# CAUSES OF DEATH IN SWINE IN JOS AREA OF PLATEAU STATE

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## ABSTRACT

**Bacterial diseases caused deaths in 84.68 per cent of dead pigs recorded in piggeries of Jos Area of Plateau State. Of the bacterial diseases the most prevalent were colibacillosis, erysipelas, oedema disease, pneumonias and salmonellosis. But deaths in 9.68 per cent were due to non-infectious causes. Ascariasis and cysticercosis were the main parasitic diseases. Early treatment of sick swine and improved husbandry and management would have certainly reduced the losses which the pig producers had sustained in consequence of these conditions.**

*Keywords:* **Colibacillosis, Erysipelas, Pneumonia, Salmonellosis, Ascariasis, Cysticercosis.**

## INTRODUCTION

Swine diseases usually cost pig industry enormous amount of money even in advanced countries where modern production techniques are used. The reason is partly due to the oft repeated fact that some 20 to 25 per cent of all pigs born fail to reach weaning age (Lodge 1966, Swendsen and Bille 1984) and partly because losses due to disease in livestock and poultry has been estimated to amount to 10 to 15 per cent of gross livestock output (Gould 1965). In Nigeria there have been numerous piggeries in villages and towns consisting of few breeding stock and their followers and are of indigenous breed of pigs. Diseases occur in them but since these swine producers hardly seek Veterinary service, the disease of these piggeries have not been documented nor were the losses in them assessed nationally. Dipeolu (1975) lamented the paucity of information on swine diseases which he stated were once neglected but are now receiving attention.

Formerly the Federal Department of Veterinary Research now known as the National Veterinary Research Institute (N.V.R.I) at Vom from the early 1940s and till fairly recently used to breed imported pedigree large white pigs for issue to some pig-producers in the Federation of Nigeria requiring exotic pig stock. Even as from that time the literature of swine diseases in Nigeria has been few and sparse despite the fact that large piggeries of exotic large white pigs existed in Kano, Minna, Badagry and Agege in Lagos State and mycoplasmal pneumonia of swine (MPS) the most important economically of pig diseases (Ross 1984) occur in the United Kingdom (UK) from where they were imported.

From the Annual Reports of the N.V.R.I. the diseases of swine were pediculosis due to *Haematopinus suis*, scabies due to sarcoptic mange associated with *Sarcoptes scabiei* infection in Jos Area (Nigeria 1943) and trypanosomiasis due to *Trypanosoma congolense* and *Trypanosoma simiae* in Agege, Lagos and Badagry (Nigeria 1943, 1948). The other diseases later documented included poisoning associated with the consumption of leaves of the plant *Khaya grandiflora* (Nigeria 1948), congenital diaphragmatic hernia (Griffin 1965), bacterial enteritis, ascariasis and cysticercosis (Nigeria 1966-70), Rabies (Osiyemi Onunkwo and Momoh 1978) and Piglet diarrhoea (Oyejide, Osiyemi and Agbonlahor 1981) and hepatic carcinoma Osiyemi *et al*, 1984.

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# CAUSES OF SWINE DEATH

The piggeries in Jos Area usually send dead pigs accompanied by their clinical history, to the Diagnostic and Investigation Division of the N.V.R.I. Vom for necropsy. The results of postmortem examination for nine years beginning from 1st January 1971 to 31st December 1979 are presented because the documentation will add to the comprehensive literature on the diseases which have occurred in Nigerian piggeries.

## MATERIALS AND METHODS

One hundred and twenty four pigs of large white breed were received during 1971-1979 (Osiyemi unpublished notes). They consisted of two boars, 45 fatteners, 28 piglets, five sows and 44 weaners. Postmortem examination were conducted according to the methods in the Laboratory Aids to Diagnosis of the British Veterinary Association (BVA 1964). The heart blood for bacteriological examination was taken using sterile pasteur pipette, the point of entry having first been seared with a hot spatula. Anatomical abnormalities were searched for, the lesions were selected for further study as to the causes of death. The isolations and identifications of the various aetiological microbial agents associated with some lesions were performed after Cowan and Steel (1970) and WHO Laboratory Techniques in Rabies (1966). The typing of the *Escherichia coli* associated with the colibacillosis and oedema disease were done using three polyvalent and 14 monospecific human *E. coli* agglutinating sera obtained from Welcome Reagents Limited, Bechenham, England, by methods previously described by Oyejide, Osiyemi and Agbonlahor (1981). Some of the piggeries were visited to gain first hand information about them and determine how they lent some predisposing factors to some of the diseases diagnosed.

## RESULTS

The results of the postmortem examination showed that major causes of deaths were due to bacterial diseases. The case of anthrax was of the classical mandibular and suprapharyngeal lymphadenitis which was positive for anthrax. The enteric colibacillosis showed distension of small intestine with contents of alkaline pH from which enteropathogenic *Escherichia coli* was isolated. The stomachs of affected pigs were filled with undigested milk curds and infarcts were present on the greater curvature of their stomachs. In one instance death was due to cystitis with rupture of the bladder and *Nocardia farcinica* was isolated from it. The condition of swine erysipelas was easily recognized by dark purplish red lesion on the skin and confirmed by cardiac haemoculture from which pure culture of *Erysipelothrix rhusiopathiae* was isolated. Oedema Disease was based upon on clinical history, the age of the affected pigs and on characteristic oedema in the mucosa of the stomach in the region of the glandular cardia. The pneumonias were invariably purulent broncho-pneumonia associated with *Corynebacterium pyogenes, Klebsiella pneumoniae, Pasteurella multocida, Pseudomonas aeruginosa* and *Streptococcus* spp. The carcasses in salmonellosis were septicaemic with petechial haemorrhages on the visceral organs and oedematous and haemorrhagic lymph nodes. Staphylococcosis was associated with septicaemia and a fatal mastitis in a sow.

Two nutritional diseases were diagnosed. Hypoglycaemia was associated with dehydration in the affected carcasses which showed characteristic mahogany brown colour in striated musculature but in pigs that died of piglet anaemia due to iron deficiency their carcasses showed hearts dilated with excess pericardial fluids, oedematous lungs and moderate enlargement of the spleen.

Ascariasis and cysticercosis were the only two parasitic diseases diagnosed. Massive infestation with *Cysticercus cellulosae* caused morta-

weaner pigs as a result of haemorrhagic myositis of skeletal and cardiac muscles. The ascariasis due to *Ascaris suum* was severe. There was intestinal blockage and perforation with fatal peritonitis.

The virus disease, rabies, in the two instances, was suspected from clinical history and was confirmed by laboratory diagnosis later. Of the three remaining miscellaneous conditions, two were diseases diagnosed at postmortem examination and the other one by histopathology.

The results were summarized in Table 1 which showed the different diseases diagnosed microbiologically, parasitologically and pathologically. In most instances the causes of death were in parentheses. The serotypes of the *E. coli* in colibacilosis of piglets belonged to polyvalent 3 and 4 which contained respectively, 086, 0114, 0125, 0127, and 0128; and 018, 044, 0112, 0124, and 0142. The serotypes of 0 groups of enterotoxaemic *E. coli* isolated in the oedema disease of weaners, were 012, 018, 019, 025, 028, 044, 086, 0114, 0127 and 0128.

## DISCUSSION

From clinical history it is realised that the dead pigs examined were mostly mere samples of affected dead pigs from the piggeries since every dead pig is not usually sent for postmortem examination to determine the cause of death. Therefore the actual numbers of pigs which succumbed to these diseases from their whole populations were not given, the incidence of mortality from these diseases cannot be accurately ascertained. However the diagnosis indicates the kinds of diseases occurring in the local piggeries of Jos Area of Plateau State at the time of the postmortem examination which are reported here.

The results have shown that 84.68 per cent were attributed to bacterial causes. Besides, colibacillosis, erysipelas,oedema diseases, pneumonia and salmonellosis were significant bacterial diseases which have been causing deaths in the piggeries in Jos Area of Nigeria as in other countries (Lawson and Dow 1966; Ellis 1978; White 1962; Dunne 1975; Sweden 1979). With knowledge of the pathogenesis of these bacterial diseases and also the fact that vaccines are nowadays available for anthrax, colibacillosis, erysipelas and oedema disease (Kaufmann, Fox and Kolb 1973; Porter 1973; Swendeen 1979; Wood 1979) it would appear that early therapeutic treatment or proper husbandry or both together would largely have prevented the mortality that has occurred. An example of poor husbandry is shown in the septic navel, which arose owing to lack of navel disinfection soon after birth.

Some predisposing factors favour the occurrence of bacterial diseases. They include for instance, food and management for oedema disease and colibacillosis (Windsor 1978; Smith and Hall 1968; increased warmth and humidity for salmonellosis (Merritt 1980); anthrax contaminated feed for porcine anthrax (Brenna 1953); sudden changes in temperature for erysipelas (Wood 1984). The Jos area weather is generally cool, but changes sometimes generally occur occasionally and such weather is probably responsible for salmonellosis and erysipelas. Osiyemi and Agbonlahor (1981) have reported that 2.8 per cent of normal pigs in Jos area carry latent salmonellae infection. They have shown that *Salmonella, reading* and *Salmonella typhimurium* exist as subclinical infection in healthy cattle and fowls in Jos Area of Plateau State (Osiyemi and Agbonlahor 1981, Osiyemi and Agbonlahor 1982) and these animals can serve as reservoir of infection for pigs (Williams 1975). It has been estimated that 30 to 50 per cent of healthy pigs on farms harbour erysipelas organism on their tonsils and other lymphoid tissues (Wood 1981). The bacterial diseases diagnosed were probably the effect of adverse weather conditions and husbandry and management factors which made their overt clinical manifestation inevitable in those piggeries from where the dead pigs were sent for postmortem examination.

**TABLE 1: CAUSES OF DEATHS IN 124 PIGS SUBMITTED FOR POSTMORTEM EXAMINATION 1971-1979**

| | No. affected | Percentage incidence |
|---|---|---|
| (a) Bacterial Diseases | | |
| Anthrax (*Bacillus anthracis*) | 1 | 0.80 |
| Colibacillosis (*Escherichia coli*) | 17 | 13.70 |
| Cystitis (*Nocardia farcinica*) | 1 | 0.80 |
| Erysipelas (Erysipelothrix rhusiopathiae) | 6 | 4.83 |
| Oedema Disease (*E. coli*) | 42 | 33.88 |
| Pneumonias | | |
| (*Corynebacterium Pyogenes*) 4) | | |
| (*Klebsiella pneumoniae*) 5) | | |
| (*Pseudomonas aeruginosa*) 2) | 13 | 10.48 |
| *Pasteurelia multocida* 1) | | |
| (*Streptococcus sp.* 1) | | |
| Salmonellosis | | |
| (*S. reading*) 3) | | |
| (*S. typhimurium*) 18) | 21 | 16.93 |
| Septic navel (*Ps. aeruginosa*) | 1 | 0.80 |
| Staphylococcosis (*S. aerus*) | 3 | 2.40 |
| (b) Nutritional Diseases | | |
| Hypoglycaemia (Glucose deficiency) | 3 | 2.40 |
| Piglet Anaemia (Iron deficiency) | 7 | 5.64 |
| (c) Parasitic Diseases | | |
| Ascariasis (*Ascaris suum*) | 1 | 0.80 |
| Cysticercosis (*Cysticercus cellulosae*) | 3 | 2.40 |
| (d) Viral: Rabies (Virus) | 2 | 1.60 |
| (e) Miscellaneous diseases | | |
| Diaphragmatic hernia | 1 | 0.80 |
| Hepatocellular caricinoma | 1 | 0.80 |
| Rupture of bladder | 1 | 0.80 |
| | 124 | 100.00 |

The isolates of the enteropathogenic *Escherichis coli* responsible for colibacillosis and oedema disease were serologically different from those *Escherichia coli* causing these diseases elsewhere. Though commercial polyvalent vaccines for these diseases are available, autogenous vaccines are preferable for adequate prevention of those diseases (Kohler 1976; Wilson 1976).

Piglet Anaemia is a common cause of preweaning losses among housed pigs. It was found out that the piglets were reared on concrete floors and no sods nor the dietary iron supplements were given to them when due and the sow and litter were not turned out to grass so that the piglets could obtain needed iron from soil. Hypoglycaemia in piglets usually arises from agalactia in their dams. These two perinatal diseases would not have occurred under sound management (English and Smith 1975).

The public hygiene around local piggeries is rather poor, human faeces are commonly found near some of them. In Miango and Vom, pigs often times roam, some swine thereby acquire cysticercosis by ingesting human faeces having proglottides of *Taenia solium*. The severe cysticercosis noticed in the carcasses showing haemorrhagic myositis of skeletal and cardiac muscles probably reflects the high rate of infection of *T. solium* in the human populations of these areas. The consequent measly pork is of economic importance because of its low market value. It is remarkable that oocysts of *Balantidium Coli* in large numbers were associated with salmonellosis due to *S. reading B. coli* by itself is not pathogenic (Varma et al 1976). The diaphragmatic hernia was perhaps a sequel to forceful manipulation involving abdominal compression.

The cases of hepatocellular carcinoma and rabies have been previously reported (Osiyemi, Oyejide, Oyetunde and Ndife, 1984; Osiyemi, Onunkwo and Momoh, 1978). The prolapsed bladder which later became ruptured was in a case of dystocia and was probably due to unprofessional attention during parturition. Bladder affection whether traumatic or infectious has been reported as one of the principal causes of deaths in sows (Jones 1968, Jubb and Kennedy 1963).

It is therefore obvious that pig producers in Jos Area of Plateau State need to seek prompt professional attention in all cases of malaise in their piggeries in order to control diseases so as to eliminate losses due to deaths and thereby increase their profits from piggery industry.

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