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Isolation and identification of *Mucor* species in a pneumonic cattle

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Abstract
Mucormycosis is an opportunistic fungal infection seen in animals. Although gastrointestinal involvement is more common in cattle, pulmonary mucormycosis is rarely reported. This study describes a case in Red Sindhi cattle from Tamil Nadu presenting with respiratory distress and anorexia. Post-mortem examination revealed pneumonia. Tracheal and lung swabs cultured on Sabouraud Dextrose Agar and stained with Lactophenol Cotton Blue confirmed the presence of *Mucor* species. This case underscores the need to include mucormycosis in differential diagnoses of bovine respiratory illness and highlights the role of culture and microscopy in confirming fungal etiology.

Keywords: Mucormycosis, cattle, pneumonia, pneumonic cattle, rarely reported

Introduction
Mucormycosis is a fungal disease affecting both animals and humans, caused by fungi belonging to the class Zygomycetes, which is further divided into two families: Entomophthoraceae and Mucoraceae. Among these, the members of the genera *Rhizopus*, *Mucor*, and *Absidia* of Mucoraceae family are the most commonly implicated in animal infections (Uzal *et al*., 2016) [9]. The incidence of mucormycosis is on the rise, particularly across Asia (Prakash and Chakrabarti, 2019) [5]. These fungi are typically present in decomposing organic material, such as fallen leaves, decaying wood and vegetation and animal feces (Seyedmousavi *et al*., 2018; Hassan and Voigt, 2019) [7, 2]. Mucoraceae fungi grow rapidly and produce airborne spores. Infection typically occurs via inhalation of sporangiospores, direct inoculation through the skin, less commonly by ingestion (Petrikkos and Tsioutis, 2018) [4]. These fungi are opportunistic pathogens, primarily affecting immunocompromised hosts (Binder *et al*., 2014; Seyedmousavi *et al*., 2018) [1, 7]. In such animals, the disease tends to progress aggressively, often spreading via the bloodstream. Although the virulence varies with the specific fungal species involved, mucormycosis is associated with high mortality rates, especially in pulmonary or disseminated forms (Hassan and Voigt, 2019) [2].
In cattle, mucormycosis is occasionally diagnosed, typically involving the forestomach-particularly the rumen and omasum, followed by the reticulum and abomasum. The disease is often associated with predisposing factors such as ruminal acidosis, mastitis, the periparturient period, immunosuppression, and prolonged antimicrobial therapy (Jensen *et al*., 1994) [3]. However, reports of pulmonary mucormycosis in cattle are scarce in the literature. The aim of the present study is to document a case of pulmonary mucormycosis in a cow from Tamil Nadu.

Materials and Methods
A Red Sindhi cattle was presented to the Veterinary Clinical Complex with a clinical history of respiratory distress and anorexia. The animal died the following day, and a post-mortem examination revealed signs of pneumonia.

Tracheal and lung swabs were collected for microbial isolation.

These samples were inoculated onto Sabouraud dextrose agar with chloramphenicol and incubated at aerobically at 25 °C for 3-4 days (Quin *et al*., 1994) [6]. The growth characteristics of the resulting isolate were documented. Subsequently, the organism was subjected to morphological identification using Lactophenol Cotton Blue staining.

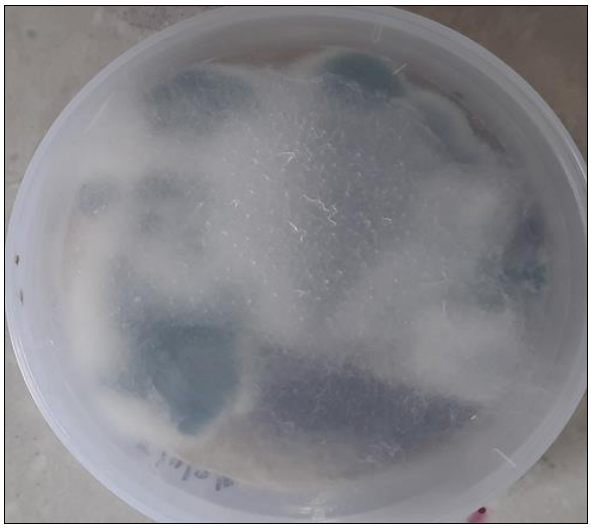

Fig 1: *Mucor* species Colony Growth in SDA agar

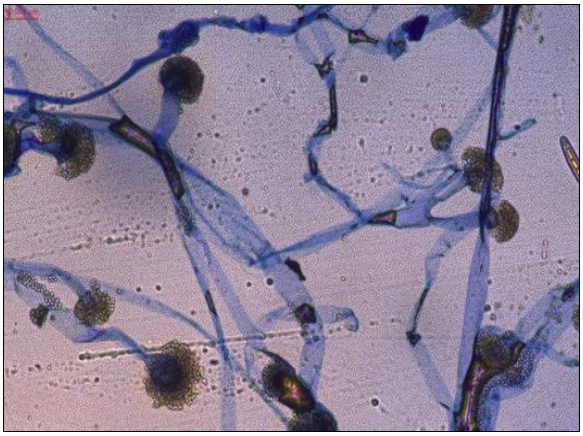

Fig 2: *Mucor* species in lactophenol cotton blue staining (Coenocytic/non septate hyphae with sporangiospores)

Results and Discussion

Culture of the tracheal and lung swabs on Sabouraud Dextrose Agar (SDA), along with Lactophenol Cotton Blue staining, confirmed the presence of *Mucor* species, indicating mucormycosis. Identification was based on phenotypic characteristics, including the appearance of white to yellowish, rapidly spreading colonies on SDA (Figure 1) and the presence of aseptate (coenocytic) hyphae with erect sporangiophores and sporangia observed under Lactophenol Cotton Blue staining (Figure 2).

The identification of *Mucor* species from the tracheal and lung swabs in this case confirms a diagnosis of pulmonary mucormycosis, a rare but severe fungal infection in cattle. The characteristic colony morphology on Sabouraud Dextrose Agar and microscopic features observed with Lactophenol Cotton Blue staining-such as aseptate hyphae and sporangiospores are consistent with previous descriptions of *Mucor* spp. (Seyedmousavi *et al*., 2018) [7]. While mucormycosis more commonly presents in the gastrointestinal tract of cattle, particularly the forestomach, pulmonary involvement remains uncommon and is rarely reported. The present case highlights the importance of considering mucormycosis in differential diagnoses of respiratory distress in cattle, especially in immunocompromised animals or those with recent antibiotic use. Similar findings were documented by Sravani and Ganesan (2024) [8] in a cutaneous form of the disease, and earlier by Wray *et al*. (2008) [10], further underscoring the pathogenic potential of *Mucor* spp. across various organ systems in animals. This report contributes to the limited literature on pulmonary mucormycosis in bovines and emphasizes the value of mycological culture and microscopy in definitive diagnosis.

Conclusion

The confirmation of *Mucor* species from tracheal and lung swabs establishes a rare case of pulmonary mucormycosis in cattle. The typical colony morphology on Sabouraud Dextrose Agar and the presence of aseptate hyphae with sporangiospores under Lactophenol Cotton Blue staining were consistent with earlier descriptions of *Mucor* spp. Although gastrointestinal involvement is more frequently reported in cattle, this case demonstrates that pulmonary mucormycosis, though uncommon, should be considered in the differential diagnosis of respiratory disorders, particularly in immunocompromised animals. By documenting this case, we add to the limited literature on pulmonary manifestations of mucormycosis in bovines and highlight the diagnostic value of combining culture with microscopic examination for accurate identification.

Conflict of Interest

Not available

Financial Support

Not available

Reference

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