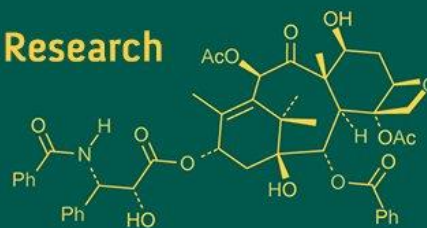
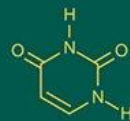


International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
 ISSN Online: 2617-4707
 NAAS Rating (2026): 5.29
 IJABR 2026; 10(6): 257-260
www.biochemjournal.com
 Received: 20-03-2026
 Accepted: 25-04-2026

Padala Harini
 Department of Veterinary
 Microbiology, NTR College of
 Veterinary Science, Sri
 Venkateswara Veterinary
 University (SVVU), Andhra
 Pradesh, India

Deepthi Balam
 Department of Veterinary
 Microbiology, College of
 Veterinary Science, Sri
 Venkateswara Veterinary
 University (SVVU), Andhra
 Pradesh, India

Anand Kumar P
 Department of Veterinary
 Microbiology, NTR College of
 Veterinary Science, Sri
 Venkateswara Veterinary
 University (SVVU), Andhra
 Pradesh, India

Bindu Kiranmayi CH
 Department of Veterinary
 Public Health and
 Epidemiology, NTR College of
 Veterinary Science, Sri
 Venkateswara Veterinary
 University (SVVU), Andhra
 Pradesh, India

Corresponding Author:
Padala Harini
 Department of Veterinary
 Microbiology, NTR College of
 Veterinary Science, Sri
 Venkateswara Veterinary
 University (SVVU), Andhra
 Pradesh, India

Phenotypic characterization of non-dermatophyte moulds from companion animals with mycotic dermatitis

Padala Harini, Deepthi Balam, Anand Kumar P and Bindu Kiranmayi CH

DOI: <https://www.doi.org/10.33545/26174693.2026.v10.i6c.8607>

Abstract

Cutaneous mycoses represent a significant proportion of dermatological disorders in companion animals, adversely affecting animal welfare and necessitating accurate laboratory diagnosis for effective management. Although dermatophytes are traditionally regarded as the principal causative agents of fungal skin infections, non-dermatophyte moulds have increasingly been implicated as opportunistic pathogens and potential contributors to dermatological lesions. The present study was undertaken to phenotypically characterize non-dermatophyte moulds recovered from dogs and cats exhibiting clinical manifestations suggestive of mycotic dermatitis. Skin scrapings and hair samples were collected aseptically from companion animals presenting with dermatological abnormalities, including alopecia, scaling, crusting, erythema, and pruritus. Samples were subjected to mycological examination through culture on Sabouraud Dextrose Agar, followed by incubation under standard laboratory conditions. Fungal isolates obtained were characterized based on their macroscopic cultural attributes, including colony morphology, pigmentation, texture, topography, and growth characteristics. Microscopic identification was performed using Lactophenol Cotton Blue (LPCB) staining to evaluate characteristic reproductive and vegetative structures. The non-dermatophyte moulds identified comprised predominantly *Aspergillus* spp. and *Penicillium* spp., followed by *Mucor* spp., *Rhizopus* spp., *Alternaria* spp., *Curvularia* spp., and *Fusarium* spp. Distinct morphological features such as septation of hyphae, conidiophore architecture, phialide arrangement, conidial morphology, sporangiophore structure, and sporangial characteristics facilitated reliable differentiation among the isolates. The diversity of fungal genera recovered underscores the potential involvement of non-dermatophyte moulds in the mycobiota associated with companion animal dermatological disorders. The findings highlight the continued relevance of conventional mycological techniques for the phenotypic identification and characterization of non-dermatophyte moulds in veterinary diagnostic laboratories. Furthermore, the study provides valuable baseline data on the occurrence and morphological diversity of non-dermatophyte moulds associated with mycotic dermatitis in companion animals, thereby contributing to improved diagnostic interpretation and future epidemiological investigations.

Keywords: Mycotic dermatitis, non-dermatophyte moulds, cultural characterization, microscopic characterization, companion animals

Introduction

Mycotic dermatitis is an important fungal skin disease of companion animals characterized by alopecia, erythema, scaling, crust formation, variable pruritus, hyperpigmentation and malodour (Scott *et al.*, 2001; Bond *et al.*, 2020) ^[1,2]. The disease poses significant diagnostic challenges as its clinical manifestations often resemble those of several infectious and non-infectious dermatological conditions (Outerbridge, 2006) ^[3]. Accurate identification of the etiological agent is therefore essential for effective treatment and prevention of recurrent infections (Chakrabarti and Singh, 2011) ^[4]. Dermatophytes are traditionally regarded as the principal fungal pathogens associated with superficial mycoses in dogs and cats (Ivaskiene *et al.*, 2016) ^[5]. However, increasing reports have documented the recovery of non-dermatophyte moulds (NDM) from companion animals with fungal dermatitis, highlighting their growing clinical significance (Kumar *et al.*, 2011; Zenad *et al.*, 2015; Hassanien *et al.*, 2021) ^[6, 7, 8]. Environmental moulds including *Aspergillus* spp., *Penicillium* spp., *Mucor* spp.,

Rhizopus spp., *Alternaria* spp., *Curvularia* spp. and *Fusarium* spp. have been recovered from canine and feline dermatological lesions (Kumar *et al.*, 2011; Hassanien *et al.*, 2021) [6, 8]. Recent investigations have reported the occurrence of *Aspergillus* spp. in dogs and cats with mycotic dermatitis (Padala *et al.*, 2026) [9]. Diagnosis of NDM-associated dermatitis is often difficult because lesions frequently mimic dermatophytosis, bacterial pyoderma and allergic skin diseases (Bond *et al.*, 2020) [2]. Although molecular techniques have enhanced fungal identification, conventional mycological methods based on culture characteristics and microscopic morphology remain valuable tools for routine diagnosis and characterization of fungal isolates (Borman and Johnson, 2014; Rudramurthy and Shaw, 2018) [10, 11]. Therefore, the present study was undertaken to characterize non-dermatophyte moulds isolated from dogs and cats with mycotic dermatitis based on their cultural and microscopic characteristics.

Materials and methods

The present study was conducted at the Department of Veterinary Microbiology, NTR College of Veterinary Science, Gannavaram, (Andhra Pradesh, India). Skin scrapings and hair samples were collected from dogs and cats exhibiting skin lesions suggestive of mycotic dermatitis, including alopecia, scaling, crusting, erythema, malodour and pruritus. Samples were obtained aseptically from the site of active lesions using sterile scalpel blades and forceps after cleansing the affected area with 70% alcohol to reduce surface contaminants. The collected specimens were transferred to sterile labelled containers and transported to the laboratory for mycological examination (Dworecka-Kaszak *et al.*, 2020; Hassanien *et al.*, 2021; Patel *et al.*, 2024) [12, 8, 13]. The collected samples were inoculated onto Sabouraud Dextrose Agar (SDA) and incubated at 28 ± 2 °C for 2 days to a week (Quinn *et al.*, 2011; Padala *et al.*, 2026) [14, 9]. The culture plates were examined periodically for fungal growth, and distinct colonies were subcultured onto fresh SDA plates to obtain pure cultures. Identification of the recovered non-dermatophyte moulds was carried out

based on their cultural characteristics and microscopic morphology following standard mycological procedures (Larone, 2011; Procopet *et al.*, 2020) [15, 16].

Pure cultures of the recovered non-dermatophyte moulds were examined for their macroscopic characteristics on SDA. Colony morphology was assessed based on colony colour, texture, growth rate, surface topography, margin characteristics and reverse pigmentation following standard fungal identification procedures (Larone, 2011; Samson *et al.*, 2014) [15, 17]. The observed cultural features were recorded and utilized for characterization of the fungal isolates. Microscopic characterization of the fungal isolates was performed using Lactophenol Cotton Blue (LPCB) staining as described by Benson (2001) [18] and Procopet *et al.* (2020) [16]. A small portion of fungal growth was mounted in LPCB stain on a clean glass slide and examined under a light microscope. Morphological features including hyphal characteristics, conidiophores or sporangiophores, arrangement of reproductive structures and spore morphology were evaluated for identification and characterization of the isolates following the keys of Larone (2011) [15] and de Hoog *et al.* (2020) [19].

Results and Discussion

Fungal culture yielded diverse fungal isolates comprising dermatophytes, yeasts and non-dermatophyte moulds. Among the recovered fungal isolates, non-dermatophyte moulds predominated, with *Aspergillus* spp. representing the most frequently encountered genus, followed by *Penicillium* spp. The remaining isolates comprised *Mucor* spp., *Rhizopus* spp., *Alternaria* spp., *Curvularia* spp. and *Fusarium* spp. The predominance of *Aspergillus* spp. observed in the present study is in accordance with earlier reports by Kumar *et al.* (2011) [6], Zenad *et al.* (2015) [7] and Padala *et al.* (2026) [9], who documented a higher occurrence of *Aspergillus* species among fungal isolates recovered from companion animals with dermatological lesions. The cultural and microscopic characteristics of the recovered non-dermatophyte mould isolates are presented in Tables 1 and 2.

Table 1. Cultural characteristics of non-dermatophyte moulds

Isolate	Colour	Texture	Growth rate	Surface topography	Reverse pigmentation
<i>A. niger</i>	Black	Powdery	Rapid	Slightly raised	Pale or colourless
<i>A. flavus</i>	Yellowish green	Powdery	Rapid	Slightly raised	Pale yellow
<i>A. fumigatus</i>	Blue-green to grey-green	Velvety	Rapid	Flat	Pale or colourless
<i>Penicillium</i> spp.	Blue-green to green	Velvety	Rapid	Flat	Pale yellow
<i>Rhizopus</i> spp.	White, turning greyish black	Cottony	Rapid	Fluffy, elevated, covers entire plate	Pale
<i>Mucor</i> spp.	White, turning grey	Cottony	Rapid	Fluffy, elevated, covers entire plate	Pale
<i>Alternaria</i> spp.	Greyish-brown to black	Velvety	Moderate	Flat	Dark brown
<i>Curvularia</i> spp.	Olive-brown to black	Woolly	Moderate	Flat to raised in center	Dark brown to black
<i>Fusarium</i> spp.	White to creamy yellow	Cottony	Moderate	Flat to raised	White with slight orange tinge

Table 2. Microscopic characteristics of non-dermatophyte moulds

Fungal isolate	Microscopic characteristics
<i>A. niger</i>	Septate hyphae with conidiophores terminating in vesicles bearing biserial phialides and radiate conidial heads with black conidia.
<i>A. flavus</i>	Septate hyphae with conidiophores terminating in vesicles bearing uniseriate or biserial phialides and radiate conidial heads.
<i>A. fumigatus</i>	Septate hyphae with conidiophores terminating in vesicles bearing uniseriate phialides and columnar conidial heads.
<i>Penicillium</i> spp.	Septate hyphae with brush-like conidiophores bearing phialides and chains of conidia.

<i>Mucor</i> spp.	Broad aseptate hyphae with sporangiophores and spherical sporangia; rhizoids absent.
<i>Rhizopus</i> spp.	Broad aseptate hyphae with well-developed rhizoids, sporangiophores and spherical sporangia.
<i>Alternaria</i> spp.	Septate hyphae with brown muriform conidia having transverse and longitudinal septa.
<i>Curvularia</i> spp.	Septate hyphae with geniculate conidiophores and curved multicellular conidia.
<i>Fusarium</i> spp.	Septate hyphae with characteristic sickle-shaped multicellular macroconidia.

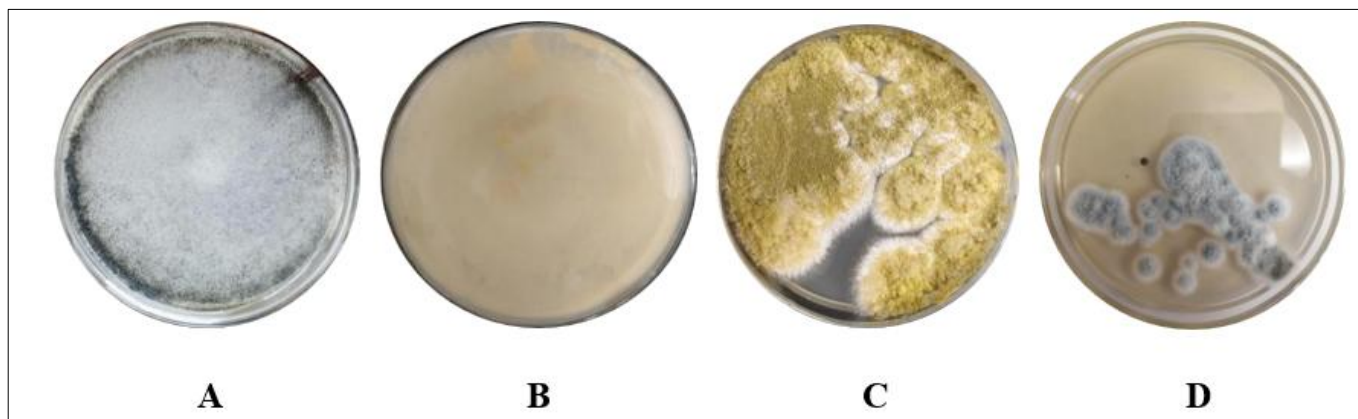


Fig 1: Colony characteristics of non-dermatophyte mould isolates on SDA. (A) *Rhizopus* spp.: White fluffy colony with black discolouration; (B) *Mucor* spp.: White fluffy colony covering entire plate; (C) *A. flavus*: yellowish-green powdery colonies; (D) *Penicillium* spp.: Bluish green colonies

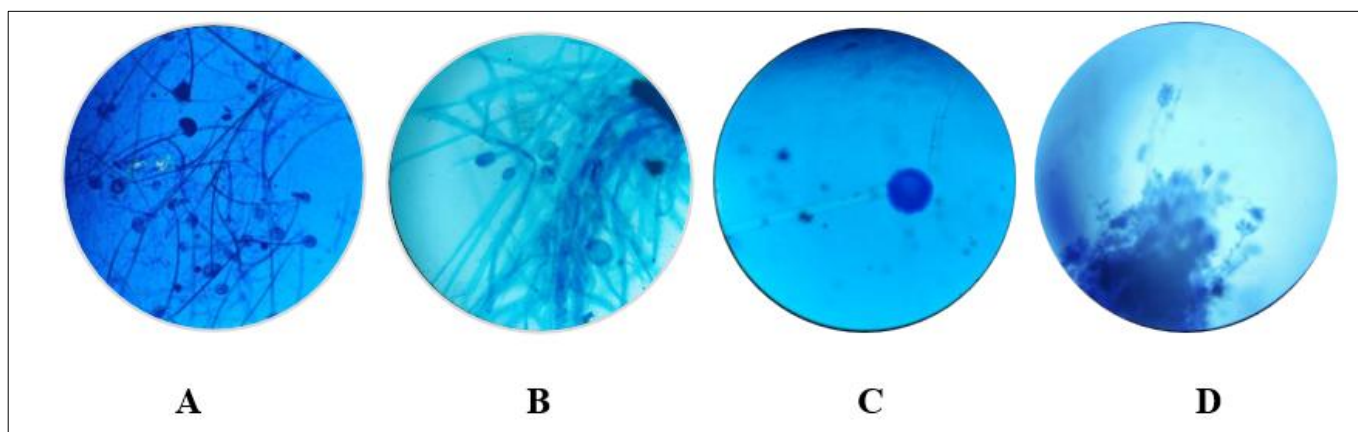


Fig 2: Microscopic characteristics of non-dermatophyte mould isolates. (A) *Rhizopus* spp. showing sporangiophores and sporangia, (B) *Mucor* spp. showing broad aseptate hyphae and sporangia, (C) *A. flavus* showing a conidiophore terminating in a vesicle, and (D) *Penicillium* spp. showing characteristic brush-like conidiophores

Aspergillus spp. and *Penicillium* spp. were the predominant non-dermatophyte moulds recovered in the present study and exhibited rapid growth on SDA (Fig. 1). Isolates of *Aspergillus* spp. produced characteristic colonies ranging from black granular growth in *A. niger* and yellowish-green powdery colonies in *A. flavus* to blue-green velvety colonies in *A. fumigatus*, whereas *Penicillium* spp. developed greenish velvety colonies. Microscopically, both genera exhibited septate hyphae and abundant conidial structures (Fig. 2); however, *Aspergillus* spp. were distinguished by prominent conidiophores terminating in vesicles bearing phialides and chains of conidia, while *Penicillium* spp. exhibited characteristic brush-like conidiophores with branched phialides. The observed cultural and microscopic features were consistent with the descriptions of Klich (2002) ^[20], Geiser *et al.* (2007) ^[21], Larone (2011) ^[15] and Padala *et al.* (2026) ^[9]. *Mucor* spp. and *Rhizopus* spp. were characterized by rapidly growing cottony colonies and broad aseptate hyphae (Figs. 1 and 2). The presence of rhizoids in *Rhizopus* spp. and their absence in *Mucor* spp. facilitated differentiation between the two genera. Similar findings have been reported by de Hoog *et al.* (2020) ^[19]. The

dematiaceous fungi, including *Alternaria* spp. and *Curvularia* spp., exhibited pigmented colonies and characteristic multicellular conidia, whereas *Fusarium* spp. produced cottony colonies with distinctive sickle-shaped macroconidia. The observed cultural and microscopic features were consistent with standard descriptions reported in the literature (Larone, 2011; Samson *et al.*, 2014) ^[15, 17].

Conclusion

The present study demonstrated the occurrence of diverse non-dermatophyte moulds in dogs and cats with mycotic dermatitis. Among the recovered isolates, *Aspergillus* spp. and *Penicillium* spp. were the predominant moulds, whereas *Alternaria* spp., *Curvularia* spp. and *Fusarium* spp. were encountered less frequently. The distinct cultural and microscopic characteristics exhibited by the isolates facilitated their identification and differentiation. Conventional mycological techniques based on culture isolation and microscopic examination continue to serve as the gold standard for routine characterization of fungal isolates and remain valuable tools in veterinary diagnostic laboratories.

Acknowledgement

The authors are thankful to the Department of Veterinary Microbiology, NTR College of Veterinary Science, Gannavaram, Sri Venkateswara Veterinary University (SVVU), Andhra Pradesh, for providing the necessary facilities and financial support to carry out this research work.

References

1. Scott DW, Miller WH Jr, Griffin CE. Muller and Kirk's Small Animal Dermatology. 6th ed. Philadelphia (PA): W.B. Saunders Company; 2001.
2. Bond R, Morris DO, Guillot J, Bensignor E, Robson D, Mason KV, *et al.* Biology, diagnosis and treatment of *Malassezia* dermatitis in dogs and cats. Clinical Consensus Guidelines of the World Association for Veterinary Dermatology. Vet Dermatol. 2020;31(1):28-74.
3. Outerbridge CA. Mycologic disorders of the skin. Clin Tech Small Anim Pract. 2006;21(3):128-134.
4. Chakrabarti A, Singh R. The emerging epidemiology of mould infections in developing countries. Curr Opin Infect Dis. 2011;24(6):521-526.
5. Ivaskiene A, Matusevicius A, Grigonis A. Dermatophytosis in dogs and cats: a review. Vet Med Zoot. 2016;74:12-18.
6. Kumar KS, Selvaraj P, Vairamuthu S, Nagarajan B, Nambi AP, Prathaban S. Survey of fungal isolates from canine mycotic dermatitis in Chennai. Tamilnadu J Vet Anim Sci. 2011;7(1):48-50.
7. Zenad MM, Badawi NM, Abdul-Jalil Wali AR. Cross-sectional study on cutaneous mycotic infections of dogs and cats in Baghdad. World Vet J. 2015;5(4):66-73.
8. Hassanien HA, Sayed RH, Abo Elyazeed HS. Cross-sectional study on dermatological affections of companion animals caused by dermatophytes and other keratinophilic fungi in Greater Cairo Area, Egypt. Adv Anim Vet Sci. 2021;9(4):615-622.
9. Padala H, Balam D, Anand Kumar P, Bindu Kiranmayi CH. Antifungal susceptibility pattern of *Aspergillus* spp. isolated from dogs and cats with mycotic dermatitis. Int J Vet Sci Anim Husbandry. 2026;11(5):382-385.
10. Borman AM, Johnson EM. Interpretation of fungal culture results. Curr Fungal Infect Rep. 2014;8(3):163-172.
11. Rudramurthy SM, Shaw D. Overview and update on the laboratory diagnosis of dermatophytosis. Clin Dermatol Rev. 2018;2(1):1-10.
12. Dworecka-Kaszak B, Biegańska MJ, Dąbrowska I. Occurrence of various pathogenic and opportunistic fungi in skin diseases of domestic animals: a retrospective study. BMC Vet Res. 2020;16:248.
13. Patel PV, Vagh AA, Bhatt RH, Bilwal AK, Parmar VL, Damor JR, *et al.* Incidence of fungal dermatitis in dogs. Int J Vet Sci Anim Husb. 2024;9(2):679-686.
14. Quinn PJ, Markey BK, Leonard FC, FitzPatrick ES, Fanning S, Hartigan PJ. Veterinary Microbiology and Microbial Disease. 2nd ed. Oxford: Wiley-Blackwell; 2011.
15. Larone DH. Medically Important Fungi: A Guide to Identification. 5th ed. Washington (DC): ASM Press; 2011.
16. Procop GW, Church DL, Hall GS, Janda WM. Koneman's Color Atlas and Textbook of Diagnostic Microbiology. 7th ed. Burlington (MA): Jones & Bartlett Learning; 2020.
17. Samson RA, Houbraken J, Thrane U, Frisvad JC, Andersen B. Food and Indoor Fungi. Utrecht: CBS-KNAW Fungal Biodiversity Centre; 2014.
18. Benson HJ. Microbiological Applications: Laboratory Manual in General Microbiology. 8th ed. New York (NY): McGraw-Hill; 2001.
19. de Hoog GS, Guarro J, Gené J, Figueras MJ. Atlas of Clinical Fungi. 4th ed. Utrecht: Westerdijk Fungal Biodiversity Institute; 2020.
20. Klich MA. Identification of Common *Aspergillus* Species. Utrecht: Centraalbureau voor Schimmelcultures; 2002.
21. Geiser DM, Klich MA, Frisvad JC, Peterson SW, Varga J, Samson RA. The current status of species recognition and identification in *Aspergillus*. Stud Mycol. 2007;59:1-10.