SARCOPTIC MANGE MITE INFESTATION IN A WEST AFRICAN DWARF GOAT: A CASE REPORT

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ABSTRACT

This case report describes a Sarcoptic mange infestation in a West African Dwarf goat with severe pruritus, alopecia, and crusting. Skin scraping and microscopic identification of Sarcoptes scabies mites confirmed the diagnosis. Treatment included ivermectin administration and supportive care. The goat showed marked clinical improvement within two weeks of treatment, underscoring the importance of early diagnosis and effective treatment protocols in managing mange infestations in small ruminants.

Keywords: Sarcoptic mange, Parasitology, Case management, Goat

INTRODUCTION

Sarcoptic mange is a highly contagious parasitic skin disease caused by the mite *Sarcoptes scabiei*, which affects domestic animals including goats, cats and dogs (Bandi and Saikumar, 2013). The condition is characterized by intense itching, skin inflammation, and crust formation due to mites burrowing into the skin (Bandi and Saikumar, 2013; Murray and Crane, 2023). The disease is common among livestock worldwide, with small ruminants particularly vulnerable (Ali *et al*., 2021). In developing regions, factors such as poor hygiene, overcrowding, and inadequate veterinary care contribute to the rapid transmission of the disease within herds (Walton and Currie, 2007). Proximity between animals enables direct contact and environmental contamination, significantly increasing the likelihood of infestations (Dysko *et al*., 2002; Nowland *et al*., 2015).

Sarcoptic mange poses a serious threat to goat health and the livelihoods of farmers who depend on them for sustenance and income, particularly in regions like West Africa, where it has been documented among goat populations, including West African Dwarf goats. The disease causes severe stress and discomfort, dramatically reducing milk production, especially in dairy goats, and adversely affecting meat production by slowing growth rates and resulting in lighter market weights, affecting the overall productivity of the affected flock (Ali *et al*., 2021). The infestation can result in severe clinical signs, including pruritus, excoriation, and secondary infections (Anyogu *et al*., 2020). In severe cases, untreated sarcoptic mange can lead to systemic infections due to the compromised integrity of the skin, which can cause lethargy, emaciation, and even death (Bandi and Saikumar, 2013). Therefore, effective management and treatment of the disease are essential to mitigate these losses and maintain the health of the livestock population.

This case report of sarcoptic mange in a West African Dwarf goat is aimed at growing the body of knowledge about ectoparasitic infestations in small ruminants, particularly in indigenous

breeds that may have different management and environmental factors. By documenting the clinical course and treatment outcome, this report provides a valuable reference for veterinarians and farmers in the region. It highlights the need for increased awareness and preventive measures to mitigate the spread of mange in goat populations.

Case Description: On the 21st of July, 2023, a client presented a male West African Dwarf goat (*Caprine*) to the Large Animal Clinic of the Veterinary Teaching Hospital, University of Ibadan, Nigeria with complaints of skin lesions around the body. The goat weighs 13 kg, with an estimated age of one year, from a flock of 10 goats. The management system was free-range, and the goat had black fur. Out of the herd, three goats were presented with similar clinical manifestations. On physical examination, the goat's vital signs were within normal ranges, with a rectal temperature of 38.7°C, respiratory rate of 29 breaths per minute, heart rate of 72 beats per minute, and pulse rate of 70 beats per minute. The mucous membranes appeared normal, with a capillary refill time (CRT) of less than 2 seconds. No fleas, ticks, or lice were detected during the examination, though the presence of mange mites was suspected. The goat exhibited severe skin lesions, including extensive hyperkeratosis, alopecia, and the presence of fissures and scabs. The skin appeared wrinkled, and large areas were covered in crusts and scales. Lesions were widespread, particularly affecting the dorsal regions of the body. The lesion on the flank (Figure 1) shows extensive hyperkeratosis and alopecia, highlighting the severity of the condition. Similarly, the lesions around the neck region and scapula (Figure 2) are characterized by extensive crusting and scaling, further demonstrating the widespread distribution of the condition.

Laboratory Findings

Parasitology: Microscopic examination of skin scrapings was conducted using the direct smear method (Chauhan and Agarwal, 2006). Under the stereoscope, numerous developmental stages of *Sarcoptes* mites including eggs, larvae, nymphs, and adult mites were identified based on morphological characteristics described by Falohun *et al.* (2015).

Figure 1: Severe hyperkeratosis and alopecia on the flank region of a male West African Dwarf goat presented to the Large Animal Clinic of the Veterinary Teaching Hospital, University of Ibadan, Nigeria

Figure 2: Extensive crusting and scaling around the neck region and scapula of a male West African Dwarf goat presented to the Large Animal Clinic, University of Ibadan, Nigeria

As seen in Figure 3, an ovigerous female *S. scabiei* var. *caprae* was observed, characterized by its oval to round, dorsally convex body covered with spines and triangular scales. Notably, only the first two pairs of legs protruded beyond the body margin, a distinctive feature of *S. scabiei*. The presence of multiple developmental stages, including eggs and nymphs, further confirmed the identification of *S. scabiei var. caprae* (Figure 4), leading to a definitive diagnosis of sarcoptic mange. This

diagnosis aligns with the clinical presentation of severe mange lesions observed in the affected animal, further substantiating the microscopic results (Figure 5).

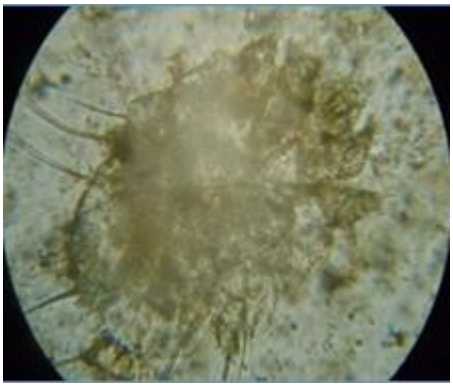

Figure 3: Ovigerous female *Sarcoptes scabiei* var*. caprae* recovered from the neck region of a male West African Dwarf goat showing characteristic oval body and spines

Figure 4: Various developmental stages of *Sarcoptes scabiei* var*. caprae* (eggs, larvae, nymphs, and adults)

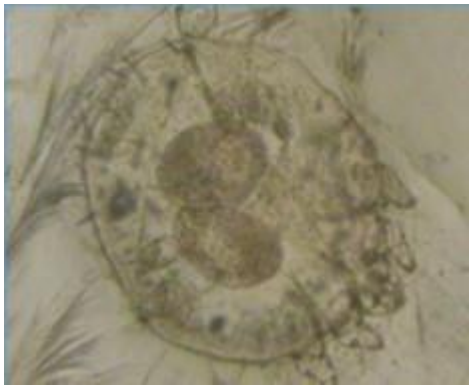

Figure 5: Microscopic view of severe mange lesions associated with *Sarcoptes scabiei* infestation in a male West African Dwarf goat

A more detailed microscopic view of an adult *S. scabiei* mite showed body structure and surface details. This view further clarifies the mite's morphology (Figure 6), reinforcing the diagnosis of sarcoptic mange.

Figure 6: Detailed view of an adult *Sarcoptes scabiei* var*. caprae* highlighting body morphology

Haematology: Blood samples were aseptically collected via the jugular vein and transferred into EDTA-coated tubes to measure haematological parameters, including packed cell volume (PCV), haemoglobin (Hb) concentration, red blood cell (RBC) counts, white blood cell (WBC) counts and differential WBC counts according to the techniques earlier described by Banwo *et al.* (2024). Haematological analysis revealed a decrease in PCV, RBC count, and haemoglobin levels, indicating anaemia. This anaemia was likely a result of the mange mites feeding on epidermal fluids and consuming blood. The low haemoglobin level and PCV could also be attributed to a decrease in cellular blood content due to mite infestation.

The goat exhibited leukocytosis, likely due to skin excoriation, which would have permitted the entry of microorganisms, prompting an increased production of leukocytes. Additionally, eosinophilia was observed, probably due to allergic reactions or the activation of the immune system in response to the mites.

Management: The affected goats were isolated from the rest of the flock, to prevent the spread of infestation. Overcrowding and stress factors were minimized to break the infective cycle. The following drugs were administered Amitraz wash at a 0.05% concentration was applied weekly. A combination of pyrethrin and flumethrin pour-on was used as a topical treatment. Ivermectin (1%) was administered subcutaneously at a dose of 0.2 mg/kg weekly to manage the mite infestation.

Oxytetracycline (5%) was administered intramuscularly at a dosage of 10 mg/kg every 24 hours for five days to control secondary bacterial infections. Multivitamins were administered intramuscularly at a dosage of 1 ml per 10 kg of body weight daily for three consecutive days to support recovery, accompanied by regular monitoring of vital signs throughout the treatment period.

Following the administration of these treatments, the goat was monitored closely through daily outpatient visits for a week. Within this period, the goat showed significant improvement, with reduced skin lesions and signs of recovery from the infestation. Subsequently, weekly follow-up visits were scheduled to ensure complete recovery and prevent recurrence. After six weeks of consistent treatment and monitoring, the goat was fully recovered and discharged from further care. As seen in Figure 7, the previously inflamed and ulcerated areas have healed, with a marked reduction in lesion size and restoration of normal skin appearance, indicating a positive response to the treatment for *S. scabiei var. caprae* infestation.

Figure 7: View of a male West African Dwarf goat infected with *Sarcoptic mange* at full recovery

DISCUSSION

Sarcoptic mange, caused by *S. scabiei*, presents a significant dermatological condition affecting various livestock, including goats. In this case, the clinical manifestations and diagnostic findings are largely consistent with existing literature on sarcoptic mange infestations, particularly in goats. However, certain variations warrant further examination and comparison with previous studies to highlight the unique aspects of this case and any deviations from established patterns.

The goat in this case exhibited generalized wrinkling and thickening of the skin, heavy crust formation, alopecia, and erythema on the abdomen, limbs, ears, and other body parts. This finding is comparable to those reported by Nwoha (2011) and (Falohun *et al*., 2015), where goats infested with *S. scabiei* presented with extensive skin lesions, including crusty, scaly patches and alopecic areas. However, while Nwoha (2011) reported a goat with no evidence of pain and normal appetite, the present case highlighted more aggressive pruritus, with the animal seen biting its skin, which may suggest more severe irritation or a different stage of infestation. This heightened pruritus aligns with the observation by Falohun *et al*. (2015) but contrasts with the relatively less severe symptoms reported in Nwoha's study. The foul-smelling odour perceived in this case, as also noted by Falohun *et al*. (2015), was likely due to secondary bacterial infections from the skin lesions, a complication frequently seen in severe infestations.

Microscopic examination of skin scrapings in this case revealed all developmental stages of *Sarcoptes* mites — eggs, larvae, nymphs, and adults — which aligns with findings by Falohun *et al*. (2015). The description of the mites' morphology, including their oval shape, dorsally convex body with spines, and the positioning of legs, is consistent with the morphological details provided by Saari *et al*. (2018). This thorough identification confirms the diagnosis of sarcoptic mange and rules out other ectoparasitic infestations, such as Chorioptic mange, which was reported in a similar case by Jesse *et al*. (2016). In contrast, the *Chorioptes* spp infestation in sheep and goats reported by Jalajakshi *et al*. (2021) was differentiated by its unique microscopic characteristics, demonstrating that accurate mite identification is crucial in distinguishing between mange types, as both present with overlapping clinical signs.

The haematological findings in this case, including decreased packed cell volume, erythrocyte count, and haemoglobin levels

indicating anaemia, are consistent with the pathophysiological mechanisms described by Falohun *et al*. (2015). Sarcoptic mange mites feed on epidermal fluids and may even cause blood loss, contributing to anaemia. Leucocytosis observed in this case is also in line with the case report by Bhardwaj *et al*. (2010), which attributes it to the skin excoriation allowing secondary infections. However, this case showed more marked eosinophilia, potentially indicating a heightened immune response or allergic reaction, which was not as prominently noted in previous studies. This may reflect either a genetic predisposition in the West African Dwarf goat or prolonged exposure to the mites before presentation for treatment.

Management of sarcoptic mange, in this case, followed a multifaceted approach, including weekly ivermectin injections, amitraz wash, pyrethrin, and flumethrin pour-on applications, and supportive treatment with antibiotics and multivitamins. This treatment protocol is largely in line with the approach taken by Falohun *et al*. (2015) and Jalajakshi *et al*. (2021), both of which used ivermectin to manage treatment with adjunct therapies to prevent secondary infections and enhance recovery. However, the administration of oxytetracycline in this case to control secondary bacterial infections offers a slight deviation from the treatment protocols used in the aforementioned studies, where deltamethrin-based sprays were more commonly used. The successful outcomes in a case report by Khalafallah *et al*. (2020) suggest that deltamethrin could be considered as an alternative or adjunct therapy, particularly in severe infestations.

In contrast to Chorioptic mange cases treated with ivermectin and deltamethrin (Butox spray), this case demonstrated the efficacy of ivermectin alone in eradicating *Sarcoptes* mites. Follow-up examinations showed significant clinical improvement, further validating the chosen therapeutic approach. The quicker response in the present case compared to the Chorioptic mange cases could be attributed to differences in mite species, as *Sarcoptes* tend to burrow deeper into the skin, while *Chorioptes* remain on the surface.

Conclusion: This case of sarcoptic mange in a West African Dwarf goat demonstrates the significant dermatological and haematological effects of *S. scabiei* infestation. The characteristic clinical signs, including severe pruritus, alopecia, hyperkeratosis, and the presence of mites in various life stages on skin scrapings, confirmed the diagnosis. The haematological findings of anaemia and leucocytosis reflect the parasite's impact on the animal's blood profile, likely exacerbated by secondary bacterial infections. Prompt and effective treatment, including ivermectin and supportive treatment, led to substantial clinical improvement, emphasizing the importance of early diagnosis and comprehensive management in mitigating the effects of mange. While the findings are consistent with previous studies, the marked eosinophilia observed suggests a potential for more individualized responses in different breeds or geographic regions.

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