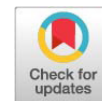


Research Article



Severe Mite Infestation in Buffalo Calves in the Coastal Region of Bangladesh and their Therapeutic Management

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Abstract | Mite infestation, commonly known as mange, is a significant ectoparasitic disease that affects the health and productivity of buffaloes, particularly in humid and saline coastal regions. This study describes an outbreak of mange mite in buffalo calves at a farm in the coastal belt of Bhola district, Bangladesh, during April 2024. Among 37 calves, several showed characteristic clinical signs such as intense pruritus, alopecia, thickened skin, and scab formation, predominantly on the neck and face. Deep skin scrapings examined microscopically revealed *Sarcoptes scabiei* mites as the causative agent. Affected calves were treated with subcutaneous ivermectin (0.2 mg/kg body weight) combined with multivitamin supplementation and topical application of 20% methylene blue solution. Marked clinical improvement was observed within two weeks, and complete recovery occurred by three weeks post-treatment without recurrence after three months. Although bovine scabies caused by *Sarcoptes scabiei* is known to induce transient pseudo-scabies in humans, no farm handlers reported pruritic dermatitis or related symptoms during the outbreak period. The findings indicate that ivermectin therapy, coupled with improved hygiene and environmental management, is highly effective in managing mite infestation in buffalo calves. This case underscores the importance of early diagnosis, integrated parasite control, and farmer awareness to minimize ectoparasitic diseases and enhance the resilience of coastal buffalo farming systems in Bangladesh.

Keywords | Buffalo calves, *Sarcoptes scabiei*, Mange, Ivermectin, Coastal region, Bangladesh

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INTRODUCTION

Buffaloes play an essential role in the rural economy of Bangladesh, particularly in the coastal regions

where they are a vital source of milk, meat, draft power, and income for smallholder farmers. However, their productivity is often constrained by various parasitic infestations, among which ectoparasites such as mites are

of significant concern. Mite infestation in buffalo calves, especially in coastal and subcoastal regions, poses a serious health challenge. Mite infestation, particularly with the obligate, burrowing mite *Sarcoptes scabiei*, is an extremely pruritic, contagious and debilitating disease of buffaloes (Naresh *et al.*, 2005). It is recognized as one of the most serious diseases of dairy animals in the Indian subcontinent (Gill *et al.*, 1989). It is a highly contagious, widespread disease that can be transmitted between animals by direct and indirect contact and manifests in outbreaks (Radostits *et al.*, 2007; Jones *et al.*, 2008). It appears to be one of the most important skin diseases of buffalo in tropical and subtropical countries (Jabeen *et al.*, 1998; Azam *et al.*, 2002). Mange was studied in both water buffalo (*Bubalus bubalis*) (Tikaram and Ruprah, 1986) and African buffalo (*Syncerus caffer caffer*) (Dräger and Paine, 1980; Bukva *et al.*, 1984). The economic impact of mange in an infested herd comes from the additional fattening time, reduced daily weight gain, cost of treatments and labor, damage to the hides and occasional mortalities (Lonneux *et al.*, 1998; Rehbein *et al.*, 2002). Moreover, mange has great zoonotic and public health importance. Water buffalo were recorded to be a source for human infestation (Chakrabarti *et al.*, 1981). The clinical findings varied based on the mite species and severity of infestation.

The morbidity rate varies from 1.5 to 82%, and reaching up to 100% in severely affected herds, with heavy losses of young animals. Knowledge of ecological factors (e.g., nutritional and temperature stresses) is probably the key for controlling and eradicating mange in cattle. The causes and associated factors of psoroptic infestation in buffalo. The coastal environment of Bangladesh, with its high humidity, saline conditions, and dense animal populations, provides favorable conditions for the proliferation of ectoparasites. Despite the economic importance of buffaloes in this region, scientific reports on mite infestation and its therapeutic management are limited. Early diagnosis and appropriate treatment is crucial to mitigate the impact of mange and to ensure better animal health and productivity.

This case report documents an incidence of mite infestation in buffalo calves in the coastal belt of Bangladesh, detailing the clinical findings, diagnosis, and therapeutic outcomes following specific treatment regimens. The findings aim to enhance understanding of the disease dynamics in coastal environments and to guide veterinarians and livestock farmers in effective control and prevention strategies.

MATERIALS AND METHODS

Buffalo farm is located Velumia in Bhola district, a coastal region of Bangladesh. The farm is consisting with 180 buffaloes where 37 were calves. The farm faced sudden infected with mite infestation during the period April 26,

2024. A thorough investigation was done to find out the cause and possible risk factors using following techniques.

CLINICAL HISTORY

For investigation, data of breed, age, season, body condition, management, sources of feed, prophylactic measure and treatment were taken into count.

PHYSICAL EXAMINATION

Physical examinations of herd profiles management, general health history, skin lesions, presence of other animals, using of acaricides, and time interval to last ectoparasite treatment.

CLINICAL EXAMINATION

Buffalo calves under investigation were clinically examined on the day of the first visit. Buffalo with skin lesions were examined for lesions, body condition and appetite. Skin lesions were scored as follow, no lesion= 0; focal lesion with alopecia and mild pruritus= 1; diffuse skin lesion with pruritus= 2, extensive lesions with pruritus and scale formation= 3, and extensive lesion with exudation and crust= 4.

PARASITOLOGICAL EXAMINATION

25 buffalo were selected randomly for parasitological examination. Deep scrapings were examined for presence of mites using the potassium hydroxide digestion method followed by a sedimentation–flotation technique with sucrose. Mites were counted and identified according to the method of Bowman (1995). Additionally, we have clarified that 25 buffaloes were randomly selected from the same farm population, including both clinically affected calves and apparently healthy individuals. Parasitological examination confirmed mite infestation exclusively in clinically affected calves, while adult buffaloes were negative.

THERAPEUTIC MANAGEMENT

To check the infestation caused by mites, all affected calves were treated topical and systemic administration of ivermectin along with supportive care and environmental management. After 3 days of these treatments, topical 20% methylene blue (MB) was sprayed and significant improvement was observed within two weeks, with complete resolution of symptoms and no recurrence after three months.

RESULTS

CLINICAL LESIONS

In Buffalo farm, among buffaloes, only calves were affected; most of the affected calves were in poor body condition. The infestation spread quickly from these localized lesions

causing generalized mange (Figure 1A, B). Although the skin lesions were found all over the body, the neck (48.5%) and the face (39.6%) were the most affected part. All calves were affected during April, 2024 by licking each other and the adverse weather during this period. Immediately farmer use penicillin drugs but that failed to protect.

LABORATORY EXAMINATION

Deep skin scrapings from the periphery of the lesions were collected in a test tube containing 3 ml of 10% potassium hydroxide solution. After gentle heating for about 3 minutes, the test tube was centrifuged at 3,000 rpm for 5 minutes. A drop of the sediment was put on a clean glass slide and examined under microscope for the presence of mites (Figure 1C). The mites found were identified by morphological characteristics of the species (Soulsby, 1982; Kettle, 1995). The skin scrapings were examined every week for 4 weeks to evaluate efficacy of treatment.

TREATMENT RESPONSES AND FOLLOW-UP STUDY

All affected calves were treated with ivermectin and other multivitamin and mineral supplements such as aminovit plus® and Hemovit® as per company instruction. After 3 days of these treatments, topical 20% methylene blue (MB) was sprayed and significant improvement was observed within two weeks, with complete resolution of symptoms

and no recurrence after three months (Figure 1D).

DISCUSSION

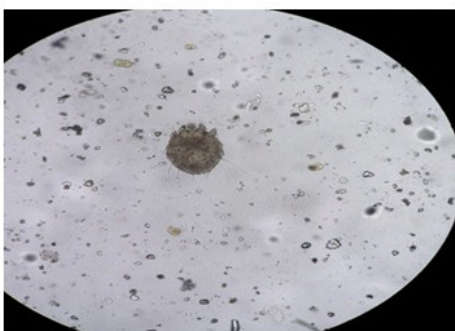
Mite infestation, or mange, is one of the most prevalent and economically important ectoparasitic diseases affecting buffaloes in tropical and subtropical regions. The present case report documents a typical incidence of mange in buffalo calves from the coastal belt of Bangladesh, characterized by clinical signs, diagnostic findings, and therapeutic outcomes following ivermectin-based treatment. Similar to other livestock production systems in humid coastal areas, the environmental and management conditions in this region significantly favor ectoparasite survival and transmission. The clinical signs observed in this study noted intense pruritus, alopecia, popular eruptions, thickened skin, and scab formation corresponds closely with the descriptions reported by Ranjan *et al.* (2020) and Kumar *et al.* (2017) in buffaloes infested by *Sarcoptes scabiei*. The high degree of irritation and scratching leads to skin injuries and secondary bacterial infections, as also noted by Haque *et al.* (2019) in Bangladeshi buffaloes. These lesions are often exacerbated by poor nutritional status and lack of proper hygiene, leading to a chronic and debilitating condition that severely affects productivity. The epidemiological context of this case aligns with findings by Rahman *et al.* (2018)



A: Herd of buffalo calves infested with mites



B: A buffalo calf with severe mite infestation



C: *Sarcoptes* mite under microscope



D.: Recovered calf after treatment

Figure 1: Severe mite infestation in buffalo calves (A and B), *Sarcoptes* mite under microscope 10x (C) and recovered after treatment (D).

and Hossain *et al.* (2020), who documented a higher prevalence of ectoparasitic infestations in coastal buffaloes during the post-monsoon and winter seasons. This is largely attributed to high relative humidity, muddy pastures, close animal contact, and the absence of regular veterinary supervision. In coastal ecosystems, saline environments can stress animals and reduce their immunity, making them more susceptible to ectoparasitic and secondary infections (Ali *et al.*, 2016; Samad, 2020). Ivermectin treatment at a dosage of 0.2 mg/kg body weight (subcutaneous, repeated after 14 days) produced excellent therapeutic results, with complete recovery in most calves within two to three weeks. This observation is consistent with earlier reports by Islam *et al.* (2019) and Singh *et al.* (2021), who demonstrated the high efficacy of ivermectin in the treatment of mange in large ruminants. Bhardwaj *et al.* (2020) and Raza *et al.* (2017) further confirmed that ivermectin not only eliminates adult mites but also prevents re-infestation when combined with improved management practices. The initial use of penicillin by farmers failed because it is a β -lactam antibiotic effective only against bacterial pathogens and has no efficacy against ectoparasites such as *Sarcoptes scabiei*.

The supportive therapy administered in this case including multivitamins, antihistamines, and topical antiseptics facilitated faster wound healing and reduced stress, a result corroborated by Abdel-Rahman *et al.* (2019) and Hassan *et al.* (2022). Comparatively, other acaricidal agents such as doramectin, amitraz, and lime-sulfur dips have been tested with variable success (Kumar *et al.*, 2017; Ghosh *et al.*, 2015; Rani *et al.*, 2021). However, ivermectin remains the most reliable and cost-effective option for field conditions in Bangladesh due to its availability, safety, and wide spectrum of activity. Nonetheless, the potential for acaricide resistance reported by Rashid *et al.* (2020) in Pakistan, highlights the need for rotational use of antiparasitic drugs and integrated parasite management approaches.

The occurrence of mange in the calves examined suggests deficiencies in preventive husbandry practices, such as irregular deworming, overcrowding, and poor housing hygiene. Studies by Et al *et al.* (2022) and Chowdhury *et al.* (2023) emphasized that community-based animal health programs and farmer training can effectively reduce the incidence of parasitic diseases in coastal regions. Environmental sanitation, regular grooming, isolation of infected animals, and maintenance of dry bedding are crucial to prevent re-infestation.

From an economic standpoint, mange infestations cause considerable losses due to reduced milk yield, poor feed conversion, delayed maturity, and decreased market value of affected animals (Ali *et al.*, 2021; Raza *et al.*, 2017; Hossain *et al.*, 2020). Moreover, zoonotic transmission of

Sarcoptes scabiei from buffaloes to humans, although rare, has been reported in close-contact situations (El-Khodery *et al.*, 2019), posing a potential public health concern. This underscores the importance of integrating buffalo health management into broader livestock and human health surveillance under the “One Health” framework. Regarding zoonotic implications, although bovine scabies caused by *Sarcoptes scabiei* is known to induce transient pseudo-scabies in humans, no farm handlers reported pruritic dermatitis or related symptoms during the outbreak period.

The present findings thus reinforce that effective management of mange in coastal buffaloes requires a multifaceted approach, including timely diagnosis, proper drug administration, improved nutrition, and enhanced hygiene. Strengthening veterinary extension services and ensuring availability of acaricidal drugs at the community level are essential steps toward sustainable buffalo production in the coastal region of Bangladesh.

CONCLUSION

The present case report highlights that mite infestation is an emerging ectoparasitic problem among buffalo calves in the coastal regions of Bangladesh, likely aggravated by humid conditions, poor hygiene, and limited veterinary care. Early clinical diagnosis and appropriate therapeutic intervention proved effective in restoring animal health and productivity. The use of acaricidal treatment combined with improved management and sanitation practices successfully eliminated the infestation and reduced reinfection risks. This finding emphasizes the importance of regular parasitic surveillance, farmer awareness, and integrated control measures to prevent future outbreaks. Strengthening veterinary extension services and promoting community-based animal health initiatives can play a crucial role in improving the overall welfare and resilience of coastal buffalo farming systems.

ACKNOWLEDGEMENT

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NOVELTY STATEMENT

This study presents one of the first detailed case reports of severe *Sarcoptes scabiei* infestation in buffalo calves from the coastal region of Bangladesh. It demonstrates the successful field management of the outbreak using ivermectin combined with supportive therapy and improved hygiene practices, with complete clinical recovery and no recurrence during a three-month follow-up. The findings provide practical evidence for early diagnosis, integrated

The authors declare that no generative AI and AI assisted technology was used in the creation of this manuscript.

AUTHOR'S CONTRIBUTION

MKR: Review of literature, investigation, resources, methodology, formal analysis, software, data curation, original draft preparation, writing review and editing. BCR: Co-supervision, resources, methodology, formal analysis, writing review and editing. MMRS: Methodology, investigation, formal analysis, writing review and editing. GKD, MAA, HB, AKMAR, MTR: Co-supervision, methodology, investigation, formal analysis, writing review and editing. MHT: Conceptualization, fund acquisition, methodology, project administration, supervision, validation, visualization, investigation, resources, writing, review and editing. All authors have read and approved the final version of the manuscript.

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ETHICAL APPROVAL

Verbal consent from the owners of the animals was accomplished by providing them with detailed objectives of the study. Registered veterinarians carried out fecal collection. Additionally, the study protocol was approved by the Animal Welfare and Experimental Ethical Committee (AWEEC) of Bangladesh Agricultural University (Approval No. AWEEC/BAU/2022-3). All procedures were carried out in accordance with the committee's guidelines.

ETHICAL CONSIDERATIONS

The study was conducted following the guidelines of the Animal Ethics and Welfare Committee of Bangladesh Agricultural University, ensuring humane handling of animals during sampling and treatment procedures. Verbal consent was obtained from buffalo farm owners prior to participation.

DATA AVAILABILITY

Data will be made available to readers upon request from the corresponding author.

STATEMENT OF CONFLICT OF INTEREST

The authors have declared no conflict of interest.

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