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Ephemeral Fever or Three-Day Sickness

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Abstract

Bovine Ephemeral Fever (BEF), also known as "Three-Day Sickness," is an acute viral disease of cattle and buffaloes transmitted by insect vectors, and it poses a significant threat to livestock production, particularly in tropical and subtropical regions such as India. The disease is caused by the Bovine Ephemeral Fever Virus (BEFV), which belongs to the *Rhabdoviridae* family, and is mainly spread through blood-feeding insects such as mosquitoes and *Culicoides* midges (Walker & Klement, 2015). In India, BEF is considered endemic and demonstrates a distinct seasonal pattern, with most outbreaks occurring during the monsoon and post-monsoon periods when vector populations are at their peak (Pyasi *et al.*, 2025). This article presents a research-based overview of BEF, emphasizing the need for an integrated approach to its understanding and management. Strengthening farmer awareness, ensuring timely veterinary care, and implementing effective vector control measures are critical strategies for minimizing the impact of the disease and improving overall livestock productivity.

Keywords-Bovine Ephemeral Fever (BEF), Vector-borne disease, Culicoides midges, Livestock productivity.

Introduction

Bovine Ephemeral Fever (BEF), also referred to as "Three-Day Sickness," is a rapidly occurring viral

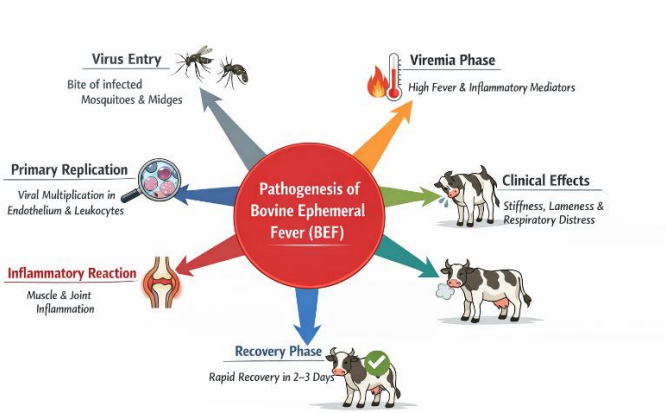
disease transmitted by insects, mainly affecting cattle and buffaloes. The causative agent, Bovine Ephemeral Fever Virus (BEFV), belongs to the *Rhabdoviridae* family and is spread through the bites of hematophagous vectors such as mosquitoes and *Culicoides* midges. This disease is commonly found in tropical and subtropical regions, including India, where its occurrence is closely linked with the monsoon and post-monsoon periods due to increased vector populations. The clinical presentation typically includes a sudden rise in body temperature, shivering, stiffness, lameness, and a significant drop in milk yield. In addition, affected animals may exhibit signs like dullness, nasal discharge, and difficulty in movement. Although the illness generally lasts for a short duration of about 1–3 days, it can spread quickly among animals within a herd, leading to a high morbidity rate that may exceed 80%. Even though the mortality rate remains relatively low (approximately 1–2%), the disease has

notable economic implications due to decreased productivity, reduced efficiency of working animals, and the expenses involved in treatment and management. According to World Organisation for Animal Health, 2021-Bovine ephemeral fever is an acute, insect-transmitted viral disease of cattle and buffalo characterized by sudden onset of fever, lameness, and rapid recovery within a few days.

Prevalence in India- Bovine Ephemeral Fever (BEF) is widely distributed across the Indian subcontinent and is recognized as an endemic, vector-borne disease affecting both cattle and buffalo. Historical and epidemiological evidence suggests that the disease has been present in India since the early 20th century, with outbreaks reported from multiple states including Tamil Nadu, Uttar Pradesh, Gujarat, and Himachal Pradesh, indicating its broad geographical spread (Walker, 2015). In India, BEF exhibits a clear seasonal pattern, with most cases occurring during the monsoon and post-monsoon months (June to October), a period that favors the multiplication of insect vectors (*Pyasi et al.*, 2025). Field-level observations and outbreak investigations have shown that the disease can spread rapidly within herds, often infecting a large proportion of susceptible animals within a short duration of 1–3 weeks. This rapid transmission is mainly attributed to the high density of vectors such as mosquitoes and *Culicoides* species (Walker & Klement, 2015). Under Indian conditions, morbidity rates during outbreaks typically range between 50% and 80%, whereas mortality is generally low, around 1–2%, although occasional severe outbreaks may result in higher death rates (Nandi & Negi, 1999). Serological evidence further confirms the endemic nature of BEF in India. For example, a recent study conducted in Gujarat detected antibodies against the BEF virus in cattle and buffalo populations, indicating ongoing viral circulation and natural exposure (*Mohapatra et al.*, 2022). Similar studies from different regions of the country have reported seroprevalence levels ranging from 30% to 70%, highlighting the widespread exposure of livestock to the virus over time.

Pathogenesis - The pathogenesis of Bovine Ephemeral Fever (BEF) follows a sequential and well-organized progression beginning with the transmission of the virus through the bite of infected blood-feeding insects, mainly mosquitoes and biting midges (*Culicoides* spp.). After entering the host, the virus quickly gains access to the bloodstream, initiating a primary viraemic phase. It then replicates within vascular endothelial cells and circulating leukocytes, enabling rapid systemic spread throughout the body (Walker & Klement, 2015). This viraemic stage is typically associated with a sudden rise in body temperature (pyrexia), largely triggered by the release of inflammatory mediators such as prostaglandins and various cytokines. As the disease advances, a strong inflammatory response is elicited, leading to increased permeability of blood vessels and infiltration of inflammatory cells into different tissues. This results in pathological conditions such as myositis and synovitis, which are responsible for clinical manifestations like stiffness and lameness. In severe cases, the involvement of pulmonary tissues may cause respiratory distress, while systemic metabolic imbalances contribute to a significant reduction in milk yield. Affected animals may also become recumbent due to intense

muscle pain and generalized weakness (Nandi & Negi, 1999).



Clinical sings- The clinical presentation of Bovine Ephemeral Fever (BEF) is typically acute and rapidly progressive, with the severity of signs influenced by factors such as the animal's immune status, age, and physiological condition. The disease is classically characterized by a biphasic or, in some cases, polyphasic fever, with rectal temperatures often rising sharply to 40–42°C. This febrile response is usually accompanied by generalized signs of systemic illness, including shivering, dullness, anorexia, and marked depression, leading to a noticeable reduction in normal activity and productivity. Affected animals frequently show serous to mucopurulent nasal discharge along with excessive salivation, suggesting involvement of the upper respiratory tract and mucosal irritation.

As the disease progresses, respiratory involvement may become evident in certain cases, presenting as labored, shallow, or rapid breathing due to pulmonary inflammation or congestion. Musculoskeletal manifestations are among the most prominent and economically significant features of BEF. Animals often exhibit stiffness in gait, reluctance to move, and varying degrees of lameness. In more severe cases, intense muscle pain and joint inflammation can result in complete recumbency, where animals are unable to rise without assistance. Additionally, lacrimation (excessive tearing) is commonly observed and may be associated with conjunctival irritation. Although the clinical signs may appear severe, BEF is generally a self-limiting disease. The host's immune system, particularly through the rapid development of neutralizing antibodies, effectively eliminates the virus from circulation. As a result, most animals recover within a short period of 2-3 days. However, some individuals may experience lingering weakness or occasional relapse, especially when exposed to stress or suboptimal management conditions (Radostits *et al.*, 2007; Walker, 2015).

Economic Importance-The economic impact of Bovine Ephemeral Fever (BEF) is significant, particularly in livestock-based economies such as India, where dairy production is a major source of income for farmers (Walker & Klement, 2015). One of the most immediate consequences of the disease is a sharp reduction in milk yield, with studies reporting a decline of approximately 30–70% during the acute phase of infection in affected animals (Radostits *et al.*, 2007). In severe cases, complete cessation of milk production may occur for several days, and normal yield levels may take 1–3 weeks to recover, further contributing to financial losses (Walker & Klement, 2015). In addition to dairy losses, BEF adversely affects the working capacity of draught animals. Due to clinical signs such as stiffness, lameness, and recumbency, animals become temporarily unfit for agricultural activities, leading to reduced farm productivity (Nandi & Negi, 1999). Outbreak investigations have shown that morbidity rates can reach 60–80% within affected herds, resulting in widespread disruption

of both milk production and field operations (Walker & Klement, 2015). The disease also contributes to deterioration in body condition, as affected animals often exhibit reduced feed intake and metabolic disturbances. This can lead to an estimated body weight loss of 5–10%, thereby lowering the overall productivity and market value of livestock (Radostits *et al.*, 2007). Furthermore, reproductive performance may be compromised, with reports indicating temporary infertility, delayed estrus, or reduced conception rates in approximately 10–20% of affected females under field conditions (Nandi & Negi, 1999). Although mortality associated with BEF is generally low, typically around 1–2%, the high morbidity rate amplifies the overall economic burden on farmers (Walker & Klement, 2015). Additional costs are incurred for treatment, veterinary care, and labor required to manage affected animals. Field-based estimates suggest that the total economic loss per affected animal may range from ₹2,000 to ₹10,000, depending on the severity of infection and production status (Radostits *et al.*, 2007).

Treatment and Management- The treatment and management of Bovine Ephemeral Fever (BEF) are primarily supportive in nature, as no specific antiviral therapy is currently available against the causative virus (Walker & Klement, 2015). The main objective of treatment is to alleviate clinical signs, reduce inflammation, and support the overall recovery of the affected animal. Symptomatic therapy plays a crucial role, particularly the use of antipyretic and anti-inflammatory drugs such as non-steroidal anti-inflammatory drugs (NSAIDs), which help in controlling fever, pain, and inflammation associated with the disease (Radostits *et al.*, 2007). In addition to this, fluid therapy is often required in animals showing dehydration or reduced feed and water intake, as it helps maintain electrolyte balance and supports normal physiological functions (Nandi & Negi, 1999).

Adequate rest is essential during the course of the illness, since affected animals commonly experience severe muscle pain, stiffness, and weakness; minimizing movement helps prevent further complications and promotes faster recovery. Proper housing management, including comfortable bedding and easy access to feed and water, is also important, particularly for recumbent animals. During the recovery phase, animals should be carefully managed and protected from stress factors such as excessive work, transportation, or extreme environmental conditions, as these may delay recovery or lead to relapse (Walker, 2015). Furthermore, veterinary consultation is crucial for accurate diagnosis, appropriate treatment, and continuous monitoring, ensuring effective management of the disease and minimizing economic losses under field conditions.

Prevention- The prevention of Bovine Ephemeral Fever (BEF) primarily focuses on controlling the insect vectors responsible for disease transmission, as the virus is mainly spread through mosquitoes and biting midges (*Culicoides* spp.) (Walker & Klement, 2015). Effective fly and mosquito control measures, including the use of insecticides, repellents, and environmental management practices, play a crucial role in reducing the risk of infection. Maintaining clean and hygienic surroundings is equally important, as it helps minimize breeding sites for vectors, particularly in areas with stagnant water, manure accumulation, and poor drainage (Radostits *et al.*, 2007).

Reducing animal exposure to vectors is another key preventive strategy. This can be achieved by

housing animals during peak vector activity periods, such as dusk and dawn, and by using protective measures like nets or shelters. Although vaccination against BEF is available in some regions, its use is limited in many countries, including India, due to factors such as availability, cost, and variable field efficacy (Walker, 2015). Therefore, an integrated approach combining vector control, proper sanitation, and management practices remains the most effective strategy for preventing the occurrence and spread of the disease.

Conclusion

Bovine Ephemeral Fever (BEF) is an economically important, vector-borne viral disease that significantly affects cattle and buffalo populations, particularly in tropical and subtropical regions. Despite its acute onset and sometimes severe clinical manifestations, the disease is generally self-limiting with low mortality; however, its high morbidity, rapid spread, and associated production losses make it a matter of considerable concern for the livestock sector (Walker & Klement, 2015). The pathogenesis involves systemic viral dissemination and a strong inflammatory response, leading to characteristic signs such as fever, lameness, and a sharp decline in milk yield. Effective management of BEF relies largely on early recognition, prompt symptomatic treatment, and adequate supportive care, as no specific antiviral therapy is available. Preventive strategies, particularly vector control and improved farm management practices, play a crucial role in reducing disease incidence. Although vaccination offers potential protection, its limited availability and application restrict widespread use in field conditions (Radostits *et al.*, 2007). Therefore, an integrated approach combining disease surveillance, vector management, and proper animal care is essential to minimize the impact of BEF. Strengthening awareness among farmers and ensuring timely veterinary intervention can further help in reducing economic losses and improving overall livestock health and productivity.

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