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INCIDENCE, PREVALENCE AND SEASONALITY OF LIVESTOCK DISEASES IN THE HOT HUMID FOREST ZONE OF NIGERIA

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A 5-year record of diagnosed livestock diseases in South-Western Nigeria (1976-1980) was analysed to determine the spectrum, prevalence and seasonality of livestock health problems. Infections were prevalent in dairy cattle(72.7% of total disease conditions), sheep and goats (61%), poultry (56.5%) and swine (52.6%), while physical injuries predominated in beef cattle (34.9%). Because of regular deworming and prophylactic treatment against ectoparasites, clinical parasitism was negligible in all species : swine (10.5%), dairy cattle (9.1%), sheep and goats (8.5%), poultry (8.2%) and beef cattle (7.9%).

Metabolic and nutritional disturbances assumed important proportions in poultry (26%) where fatty liver syndrome was the major entity, and in sheep and goats (23%) plagued mainly with pregnancy toxaemia and rickets. Other less frequent and unclassified conditions were dystocia in sheep, snake bites in swine and uterine prolapsus in cattle. A definite seasonal pattern was observed for streptothricosis, babesiosis and clinical helminthiasis in cattle, and *'peste des petits ruminants'* which were prevalent during the rains.

Key words: livestock , disease, seasonality, humid tropics

Livestock health pattern is a dynamic process (Corrier et al 1978). The spectrum and prevalence of disease conditions often change with the environment. Within the same environment, disease pattern may vary from herd to herd, and within the herd,changes may be observed seasonally and over the years. It is essential to monitor this changing pattern in the spectrum, prevalence and seasonality of livestock diseases, so that appropriate prophylactic measures can be adopted in good time.

One effective means of keeping track of these changes is to record all diagnosed disease conditions and causes of death in the herd , and periodically analyse these records. Such periodic analyses of livestock disease conditions will reveal any changing pattern in the predominant livestock diseases, as well as expose any new emergent ones. The present report is the first in a series of proposed periodic reviews of recorded livestock diseases at the University of Ife farms. It covers a 5 - year period from 1976 to 1980.

Materials and Methods

The University of Ife Teaching and Research Farms occupy a total land area of about 1250 ha. The livestock section which comprises dairy and beef cattle, swine, sheep and goats, poultry and rabbit units, occupies about 2/5 of the land area. Ecologically, Ile-Ife typifies the hot humid tropical forest, with a bimodal rainfall pattern averaging over 1000 mm yearly. It is dry (36 mm/month) and hot (32°C) from November to March, but wet (165 mm/month) and slightly cooler (28.9°C) from April to October. Ile-Ife is situated within an area lying between latitudes 7° 25'N and 7°35'N, and longitudes 4°25'E and 4°40'E.

Livestock management: The total number of the various livestock species on which the data was collected fluctuated over the years. Mean values obtained over the 5-year period were: 200 sheep made up of the Ouda, Yankasa, West African Dwarf, Sokoto brown and Saanen breeds; 120 Ndama, Muturu and Keteku breeds of beef cattle; 50 dairy cattle made up of the White Fulani, Jersey and Friesian breeds;500 local and large white breeds of pigs; 1500 layers, 1200 broilers and 200 breeders of various breeds, strains or breed crosses. The figure for each species includes crosses of the various breeds.

Cattle, sheep and goats were kept indoors or under shade, except during the day when they were allowed to graze. Swine and poultry were housed, except for a few old boars and sows that were kept in a yard provided with wallowing trenches. Layers were kept two to a cage measuring 37.0 by 32.0 by 42.5 cm while broilers were floor raised.The compositions of diets fed to each of the species are shown in Table 1. Cattle, sheep

Table 1:
Composition of concentrate diets fed to the various livestock species[1]

Ingredients (% as fed)	Dairy cattle	Beef cattle	Sheep and goats	Swine	Poultry		
					Layers	Chicks	Growers
Maize (yellow)	34.0	23.0	50.0	82.3	57.45	61.0	62.5
Brewers' dried grain	40.0	60.0	10.0	-	20.0	6.0	15.5
Groundnut cake	20.0	11.0	7.5	12.4	8.7	22.95	15.5
Fishmeal	-	-	-	3.0	3.9	8.0	3.5
Rice bran	-	-	30.0	-	-	-	-
Dicalcium phosphate	3.0	3.0	1.5	1.3	1.9	1.0	1.0
Oyster shell	-	-	-	-	7.5	1.0	1.0
Bone meal	2.0	2.0	-	-	-	-	-
Salt	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Agricare[2]	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Amprolium	-	-	-	-	0.05	0.05	0.05

[1]Cattle, sheep and goats received the corresponding diets as supplements to grazing

[2]Vitamin and trace mineral mixes specially formulated for the various livestock species. Cattle, swine , sheep and goats received the same formulation.

and goats were dewormed at 3 monthly intervals and sprayed or dipped against ectoparasites every month. Poultry were the only species routinely vaccinated against the more common microbal diseases such as Newcastle disease, fowl pox, fowl typhoid and infectious bursal diseases.

Analyses of records: Routinely, all cases of illness and death were attended by the Veterinarian who examined the animal and recorded his observations, diagnoses, treatments and post mortem lesions. in cases of deaths. Diagnosis was based on a combination of the following: clini-

cal features, post mortem lesions, isolation of causative organisms and response to specific treatments.

These records were analysed by grouping the various conditions diagnosed under five headings: infections, infestations, physical injuries, nutritional/metabolic disturbances and others; that is, conditions that could not be placed under the four preceeding headings. The total number of conditions recorded under each group was then expressed as a percentage of the total number of recorded disease conditions.

In order to examine the seasonality, the conditions were tabulated in terms of month observed. The total number of times each disease was recorded during the wet (April to October) or dry (Novmeber to March) months was then expressed as a percentage of the total for both seasons.

Results

Climatological data collected at the University farms are summarised in Table 2, which shows yearly means of rainfall, temperature and

Table 2:

Yearly means of temperature, humidity and rainfall

Year	Temperature (°C)		Relative humidity (%)		Rainfall (mm)
	Maximum	Minimum	1000h	1600h	
1976	29.8	19.7	83.1	63.9	916
1977	30.9	20.4	81.9	57.9	698
1978	30.3	20.4	84.0	61.2	1318
1979	30.6	20.7	83.3	60.9	1416
1980	29.8	21.1	81.8	60.0	1227
5-year mean	30.3	20.5	82.8	60.8	1115

relative humidity. These values are similar to those reported for the hot humid tropical forest zones (Jeje 1977). Figure 1 shows the monthly fluctuations in temperature. Wider variations in temperature were recorded during the dry season, and the bimodal nature of the rainfall is well illustrated in Figure 2.

Table 3 shows a summary of disease prevalence according to species. Infections were prevalent in dairy cattle, sheep, goats, poultry and swine, while physical injuries such as fractures, luxations, wounds and lacerations were prevalent in beef cattle. Injuries accounted for less than 10% of total disease conditions in all other species except swine (16%), where tail and ear biting were the major causes of injuries. The spectrum of infectious conditions observed included: fowl typhoid, lymphoid leukosis, infectious bursal disease, aspergillosis and Newcastle disease in poultry, tetanus, pasteurellosis and anthrax in beef cattle, mastitis and streptothricosis in dairy cattle, anthrax in swine, listeriosis, pasteurellosis and pneumo-enteritis complex in sheep and goats.

As a result of regular deworming and spraying against ectoparasites

Figure 1:
Monthly fluctuations in temperature (1976 - 1980)

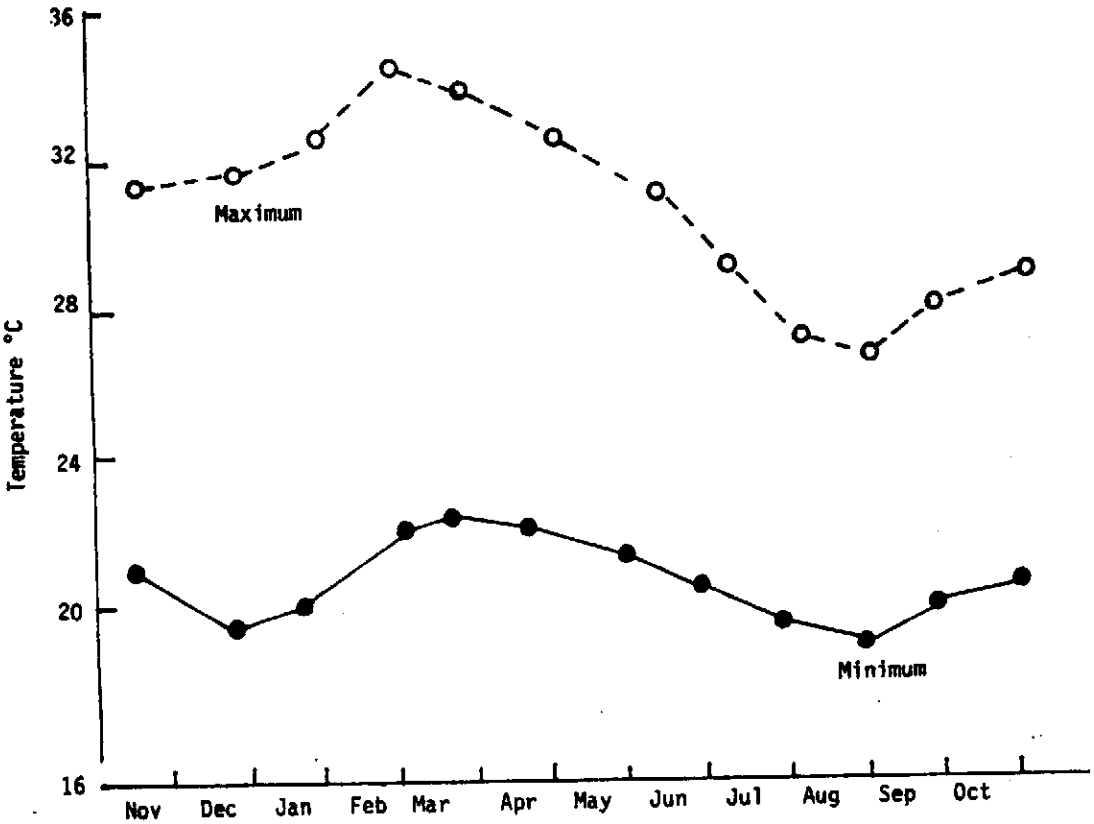


Figure 2:
Monthly fluctuations in rainfall (1976 - 1980)

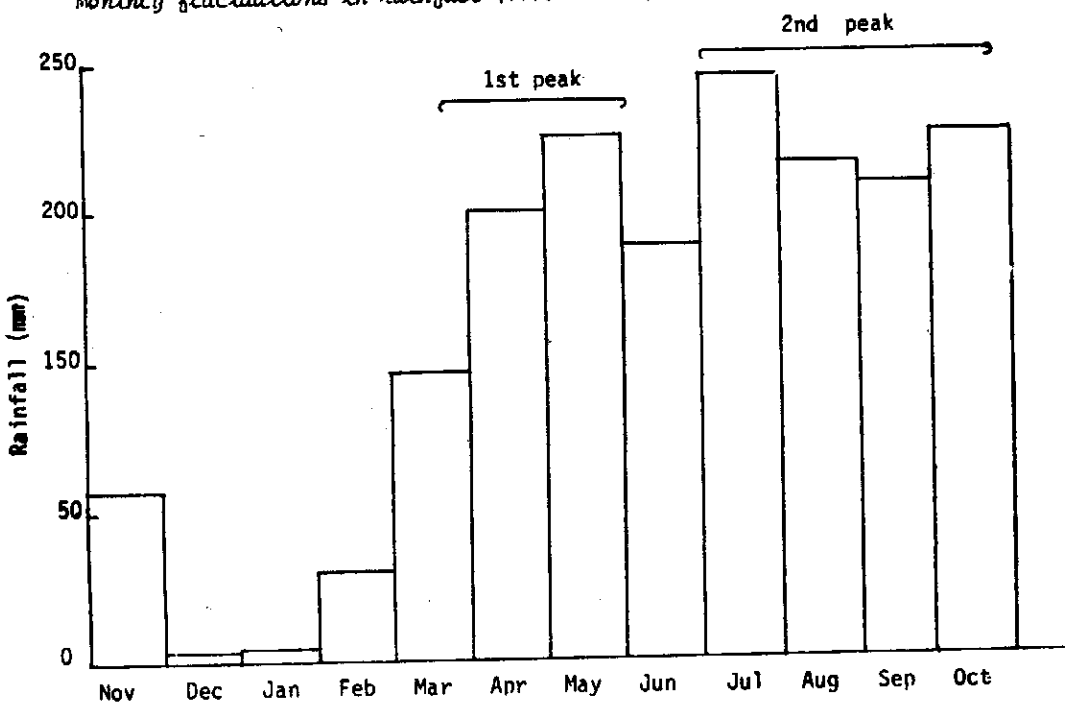


Table 3:

Prevalence of livestock diseases according to species

Species	Diseases (% of total)				
	Infections	Infestations	Injuries	Metabolic	Others
Beef cattle	30.2	7.9	34.9	14.3	12.7
Dairy cattle	72.7	9.1	7.8	1.3	9.1
Swine	52.6	10.5	15.8	5.3	15.8
Poultry	56.5	8.2	5.9	25.9	3.5
Sheep/goats	61.0	8.5	4.2	23.0	3.4

clinical parasitism was negligible in all species (Table 3). Mange and ascaridiosis were the major parasitic infestations in swine. The major entities in other species were: babesiosis, coccidiosis and helminthiases in cattle, coccidiosis and ascaridiosis in poultry; mange, coccidiosis and helminthiasis in sheep and goats. Nutritional and metabolic disturbances assumed important proportions in poultry (26%), sheep and goats (23%) and beef cattle (14%). The major metabolic disturbances in poultry were fatty liver syndrome in old layers and perosis in broilers. Sheep and goats suffered from chronic calcium/phosphorus deficiency revealed by hypocalcemia, rickets and osteomalacia. The bones became so fragile that fractures occured during routine weighing exercises . Pregnancy toxaemia was another common metabolic disease observed in ewes.

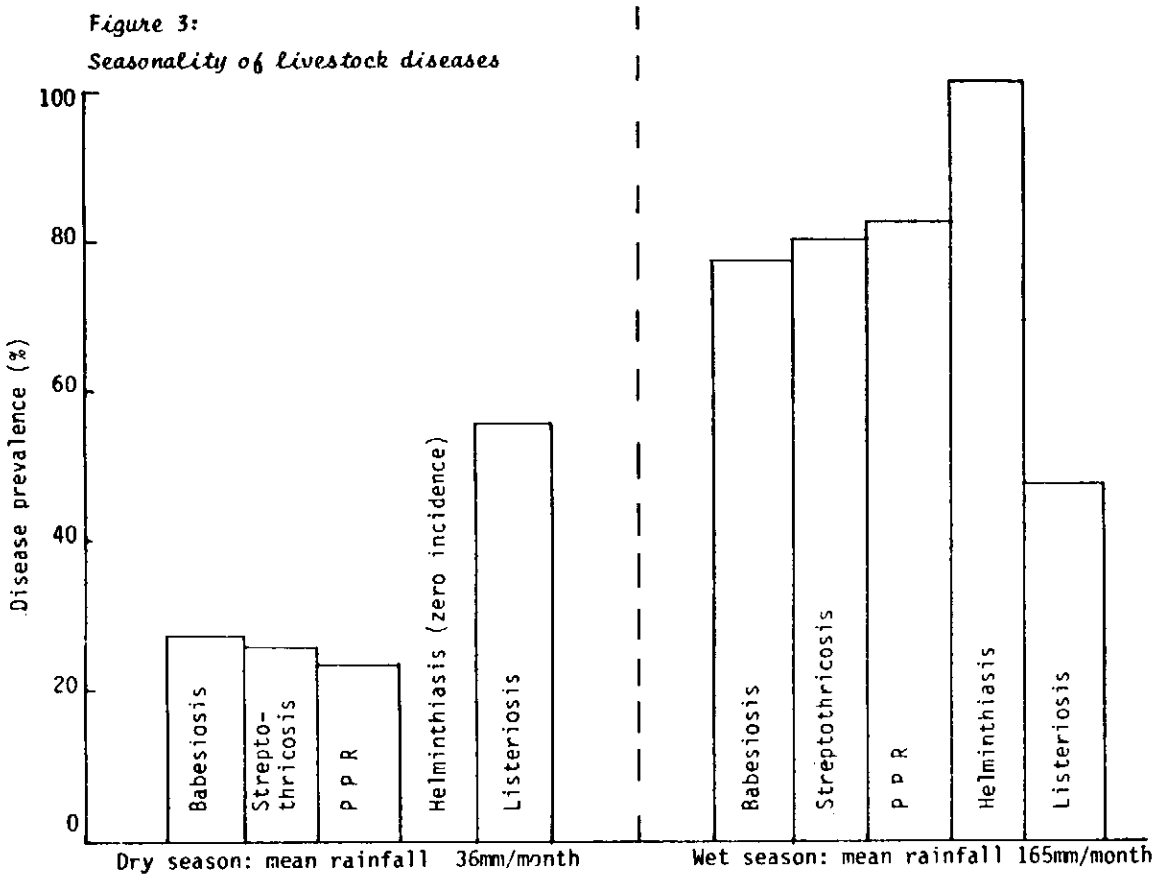
Potassium deficiency, generally considered unlikely in cattle (Agricultural Research Council 1965; National Research Council 1976), was diagnosed in a group of beef cattle raised exclusively on pasture. A detailed report of this rare condition has been made elsewhere (Smith et al 1981). Dystocia in sheep, snake bites in swine, uterus prolapsus in cattle, smothering and intestinal occlusion in poultry were some of the conditions grouped under 'others' (Table 3).

Very few of the conditions observed showed a definite seasonality Figure 3 is a representation of the seasonality observed for some of the conditions. The incidence of the first four conditions shown was two to three times higher during the wet season, except for helminthiasis for which all cases observed were during the rains. The fifth block (listeriosis) illustrates the pattern of a non-seasonal disease.

Discussion

Variations in temperature, humidity and rainfall have a significant effect on the spectrum and prevalence of animal diseases. Seasonal variations may alter the spectrum and prevalence of diseases to such an extent that a disease present in susceptible animals in one season, may be absent in another as was observed in the present report. It is essential to be aware of these seasonal fluctuations in disease prevalence so that appropriate prophylactic measures may be taken in good time. Adverse climatic conditions may also lower animal resistance to such an extent that usually innocuous organisms may become troublesome. Thus, in tropical climates

Figure 3:
Seasonality of livestock diseases



temperature and humidity are usually high, and the animal is subjected to an extra heat load which seriously affects its ability to resist dis - ease (Hall 1977). In the location under study, temperature and humidity were not continuously high, but showed a diurnal fluctuation,with temperature and sometimes humidity lowered at night, particularly during the wet season. It is unfortunate that this diurnal variation is not exploited by allowing livestock to graze at night and resting them under shades during the hot, humid daytime. In practice, they are locked up during the cool nights and grazed in the heat of the day.

Medium and long term benefits of periodic analyses of recorded livestock diseases are the exposure of new emergent diseases and the identification of changing patterns in disease prevalence. A more immediate benefit is the highlighting of areas of faulty management. Thus,the high incidence of injuries in the beef unit is attributable to two management shortcomings. First, the animals were not dehorned routinely. Only animals with excessively long and misdirected horns growing back towards the head were dehorned. Secondly, male and female cattle were herded together. Horn fights were therefore frequent, particularly when a female was on heat. Doubtlessly, routine dehorning at an early age, and the separation of the sexes would have reduced the incidence of physical injuries. It should be pointed out that dairy cattle suffered fewer physical injuries

than beef cattle even though neither were dehorned routinely and both were herded together regardless of sex. Dairy animals (White Fulani, Friesian) would appear to be of a better temperament then beef animals (Ndama, Muturu).

Swine was the only other species in which physical injuries accounted for more than 10% of total disease conditions (Table 3). Tail and ear biting, which were the major causes, result from close confinement, boredom and crowding (Pond and Maner 1974). The range of floor - space allowance for the growers where the incidence was highest was 0.65 - 1.49 m^2/pig . This covers the recommended space allowance suggested for growers in high ambient temperature by Gehlbach et al (1966) and Jensen (1972). Occasionally however, the pen or group size was larger than the 20 - 30 pigs/ pen recommended by Jensen (1972). This may explain the ocassionally high incidence of tail biting observed, since evidence exists that number of pigs /pen and ambient temperature may have an effect on optimum space allowance (Jensen 1971).

Newcastle disease was one of the infectious conditions diagnosed in poultry, mainly in old layers. This fairly high incidence of Newcastle disease in layers that were vaccinated at day old (Intraocular) and at 7 weeks (Komarov) confirms the need for a booster just prior to the laying period. The University flock did not receive this booster. It is interesting to note that of all the breeds and breed crosses of poultry used over the years , the Harco breed was particularly susceptible to lymphoid leukosis. This confirms reports of breed variation in susceptibility to the leukosis complex (West 1976).

The presence of exotic temperate breeds of cattle in the dairy unit, probably accounts for the fairly high level of infectious conditions in this unit Proportionately over twice as many cases were diagnosed in this unit as in the beef unit, where there were no exotic breeds. Streptothricosis, which was not observed in beef cattle, accounted for 34% of all infections in dairy cattle, confirming earlier reports that the Muturu and Ndama breeds of cattle are resistant to *Dermatophilus congoloensis* (Oduye 1976; West 1976).

One further observation of practical importance is that cattle were not vaccinated against such common diseases as anthrax, blackquarter, foot and mouth disease and haemorrhagic septicaemia, yet the incidence of these diseases was negligible.

As indicated earlier,periodic analyses of recorded livestock diseases not only reveal the changing patterns of disease prevalence, incidence and seasonality, but also identify areas of faulty management techniques . Once these have been exposed, appropriate measures can be adopted to correct deficiencies and protect livestock, in order to ensure maximum productivity. These benefits are sufficiently attractive for the exercise to be worthwhile,and it is recommended.

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