



Veterinary Microbiology

Detection of seasonal asymptomatic dermatophytes in Van cats



Ziya Ilhan^{a,*}, Mehmet Karaca^b, Ismail Hakki Ekin^a, Hasan Solmaz^c,
Hasan Altan Akkan^b, Mehmet Tutuncu^d

^a Yuzuncu Yil University, Faculty of Veterinary Medicine, Department of Microbiology, 65080 Van, Turkey

^b Yuzuncu Yil University, Faculty of Veterinary Medicine, Department of Internal Medicine, 65080 Van, Turkey

^c Yuzuncu Yil University, Faculty of Pharmacy, Department of Pharmaceutical Microbiology, 65080 Van, Turkey

^d Ondokuz Mayıs University, Faculty of Veterinary Medicine, Department of Internal Medicine, 55270 Samsun, Turkey

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ABSTRACT

The Van cat is a domestic landrace found in the Van province of eastern Turkey. In this study, we aimed to determine the seasonal carriage of dermatophytes in Van cats without clinical lesions. A total of 264 hair specimens were collected from clinically healthy cats in and around the Van Province. Of these samples, 30.3% were obtained in spring, 30.6% in summer, 16.6% in autumn, and 22.3% in winter; 45.1% of samples were from male cats and the rest from female ones. Of the studied cats, 118 were younger than 1 year, 78 were 1–3 years old, and 68 were older than 3 years. The specimens were subjected to direct microscopic examination with 15% potassium hydroxide and cultured on Sabouraud dextrose agar and dermatophyte test medium supplemented with cycloheximide and chloramphenicol. Dermatophyte identification was carried out based on macroscopic and microscopic colony morphology, urease activities, *in vitro* hair perforation test, growth at 37 °C, and pigmentation on corn meal agar. Dermatophytes were isolated from 19 (7.1%) of the 264 specimens examined. The most frequently isolated fungi were *Trichophyton terrestre* (4.1%), followed by *Microsporum gypsum* (1.1%), *M. nanum* (1.1%), and *T. mentagrophytes* (0.7%), and these fungi may represent a health risk for humans in contact with clinically healthy Van cats. *M. canis* was not isolated from any of the specimens. Our results show no significant ($p > 0.05$) association between carriage of dermatophytes and the gender of cats. The carriage rate of dermatophytes was high in spring and winter, and the only possible risk factor for infection was age of the animal.

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Introduction

The Van cat originates from the Eastern Anatolia region of Turkey, and should not be confused with the Turkish Angora

cat. One of the characteristic features of the Van cat is eye color and is accordingly classified into three groups: both eyes blue; both eyes amber (yellow and its tones); and one eye blue and the other amber (dischromatopsy). Blue-eyed Van cats usually display turquoise blue, while amber eye color displays

* Corresponding author at: Yuzuncu Yil University, Faculty of Veterinary Medicine, Department of Microbiology, 65080 Kampus/Van, Turkey.
E-mail: zilhan@yyu.edu.tr (Z. Ilhan).

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tonal variation such as amber, light amber, yellow, and green almond. Although very rare, brown eye color can also be seen. Van cats love to swim and play with water, and are the only cat species to do so. This cat is a semi-long-haired breed that conveniently sheds its hair during the spring and summer only to be replaced by a short velvety coat. Europeans have been introducing the Van cat to the rest of the world since the 1950s.^{1–3}

Dermatophytosis (ringworm) is an infection of keratinized structures, such as nails, hair, and the stratum corneum of the skin, and is the most common fungal disease found in animals.⁴ Dermatophytes are fungi that cause dermatophytosis and are classified in three genera: *Trichophyton* (*T.*), *Microsporum* (*M.*), and *Epidermophyton* (*E.*). While only a few species belong to the *Trichophyton* genus, there are approximately 40 accepted species in the genus *Epidermophyton*; and the *Microsporum* species usually cause dermatophytosis in domestic animals. Dermatophytes are usually divided into three ecological groups depending on their main natural host or habitat as anthropophilic (humans), zoophilic (animals), or geophilic (soil).^{5–7}

As its name suggests, feline dermatophytosis is an infection of the superficial keratinized tissues in cats, and its most common cause is *M. canis* fungus. Two other species, *M. gypseum* and *T. mentagrophytes*, can also cause dermatophytosis in the cat, albeit with a lower incidence.^{6,8,9} *M. canis* infections in cats are of major importance as cats serve as a reservoir of this zoonosis, which is considered highly contagious and potentially pathogenic in humans, especially children.¹⁰ Dermatophyte transmission occurs upon contact with infected hair or fomites (clippers, brushes), or from the environment (spores in soil), and in rural areas, up to 80% of all human fungal skin infections may be of animal origin.¹¹

It is important to note that canine and feline ringworm infections differ clinically. Canine infections generally produce lesions, whereas clinical signs may not be evident in cats, and it is possible to culture dermatophytes from clinically healthy cats that act as carriers of conidia but are not themselves infected.^{6,12} While some reports on the prevalence of dermatophytic fungi are based on samples taken only from animals showing ringworm lesions,^{13,14} others studies using random population samples taken from animals with no lesions reveal different results.^{15–17}

Further, the incidence of dermatophytosis is related to geographic region, climate, and animal husbandry techniques, and is frequently found in young, stray, sick, or otherwise debilitated animals.⁴ The asymptomatic carrier state is the most important variable in the transmission of the disease among cats and from cats to humans.¹⁸ To the best of our knowledge, no previous studies have assessed the asymptomatic carrier state in Van cats. Therefore, the aim of this study was to determine the seasonal carriage of dermatophytes in such pets without overt clinical lesions.

Materials and methods

Geographical characteristics

Van Province is the 18th largest province of Turkey and lies in the Eastern Anatolia region with a population of over 1 million.

It is located between northern latitudes of 38°28' and eastern longitudes of 43°20', is 19,069 km² in area, and lies between Lake Van and the Iranian border. This area faces extremes of temperature during summer and winter,^{19,20} has a dry continental climate with cool snowy winters and warm dry summers. Rainfall primarily occurs during spring and autumn, and annual average rainfall is 384 mm. The region's average maximum temperature during winter and summer are –2.2 °C and 20.4 °C, respectively, and the relative humidity is approximately 59%.¹⁹

Samples

A total of 264 Van cats from different parts of the Van Province, all of which were owned and fed at home, were selected for inclusion in the study. Complete body surface of the cats was thoroughly examined for dermatological lesions, and only those animals that were free of cutaneous lesions (Fig. 1) and had not received antifungal therapy in the preceding 3 months were included in the study. All cats were domesticated and housed indoor or in cages. After cleaning the selected area with 70% alcohol, a sterile brush was used to take hair samples from the head, neck, trunk, and tail. Each sample was placed in a plastic storage tube and appropriately labeled. The samples were then transferred to the Department of Microbiology, Faculty of Veterinary Medicine, Yuzuncu Yil University, Van, Turkey.

Of these 264 samples, 80 (30.3%) were obtained in spring, 81 (30.6%) in summer, 44 (16.6%) in autumn, and 59 (22.3%) in winter; 119 (45.1%) were from male cats and 145 (54.9%) were from female cats. A total of 118 (44.7%) cats were younger than 1 year, 78 (29.5%) were 1–3 years old, and 68 (25.7%) were older than 3 years.

Culture and identification

Each sample was divided into two portions, one portion was used for direct microscopic examination and the other was used for culture. Direct microscopic examination was performed after the sample was placed on a slide and 30 µL of 15% potassium hydroxide (KOH) added. After 5 min., the wet preparation was carefully examined under both low (10×) and



Fig. 1 – A clinically healthy Van cat.

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