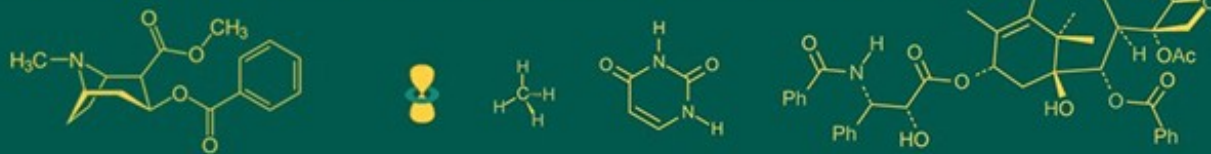


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Epidemiological pattern of canine fungal dermatitis in Tarai area of Kumaon, Uttarakhand

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ABSTRACT

Canine dermatology is multidisciplinary aspects incorporates knowledge from diverse disciplines including bacteriology, mycology, parasitological, immunology, endocrinology and oncology. A detailed clinical history, physical examination and assessment of hematological and biochemical alterations are important components of the diagnostic process. Further diagnostic confirmation may involve skin scrapings and microbiological culture using selective and enrichment media. The prevalence of cutaneous fungal infections in dogs varies considerably according to geographical and climatic conditions, with a greater incidence generally reported in warm and humid environments. In the present investigation, the occurrence of fungal dermatitis in dogs was assessed using secondary data obtained from clinical records maintained at the Veterinary Clinical Complex of G.B. Pant University of Agriculture and Technology, Pantnagar, along with records from various veterinary hospitals located in the Tarai region of Uttarakhand, covering a period of one year. The epidemiological assessment was based on overall occurrence as well as distribution according to sex, age, breed, and season. An overall occurrence of 8.91% fungal dermatitis was recorded among the examined dog population. Male dogs showed a higher occurrence (55.56%) than female dogs (44.44%), indicating a predominance among males. The highest occurrence was observed in dogs belonging to the 0–1 year age group, accounting for 36.29% of the recorded cases. The findings of the present study indicate that fungal dermatitis constitutes a notable dermatological problem among dogs in the Tarai region of Uttarakhand.

Keywords: Canine fungal dermatitis, Dermatophytosis, Epidemiological pattern, Tarai region, Uttarakhand

Introduction

Canine dermatology is a multidisciplinary field that requires clinicians to integrate knowledge from diverse disciplines including bacteriology, mycology, parasitological, immunology, endocrinology and oncology. Diagnosis is made on the basis of clinical history, physical examination and hematobiochemical alterations. Additional diagnostic approaches include skin scrapings and microbiological cultures on selective and enrichment media (Larsson *et al.*, 2016) [1]. The prevalence of cutaneous fungal diseases in dogs exhibits considerable geographical variation with the highest occurrence observed in warm humid climates. Historically, tinea commonly known as "ringworm," was among the first fungal infections recognized in both humans and animals. The initial documentation of canine dermatophytosis caused by *Microsporum* species dates back to 1896, underscoring the long-established recognition of this condition in veterinary medicine (Jungerman *et al.*, 1972) [2].

Dermatophytosis is one of the most prevalent fungal skin diseases and poses a significant public health concern (Ivaskiene *et al.*, 2016) [3]. Narang *et al.*, (2015) [4] documented that fungal dermatoses accounted for 30.94% of the total canine dermatological cases evaluated. In a study conducted in Uttarakhand, Begum *et al.* (2021) [5] reported that 50% of the dogs screened for dermatophytosis were positive with *Trichophyton mentagrophytes* as the most common isolate followed by *Microsporum canis*, *M. gypseum* and *M. audouinii*, whereas other *Trichophyton* species were detected less frequently. Patel *et al.* (2024) [6] documented that canine fungal dermatitis occurred predominantly in male dogs which comprised 66.67% of the affected cases and was more common in animals below one year of age, suggesting that demographic factors such as sex and age play an important role in disease susceptibility. Recent molecular epidemiological studies indicate a rising global burden of dermatophytosis in companion animals with a high prevalence of infection in mixed human-animal households. These studies have confirmed *Microsporum canis* as the predominant species in dogs followed by *Trichophyton mentagrophytes* and *Microsporum gypseum* (Jarjees *et al.*, 2022) [7]. Moriello *et al.* (2017) [8] found that *Microsporum canis*, the most common cause of dermatophytosis is not normally present on the skin of healthy dogs and cats. They also reported that the normal fungal population on pets is quite diverse with fifteen different genera identified including thirteen saprophytes and two der

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matophytes. Among these *Aspergillus*, *Alternaria*, *Penicillium* and *Cladosporium* were the most commonly detected fungi.

Seker et al. (2011) [9] reported that fungal dermatitis in dogs is mainly caused by dermatophytes belonging to the genera *Microsporum*, *Trichophyton* and *Epidermophyton*. Dermatophytes as well as various non-dermatophytes are frequently isolated from dogs and cats which are capable of infecting both healthy and immunocompromised hosts. These fungi are also of zoonotic importance as they can be transmitted bidirectionally between humans and companion animals particularly associated in close environment (**Lagowski et al., 2019**) [10]. Dermatophytosis is therefore regarded as a major global public health concern predominantly transmitted through direct contact with infected animals (**Kindo et al., 2024**) [11]. Among the keratinophilic fungi of veterinary importance like *Microsporum canis* and *Trichophyton mentagrophytes* are the most frequently isolated species in dogs and cats which are accounting for most dermatophyte infections (**Haggag et al., 2017**) [12]. In contrast *Trichophyton rubrum* an anthropophilic species is sporadically documented in animals and remains an uncommon finding in veterinary practice (**Segal et al., 2015**) [13]. Fungal dermatitis is among the most common mycotic infection in small animals and is characterized by superficial lesions restricted to keratinized structures of the skin, hair and claws. The causative fungi produce keratinases and other proteolytic enzymes that degrade the keratin complex and enable to penetrate into the stratum corneum (**Copetti et al., 2006**) [14].

Material & method

The occurrence of fungal dermatitis was conducted on the basis of secondary data obtained from records maintained at Veterinary Clinical Complex, G.B. Pant University of Agriculture and Technology, Pantnagar and various Veterinary Hospitals of Tarai region of Uttarakhand over a period of one year from January 2025 to December 2025. The diagnosis of dermatological disorders and fungal dermatitis was based on clinical manifestations presented by the animal owner at the hospitals. The criteria for epidemiological study was based on Overall occurrence, Sex wise occurrence, Age Wise occurrence, Breed wise, Season wise.

Result & discussion

Of the total 18,697 record cases obtained from hospitals 5,335 dogs were recorded to be suffering from dermatological disorders, giving an overall occurrence of 28.52% (5,335/18,697) of dermatological cases (Table 1). Of these 5,335, dermatological cases 1,665 were treated for fungal dermatitis based on hospital records corresponding to an occurrence of 8.91% (1,665/18,697) in the total dog population. Moreover, fungal infections accounted for 31.20% (1,665/5,335) of all dermatological conditions observed during the study period. The present study was in accordance with the observations of **Attri (2003)** [15], who reported a prevalence of 37.66% dermatoses in dogs from Northern India and **Joshi (2019)** [16] who documented an overall prevalence of 31.29% in the districts of Udham Singh Nagar and Nainital. In contrast to the present study, **Dimri (1998)** [17] reported a comparatively lower prevalence of 13.91% skin diseases in dogs from Northern India. The present study was in accordance with the observations of **Narang et al. (2013)** [14] who reported fungal dermatoses in 30.94% of canine dermatological cases. In contrast to the present findings a progressively increasing trend in the prevalence of fungal dermatoses has been documented by **Joshi (2019)** [16] and **Singh (2025)** [18], who reported 40.58% and 48.72% prevalence respectively.

Table 1. Overall occurrence of dermatological disorders and fungal dermatitis in dogs of the Tarai region of Uttarakhand (Jan-Dec 2025)

Number of dogs (hospital records)	Number of dermatological cases (%) positive)	Number of Fungal cases (%) positive)
18,697	5,335(28.52)	1,665(8.91)

Sex wise occurrence

The sex-wise distribution of fungal dermatitis in dogs of the Tarai region during the period from January to December 2025 is presented in Table 2. Out of total 1,665 cases of fungal dermatitis recorded, a higher proportion was observed in male dogs 55.56% (925/1,665) compared to female dogs (740/1665) 44.44%, indicating a clear male predominance. The increased susceptibility of male dogs observed in the present study may be attributed to their greater roaming behaviour which enhances exposure to contaminated environments, comparatively lower standards of grooming and healthcare and preferential acceptance of male dogs by owners resulting in more frequent hospital visits. These findings were in accordance with the observations of **Singh et al. (2012)** [19], **Saleem (2021)** [20] and **Patel et al. (2024)** [6] who reported that male dogs were more susceptible to dermatological disorders (52.38%, 63.39% and 66.67% respectively). Similarly, a higher prevalence of dermatological cases was recorded in male dogs (60.82%) as compared to females (39.17%) by **Joshi (2019)** [16] thereby supporting the findings of the present study. In contrast to the present study, **Brilhante et al. (2003)** observed no significant sex predisposition in cases of fungal dermatitis, suggesting that sex-related variations may be influenced by geographical factors, management practices and prevailing environmental conditions.

Age wise occurrence

The highest occurrence was recorded in the dogs of 0-1 year age group 36.29% (604/1665) followed by dogs aged 2-5 years 24.08% (401/1665) and 1-2 years 21.68% (361/1665) (Table 3). Least occurrence was observed recorded in dogs older than five years (17.95%) 299/1665. These finding suggested that younger dogs are more vulnerable to fungal skin infections possibly due to their immature immune status, increased exposure to contaminated environments and frequent close contact with infected animals.

Table 2. Sex wise occurrence of fungal dermatitis in dogs of the Tarai region of Uttarakhand (Jan-Dec 2025)

S. No.	Gender	Fungal affected dogs	Percent positive (%)
1.	Male	925/1665	55.56
2.	Female	740/1665	44.44

Comparable observations were earlier reported by **Singh et al. (2012)** [19], **Katirae et al. (2021)** [21] and **Patel et al. (2024)** [6] who recorded a higher prevalence of fungal dermatoses in dogs below one year of age (52.38%, 61.5% and 53.85% respectively). However other investigators have reported a higher incidence of fungal dermatoses in young adult dogs. **Joshi (2019)** [16] observed the highest prevalence in dogs aged 2-5 years (35.05%) followed by the 1-2 year age group (25.77%). Similarly, **Singh (2025)** [18] recorded the maximum occurrence of fungal dermatoses in the 2-5 year age group (36.84%) followed by dogs aged 1-2 years (21.05%). The present study also recorded comparable results for the 1-2 year age group which is in agreement with the findings of **Joshi (2019)** [16] and **Singh (2025)** [18]. These variations across different studies indicate that the age-related distribution of fungal dermatitis may be influenced by regional factors, management practices, environmental exposure and host immunity.

Breed wise

Of the total cases of fungal dermatitis (1665), the highest occurrence was observed in Mongrel dogs (665/1665) 39.33% followed by German Shepherds 25.28% (421/1665), Labradors 22.47% (374/1665) and other breeds 12.92% (215/1665) (Table 4). The higher occurrence in mongrel dogs may be attributed to their greater exposure to outdoor environments, comparatively poor housing conditions, irregular grooming practices and limited access to routine veterinary care.

Table 3. Age wise occurrence of fungal dermatitis in dogs of the Tarai region of Uttarakhand (Jan-Dec 2025)

Age group	Fungal dermatitis cases	Percent positive (%)
0-1 year	604/1665	36.29
1-2 years	361/1665	21.68
2-5 years	401/1665	24.08
> 5 years cases	299/1665	17.95

These findings were in agreement with the collective observations of Sachan *et al.* (2000) [22], Senthil Kumar *et al.* (2011) [23] and Joshi (2019) [16], who reported higher occurrence of fungal dermatoses in mongrel dogs with prevalences of 25%, 31% and 31.95%, respectively.

The consistent predominance of fungal dermatitis in mongrel dogs across different studies highlights the influence of management practices and environmental exposure on the occurrence of canine fungal skin infections.

Table 4. Breed wise occurrence of fungal dermatitis in dogs of the Tarai region of Uttarakhand (Jan-Dec 2025)

Breed	Number's positive	Percent positive (%)
Mongrel	655	39.33
German Shepherd	421	25.28
Labrador	374	22.47
Other breeds	215	12.92
Total	1665	100%

Season wise

The season-wise distribution of fungal dermatitis in dogs of the Tarai region from January to December 2025 is presented in Table 5. Out of the total 1,665 fungal dermatitis cases recorded during the study period the highest prevalence was observed in the rainy season (36.42%) 610/1665, followed by the winter season (33.73%) 565/1665 cases and the summer season (29.85%) 500/1665 cases.

These findings are in agreement with the observations of Gupta *et al.* (2000) [24], Kumar *et al.* (2001) [25], Joshi (2019) [16] and Singh (2025) [18], who also reported a higher incidence of fungal dermatoses during the rainy season a period characterised by increased humidity and temperature. The present results further emphasise the strong influence of seasonal climatic variations on the occurrence of fungal skin infections in dogs of the Tarai region.

Table 5. Season wise occurrence of fungal dermatitis in dogs of the Tarai region of Uttarakhand (Jan-Dec 2025)

Season	Fungal dermatitis cases	Prevalence (%)
Summer (March- June)	500	29.85
Rainy (July-September)	610	36.42
Winter (October-February)	565	33.73

Summary

Dogs are highly susceptible to dermatological disorders as the skin is the largest and most exposed organ of the body. The present investigation comprised to fungal dermatitis in dogs of the Tarai region of Uttarakhand, including epidemiological evaluation. In present investigation the prevalence study was conducted using secondary data collected from hospital-based records over a period of one-year from January 2025 to December 2025. Out of 18,697 canine cases presented to different veterinary hospitals in the Tarai region of Uttarakhand, a total of 5,335 dogs were diagnosed with dermatological disorders which resulted an overall occurrence of 28.52%. Among these dermatologically affected dogs, 1,665 cases were recorded as fungal dermatitis accounted for 8.91% of the total dog's population and 31.20% of overall dermatological cases. A higher prevalence was recorded in male dogs (55.56%) compared to females (44.44%). Age-wise analysis revealed that the highest occurrence was in dogs below one year of age (36.29%). Mongrel dogs showed the highest prevalence (39.33%) and seasonally, it was reported that the fungal dermatitis was most common during the rainy season (36.42%).

Conclusion

Fungal dermatitis was identified as a common dermatological condition in dogs of the Tarai region of Uttarakhand with higher prevalence observed in males, younger age groups, mongrel breeds and during

the rainy season.

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