

Case report of sarcoptic mange and anaplasmosis in a three-year-old ewe in Maiduguri, Nigeria

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Abstract

A three-year-old ewe was presented with severe pruritus, alopecia, crusting and generalized skin lesions consistent with mange. The ewe also exhibited lethargy, pale mucous membranes and a poor appetite. Microscopic examination of skin scrapings revealed the presence of *Sarcoptes scabiei* mites, confirming a diagnosis of sarcoptic mange. Haematological evaluation indicated anaemia and leukocytosis, while examination of the stained blood smear showed *Anaplasma marginale* inclusion bodies within erythrocytes, confirming anaplasmosis. Treatment involved the administration of ivermectin to target the sarcoptic mange, along with long-acting oxytetracycline to manage anaplasmosis. Supportive care included nutritional supplementation and wound management. Clinical improvement was observed within three weeks, with resolution of pruritus and normalization of haematological parameters. This case highlights the importance of thorough diagnostic evaluation in animals presenting with dermatological and systemic signs, emphasizing the potential for concurrent infections to complicate clinical presentations and thus affect therapeutic strategies. This report underscores the need for integrated treatment protocols in veterinary practice, particularly for mixed infections involving parasitic and bacterial pathogens in livestock.

Keywords: *Anaplasma ovis*; *Sarcoptes scabiei*; Mixed infection; Sheep, Skin lesions; Haematology alterations.

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Introduction

Sarcoptic mange of sheep, caused by the mite *Sarcoptes scabiei-ovis*, is a highly contagious zoonotic ectoparasitic infestation that affects the less woolly skin, usually on the head, neck and face, resulting in hyperkeratosis. Infested sheep usually exhibit pruritis, excoriation, crusts, lichenification and secondary alopecia on the affected parts of the body (Murthy et al., 2013). Mite infestation in domestic animals is common in sub-tropical countries like India especially during rainy and winter seasons due to low temperature and high humidity. Animals in poor condition appear to be most susceptible. Infestation by *Sarcoptes scabiei* is a rare condition in sheep, but may occur occasionally, leading to severe mange lesions on face, ears and legs (Arliann, 1989; Wall and Shearer, 2001). The causative agent, *S. scabiei*, is usually considered to have a number of varieties each generally specific to a particular host species (Radostits et al., 2006). Female mites form shallow burrows in the lower stratum corneum of the skin.

Anaplasmosis, a disease of ruminants, is caused by obligate intra-erythrocytic bacteria of the genus *Anaplasma* (Rar et al., 2021; Dumler et al., 2001). Anaplasmosis occurs in tropical and sub-tropical regions of the world (Omer et al., 2022). Depressive symptoms, debility, decreased milk production, weight loss, miscarriage, severe anaemia and jaundice have been reported to be associated with *Anaplasma ovis* and *Anaplasma marginale* infections in endemic areas (Hosseini-Chegeni et al., 2020). Worldwide up to 17 different tick vector species (including *Dermacentor*, *Rhipicephalus*, *Ixodes*, *Hyalomma* and *Argas*) have been reported to transmit *Anaplasma* spp (except *A. centrale* found naturally in South Africa) (Marchette and Stiller, 2018). Not all of these are likely significant vectors in the field, and it has been shown that strains of *A. marginale* also co-evolve with particular tick strains. *Rhipicephalus (Boophilus)* spp are major vectors of *A. marginale* in Australia and

Africa. Mechanical transmission via biting dipterans occur in some regions (Aubry and Geale, 2011; Marchette and Stiller, 2018). Anaplasmosis may also be spread through the use of contaminated needles, dehorning or other surgical instruments.

Concurrent infections with *Anaplasma* and other pathogens can complicate the clinical picture and lead to a more severe systemic illness. The present case report is that of co-infection/infestation of mange mites (*Sarcoptes scabiei*) and *Anaplasma ovis* in an ewe, in Maiduguri, Nigeria.

Case Presentation

History and Signalment: On June 20, 2024, a three-year-old ewe weighing approximately 35 kg was presented to the Ambulatory Unit of Veterinary Teaching Hospital, University of Maiduguri, Nigeria, with a history of progressive pruritus and hair loss over three weeks. The ewe was part of a small flock housed in a communal grazing area. According to the owner, the ewe had been in good body condition until the onset of the current condition. No other animal in the flock showed similar signs, but new stock had recently been introduced.

Physical and Clinical Investigations: Upon physical examination, there were crust formations around the pruritic area, and there was also alopecia on both the fore and hind limbs (Figures 1A and B). The mucous membranes were pale (Figure 2). There was also dehydration, lethargy, presence of scanty fleas on the body and extremities, emaciation and erythema. The rectal temperature was 32.1°C, and other clinical parameters such as pulse rate and respiratory rate were within the normal range. No significant respiratory or neurological abnormalities were noted.

About 5 ml of blood sample was collected by jugular venipuncture into an EDTA vacutainer for haematological examination. A smear was

made on a glass slide and was stained with Giemsa for blood parasite evaluation (Brahma *et al.*, 2018). Other haematological parameters were also evaluated following standard procedures. Multiple deep skin scrapings were taken from the edges of the lesions. Microscopic examination revealed the presence of sarcoptic mites (*Sarcoptes scabiei var. ovis*), confirming sarcoptic mange. Parasitological examination of the faecal sample showed no significant gastrointestinal parasites.

Results of haematological evaluation showed that the ewe had a packed cell volume of 20%, erythrocyte count of 2.8 million cells/ μ l, a haemoglobin concentration of 4.3 g/dl and total white blood cell count of 18,000 cells/ μ l.

Microscopic examination of the Giemsa stained slides showed presence of *Anaplasma ovis*. In thin blood films, *Anaplasma* spp. appeared as dense, uniformly basophilic-staining inclusions ranging from 0.3 to 1.0 μ m in diameter, forming small clusters of two to eight organisms known as morula (Figure 3).



Figure 1. Alopecia of both the fore limb (A) and hind limb (B) of the ewe that had sarcoptic mange.



Figure 2. Pale mucous membranes of the ewe that had sarcoptic mange and anaplasmosis.

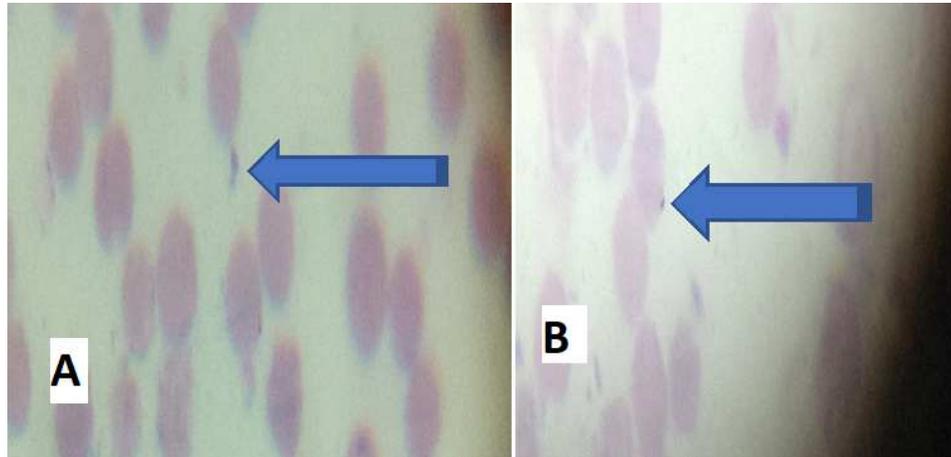


Figure 3. Giemsa-stained blood smears (A and B) showing presence of *Anaplasma spp.* within red blood cells (arrowed).

Diagnosis

A diagnosis of sarcoptic mange (*Sarcoptes scabiei*) and anaplasmosis (*Anaplasma ovis*) was made.

Treatment

A combination of anti-parasitic and anti-bacterial treatments was given to the ewe to address both infections. Ivermectin 1% injection (Kepromec®; Kepro, Holland) was administered to the ewe subcutaneously at the dosage of 1ml/50 kg body weight twice at an interval of one week. The ewe was also treated with two doses of long-acting oxytetracycline 20% LA (Oxycare®; Animal

Care Ltd., Nigeria) at the dosage of 20 mg/kg body weight intra-muscularly 48 hours apart, as earlier reported by Razavi *et al.* (2014) and Castilla-Castaño *et al.* (2021) [Table 1]

Meloxicam (Interchemie, De Adelaar B.V., Netherland) was administered at 0.5 mg/kg body weight intramuscular for five days, as supportive therapy. Additionally, iron supplement and multivitamin injection (V MultiNor®; Jubaili Agrotech, Nigeria) at 1ml/10kg body weight intramuscular was given for three days (Radostits *et al.*, 2007) [Table 1]

Significant clinical improvement was noticed after five days of treatment and the ewe was discharged after complete clinical recovery.

Table 1. Treatments administered to ewe that had sarcoptic mange and anaplasmosis.

Drugs administered	Dosage	Route	Drug category	Frequency of administration
Ivermectin 1%	1ml/50 kg bw.	SC	Anti-parasitic	Twice at an interval of one week.
Oxytetracycline 20%	20 mg/kg bw.	IM	Antibiotic	Twice within 48 hours.
Meloxicam	0.5 mg/kg bw.	IM	Analgesic	Three days.
Multivitamins	1ml/10 kg bw.	IM	Vitamins supplement	Three days.

SC – subcutaneous; IM - intramuscular

Discussion

The simultaneous occurrence of sarcoptic mange and anaplasmosis in this three-year-old ewe underscores the often complex, multi-factorial nature of disease development in both animals and humans. Sarcoptic mange, caused by *Sarcoptes scabiei var. ovis*, is a highly contagious ectoparasitic disease that severely affects the skin of sheep, resulting in intense itching, hair loss and crusty lesions. Infected animals often suffer from reduced productivity due to weight loss, anaemia and secondary bacterial infections (Ibrahim and Abu-Samra, 1987; Heath *et al.*, 1995). Simultaneously, anaplasmosis, caused by *Anaplasma ovis*, is a tick-borne haemoparasitic infection that induces haemolytic anaemia, fever and lethargy (Rymaszewska and Grenda, 2008). Both diseases independently weaken the immune system, making affected animals more susceptible to secondary infections, and worsening their clinical condition (Guillot *et al.*, 2023).

The ewe displayed severe pruritus, crusty skin lesions and lethargy, along with evident signs of anaemia characterized by pale mucous membranes. Alopecia was also observed around the affected areas. Anaemia has been reported to be a characteristic feature of anaplasmosis (Kocan *et al.*, 2010). Furthermore, the heavy mange parasite load contributed to the animal's deteriorating condition. The simultaneous occurrence of *Sarcoptes scabiei* and *Anaplasma ovis* likely exacerbated the severity of clinical signs.

It is thought that the stress of the sarcoptic mange may have suppressed the immunity of ewe and made it more susceptible to additional infections. *Sarcoptes scabiei* induces intense itching and inflammation through hypersensitivity reactions while also compromising the skin barrier, facilitating secondary infections and weakening systemic immunity (Bornstein *et al.*, 2001). Chronic stress from persistent itching, reduced feed

intake and immune suppression may have further increased the risk of *Anaplasma ovis* infection. This interaction highlights how immune-compromised animals become susceptible to opportunistic pathogens (Smith *et al.*, 2017)

Sarcoptic mange and anaplasmosis are both economically significant diseases that can cause substantial losses in sheep production, as a result of reduced wool quality, weight loss and increased mortality rates. Effective disease control in endemic regions requires an integrated approach, including routine ectoparasite management, tick control programmes and enhanced nutrition.

The quick recovery in this case could be attributed to early diagnosis and the administration of a high dose of oxytetracycline. It has been reported that long-acting tetracycline formulations at a dosage of 20 mg/kg, administered once weekly for two to four weeks, is effective (Lei *et al.*, 2017). Additionally, Imidocarb dipropionate may be beneficial in treating anaplasmosis, although information on its dosage and treatment protocols remains limited (Smith and Sherman, 2009). Treatment of mange infestation was successfully done using Ivermectin at 200 µg/kg body weight and complete recovery of skin lesions was observed between 10th and 14th day post treatment, as earlier reported by Murthy *et al.* (2013).

Conclusions and Recommendations: The reported co-infection/co-infestation of the ewe with mange mites and *Anaplasma* spp. in the three-year-old ewe highlights the interplay between dermatological and systemic infections, particularly under conditions of stress-induced immunosuppression. Stress, anaemia and reduced immunity can exacerbate the severity of both diseases. Properly managing these infections is critical to minimizing economic losses and improving animal welfare in sheep farming systems.

Preventive measures that prioritize vector control and biosecurity practices to limit disease spread are recommended. Regular dipping or application of topical acaricides can help manage mange infestations, while strategic use of acaricides for tick control is essential in preventing anaplasmosis (Jonsson, 2006).

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Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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