



Clinical Diagnosis and Therapeutic Management of Dermatophilosis in Dairy Cattle: A Field Case Study

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Dermatophilosis is an economically important bacterial skin disease of cattle caused by the actinomycete bacterium *Dermatophilus congolensis*. The disease is characterized by exudative dermatitis, crust formation, matted hair, and varying degrees of alopecia, resulting in reduced productivity, impaired animal welfare, hide damage, and increased treatment costs. Predisposing factors such as prolonged rainfall, high humidity, ectoparasite infestation, poor nutrition, skin trauma, and immunosuppression facilitate the establishment and progression of infection. Early clinical recognition combined with laboratory confirmation and prompt therapeutic intervention is essential for successful disease management. This field case study describes the clinical presentation, diagnostic approach, therapeutic management, and clinical outcome of dermatophilosis in a lactating dairy cow managed under tropical field conditions. The case highlights the importance of integrating antimicrobial therapy, topical wound management, ectoparasite control, nutritional support, and environmental hygiene for complete recovery. The report also emphasizes preventive strategies that can minimize recurrence and reduce economic losses in dairy herds.

Introduction

Dermatophilosis is a contagious bacterial dermatitis affecting a wide range of domestic and wild animals, particularly cattle, sheep, goats, horses, and occasionally humans. In dairy cattle, the disease assumes considerable economic importance because of reductions in milk yield, deterioration of body condition, hide damage, decreased market value, and increased veterinary expenditure. The disease is most prevalent in tropical and subtropical regions where prolonged periods of rainfall, elevated humidity, and heavy ectoparasite burdens create favorable conditions for bacterial proliferation. The etiological agent, *Dermatophilus congolensis*, is a Gram-positive, facultatively anaerobic actinomycete that exhibits a characteristic branching filamentous morphology. Under favorable environmental conditions, infective motile zoospores are released from mature filaments and penetrate damaged epidermis. Moisture softens the skin barrier, allowing zoospores to invade superficial epidermal layers where they proliferate and induce acute inflammatory reactions. The resulting exudation dries to form characteristic multilayered crusts firmly attached to the underlying skin.

The disease is generally associated with tick infestation, prolonged wetting of the skin, nutritional deficiencies, poor housing hygiene, and immunosuppressive conditions. Crossbred dairy cattle often exhibit greater susceptibility than indigenous breeds because of differences in skin characteristics and environmental adaptability. Although mortality is uncommon, severe generalized infections may significantly compromise animal health and productivity. Accurate diagnosis requires careful evaluation of clinical signs together with laboratory confirmation by cytology, bacterial culture, or molecular methods. Appropriate therapeutic management involves systemic antimicrobial therapy, removal of crusts, topical antiseptic treatment, tick control, nutritional supplementation, and correction of environmental risk factors. The present article documents a field case of dermatophilosis in a dairy cow and discusses the clinical diagnosis, therapeutic management, and preventive measures relevant to field veterinarians.

Case History

A five-year-old crossbred Holstein Friesian × indigenous dairy cow weighing approximately 430 kg was presented to a veterinary field clinic with complaints of progressive skin lesions over the neck, shoulders, dorsum, and rump for approximately three weeks. The owner reported gradual reduction in milk production from 14 L/day to approximately 9 L/day, accompanied by decreased feed intake and occasional rubbing of affected areas against fences. The animal was maintained under semi-intensive management with daily grazing during the monsoon season. The farm had experienced persistent rainfall for nearly two weeks before the onset of lesions. Tick infestation had been observed in several animals, although routine acaricidal treatment had not been performed during the previous three months. No recent vaccination or major systemic illness was reported.

Clinical Examination

General clinical examination revealed moderate depression, mild dehydration, reduced body condition score, and rectal temperature of 39.6°C. Heart rate and respiratory rate were within normal physiological limits. Dermatological examination demonstrated multiple irregular, thick, dry, paintbrush-like crusts distributed over the neck, withers, shoulders, dorsum, and rump. Removal of crusts exposed moist, erythematous, exudative skin with slight hemorrhage. Hair tufts were firmly embedded within crusts and detached together when removed. Multifocal alopecia was evident around chronic lesions. Moderate pain was elicited during palpation of active lesions. Numerous adult ticks were observed around the ears, dewlap, tail switch, and perineal region. No oral lesions or enlargement of superficial lymph nodes was detected.

Diagnostic Investigations

Samples were collected from freshly detached crusts and underlying exudate after gentle cleaning of lesion margins. Direct microscopic examination of Gram-stained smears demonstrated branching filamentous organisms with characteristic transverse and longitudinal septa, producing the classical "railroad track" appearance typical of *Dermatophilus congolensis*. Giemsa staining also revealed numerous coccoid zoospores associated with inflammatory cells. Bacterial culture on 5% sheep blood agar incubated under microaerophilic conditions yielded small, rough, β-hemolytic colonies after 48 hours. Colony morphology and biochemical characteristics confirmed *Dermatophilus congolensis*. Complete blood count revealed mild leukocytosis with neutrophilia consistent with active bacterial infection. Serum biochemical analysis indicated mild hypoalbuminemia, likely resulting from chronic exudative skin inflammation. Based on the clinical presentation, cytological findings, and bacterial isolation, a definitive diagnosis of dermatophilosis was established.

Differential Diagnosis

Several dermatological disorders were considered before confirmation of the diagnosis. Differential diagnoses included:

- Lumpy Skin Disease
- Ringworm
- Mange
- Bovine Papillomatosis
- Photosensitization
- Allergic dermatitis
- Tick bite hypersensitivity
- Zinc-responsive dermatosis

The absence of generalized nodular lesions, papillomatous growths, fungal hyphae, and ectoparasitic burrows, together with characteristic microscopic morphology, allowed differentiation from these conditions.

Therapeutic Management

Therapeutic management was directed toward elimination of bacterial infection, restoration of skin integrity, control of ectoparasites, correction of predisposing factors, and prevention of recurrence. Systemic antimicrobial therapy consisted of long-acting oxytetracycline administered intramuscularly at the recommended therapeutic dosage under veterinary supervision, with repeat administration according to the manufacturer's recommendations and clinical response. Oxytetracycline remains one of the most effective antimicrobials against *Dermatophilus congolensis* because of its excellent tissue penetration and prolonged activity. Prior to topical treatment, thick crusts were softened using warm antiseptic solution and carefully removed without causing excessive trauma. Removal of crusts exposed infected tissue and significantly improved penetration of topical medications. Affected skin was cleansed daily using dilute chlorhexidine solution followed by application of povidone-iodine antiseptic. In severely exudative lesions, topical antibiotic spray was applied to minimize secondary bacterial contamination and accelerate epithelial healing. Heavy tick infestation was controlled using an appropriate acaricide applied to all cattle on the farm. Simultaneously, animal housing was thoroughly cleaned, manure removed, and bedding replaced to reduce environmental contamination and interrupt reinfection. Supportive therapy included balanced mineral supplementation, vitamins A and E, zinc supplementation, adequate protein nutrition, and unrestricted access to clean drinking water. Improvement of nutritional status was considered essential for restoration of skin integrity and enhancement of immune function. During the treatment period, the affected cow was isolated from healthy animals to reduce transmission through direct contact and contaminated equipment. Milking hygiene and handling procedures were improved, and separate grooming equipment was designated for infected animals.

Clinical Outcome

Marked clinical improvement became evident within one week following initiation of therapy. Appetite improved, exudation gradually diminished, and new lesion formation ceased. After approximately three weeks, most crusts had detached naturally, revealing healthy granulation tissue and progressive re-epithelialization. Hair regrowth became visible over healed areas, while milk production gradually increased to approximately 12.5 L/day. Complete clinical recovery occurred within five weeks without recurrence during the subsequent three-month follow-up period. Routine tick control and improved housing management were continued as preventive measures.

Discussion

Dermatophilosis remains one of the most important bacterial skin diseases encountered under tropical dairy production systems, particularly during prolonged rainy seasons. Moisture-induced disruption of the epidermal barrier permits invasion of *Dermatophilus congolensis* zoospores into superficial skin layers, initiating acute inflammatory reactions and formation of characteristic crusts. Tick infestation represented a major predisposing factor in the present case. Tick feeding causes repeated skin trauma, facilitating bacterial entry while

simultaneously suppressing local immune responses. Similar observations have been documented in numerous field investigations where effective tick control substantially reduced disease incidence. Clinical diagnosis was strongly supported by the presence of paintbrush-like crusts, exudative dermatitis, and the characteristic "railroad track" morphology observed on stained smears. Cytological examination provides a rapid, inexpensive, and highly reliable diagnostic method for field veterinarians, although bacterial culture remains valuable for definitive confirmation. The favorable therapeutic response observed in this case reflects the importance of integrated management rather than reliance on antimicrobial therapy alone. Successful treatment requires removal of protective crusts, topical antiseptic, systemic antibacterial therapy, correction of nutritional deficiencies, and elimination of environmental risk factors. Failure to address predisposing conditions often results in incomplete recovery or recurrence. Economic losses associated with dermatophilosis extend beyond treatment expenses. Reduced milk production, decreased body weight, hide damage, impaired reproductive performance, and prolonged recovery collectively diminish farm profitability. Early diagnosis and prompt intervention therefore represent economically beneficial disease-control strategies.

Preventive Measures

Effective prevention depends on integrated herd health management. Regular tick and ectoparasite control programs should be implemented throughout the year, particularly before the onset of the rainy season. Adequate drainage and dry housing conditions help maintain skin integrity by minimizing prolonged moisture exposure. Balanced nutrition with sufficient protein, trace minerals, and vitamins supports immune competence and resistance to infection. Skin injuries should be treated promptly to prevent bacterial invasion, while affected animals should be isolated until complete recovery. Farm equipment used for grooming or treatment should be disinfected routinely to reduce indirect transmission. Periodic clinical surveillance enables early detection and treatment of new cases before widespread herd involvement occurs.

Conclusion

Dermatophilosis is an important bacterial skin disease that continues to affect dairy cattle, particularly in humid tropical environments where prolonged moisture and ectoparasite infestation compromise skin defenses. This field case demonstrates that accurate clinical recognition supported by laboratory confirmation allows early diagnosis and appropriate therapeutic intervention. Integrated management comprising systemic antimicrobial therapy, topical wound care, crust removal, ectoparasite control, nutritional support, and environmental hygiene resulted in complete clinical recovery and restoration of milk production. Sustainable prevention requires comprehensive herd-health practices, including regular tick control, improved housing sanitation, balanced nutrition, and early treatment of affected animals. Adoption of these measures can substantially reduce disease recurrence, improve animal welfare, and minimize economic losses in dairy production systems.