood shavings. 60 watts bulbs were used to provide heat during brooding and subsequently as a source of light through out the remaining part of the trial. Chick feeders and drinkers were used for the first 4 weeks and thereafter changed to bigger ones. The partitioning of the pens was raised up to roof level using wire mesh because of the flighty nature of the wild guinea fowl. Feed and water were supplied *ad libitum* and appropriate medications given as of when due.

Table 3: Apparent nutrient digestibility by indigenous wild guinea fowls fed graded levels of protein.

	Dietary protein levels (%)				
	T_1	T_2	T_3	T_4	
Parameters	18	22	24	26	SD
Dry matter	54.33^{c}	59.24^{ab}	62.68^{b}	71.25^{a}	6.76*
Crude protein	30.69^{c}	38.09^{c}	47.16^{b}	61.06^{a}	2.32*
Crude fibre	48.75	50.55	57.76	52.43	4.74ns
Ether extract	92.33^{b}	94.42^{a}	93.81^{ab}	95.08^{a}	1.17*
Nitrogen free extract	97.99	94.33	98.46	96.82	2.92ns

Means denoted by different alphabets along the same row are significantly different ($p<0.05$), ns: not significant ($p>0.05$), SD: Standard deviation.

Table 4: Haematology values of indigenous wild guinea fowls fed graded levels of protein.

	Dietary protein levels (%)				
	T_1	T_2	T_3	T_4	
Parameters	18	22	24	26	SD
Total protein (g/100ml)	5.44	4.69	4.58	4.78	0.39ns
Albumin (g/100ml)	2.69	2.36	2.63	2.63	0.15ns
Globulin (g/100ml)	2.75	2.33	1.95	2.15	0.34ns
Glucose (g/100ml)	330.47	317.13	301.28	329.38	31.60ns

ns: not significant ($p>0.05$), SD: Standard deviation.

Digestibility trial

Two birds were selected from each treatment and used to carry out digestibility trial. Samples of faeces were collected from the birds in the metabolic cages after a 5 days adjustment period and stored in the refrigerator. These were later dried at 65^{0}C until a constant weight was achieved and used for laboratory analysis to ascertain the level of nutrient utilization by the birds.

Blood analysis

Blood sample (5 ml) was collected via the wing veins and used for haematological study. Glucose content was analyzed using the method of Jain (1986) while blood analyzer (model 6300 Ames Company USA) was used for the determination of plasma protein and albumin.

Carcass analysis
Two birds from each treatment were selected, slaughtered by severing the jugular vein, bled and used for carcass analysis.

Statistical analysis
Data collected during the study were statistically analyzed by the method of Steel and Torrie (1980) and means separated where significant differences exist by the method of Duncan (1955).

Table 5: Effect of feeding graded levels of protein on the cut-up parts of indigenous wild guinea.

	Dietary protein levels (%)				
	T_1	T_2	T_3	T_4	
Parameters	18	22	24	26	SD
Live weight (g)	566.0^c	672.5^a	695.0^b	781.0^a	88.45*
Percentages of live weight					
Slaughtered weight	97.69^a	97.32^a	96.69^b	97.79^a	0.56*
Dressed weight	73.32^b	76.25^a	77.33^a	75.15^a	1.71*
Back	13.84^c	14.43^b	16.72^a	15.54^a	1.27*
Drumstick	9.12	9.48	9.60	11.31	0.95ns
Neck	4.77	4.93	5.13	4.25	0.38ns
Wing	11.75^a	11.80^a	10.93^b	11.92^a	0.45*
Breast	19.06^c	22.65^b	24.52^a	22.44^b	2.25*
Thigh	11.08	11.64	11.75	12.06	0.41ns
Legs	3.75	3.33	3.16	3.03	0.31ns
Head	4.28	3.53	3.40	3.44	s0.42ns

Means denoted by different alphabets along the same row are significantly different ($p<0.05$).
ns: not significant ($p>0.05$), SD: Standard deviation.

RESULTS AND DISCUSSION
Table 2 shows the general performance of the guinea fowl keets from day old to 8 weeks of brooding. It shows that feed intake, body weight and body weight gain of the keets increased with age. The result of the feed conversion efficiency did not follow any specific trend.

Table 3 shows the apparent nutrient digestibility of the diets fed the birds. Dry matter, crude protein and ether extract digestibility were significantly elevated ($p<0.05$) as a result of feeding graded levels of protein to the wild guinea fowls. In all the parameters measured except Nitrogen free extract, the guinea fowls fed 18%CP diet had lower values compared to those fed the 22%, 24% and 26%CP diets. The lower value observed (the 18%CP diet) especially for dry matter digestibility is at variance with the findings of Obioha and Okonkwo (1983) who reported that dry matter digestibility is increased when lower levels of protein are fed to guinea fowls. This work shows that a direct relationship possibly exist between protein level and nutrient digestibility. All the birds were able to utilize the carbohydrate component of the diets to the same degree hence the non significant ($p>0.05$) nature of NFE digestibility. This agrees with Vogt and Stute (1994) who in their comparative study of the guinea fowl, found out that the birds utilize Nitrogen free extract and lignin components of feed better than the domestic fowl. The result obtained for ether extract and crude protein digestibility however agrees with the findings of Agwunubi (1984).

The result of the blood analysis is presented in Table 4. No significant effect ($p>0.05$) was noticed as a result of the feeding of graded levels of protein to the guinea fowls. The low serum total protein observed for birds fed 22%, 24% and 26%CP is indicative of the fact that dietary protein is better utilized at higher levels by guinea fowls. The range of value obtained in this study is not too different to that reported by Olowokurum *et al.* (1983) although in their own work, no feeding regime was used. The almost similar values observed for glucose reflects the similarity in the energy portion of the diets.

Table 5 shows the cut-up parts expressed as a percentage of live weight. The increase in the proportion of the cut-up parts obtained from birds fed 22%, 24% and 26%CP diets could be attributed to the tendency of the body parts to grow in proportion to body weights of the birds. The results shows that as the protein level increased in the diets, there was an increase in the ability of the guinea fowls to retain more of it in the form of muscle. This might be the reason why better weights were observed for the cut-up parts of guinea fowls fed 26%CP diet compared to those in the other treatment groups. The guinea fowls on slaughter in this trial had a dressing percentage of between 73.32-77.33% of edible parts which quite agrees with the range of 50-80% posited by Ayeni (1980).

CONCLUSION

The result of the study showed that indigenous wild guinea fowls respond to different levels of protein and the respond is positively related to the level of protein fed. The guinea fowls fed the 26%CP diet performed better in most of the parameters measured.

REFERENCES

Agwunubi, L.N., 1984. Comparison of protein and energy requirements of broiler guinea fowl and chicken. Post graduate seminar, Department of Animal Science, University of Ibadan, Nigeria.

Ayeni, J.S.O., 1980. The biology and utilization of the helmet guinea fowl (*N.m.galeata pallas*) in Nigeria. PhD thesis, University of Ibadan, Nigeria.

Ayeni, J.S.O. and J.O. Ayanda, 1982. Studies of the husbandry practices and social acceptance of guinea fowl in Nigeria. *Bull. Anim. Health and Prod. Afr. 30(2)*: 139-148.

Ayorinde, K.L. and J.S.O. Ayeni, 1983. Comparison of the performance of different varieties of indigenous guinea fowl (*N. m galeata*) and imported stock (*N. meleagris*) in Nigeria. *KLRI Annual Report.* Pp: 170-182.

Ayorinde, K.L. and A.N. Okaeme, 1984. All year guinea fowl-how feasible? *African Farming and Food Processing.* March/April. Pp: 21-22.

Duncan, D.B., 1955. Multiple range and multiple F-test. *Biometrics 11:* 1-42.

Jain, N.C., 1986. Schalm's veterinary haematology. 4th edition, Lea and Febiger, Philadelphia.

Obioha, F.C. and I.U. Okonkwo, 1983. Energy and protein requirements of guinea fowls. *In:* Ayeni, J.S.O., Aire, T.A. and Olomu, J.M. (Eds.), The helmet guinea fowl (*N. m. galeata pallas*) in Nigeria. Pp: 129-136.

Okaeme, A.N., 1982. Guinea fowl production in Nigeria. *World Poultry Science Journal (38):* 36-39.

Olowokurum, M.O., Makinde, M., Aire, T.A. and J.S.O. Ayeni, 1983. Guinea fowl compared with the Nigerian local fowl. *In:* Ayeni, J.S.O., Aire, T.A. and Olomu, J.M. (Eds.), The helmet guinea fowl (*N. m. galeata pallas*) in Nigeria. Pp: 85-91.

Steel, R.G.D. and J.H. Torrie, 1980. *Principles and procedures of statistics.* McGraw-Hill, New York.

Vogt, H. and F. Stute, 1994. Digestibility of some carbohydrate fractions in hens and guinea fowls. *Archi. Fur. Gefl. U geikunde 38:* 117-118.

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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 (Kg)
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	4.1	3.9	4.0	0.30	3.1	2.8	2.95	0.32
May-July								
2nd Week	5.2	5.4	5.3	0.38	4.2	4.2	4.2	0.44
Aug. – Sept.								
3rd Week	6.5	6.6	6.6	0.48	4.3	4.4	4.35	0.43
Nov. – Jan.								
4th Week	8.3	8.4	8.35	0.59	5.6	5.7	5.65	0.54
Feb. – April								
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.

REFERENCES

Ayoade, J. A., Ogebe, P. O. Okuvori, A.L. and Ogbede, T. O. (1999) Proceedings of Nigerian Society of Animal Production Conference (NSAP). Abeokuta Nigeria pg 55-56.

Casey, R. H. (1988). Effect of foot paring of sheep affected with footrot on response to zinc sulphatedium laory sulphate foot bathing treatment. Australian Vet. Journal. 65: 258 - 259

Dee, W. (1996). Control, treatment and elimination of footrot form sheep. Journal of Virginia Cooperative Extension. 12: 410 – 428.

Egerton, J. R. , Ghimire, S. C., Dhungyel, O. P Shrestha, H. K., Joshi, B. R. (2002). Eradication of virulent footrot from sheep and goats in an endemic area of Nepal and an evaluation of specific vaccination, The Veterinary Record, 151 (10) 290-295.

FDLPC, (1992). Nigerian Livestock Resources, Jersy, U. K. pg 19-63.

Galyean, M.L. and Goestch, O. L. (1993) Processing of forage cell wall structure and digestibility. A. SSA USA pg 33-62.

Gyang, E. O. Umoh, J. U, Ezeokoli, G. D. Momodu, J. O. and Abdulkadir, I (1986). Epidemiology of lameness in small ruminants in Zaria. The livestock farmer 6(1): 21-23.

Helen, A. S (1990). Footrot control in sheep. In Lincoln University at Jefferson City of Missouri and the U. S Department of Agriculture, distributed in furtherance of Food and Agricultural Act, 1977. pg 95-113.

Leite-Browning, M. L. (2007). Footrot and foot-scald goats and sheep. Extension Animal Scientist, Alabama A and M University. Pg 1-4.

Said, A. N. and A. Tolera, 1993. Supplementation of Poor Quality Roughage with Forage Legume. Livestock Production Science, 33: 229-237.

Roger C. M., R.P., Kevin, C. B. Joseph and S.F Dwight, 1999. Anim. Feed Sci. Technol., 82:107-120.

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