

RESEARCH PAPER

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Survey of swine diseases and treatment approaches in Korhogo subprefecture, northern of Côte d'Ivoire

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ABSTRACT

In Korhogo, pig farming is primarily carried out by small family-run operations. These farms face numerous challenges, including animal diseases, inappropriate farming practices, and a lack of professional training for the majority of farmers. These constraints constitute major obstacles to self-sufficiency in animal protein in Côte d'Ivoire, particularly in region of Korhogo. It is in this context the study focused on swine diseases and the treatment methods used by farmers in the study area. The survey was conducted using a questionnaire administered to thirty-one farmers spread across twelve villages, based on their availability. The main diseases identified are diarrhea, erythema, and scabies. Other conditions, such as African Swine Fever (ASF), green disease, injuries, and trypanosomiasis, occur less frequently. These pathologies, which are of digestive, bacterial, parasitic, or infectious origin, are exacerbated by poor hygiene conditions. The therapeutic approaches identified include the combined use of antibiotics and dewormers, as well as the use of either one alone. Combined treatments have proven to be the most effective, particularly against frequent co-infections. Single-agent treatments, while effective against specific infections, are less suitable in cases of superinfections. Bacterial and parasitic diseases are the most common conditions encountered, while viral diseases are less frequent. Future research could focus on studying the resistance of pathogens to antibiotics.

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INTRODUCTION

Livestock farming is an important sector in the economies of many countries. It is one of the main sources of animal protein, jobs, and income (Seegers *et al.*, 2013). In Côte d'Ivoire, livestock farming is practiced throughout the country. Several animal species were be breed including pigs (Kouadio *et al.*, 2023). The swine industry has developed to meet the high demand for animal protein, thereby contributing to food security (Brou *et al.*, 2020). It represents the third-largest source of meat after cattle and poultry (FAOSTAT, 2020). The pig population in Côte d'Ivoire was estimated at approximately 600,000 pigs in 2018 (FAOSTAT, 2020). However, this production has been severely affected by swine diseases, particularly African swine fever (ASF), which caused a 64% decline in modern pig herds and a 32% decline in traditional pig herds following the 1996 outbreak (Tra Bi, 2009). Several studies have focused on zoonotic diseases in ruminants in Côte d'Ivoire (Acapovi *et al.*, 2019; Aboly, 2022). Knowledge of parasitic agents affecting pigs is therefore important for optimizing sector productivity. It allows for compliance with hygiene measures and also enables the implementation of additional sanitary measures to better protect animal health (Adoho *et al.*, 2021). Unfortunately, very few studies have focused on swine diseases in general, and particularly in the Poro Region (Koné *et al.*, 2022). This lack of data on swine diseases—some of which are transmissible to humans—poses a risk to public health (Abdou, 2021).

This study was conducted to address this information gap. The objective of this study is to gain a better understanding of zoonotic diseases in pigs in order to contribute to public health prevention, on the one hand, and to combat these swine diseases with a view to improving farm productivity, on the other.

The objective of this study is to compile an inventory of swine diseases and therapeutic approaches in the Korhogo area. More specifically, the study aims to

develop a sociological profile of pig farmers, compile an inventory of swine diseases occurring in Korhogo, and evaluate the methods used for treating pigs and their effectiveness.

METHODOLOGY

Thirty-one (31) farms were visited during this survey in ten (10) villages (Dokaha, Torgokaha, Bafimé, Kafigué, Tiékélézo, Kassirimé, Sékongaha 2, Lakpolo, Louhoua, and Pignon) from April 2023 to February 2024 due to the high concentration of farms in these areas (Fig. 1). The climate of Korhogo is characterized by two seasons: a dry season and a rainy season. The dry season runs from November to April, with the Harmattan (a dry, cool wind from the Sahara) blowing between December and February. This dry season is also characterized by very hot and dry weather, with heat waves occurring between March and April. The rainy season spans the period from May to October, with peak rainfall in June and September (CNRA, 2021).

The biological material used in this study consisted of domestic pigs *Sus scrofa domesticus* (Erxleben, 1777) of various breeds. The technical materials consisted of veterinary products for treating sick animals, equipment for maintaining the pens, and a pre-prepared survey form containing the questionnaire used to record data collected from the farmers.

A questionnaire was administered to farmers to identify the diseases encountered on their farms and the treatments used to improve the animals' health status. This document included several sections, notably: swine diseases present in the Korhogo area, the different breeds raised, the therapeutic practices implemented, as well as the breeds' tolerance to the applied treatments.

Frequencies were calculated, particularly those of breeds and the breed composition of farms, to assess their distribution. These frequencies were then compared and classified using the parametric k-proportion test comparison method with XLSTAT 2014 software.

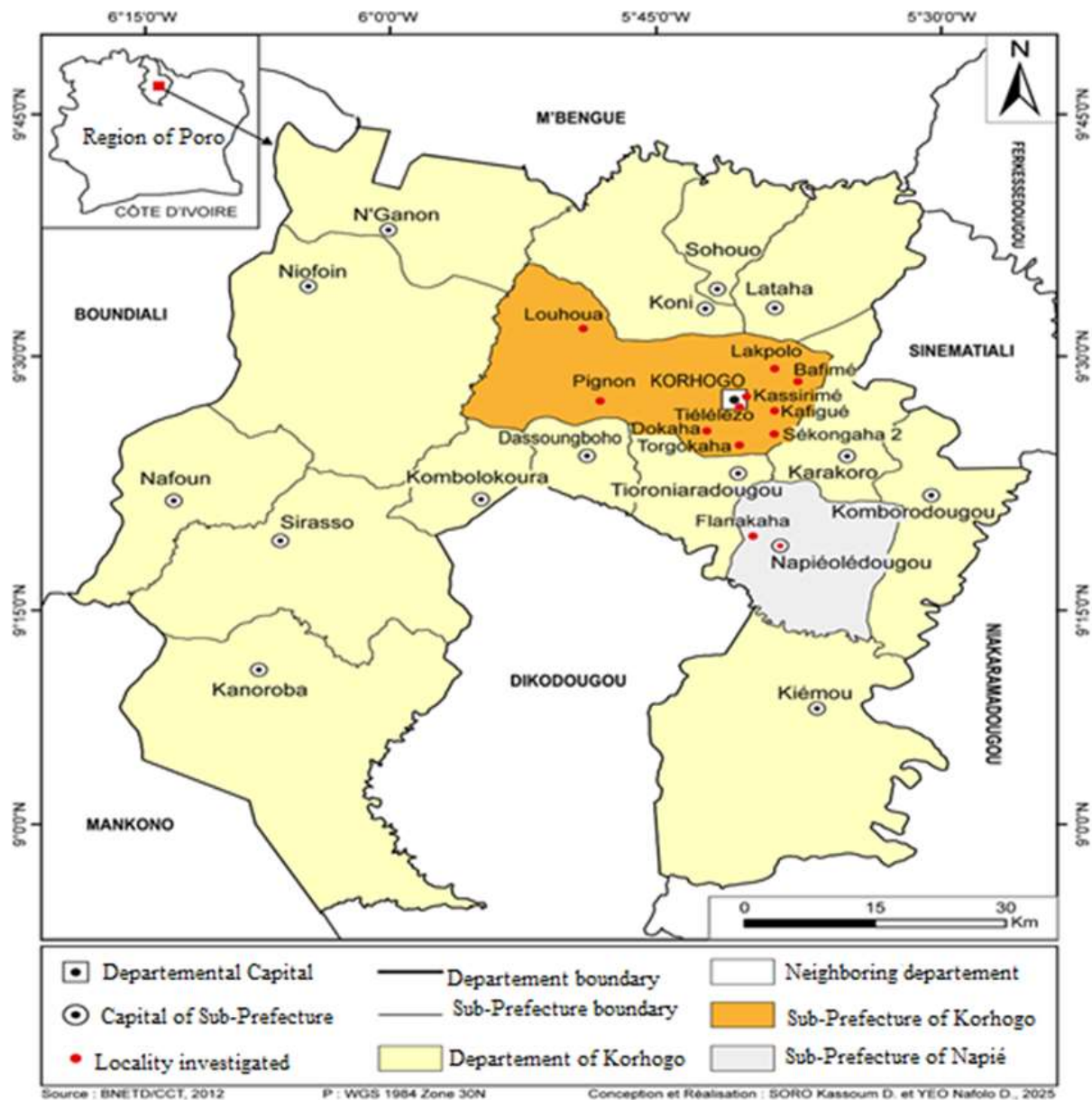


Fig. 1. Map of the Korhogo department

RESULTS

Breed composition of farms

The herds consisted of various pig breeds, including Large White, Landrace, G4 Hybrid, Pietrain, and Korhogo. The Large White and G4 Hybrid breeds were significantly more prevalent on the majority of farms, while the Pietrain and Korhogo breeds were in the minority ($p < 0.001$) (Table 1). Breed compositions differed significantly across the study area ($p < 0.001$). The majority of farms consisted solely of G4 Hybrid. Only six percent (6%) of farms had all four breeds. The Landrace breed was rarely raised without other breeds (Table 2).

Table 1. Different pig breeds found on farms

Race	Proportion (%)	<i>p</i> -value
Pietrain	12.90 ^b	0.001
Korhogo	22.58 ^b	
Landrace	32.26 ^{ab}	
G4 Hybrid	38.71 ^a	
Large white	41.94 ^a	

The numerical values labeled a or b differ significantly for the same variable at the 0.001 level.

Types of feed provided to pigs

Nearly half of the pig farmers in Korhogo used a combination of concentrated feed and agricultural byproducts. The majority of farmers used only local agricultural products, notably corn bran, rice bran,

tchapalo distiller's grains, and some fruits and vegetables, either on their own or mixed with concentrated pellets (Table 3).

Table 2. Racial composition of farms

Racial composition of farms	Proportion (%)	p-value
Large white and Landrace (S ₁)	22.58 ^{ab}	0.001
G4 Hybrid only (S ₂)	32.26 ^a	
Landrace only (S ₃)	3.23 ^b	
G4 Hybrid and Piétrain (S ₄)	6.45 ^b	
Korhogo breed only (S ₅)	16.13 ^{ab}	
Large white only (S ₆)	12.90 ^{ab}	
Piétrain, Landrace, Large white and Korhogo (S ₇)	6.45 ^b	

S₁: Large White and Landrace; S₂: G4 Hybrid only; S₃: Landrace only; S₄: G4 Hybrid and Piétrain; S₅: Korhogo breed only; S₆: Large White only; S₇: Piétrain, Landrace, Large White, and Korhogo breed. Numerical values labeled with the letters a or b differ significantly for the same variable at the 0.001 level.

Table 3. Different types of feed used on farms in Korhogo

Types of food	Proportion (%)	p-value
Concentrated feed	6.45 ^b	0.001
Feed made from agricultural products	48.39 ^a	
Feed made from agricultural products and concentrates	45.16 ^a	

The numerical values labeled a or b differ significantly for the same variable at the 0.001 level.

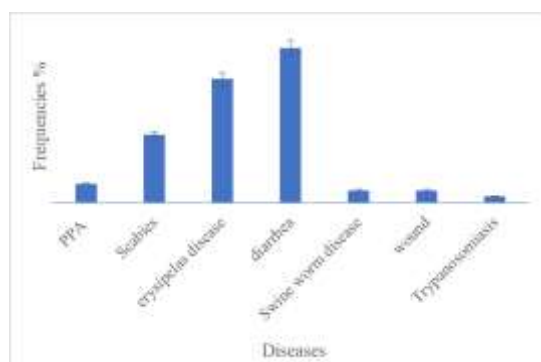


Fig. 2. Prevalence of swine diseases

Overview of swine diseases and medications administered

Diarrhea and erythema, which are digestive and bacterial diseases, were the most common, with frequencies of 25% and 20%, respectively. Scabies (11%) was also observed on all farms visited. African

Swine Fever (ASF) was also present, though at a lower rate of 3%. Trypanosomiasis was the least common (1%) (Fig. 2). Common skin conditions were scabies and erythema (Fig. 3&4).

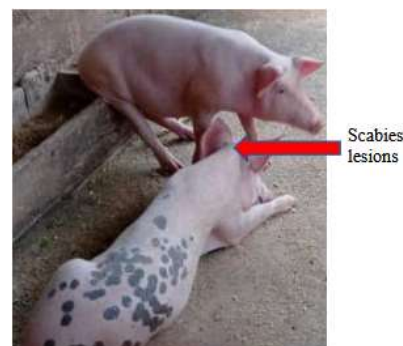


Fig. 3. Pig showing signs of ear mites



Fig. 4. Pig with lesions of the erythema

Types of treatments administered to pigs

More than half of the farmers surveyed reported administering both antibiotics and deworming treatments at the same time. The exclusive use of antibiotics or deworming treatments was reported by 19% and 7% of the farmers interviewed, respectively. Others, however, did not administer any treatments to the animals (Fig. 5).

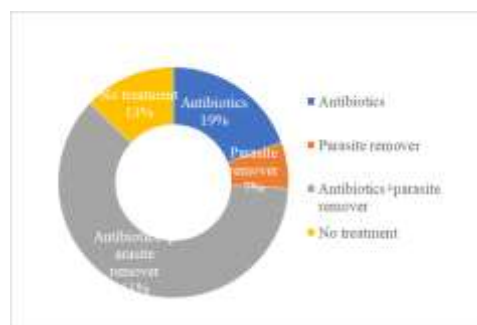


Fig. 5. Proportions of treatment types administered by farmers

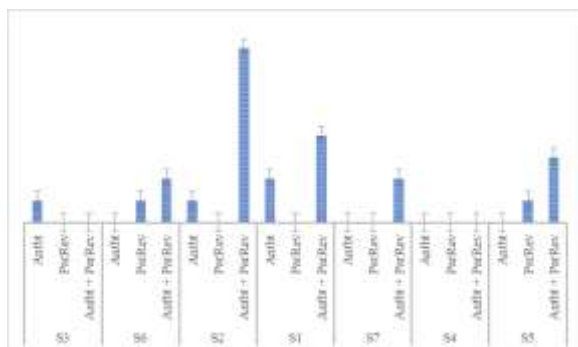


Fig. 6. Different treatments administered according to the breeds present on the farm

Antbt: Antibiotics; ParRev: Parasite Remover; Antbt + ParRev: Antibiotics + Parasite Remover; S: System breeding

Statistical analysis revealed a significant difference in the treatments administered based on the racial composition of the farms ($p < 0.001$). Three types of treatments were administered to the animals: antibiotics alone, deworming agents alone, and a combination of deworming agents and antibiotics. Farmers on farms S1, S2, S5, S6, and S7 preferred to use a combination of antibiotics and dewormers as a treatment for pigs. Farmers on farm S3 preferred to administer only antibiotics to the animals (Fig. 6).

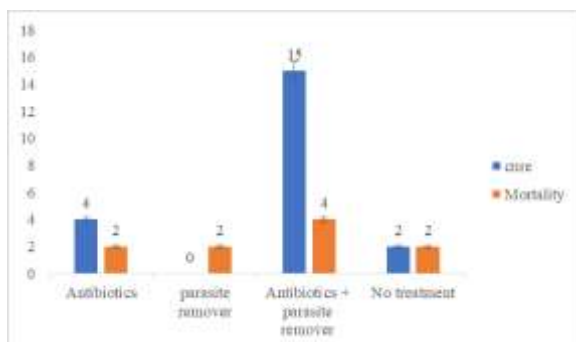


Fig. 7. Efficacy of different treatments administered to animals

Efficacy of treatments administered to animals

Three types of treatments were administered to the animals: antibiotics alone, deworming medication alone, and a combination of deworming medication and antibiotics. The combination of deworming medication and antibiotics was more effective than the other two treatments, although mortality was

observed on the farms. Farmers who administered only deworming treatments still observed mortality on their farms (Fig. 7).

DISCUSSION

Pig breeds in the Korhogo area

The limited presence of purebred exotic pig breeds could be explained by the fact that, although they perform well in controlled environments, they are less well-adapted to local conditions, particularly the climate and disease resistance. This limits their adoption by small-scale farmers (Anugwa and Okwori, 2008). The breed composition of farms appears to depend on the availability of animals, consumer demand, and their environmental adaptability. Conversely, the predominance of crossbred breeds is explained by farmers' desire to optimize zootechnical performance in tropical environments (Djimenou *et al.*, 2017). Consequently, rigorous monitoring remains essential to prevent excessive loss of genetic diversity and maintain resistance to endemic diseases.

Overview of swine diseases and administered treatments

Diarrhea and erythema, which are digestive and bacterial diseases, respectively, were the most common conditions. This prevalence is believed to be linked to poor nutrition and poor hygiene observed on the farms. The feed provided to the animals is insufficient to meet their energy needs for growth and production. Most of the time, the animals roam freely, searching for food. They frequently drink from sewage puddles. Under these farming conditions, pigs are exposed to numerous diseases (Bossa, 2009). Diseases caused by intestinal nematodes and ectoparasites are significant among these infestations (Rouillé *et al.*, 2014). These diseases are more prevalent in intensive systems where animals are kept in greater numbers in a limited space and are therefore more exposed. Contagious diseases can spread rapidly from one animal to another. In these intensive systems, local breeds are being replaced by so-called improved breeds, which are often less resistant to

disease. Unfortunately, for many of these diseases, there is still no vaccine (Soglohoun, 2017). This finding was similar to that reported by Kouadio *et al.* (2023) in pigs examined at the slaughterhouse of the Société Ivoirienne d'Abattage et de Charcuterie de Yopougon in Abidjan, Côte d'Ivoire, and at the abattoir of Port-Bouët. Although African Swine Fever (ASF) was the least common disease compared to physical injuries and trypanosomiasis, it was the most feared disease due to its devastating impact on pig farms. Indeed, it was the disease causing the most deaths on pig farms and for which there is currently no effective cure (Coffi *et al.*, 2023). The low incidence of ASF and trypanosomiasis observed could be linked to the fact that these conditions are less common or better controlled in the studied population (Soro *et al.*, 2025). This distribution of diseases would help guide priorities for prevention and treatment, with a focus on controlling scabies, erysipelas, and diarrhea while minimizing the risk of ASF outbreaks on various farms.

Soglohoun (2017) demonstrated that swine scab is an endemic disease in many tropical regions, linked to poor biosecurity practices and high stocking densities. Similarly, Simon-Grifé *et al.* (2015) reported that erysipelas caused by bacteria such as *Erysipelothrix rhusiopathiae* was frequently observed in herds where vaccination was rarely or never performed. Diarrhea, often of bacterial, viral, or parasitic origin, was also one of the major causes of mortality, particularly among piglets, as highlighted by Asambe *et al.* (2019). The low incidence of physical injuries, trypanosomiasis, and African Swine Fever (ASF) could be attributed to adherence to biosecurity measures and effective epidemiological surveillance (Traoré, 2022). Therefore, farmers must implement preventive measures to improve herd production. This approach was recommended by Dotché *et al.* (2021) who emphasized the importance of an integrated strategy combining hygiene and antiparasitic treatment to reduce the parasitic and infectious burden in pig farms. More than half of the farmers

surveyed used both antibiotics and antiparasitic treatments. This method is a systematic therapeutic strategy aimed at simultaneously treating bacterial and parasitic infections (Agbokounou *et al.*, 2016).

This survey showed that the appropriate use of antibiotics combined with antiparasitic agents resulted in a significant reduction in morbidity and mortality associated with bacterial and parasitic infections for the targeted diseases. Ivermectin, Levamisole, Tetramisole, Piperazine Citrate, Albendazole, Oxbendazole and Oxfendazole are the veterinary products used against internal parasites of pigs by the majority of farmers (Soro *et al.*, 2025). However, Roberts *et al.* (2009) emphasized that the clinical efficacy of antibiotics depends heavily on the appropriateness of the prescription and adherence to treatment protocols. Statistical analysis indicated a significant difference in treatments between breeds across farms. This demonstrated that there was a significant difference in treatments between breeds. The pig breed would therefore be a factor influencing the type of medication used (Ayssiwede, 2009; Koné *et al.*, 2022). Farmers generally use medicinal plants they know to treat animals.

However, the limitation of this reliance on traditional knowledge lies in the lack of understanding of the optimal dosage, the average treatment duration, information on the toxicity of these plants, and the potential for adverse combinations. Implementing a policy to control the unregulated use of these medicinal plants by farmers would be beneficial.

CONCLUSION

Pig farming in Korhogo relies on crossbred breeds and faces several diseases, the most common of which are diarrhea, erysipelas, and scabies. The combination of antibiotics and dewormers is the method most commonly used by farmers. This method is the most effective, with a high cure rate among treated animals. This therapeutic approach, combined with the use of crossbred breeds, could be recommended to farmers to optimize farm productivity.

African Swine Fever (ASF), although rare, remains a major risk to the local swine industry. This disease warrants specific studies aimed at developing treatments, particularly through in-depth analyses of the genetic material of the responsible pathogen. This study has highlighted the urgent need to strengthen inspections of meat intended for consumption in order to reduce the risk of transmission of zoonoses that could pose public health problems. Further research could also focus on the genetic material of the agents responsible for diarrhea, erythema, and scabies. A political for managing internal parasites in local breed pigs must begin with the most accessible and least expensive local resources for farmers, such as medicinal plants. In-depth studies on medicinal plants to identify their bioactive compounds must be carry out.

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