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CONCURRENT INFECTION OF DERMATOPHILOSIS AND MANGE IN A CAMEL-A CASE REPORT

Tresamol P.V.[1], Suchithra S.[2], Mery Rincy K.[3], Prasanth S.[4] and Vinod Kumar K.[5]

[1]Professor and Head, [5]Assistant Professor, Department of Veterinary Epidemiology and Preventive Medicine, [2,3]Research Assistant, [4]Veterinary Surgeon, Animal Husbandry Department, College of Veterinary and Animal Sciences, Kerala Veterinary and Animal Sciences University, Mannuthy, India

ABSTRACT

The present paper reports a case of mixed infection of sarcoptic mange and dermatophilosis in a camel reared in a farm. Animal had generalised skin lesions with alopecia and scab formation with matting of hairs especially on the rump region, legs and perineum. Microscopy of skin scrapings revealed presence of sarcoptic mites. Giemsa-stained scab smears revealed parallel rows of cocci arranged in typical tram track appearance suggestive of *Dermatophilus congolensis*. Cultural examination of skin scabs yielded haemolytic, greyish adherent colonies in sheep blood agar in presence of 10 per cent carbon dioxide, which was confirmed by morphological and biochemical characteristics. Molecular confirmation of the isolate was done using species specific PCR. The animal was treated successfully with two doses of long acting oxytetracycline @ 20mg/kg body weight at 3 days apart along with weekly injections of ivermectin @ 200µg/kg body weight and topical application of povidone iodine for four weeks.

Key words: Camels, *Dermatophilus congolensis*, sarcoptic mange, therapy

Dermatophilosis has a worldwide distribution and reported most frequently in tropical and subtropical countries with high ambient temperature and torrential rain patterns. First report of natural *D. congolensis* infection in camels was among camel calves reared on a commercial farm in a semi-arid area in Kenya (Gitao *et al*,1990). Khodakaram-Tafti *et al* (2012) reported 13.6 percent of prevalence of dermatophilosis among camels in Iran. Hughes and Anderson (2020) reported *D. congolensis* as a pathogen of zoonotic significance in camels. Bodinga and Shehu (2019) reported occurrence of dermatophilosis among 16 percent of camels slaughtered in an abattoir in Sokoto.

Gitao *et al* (1998a) reported an outbreak of dermatophilosis among camels from the Butana region of Eastern Sudan where camel calves were more likely to be infected (34%) than adults (8.9%), and lesions were more severe and involved most parts of the body. Mixed infection of *D. congolensis* and M. gypseum in camels reared on a dairy farm in Saudi Arabia was reported by Gitao *et al* (1998b). Gitao (1993) used enzyme linked immunosorbent assay (ELISA) to determine the epidemiological prevalence of *D. congolensis* infection in camels reared in a pastoral area of Kenya. Molecular diagnosis by using polymerase chain reaction (PCR) was described as a highly specific and sensitive test in comparison with the widely used conventional microbiological methods (Shaibu *et al,* 2010; Tresamol and Saseendranath, 2015).

Sarcoptic mange is a highly contagious zoonotic skin disease and in camels it is caused by *Sarcoptes scabiei* var *cameli* (Singh and Veer, 2005). The present paper reports a case of mixed infection of sarcoptic mange and dermatophilosis in a camel and it's successful therapeutic management.

Materials and Methods

A camel reared at a farm in Thrissur district was presented to University Veterinary Hospital, Mannuthy with generalised skin lesions which included alopecia and scab formation (Fig 1). It was previously treated for mange infestation using ivermectin and topical application of scabimide lotion without much improvement.

Skin scabs were collected aseptically from the lesions and were subjected to direct microscopy and bacterial and fungal culture. Smears were stained with Gram's and Giemsa stain. The scab materials were inoculated on sheep blood agar in the presence of 10 per cent carbon dioxide and incubated at 37°C in incubator. The isolates were further confirmed by the macroscopic and microscopic morphology of

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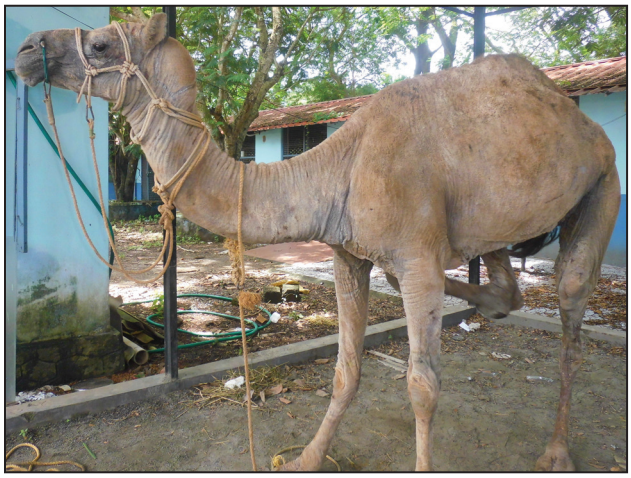

Fig 1. Camel with generalised skin lesions with alopecia and scabs.

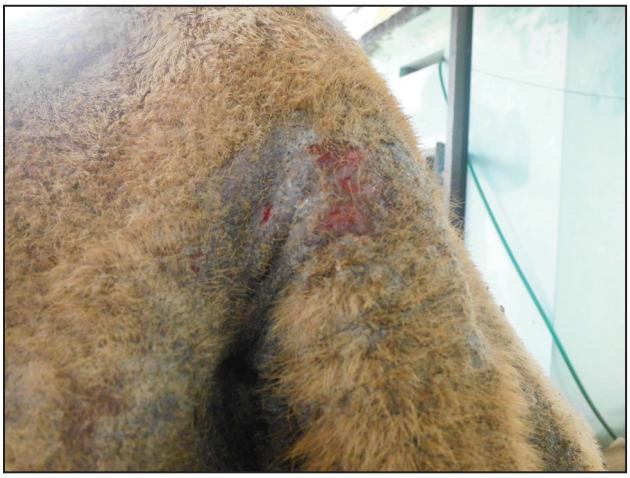

Fig 2. Thick scabs with matting of hairs on legs.

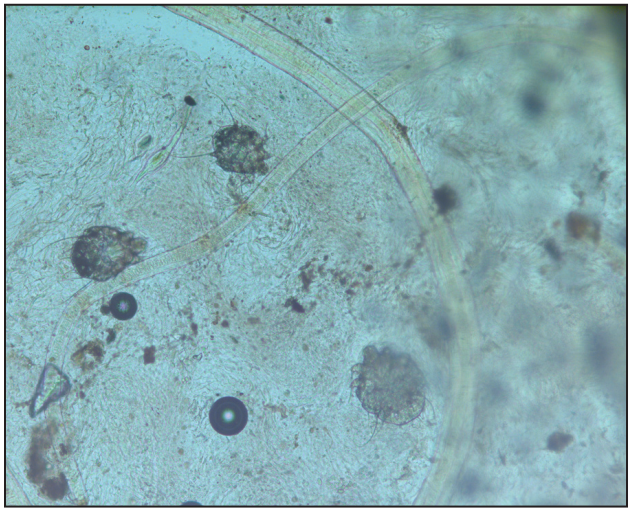

Fig 3. Sarcoptes mites in skin scrapings.

the colonies and biochemical tests.The PCR assay was carried out using the primers targeting the 16S rRNA gene of *D. congolensis* as described by Shaibu *et al* (2010). Skin scrapings (collected in 10% potassium hydroxide) were subjected to microscopical examination for detection of fungal spores or mites.

Results and Discussion

Clinical examination revealed thick scabs with matting of hairs especially on the rump region, legs and perineum (Fig 2). Osman (2014) reported lesions in the form of exudative dermatitis, thick greasy scabs and long hairs collected to form paint brush appearance in clinically affected camels. Removal of these hairs in the early stage of the disease revealed severe pain leaving bleeding area beneath it. Microscopy of skin scrapings revealed sarcoptes mites (Fig 3). Giemsa-stained and Gram's-stained scab smears revealed parallel rows of cocci arranged in typical tram track appearance

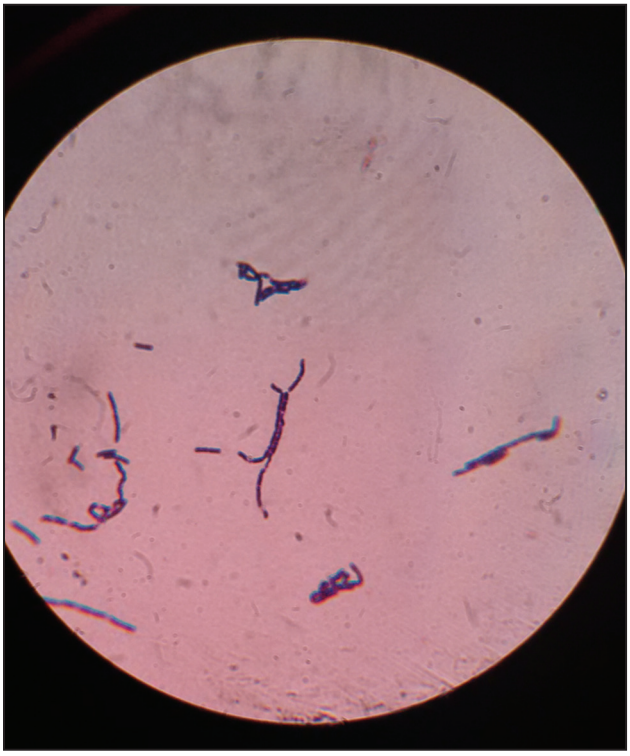

Fig 4. Gram's-stained scab smears with parallel rows of cocci suggestive of *D. congolensis*.

suggestive of *Dermatophilus congolensis*. Cultural examination of skin scabs yielded haemolytic, greyish adherent colonies in sheep blood agar in presence of 10 per cent carbon dioxide, which was confirmed by morphological and biochemical characteristics. Microscopical appearance of organisms in Gram-stained smears from colonies were also highly variable with Gram-positive branching filaments in different stages of segmentation, packets of coccoid forms, germinating spores or combinations of the above forms depending on the age of the culture and strain of the isolate (Tresamol *et al,* 2015a,b).

Fig 5. Haemolytic, greyish adherent colonies of *D. congolensis* in sheep blood agar.

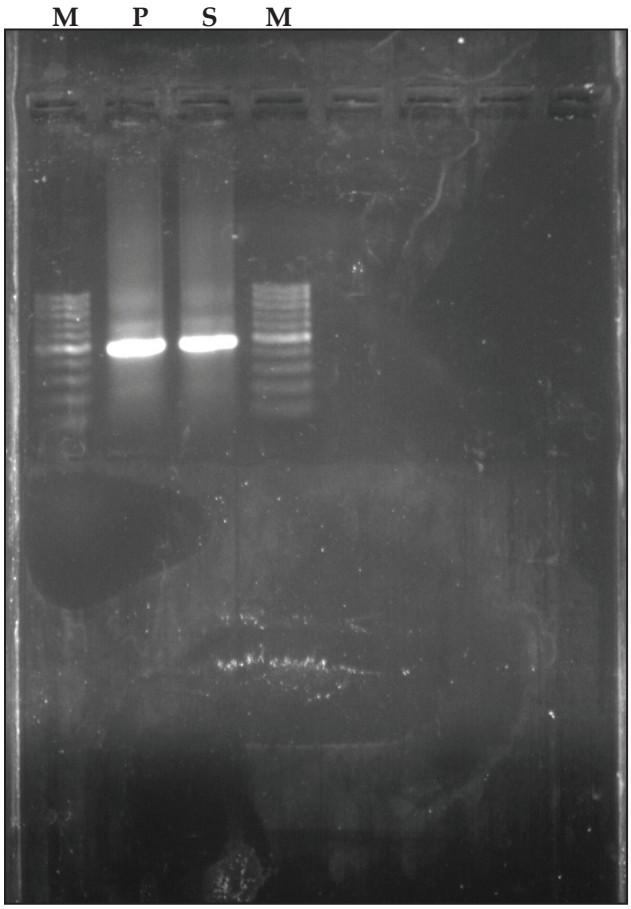

Fig 7. PCR amplification products of 500bp of *D. congolensis*.
M - Molecular marker 100 bp
P - Positive control - *D. congolensis* from cattle
S - Test sample from camel

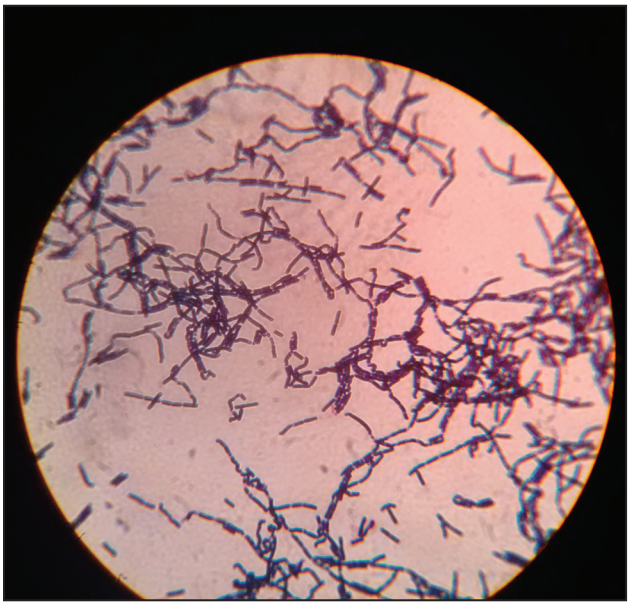

Fig 6. Gram-positive branching filaments of *D. congolensis* in different stages of segmentation agar.

Molecular confirmation of the isolate through PCR was done using primers targeting the 16S rRNA, and were found positive for *D. congolensis* amplifying a 500bp product (Fig 7). PCR has been adjudged as an effective tool for the definitive identification of *D. congolensis* in cattle, sheep and goats (Samon *et al,* 2010). The primers used in present study was found to be highly specific in detecting *D. congolensis* isolates from cattle, sheep, and goat (Tresamol and Saseendranath, 2015; Oladunni *et al,* 2016). Microscopical examination of skin scrapings revealed sarcoptes mites, however, fungal isolates could not be obtained by fungal culture. The concurrent infections might have resulted in severe lesions in the present case. Concurrent infections of dermatophilosis with other diseases such as camel pox (Abd, 2018), caseous lymphadenitis (Tarazi and Al Ani, 2016) and dermatophytes (Gitao *et al,* 1998b) were also reported previously in camels.

The camel was treated successfully with two doses of long acting oxytetracycline @ 20mg/kg BW at 3 days apart along with weekly injections of ivermectin @ 200mg/kg BW and topical application of povidone iodine for four weeks. Tarazi and Al-Ani (2016) reported successful treatment of affected camels using long-acting oxytetracycline injection in a dose rate of 10 mg/kg body weight every 48 hours for three successive treatments, and local antiseptic and antibiotic cutaneous spray treatment for five successive days. Osman (2014) also reported efficacy of long-acting tetracycline in treatment of dermatophilosis in camels. Branford *et al* (2021)

carried out the first detailed genomic study on *D. congolensis*, including observation of a tetracycline resistance-conferring gene tet (Z). Treatment with ivermectin was reported to be effective on sarcoptic mange infestation, and was found beneficial on clinical and body condition scores in camels (Feyera *et al*, 2015).

Prolonged wetting of the skin by daily bathing as reported by the owner might be one of the predisposing factor for dermatophilosis (Aliye *et al*, 2020). Vitamin deficiency and tick infestation were also reported to cause severe skin lesion of camel dermatophilosis (Osman, 2014; Gitao, 1993). Managemental factors such as avoidance of trauma and persistent moisture and control of ticks are important in preventing the recurrence of the condition.

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