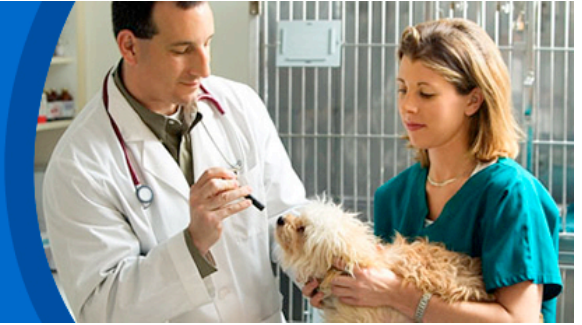




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Nagella Naveen

Division of Medicine, ICAR-
Indian Veterinary Research
Institute, Izatnagar, Bareilly,
Uttar Pradesh, India

Ujjwal Kumar De

Division of Medicine, ICAR-
Indian Veterinary Research
Institute, Izatnagar, Bareilly,
Uttar Pradesh, India

Sakshi

Division of Medicine, ICAR-
Indian Veterinary Research
Institute, Izatnagar, Bareilly,
Uttar Pradesh, India

Bharat Saini

Division of Medicine, ICAR-
Indian Veterinary Research
Institute, Izatnagar, Bareilly,
Uttar Pradesh, India

Krishna Verma

Division of Medicine, ICAR-
Indian Veterinary Research
Institute, Izatnagar, Bareilly,
Uttar Pradesh, India

Corresponding Author:

Nagella Naveen

Division of Medicine,
ICAR- Indian Veterinary
Research Institute,
Izatnagar, Bareilly, Uttar
Pradesh, India

Concurrent anaplasmosis and *Psoroptes natalensis* infestation in a buffalo: A case report

Nagella Naveen¹, Ujjwal Kumar De², Sakshi³, Bharat Saini⁴, Krishna Verma⁵

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ABSTRACT

A six-year-old buffalo was presented to the Referral Veterinary Polyclinic, ICAR-IVRI, Izatnagar, with a history of inappetence, sudden drop in milk yield and pruritic skin lesions over the neck and thigh. Clinical examination revealed pallor mucous membranes, enlarged lymph nodes, tick infestation tachycardia, crusted skin lesions and reduced ruminal motility. Haematobiochemical examination indicated anemia, neutrophilia and elevated hepatic enzymes. Skin scrapings revealed the presence of a parasitic mite which was morphologically identified as *Psoroptes natalensis*, causing psoroptic mange in buffaloes, while Giemsa-stained smears confirmed *Anaplasma marginale* infection. The case was diagnosed as concurrent psoroptic mange and anaplasmosis. Treatment with oxytetracycline, fluid therapy, endectocide, antioxidants and supportive care led to marked clinical improvement and gradual resolution of clinical signs over 21 days.

Keywords: Anaplasmosis, Buffalo, Ivermectin, Mange, *Psoroptes natalensis*

Introduction

Anaplasma marginale is an obligate intracellular, Gram-negative bacterium and the most common cause of bovine anaplasmosis (Gall sickness), a highly pathogenic disease prevalent in tropical and subtropical regions (Zafar *et al.*, 2022) [1]. Transmission of *Anaplasma marginale* can occur through infected ticks, biting flies and contaminated fomites, while transplacental transmission has also been reported during the 3rd and 4th trimesters of pregnancy (Zaugg, 1985; Atif *et al.*, 2021) [3, 2]. A presumptive diagnosis of bovine anaplasmosis is often based on clinical signs such as lethargy, laboured breathing, aggressive behaviour, and/or death, accompanied by pallor and icterus of the mucous membranes. Haemoglobinuria is not a feature of anaplasmosis. In acute cases, *Anaplasma marginale* may be detected on blood smears, though these are not routinely examined (Ierardi, 2025) [4]. Oxytetracycline has been reported to be effective in treating *Anaplasma marginale* infections in buffaloes, showing marked clinical and haematological improvement, particularly during the bacteraemic phase (Namratha and Ramesh, 2020; Nitture *et al.*, 2020) [5, 6]. Mange is a highly contagious and prevalent skin disease of buffaloes, particularly significant in tropical and subtropical regions (Jabeen *et al.*, 1998) [7]. Water buffaloes (*Bubalus bubalis*) are primarily affected by *Sarcoptes*, *Psoroptes* and *Chorioptes* species of mites (Afzal *et al.*, 1995; Rakesh *et al.*, 2017) [8]. *Psoroptes natalensis* is an emerging ectoparasite causing dermatitis in buffaloes in the Indian subcontinent. These superficial skin mites primarily inhabit hair-covered areas of the body (Mahajan *et al.*, 2016). *Psoroptes* spp. are obligate, non-burrowing mites that feed superficially on the skin by abrading the outer epidermal layer with their toothed chelicerae. They ingest a mixture of lymph, red blood cells, skin cells, exudates, and surface bacteria (He *et al.*, 2016) [9]. Mite infestations are associated with oxidative stress, which can contribute to immunosuppression and thereby allow opportunistic microflora to cause secondary infections. Free radicals and oxidative stress play a key role in the pathogenesis of various allergic and inflammatory skin diseases in humans. As the body's outermost barrier, the skin is exposed to both endogenous and exogenous pro-oxidants. Free radical-induced effects on the skin include edema, erythema, wrinkling, inflammation, autoimmune reactions, hypersensitivity and keratinization abnormalities (Mahajan *et al.*, 2017) [10]. Psoroptic mange leads to significant economic losses in affected animals by causing weight loss, reduced milk production and increased susceptibility to secondary infections (Richard and Karin, 2006). The present paper describes the clinical features and successful therapeutic management of concurrent *Anaplasma marginale* infection and *Psoroptes natalensis* infestation in a buffalo.

Case history and clinical observations

A six-year-old female buffalo was presented to the Referral Veterinary Polyclinic at ICAR-IVRI, Izatnagar, with a history of inappetence, sudden decrease in milk yield and pruritic skin lesions over the neck. Clinical examination revealed pallor mucous membranes (Figure 1), enlarged lymph nodes, tachycardia (86 bpm), reduced ruminal motility, decreased milk yield, tick infestation, normal rectal temperature (102.3 °F) and pruritic skin lesions on the neck and lateral thighs.



Figure 1. Pallor of the mucous membranes

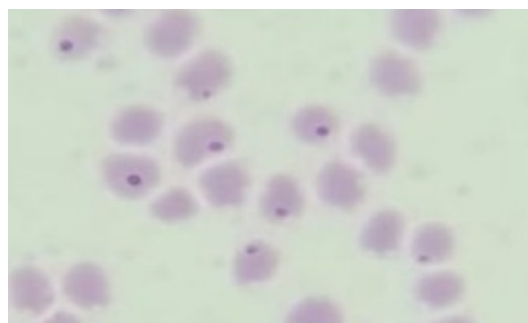


Figure 2. Giemsa-stained blood smear showing basophilic inclusion bodies consistent with *Anaplasma marginale* at the periphery of erythrocytes

Treatment

The treatment regimen included oxytetracycline at a dosage of 20 mg/kg body weight, administered intravenously once daily for five consecutive days, to address anaplasmosis. Supportive therapy in-

cluded intravenous administration of 1 L of Vetplasma, a colloidal plasma volume expander, and 1 L of dextrose normal saline (DNS) daily for five consecutive days to support intravascular volume, hydration and overall circulatory status. Additionally, 1% w/v ivermectin was administered subcutaneously at 200 µg/kg body weight, once a week for three weeks, to manage the tick and mite infestation. Chlorpheniramine maleate (10 ml, IM) was given for 3 days to control pruritus. Vitamin E and selenium (Repronol) were administered subcutaneously at a dose of 1 ml per 50 kg body weight to reduce oxidative stress. To aid recovery, the animal was prescribed haematinics and liver support: Syrup 3D Red (50 ml orally, twice daily) to improve haematological status and Livotas syrup (50 ml orally, twice daily) to support liver function. Environmental control measures included the application of deltamethrin to the buffalo's surrounding environment twice at two-week intervals to reduce reinfestation. Buffalo showed uneventful clinical recovery with gradual resolution of clinical signs over a period of 21 days.

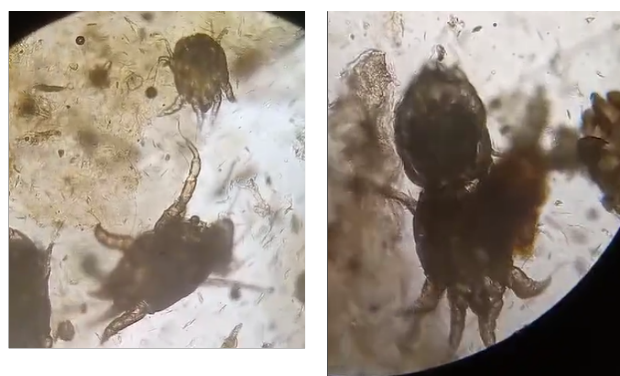


Figure 3. Photomicrograph of *Psoroptes natalensis* mites

Results and discussion

Haematological examination revealed severe anaemia, characterized by marked reductions in haemoglobin, PCV and total erythrocyte count (TEC), accompanied by neutrophilia and a relative decrease in

lymphocyte percentage (Table 1) were consistent with findings by Rakesh *et al.* (2017) [8] and Das *et al.* (2022) [11]. The marked reduction in erythrocytic indices indicated severe anaemia and may have been associated with erythrocyte destruction during *Anaplasma marginale* infection. Elevated ALT and AST levels (Table 1) likely re-

flect hepatic damage caused by phagocytosis of parasitized erythrocytes, in agreement with Das *et al.* (2022) [11]. Following treatment, improvement in haematological and biochemical parameters was observed, along with resolution of the major clinical signs.

Table 1. Haemato-biochemical profile of the affected buffalo before and after treatment

Parameter	Prior treatment	Post treatment
Hb (gm/dL)	3.9	5.8
PCV (%)	16	25
TEC (x10 ⁶ /mm ³)	3.1	4.5
TLC (x10 ³ /mm ³)	14.1	9.5
Neutrophils (%)	76	30
Lymphocytes (%)	16	68
Monocytes (%)	3	2
Eosinophils (%)	5	0
Total bilirubin (mg/dL)	0.92	0.78
ALT (IU/L)	89.6	37
AST(IU/L)	163.4	72
ALP(IU/L)	126	83
Total protein (g/dL)	7.2	6.5
Albumin (g/dL)	2.8	3.7
Globulin (g/dL)	4.4	2.8

The mites in the skin scrapings were oval and large, with legs extending beyond the body margin. Their pedicels were long, segmented and bore suckers on the first, second and third pairs of legs in males, and on the first, second and fourth pairs in females. Based on these morphological features, they were identified as *Psoroptes natalensis*, similar to observations by Rakesh *et al.* (2017) [8]. Das *et al.* (2022) [11] recommended the incorporation of antioxidants as an adjunct while treating anaplasmosis for better response because there was a positive correlation between haemolytic crisis and oxidative stress in animals infected with anaplasmosis. After treatment, the skin scrapings examination showed progressive decrease in the number of mites found, but a few live mites were still present on day 7 prompting further two doses of Ivermectin. Meanwhile, antibiotic treatment with Oxytetracycline was continued daily for 5 days. The animal recovered uneventfully following treatment with oxytetracycline, ivermectin, antioxidants and supportive care.

Conclusion

This case highlights the importance of early diagnosis and integrated management of concurrent haemopathogenic bacterial and ectoparasitic infections for achieving favourable clinical outcomes and minimizing disease-associated complications

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