Assessment of the Problems of Sheep and Goat Production, in Udi Local Government Area, Enugu State of Nigeria.

Egbuhelu C.O., Eze E. C., and Ajibo F.E.
Dept of Animal Health and Production, Enugu State Polytechnic, Iwollo.
Corresponding Author: Egbuhelu C.O.,

Abstract: The study was carried out to determine the major problems of sheep and goat that has limited the production of these animals in Udi Local Government Area of Enugu State. The study adopted a survey design which sought the opinion of farmers on the major problems they face in sheep and goat production. Opinions of the farmers on the usual disease symptoms and nutritional problems sheep and goat are usually are presented with in the area were used to determine the major problems facing the farmers. Forty (40) questionnaire items were constructed after a review of the related literature on diseases and nutritional problems of sheep and goat. The data collected were analyzed using Descriptive Statistics of means and standard deviation, while T-test was used to test the null hypothesis formulated to guide the study. Results of analysis show no significant difference (P>0.05) in the disease symptoms or clinical signs observed in both large scale and small scale farms in the local government. The results also show that the major limiting diseases of sheep and goat in the area are trypanosomiasis and Pastes Des PetitsRuminantum (PPR). Nutritional problem is another factor in animal production in the area. Some of the nutritional problems of sheep and goat in the area as revealed by the results of the study include stiff traditional laws prohibiting the free movement of animals. Thus animals are kept in long confinement where they are left on the mercy of the owner for the supply of feed which is always in short supply or deficient in the essential nutrients. Furthermore, the study reveals that farmers do not make provision for dry season feeding or pasture development and utilization. Hence, animals suffer from starvation with consequent susceptibility to infections. The study also attributed part of the problem to adaptation as more productive species find it difficult to adapt to the humid environment. Thus, it is only the trypano-tolerant dwarf species that thrive here. However, the results of this work expresses hope for increased ruminant production if improvements are made on the identified problems and/or by the application of some recently acquired knowledge on Livestock Improvement Methods which were also highlighted in this study.

I.   INTRODUCTION

Sheep and goats have been important sources of animal protein in Nigeria, with over 30 percent contribution to total meat consumption in the country (Francis, 1987). The annual output used to be well over 100,000 tones in the sixties and seventies, and was even estimated to double by 1980 (McClintock, 1983). However, in recent times, this trend is dwindling following some management factors attributable to disease factors, breed adaptability and nutritional problems.

From the onset, livestock production in the humid zone of West Africa has been limited by the disease trypanosomiasis (Opasina, 1985). The disease has continued to hinder livestock production in the zone, such that the few ruminants found here are the indigenous, trypano-tolerant dwarf breeds. This explains why this zone has depended on the north for its animal protein demands.

High rainfall, humidity and temperature of the humid tropics provide ideal conditions for disease-causing organisms and vectors to thrive. Notable among the diseases include that of Pneumonia, Peste des petits Ruminantum (PPR), ContagiuosCaperinePleuro-pneumonia (CCPP) and some parasitic infections(Francis, 1985).

Respiratory/Pneumonia Syndromes of sheep and goat can be viral, bacterial or parasitic in origin. It is usually predisposed by stress such as when the animals are being left at the mercy of the sun, rain, cold and often overcrowding especially during the wet season or even starvation (Stewart, 1931; Vohradsky, 1966; Oppong, 1973; Oppong and Yebuah, 1981; Bonniwell, 1978; Smith and Van Houtert, 1984 and Smith *et al*, 1986). Pneumonias are the most common killing diseases of small ruminants, accounting for over 35 percent of deaths, (Oppong, 1973; Bonniwell, 1978; Oppong and Yebuah, 1981; Otesile, Kasali and Nzekwu, 1983; Smith and Van Houtert, 1984; Majiyagbe, 1985; Adeoye, 1985 and Opasina, 1985). Pneumonia diseases of sheep and goat include

---

Peste Des PetitsRuminantum (PPR) also known as pneumo-enteritis complex or kata is caused by a virus which is enzootic in humid West Africa. It is considered by many to be the most important single cause of mortality in sheep and goats and often approaching 50–100 percent, (Nduaka and Ihemelandu, 1973; Ojo, 1976; Bonniwell, 1978 and 1983; Opasina, 1983; Adekeye, 1984; Majiyagbe, 1985).

Contagious CaprineAnd Ovine Pleuropneumonia (**CCPP & COPP**) caused by the bacteria Mycoplasmamycoides, (with strains such as M. agalactiae in goats and M. arginini and M. ovipneumoniae in sheep respectively) is seen mostly during the wet and cool seasons of the year (Campbell, 1956, 1957; Mohan and Uzoukwu, 1985).. Sheep and goats of all ages are affected but more often, lambs and kids are susceptible to bacterial pneumonia

Parasites also constitute major source of loss to sheep and goat production in Africa. Because of its ubiquity and variability of its effect on performance, it is difficult to assess the true extent of the cost of parasitism (Uzoukwu, 1985). Sheep and goat in the area are not spared by parasites especially ticks. The ticks apart from sucking a lot of blood from the animal also transmit diseases such as babesiosis, anaplasmosis and heartwater.

Inadequate feed intake is also responsible for poor body condition of animals leading to energy or protein deficiency thus making the animals susceptible to diseases and parasites, to which they ordinarily would resist. Feeding has been a very potent tool in manipulating livestock productivity. In Nigeria generally, feeding however constitutes a major constraint facing sheep and goat production, both in terms of scarcity of grazing area and the question of effective pasture utilization with consequent livestock Starvation (Bonniwell, 1978). Starved ewes are unable to suckle their young. Starvation accounts for a very high mortality in lambs and kids. Starvation not only predisposes the animals to succumb to intercurrent infections but also results in stunted growth and abortions in pregnant ewes and nannies. Hence, proper nutrition is a key factor in animal disease control

II. RESEARCH METHODOLOGY

I. Area of the study: The area of this study consists of the twenty eight (28) towns that make up Udi Local Government Area of Enugu State, Nigeria.

II. Research Design: The study adopted a Survey Research Design. A survey research according to Awokeni, (2002) is one in which a group of people is studied by collecting data through the use of questionnaires on a few people considered to be representatives sample of the entire group. The design was considered to be suitable since the study intends to seek information on the clinical signs of diseases presented by sheep and goat in the area.

III. Population of the study: Twenty five (25) Small Scale and twenty five (25) Large Scale farms of sheep and goat were randomly selected from each of the twenty eight (28) towns in Udi Local Government Area were visited, giving a total population of 1400 farms.

IV. Instrumentation: The instrument for data collection was a structured questionnaire identified as Sheep and Goat Disease Survey Questionnaire (SGDSQ). The questionnaire items were generated after a review of literature on sheep and goat diseases in the tropics. The questionnaire consisted of two (2) sections A and B. Section A solicited for personal information on the respondents while Section B sought information on research questions which consisted of forty (40) items on a 4 points grade scale of; Strongly Agree (SA), Agree (A), Disagree (D), Strongly Disagree (SA).

V. Method of Data Analysis: Descriptive statistics involving the use of means and standard deviation were used to answer the research questions while t-test was used to test the null hypotheses formulated to guide the study. The decision rule is that any item that has a mean value of up to 3.5 were regarded as "Strongly Agree", mean values from 2.5 to 3.4 were regarded as "Agree", while values from 1.5 to 2.4 were regarded as "Disagree". Mean values of less than 1.5 were regarded as "Strongly Disagree".

III. RESULTS AND DISCUSSION

Research Question 1:
What are the disease symptoms of sheep and goat in Udi Local Government Area of Enugu State?

Table Ia; Showing mean scores on diseases encountered by Small scale and Large Scale sheep and goat farms in Udi Local Government Area of Enugu State.

		Mean score for	Mean score for		Standard	

S/No	Items	small scale farm	large scale farm	Mean	Deviation	Decision
1	The animals suddenly become dull and weak	3.27	2.50	2.89	0.39	A
2	The animals usually have diarrhea	2.61	2.71	2.66	0.05	A
3	animals of all ages are affected	3.69	3.57	3.63	0.06	SA
4	There is limping followed by lameness	1.61	1.64	1.63	0.16	D
5	There is initial chilling of the body	2.83	2.88	2.85	0.025	A
6	There is initial dry cough which later becomes moist	2.60	2.67	2.64	0.023	A
7	There is usual labored breathing and respiratory grunt	2.72	2.55	2.64	0.085	A
8	There is watery nasal discharge which later becomes mucu-purulent	3.21	2.72	2.97	0.25	A
9	There is swollen udder and blood cloths in milk	1.21	1.03	1.12	0.09	SDA
10	The hair coat is dull, rough and usually fall off	2.48	2.62	2.55	0.05	A
11	There is lacrimation and ocular discharges	2.74	2.51	2.63	0.12	A
12	There is progressive emaciation, recombency, comma and death	3.11	2.83	2.97	0.14	A
13	There is intermittent fever and edematous swellings	2.48	2.62	2.55	0.07	A
14	There is conjunctivitis, corneal opacity and blindness	2.46	2.56	2.51	0.05	A
15	The animal lie on one side pedaling the fore limbs	1.53	1.49	1.51	0.02	DA
16	There is usual ocular discharges	2.81	2.69	2.75	0.06	A
17	The animals have nasal discharges	3.51	3.89	3.70	0.19	SA
18	There is usual emaciation and loss of body condition	3.57	3.67	3.62	0.05	SA
19	There is usual abortion/stillbirth towards the last trimester of gestation	1.49	1.17	1.33	0.16	SDA
20	The sahel/northern breeds perform better than the traditional dwarf breeds here	1.38	1.23	1.31	0.075	SDA
	Grand Mean	2.57	2.48	2.52	0.045	A

Table 1a presents the clinical symptoms which sheep and goat farmers usually observe before the death of the animals in the area. From the table, it can be observed that the clinical signs that the farmers rated Strongly Agree and Agree were the common symptoms associated with the disease trypanosomiasis and the

viral disease PPR. The strong affirmative responses to the symptoms of these two diseases indicate their high incidence in the area.

Research Question 2:
What are the nutritional problems confronting sheep and goat farmers in Enugu State?

Table 2a; Mean scores on the nutritional problems of sheep and goat in Small and Large Scale farms in Enugu State

S/No	Items	Mean score for small scale farm	Mean score for large scale farm	Mean	Standard Deviation	Decision
1	There are traditional laws prohibiting the roaming about of sheep and goat	2.68	2.49	2.59	0.074	A
2	The animals are allowed to go out and graze	1.05	2.44	1.75	0.70	DA
3	The animals are on proper and balanced nutrition	1.24	2.44	1.84	0.6	DA
4	The animals are provided with salt/mineral licks	1.84	2.17	2.00	0.17	DA
	The animals are fed ad libitum	1.35	2.33	1.84	0.49	DA
6	Feeding is supplemented with some house hold wastes such as yam peels, cassava peels , maize and other crop residue	2.92	2.74	2.83	0.09	A
7	There is adequate supply of wholesome water	1.16	2.22	1.69	0.53	DA
8	Legumes and sheep manure are also used in improving soil fertility	1.70	1.62	1.66	0.04	DA
9	Legumes such as centrosema or pidgeon pea are adequately incorporated in feeding the animals	1.47	1.88	1.68	0.21	DA
10	Feed and water sources of the animal are always scrutinized for infection before giving it to the animals	1.38	1.23	1.31	0.075	SDA
11	There is effective pasture utilization	1.01	1.23	1.12	0.11	SDA
12	There is clear demarcation between grazing fields and crop lands	1.10	1.12	1.11	0.01	SDA
13	There is adequate plan for dry season feeding	1.35	1.44	1.39	0.045	SDA
14	There is effective hay and silage utilization	1.11	1.12	1.11	7.07	SDA
15	Animals trek long distances in search of	1.10	1.21	1.15	0.055	SDA

	herbage					
16	Animals are kept in confinement throughout the season	1.53	1.66	1.60	0.065	DA
17	Animals have good variety of herbage to select from	1.64	1.45	1.55	0.13	DA
18	The animals usually become weak and recumbent immediately after parturition	1.38	2.06	1.72	0.34	DA
19	Farmers are educated on pasture production and management	1.00	1.21	1.11	0.105	SDA
20	There is adequate grazing area for the animals	1.54	1.57	1.55	0.016	DA
	Total	29.55	35.63	32.60	3.04	
Grand Mean		**1.48**	**1.78**	**1.63**	**0.15**	**DA**

Table 2a above presents the nutritional problems of sheep and goat in both small and large scale farms in Udi Local Government Area of Enugu State. From the table, it can be observed that some of the nutritional problems of sheep and goat in the state include some traditional laws restricting animal movements, lack of adequate and right type of herbage, including poor plan for hay and silage utilization and/or poor pasture utilization etc. The only area the farmers were rated high was in the supplementation of feed with some household wastes like yam peels, cassava peels, maize offal etc

The summary of the problems of sheep and goat in Udi Local Government Area of Enugu State is illustrated in the pie chart below
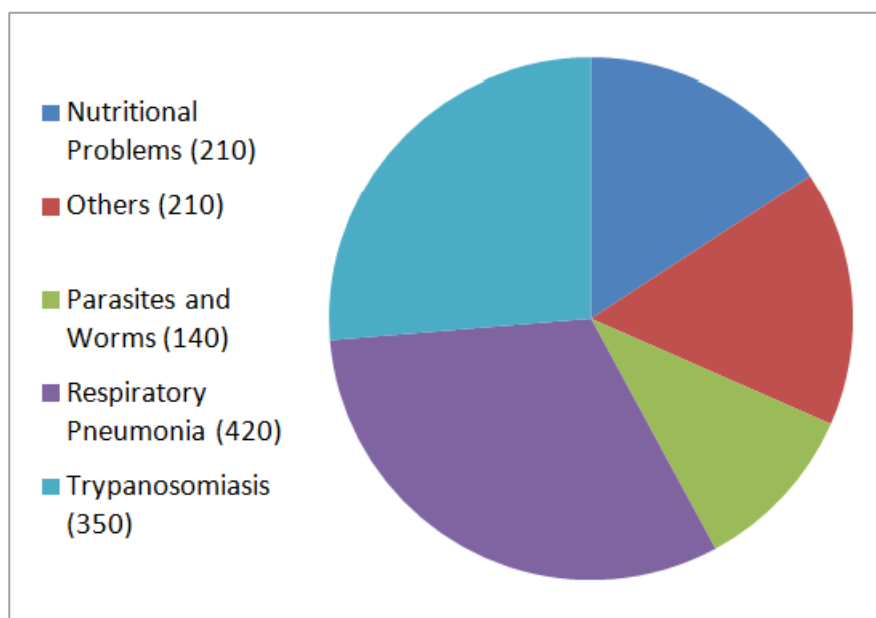

Figure 1; Showing summary of the problems of sheep and goat in Udi Local Government Area of Enugu State.

IV. DICUSSION

Table 1a presents the symptoms of diseases of sheep and goats in Udi Local Government Area of Enugu State. The table shows that the clinical signs the farmers responded in Strong affirmation were the common symptoms of Respiratory Pneumonia, Trypanosomiasis and worm parasites. Majority (420) of the farmers agree strongly that some of the signs their animal present before death occurs include; initial chilling of the body, initial dry cough which later becomes moist, labored breathing and respiratory grunt, watery nasal

discharge which later becomes mucu-purulent, diarrhea and dehydration. These signs according to Opasina, (1983) are indicators of Respiratory Pneumonia Syndrome of sheep and goat which is related to Peste Des Petits Ruminantum (PPR) and Contagious Caprine Pleuropneumonia (CCPP). Taylor, (1985) in consonance believe that Respiratory Pneumonia is the most important single cause of mortality in sheep and goats with mortality rates of 50–100 percent, (Opasina, 1983; Adekeye, 1984; Majiyagbe, 1985). This is also illustrated in the above chart with Respiratory having about four hundred and twenty of the recorded mortalities in this study.

Trypanosomiasis was the second killer disease of sheep and goat as revealed in this study. From table 1a, some of the clinical signs that received strong affirmation include; intermittent fever, edematous swellings, lacrimation, ocular discharges, conjunctivitis, corneal opacity and blindness, progressive emaciation, recumbence, comma and death. These according to Smith *et al* (1987) were the cardinal signs of trypanosomiasis. This is also illustrated in the chart above with trypanosomiasis having three hundred and fifty of the recorded mortalities in this study. .Jahnke, (1982) had reported that in the humid areas West Africa such as Enugu State, the predominant animals were the indigenous, trypano-tolerant dwarf breeds that are resistant to trypanosomiasis. High rainfall and humidity in the state favour the growth and multiplication of the disease organism and vectors (Tse-tse fly).

Table 2a above presents the nutritional problems confronting sheep and goat in both small and large scale farms in Enugu State as two hundred and ten (210) of the recorded mortalities were nutritional. The table indicates that some of the nutritional problems of sheep and goat in the state include some traditional laws restricting animal movements, lack of adequate and right type of herbage, including poor plan for hay and silage utilization and/or poor pasture utilization etc. The only area the farmers were rated high was in the supplementation of feed with some household wastes like yam peels, cassava peels, maize offal etc. thus nutrition is a serious problem confronting sheep and goat in the state.

Bonniwell, (1983) in consonance state that feeding has constituted a major constraint facing livestock production in Nigeria, both in terms of inadequate grazing area and ineffective pasture utilization. Otesile, Kasali and Nzekwu, (1983) state that High rainfall and prolonged rainy season in the humid West Africa favour the growth of both grasses and legumes for livestock production, but ironically, animals still die of starvation. This is often due to the non-availability of the right type or poor nutritional nature of herbage around and the consequent long distances animals have to walk in order to graze, (Oppong and Yebuah, 1981). Long confinement in pens during the farming season when animals are not allowed to roam about results in a condition called "Starvation/Confinement Syndrome", (Bonniwell, 1983). Starved Ewes cannot suckle their young since little or no milk is produced. Hence the high mortality in lambs and kids usually encountered. Starvation can also predispose animals to opportunistic infections, stunted growth and abortions in pregnant animals (Smith and Van Houtert, 1984).

From table 2a above, it is clear that the farmers make little or no effort for dry season feeding in the form of hay or silage. The animals are left to feed only on poor herbage which does not meet their nutrient requirements and at times indiscriminate grass burning leaves the animals with nothing to feed on. The animals are forced to feed on non-digestible objects such as rubber or nylon leather, pieces of clothing, etc. which invariably results in impaction, ruminal stasis and death from intoxication (Stewart, 1931; Vohradsky, 1966; Oppong, 1973).

V. CNCLUSIONS AND RECOMMENDATIONS.

The results of this work show that Trypanosomiasis and Peste des petits ruminants are the major diseases affecting sheep and goat in the humid tropics. Adeoye, (1985) insists that sheep and goats should be vaccinated twice a year against PPR, first dose in February/March before the rains, and again in November/December before the onset of the cold harmattan period for those too young to have been vaccinated in February/March. Animals are most susceptible to the disease during the rains and the dry season. The Tissue Culture Rinderpest Vaccines (TCRV) has been found to confer immunity for over one year to sheep and goats (Majiyagbe, 1985 and Taylor, 1985). Vaccination and other routine treatments such as deworming against PGE (Parasitic Gastro-Entritis) and coccidiosis is usually aimed at whole village flocks instead of on individual or household flocks.

On the other hand, trypanosomiasis which is found to be the second most challenging disease of ruminants in the tropics can be controlled with isomethamedium chloride (samorin[R]). This drug has been found to have both curative and prophylactic effect against the disease. Other drugs such as Nividium[R] or Berenil[R] are also safe and economical in controlling the disease. However, the relationship between nutritional status and disease condition of animals is important to note. Poor body condition of sheep and goats attributable to inadequate feed intake leads to energy or protein deficiency making the animals susceptible to the parasitic diseases to which they normally enjoyed some degree of resistance. Therefore, proper nutrition is the basic prophylactic measure against most disease conditions of animals.

Furthermore, we have also suggested that effective pasture utilization should be the basis of sheep and goat production in Nigeria. However, its full implementation at the moment will be very difficult since in this locality, and other rural areas in Nigeria, there is no clear cut demarcation of the land into grazing area and fields for cultivation of arable crops. So any livestock improvement programme should start from education of local farmers on effective pasture utilization based on grass and legumes. The problem of protein deficiency can be rectified by incorporating legumes in the diet of these small ruminants. Pigeon pea (<u>Cajanuscajan</u>) and <u>Centrosemapubescens</u> are valuable sources of protein which can contribute greatly towards the improvement of nutritional conditions of sheep and goats.

REFERENCES

[1]. Adu, I.F., Buvanendran, V. and Lakpini, C.A.M. (1979). The reproductive performance of Red Sokoto goats in Nigeria. J. Agric. Sci. (Camb). 93: 563–566.

[2]. Adu, I.F. and Ngere, L.O. (1979).The indigenous sheep in Nigeria. World Review of Animal Production 15(3): 51–62.

[3]. Adekeye, J.O. (1984). Studies on zaerobic bacteria associated with ovine and caprine pneumonic lungs in Zaria. Nig. Vet. J. <u>13</u> (1): 5–8.

[4]. Adeoye, S.A.O. (1985). Disease profiles of sheep and goats in two groups of villages in Southwest Nigeria. Sheep and Goats in Humid West Africa: Proc. Workshop on Small Ruminant Production Systems in humid zone of West Africa - ILCA, Addis Ababa. p. 13–21.

[5]. Bayer, W. (1984). Traditional small ruminant production in the sub-humid zone of Nigeria. Paper presented at the Second ILCA/NAPRI symposium on Livestock Systems Research in Nigeria's sub-humid zone, at Kaduna, Nigeria, 29 October - 2 November 1984.

[6]. Bonniwell, M.A. (1978). Vetertinary problems associated with sheep rearing in the Ashanti region.Proc.First African Veterinary Congress (Accra) Tad.Pub. Cuxhaven, F.G.R.; <u>1</u>: 116–126.

[7]. Bonniwell, M.A. (1983). The results of TCRV in Ghana.Peste des petits ruminants (PPR) in sheep and goats: Ed. D.H. Hill. ILCA, Addis Ababa. pp. 85–87.

[8]. Campbell, A.D. (1957). Annual Report on Veterinary Department Eastern Nigeria.Government Printer Enugu.

[9]. David-West, K.B. (1985). Role of Government in small ruminants production in

[10]. Nigeria. Proceedings National Conference on Small Ruminant Production, NAPRI, Zaria. pp. 10–16.

[11]. Delgado C L and Staatz J M. 1980 Ivory Coast and Mali. In: *Livestock and **meat**marketing in Africa* (Vol. **I1).** CREt).

[12]. Devendra, C. and Burns, M. (1970).Goat Production in the Tropics, Tech. Comm.No. 19 Commonwealth Agric. Bureaux, Bucks, U.K.

[13]. Falade, S., Sellers, K.C. and Ojo, M.O. (1975). A serological survey of caprine brucellosis in Nigeria. Bull. Epiz. Dis. Afr. <u>22</u>: 335–339.

[14]. Francis, P.A. (1987). Livestock and farming systems in southeast Nigeria. Paper presented at the International Workshop on Goat Production in the Humid Tropics at ObafemiAwolowo University, Ile-Ife. 20–23 July 1987.

[15]. Fry, N.C. (1958). Diseases of sheep in Ghana (Gold Coast). Br. Vet. J. <u>114</u>: 209 215.

[16]. ILCA. 1981. Trends and prospects for livestock and crop production in tropical Africa. Working Docutneit No. **5.**Addis Ababa.

[17]. Jahnke, H.E. (1982). Livestock production systems and livestock development in tropical Africa. KielerWissenschaftsverlag, Vauk, Kiel.

[18]. Josser.nd II **1'**and Sullivan **G.** 19719Benin, Ghana,l.iberia, Togo. In *Livetstockwnd neat marketintginWs'st Africa* (VII. Ill). CREl). Ann Arbor.

[19]. Mack, S.D. (1983). Evaluation of the productivities of West African dwarf sheep and goats in southwest Nigeria. Humid Zone Programme, Document No. 7.

[20]. McClintock, J. (1983). What causes supply levels from African Livestock Sectorsto change? ILCA's LPU working paper no. 2.

[21]. Mohan, K. and Uzoukwu, M. (1985).<u>Mycoplasma</u> sp. from pneumonic goats and sheep in Eastern Nigeria. Bull. Anim. Hlth. Prod. Afr. <u>33</u>: 235–239.

[22]. Majiyagbe, K.A. (1985). Health management in small ruminants with emphasis on peste des petitis ruminants (PPR). Small Ruminant Production in Nigeria: Proceedings of National Conference on Small Ruminant Production.NAPRI Zaria. pp. 220–230.

[23]. Molokwu, E.C.I. (1982). Goat production in Nigeria - prospects and problems.

[24]. Proc. National Workshop on Small Ruminant diseases and production in Nigeria.University of Nigeria, Nsukka. May, 1982.

[25]. Nduaka, O. and Ihemelandu, E.C. (1973). Observations on pneumonia-enteritis complex in Dwarf goats in eastern states of Nigeria-preliminary report. Bull. Epizoot. Dis. Afr. 21: 87–98.
[26]. Obasaju, M.F. and Otesile, E.B. (1980).Ctenocephalidescanis infestation of sheep and goats.Trop. Anim. Hlth. Prod.12: 116–118.
[27]. Obasaju, M.F. and Olufemi, B.E. (1981). The infestation of sheep and goats with lice in Ibadan, Nigeria. Bull. Anim. Hlth. Prod. Afr. 29: 259–262.
[28]. Obi, T.U. (1985). Serological survey of some rural infections in goats in Southern Nigeria. In sheep and goats in humid West Africa. Ed. J.E. Sumberg and K. Cassaday, ILCA, Addis Ababa, pp. 17–21.
[29]. Obrien, J.M. (1912). Report on the laboratory department for 1911, Accra Government Printer, Gold Coast.
[30]. Opasina, B.A. (1983). Epidemiology of PPR in the humid forest and derived savannah zones. Peste des petits ruminants (PPR) in sheep and goats. Ed. D.H. Hill, ILCA, Addis Ababa, pp. 14–21.
[31]. Opasina, B.A. (1985). Disease prevalence among village goats in Southwest
[32]. Nigeria. In small ruminant production in Nigeria.Proc. National Conference on Small Ruminant Production, NAPRI, Zaria.pp. 275.
[33]. Oppong, E.N.W. (1973). Diseases of sheep in Ghana. Ghana Jnl. Agric. Sci. 6: 3–7.
[34]. Oppong, E.N.W. and Yebuah, N.M.N. (1981). Some production traits of the West African Dwarf goat.Trop. Anim. Hlth. Prod.13: 208–212.
[35]. Osuagwu, A.I.A. and Akpokodje, J.U. (1981). West African Dwarf (Fouta Djallon) goat. I. Causes of early mortality. Int. Goat and Sheep Res. 1: 303–309.
[36]. Osuagwu, A.I.A. and Akpokodje, J.U. (1984). The reproductive performance of the West African Dwarf (Fouta Djallon) goat. Trop. Anim. Prod. 9: 231–238.
[37]. Osuagwu, A.I.A. and Akpokodje, J.U. (1985). An outbreak of abortion in West African Dwarf (Fouta Djallon) goat due to malnutrition. Trop. Vet.Otesile, E.B., Kasali, O.B. and Nzekwu, C.K.N. (1983). Mortality in goats on the University of Ibadan Teaching and Research Farm. Bull. Anim. Hlth. Prod. Afr. 31: 281–286.
[38]. Sadig, N.A. (1985). Studies on anaplasmosis of small ruminants. In small ruminant production in Nigeria. Proceedings of National Conference on Small Ruminants in Nigeria, NAPRI, Zaria.pp. 271.
[39]. Smith, O.B., Ayeni, O.A., Onawunmi, A.O. and Ademosun, A.A. (1986).Helminths and Haematozo on parasites of Dwarf goats in Southwest Nigeria. Bull. Anim. Hlth. Prod. Afr. 34: 67–70.
[40]. Smith, O.B., Van Houtert, M.F.J. and Olubonmi, A.O. (1987). Herd health problems in West African Dwarf goats reared in total confinement in the humid tropics. Paper presented at Int. Workshop on Goat Production of the Humid Tropics, Ile-Ife, ObafemiAwolowo University - Ile-Ife.
[41]. Stewart, J.L. (1937). Report on Veterinary Department (1936–1937), Accra; Government Printer, Gold Coast.
[42]. Stewart, J.L. (1943). Report on Veterinary Department (1943–1944), Accra; Government Printer, Gold Coast.
[43]. Taylor, W.P. (1985). A case of PPR in Eastern Nigeria. In peste des petitsruminants in sheep and goats. Ed. D.H. Hill, ILCA, Addis Ababa.
[44]. Ugochukwu, E.K. (1983). Pathology of bacterial pneumonia of goats in Nsukkaand Enugu Zones of Anambra State, Nigeria. Bull. Anim. Hlth. Prod. Afr. 31: 343–347.