

Isolation of dermatophytes from 50 asymptomatic domestic cats treated at the Federal University of Mato Grosso Veterinary – Hospital in Cuiabá, MT

Isolamento de dermatófitos em 50 felinos assintomáticos atendidos no HOVET-UFMT, em Cuiabá

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Abstract

Dermatophytosis, commonly known as ringworm, is a zoonotic disease caused by complex fungi that grow as hyphae and attach to the skin, hair and nails or claws. About 40 species of fungi of the genera *Microsporum* spp., *Trichophyton* spp. and *Epidermophyton* spp. are considered dermatophytes, and *Microsporum canis* is the genus most commonly isolated from cats. This study investigated the occurrence of dermatophytes in cats without clinical signs of skin diseases. The study involved the physical examination of 50 clinically healthy cats and the collection of samples for direct examination and fungal culture at a university veterinary hospital. The resulting data were evaluated by the chi-square association test. Of the 50 cats, 11 (22%) presented dermatophytes, with a predominance of *Microsporum* spp. The other 39 animals were diagnosed for non-dermatophytic fungi. Sex, breed and the presence of contactants showed no statistical difference, although there was a predominance of adult animals. The high dermatophyte infection rate confirms that cats without clinical signs can harbor these fungi, acting as asymptomatic carriers, contaminating the environment and increasing the infection rate. This study confirms that cats without clinical signs can be carriers of ringworm, which underscores the importance of the adoption of control methods even for clinically healthy animals.

Key words: Cats. Fungi. *Microsporum* spp. *Trichophyton* spp. Zoonotic disease.

Resumo

Dermatofitose é uma zoonose causada por fungos complexos que crescem como hifas e se fixam na pele superficial, pelo e unhas. Existem cerca de 40 espécies de fungos pertencentes aos gêneros *Microsporum*, *Trichophyton* e *Epidermophyton*, considerados dermatófitos e, destes, o mais isolado em gatos é o *Microsporum canis*. Este estudo teve o objetivo de verificar a ocorrência de dermatófitos em felinos, ausentes de sinais clínicos de dermatopatias. Em Hospital Veterinário Universitário, 50 gatos clinicamente saudáveis foram avaliados e submetidos ao exame físico, coleta de amostra para

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exame direto e cultura fúngica. Os dados foram avaliados por Teste de Associação Qui-quadrado. Dos 50 gatos, 11 (22%) apresentaram dermatófitos, com predomínio de *Microsporum* spp. Os outros 39 animais foram diagnosticados para fungos não dermatófitos. Não foi observada diferença estatística para sexo, raça ou presença de contactantes, mas houve predomínio de animais adultos. A elevada taxa de infecção por dermatófitos confirma que felinos sem sinais clínicos podem albergar estes fungos, agindo como carreadores assintomáticos e, conseqüentemente, contaminando o ambiente e elevando a taxa de infecção. Este trabalho confirma que gatos sem sinais clínicos podem ser portadores de dermatofitose, fato que evidencia a importância de adoção de método de controle, mesmo em animais clinicamente saudáveis.

Palavras-chave: Felinos. Fungos. *Microsporum* spp. *Trichophyton* spp. Zoonose.

Ringworm is a zoonotic disease (BALDA et al., 2004; MORIELLO; NEWBURY, 2006) caused by complex fungi that grow as hyphae in the form of micelles (MORIELLO; DEBOER, 2012) which attach to the skin, hair and nails (MORIELLO; NEWBURY, 2006). About 40 species of fungi of the genera *Microsporum*, *Trichophyton* and *Epidermophyton* are considered dermatophytes (MORIELLO; DEBOER, 2012), among which *Microsporum canis* is the most frequently isolated agent (MEDEIROS et al., 2009; NEVES et al., 2011).

This disease has anthroozoonotic characteristics, and 50% of people who own an infected cat (symptomatic or asymptomatic) become infected with ringworm. In 30 to 70% of cases of contact with infected cats, at least one person will become infected. Although there is no evidence that humans have an anatomical predisposition for contracting this fungal disease, an association has been found between long contact time with cats and the occurrence of lesions, e.g., on the arms (SCOTT et al., 1996).

Dermatophytic skin lesions are rarely seen in cats, especially during the incubation of the microorganism, which makes the diagnosis difficult (MORIELLO; NEWBURY, 2006). Lesions appear when the host is old or young, or presents immunosuppression or comorbidity (CAFARCHIA et al., 2004; MORIELLO; NEWBURY, 2006), but usually the skin's immune response is usually suffices to eliminate the infection (MORIELLO; NEWBURY, 2006). Direct examination of hair and

scales and a Wood lamp skin examination are good screening methods, although Cafarchia et al. (2004), Moriello and Newbury (2006) and Nardoni et al. (2013) state that the most reliable and definitive method is mycology cultivation.

Considering the importance of cats as dermatophyte carriers, this study aimed to ascertain the occurrence of dermatophytes on cats without clinical signs of skin or systemic diseases. Fifty cats without signs of skin diseases were evaluated at the Department of Internal Medicine of the Federal University of Mato Grosso Veterinary Hospital (HOVET/UFMT) in Cuiabá, state of Mato Grosso, Brazil. These animals came from households in the metropolitan area of Cuiabá and were selected at random, regardless of age, sex and breed. The only condition for inclusion in the study was that they had not been washed for two weeks prior to the procedures. The cats were divided into groups according to age, as follows: less than one year old, one to three years old, and more than three years old (BALDA et al., 2004). The owners were asked questions about skin lesions on humans and other animals living with these cats.

The animals were examined physically for clinical signs of ringworm lesions (LUCAS, 2008) and hair specimens were collected for mycological examination by brushing their fur with a 5x5cm piece of sterilized carpet (MARIAT; ADAM-CAMPOS, 1967).

The collected material was placed on Petri dishes containing Sabouraud dextrose agar and chloramphenicol (0.05 g/L), left there to imprint for

about 15 min (MARIAT; ADAM-FIELDS, 1967), and then incubated at 28°C for 7 to 14 days, during which the growth of filamentous fungal mycelium was examined and differentiated on a daily basis. The mycological culture was examined directly by means of the observation method using adhesive tape and cotton blue staining on a microscope slide, examining fungal structures such as macroconidia, spores and hyphae at 40x magnification (KERN; BLEVINS, 1999).

The data were evaluated by the chi-square test of association, considering $p < 0.05$ significant (SOKAL; ROHLF, 1995).

The cats comprised 29 (58%) females and 21 (42%) males. Eleven (22%) of the 50 cats were positive for some type of dermatophyte and 39 (78%) for non-dermatophyte fungi. Eleven (22%) were pure breeds and 39 (78%) mixed breeds, ranging in age from three months to eight years, with an average age of one year and three

months and a predominance of two years. The 11 (22%) pre breed cats were divided into 5 Siamese (10%), 5 Persian (10%), and 1 Maine Coon (2%). 78% (39/50) of the cats were of mixed breed.

None of the factors – age, breed, sex, or contact with humans or other animals – showed a statistically significant difference. However, in one case, the owner of one of the cats positive for *Microsporum* spp. reported that he found skin lesions on his dog, which lived in the same household.

Microsporum spp. was isolated from 9 (18%) of the 50 cats and *Trichophyton* spp. from 2 (4%) of them. Among the causers of dermatomycosis that were isolated, 44 (88%) were *Aspergillus* spp., 12 (24%) were *Penicillium* spp., 4 (8%) were *Curvularia* spp., 2 (4%) were *Candida* spp. and 1 (2%) was *Malassezia* spp. One of the samples contained *Candida* spp. and *Malassezia* spp. concomitantly. Table 1 lists the isolated fungi, in percentage.

Table 1. Isolated fungal species in cultivation carried out by and flakes 50 healthy cats treated at the Veterinary Teaching Hospital.

Fungal species	Cats (%)
<i>Aspergillus</i> spp.	88
<i>Penicillium</i> spp.	24
<i>Microsporum</i> spp.	18
<i>Curvularia</i> spp.	8
<i>Trichophyton</i> spp.	4
<i>Candida</i> spp.	4
<i>Malassezia</i> spp.	2

The isolation of *Microsporum* spp. from nine cats and *Trichophyton* spp. from two animals confirms that, even in the absence of clinical signs, such felines can harbor these fungi, thus acting as asymptomatic carriers. Although cats infected with dermatophytes rarely exhibit clinical signs, these fungi account for 10.2% (NARDONI et al., 2013) to 28.2% (CAFARCHIA et al., 2004) of skin lesions.

No predisposition relating to sex or breed was found (CAFARCHIA et al., 2004; BALDA et al.,

2004; MORIELLO; NEWBURY, 2006; NEVES et al., 2011), but a predisposition was identified in terms of age. The average age of the cats was one year and three months, with a predominance of two years, i.e., adult animals. The literature suggests that ringworm occurs more frequently in young and old animals, because their immune system cannot cope with fungal infections, resulting in lesions (BALDA et al., 2004; ROMANI, 2004; MORIELLO; NEWBURY, 2006). This divergence

can probably be explained by the fact that the cats of this study were immunocompetent and showed no clinical lesions suggestive of ringworm, unlike animals studied in other surveys (CAFARCHIA et al., 2004; MORIELLO; NEWBURY, 2006; NEVES et al., 2011).

Dermatophytes do not usually penetrate healthy unblemished skin, which acts as a protective barrier, aiding epidermal regeneration and physical removal. Nevertheless, these fungi remain attached to the fur of cats, making them passive carriers (MORIELLO; NEWBURY, 2006). The skin's cell defense mechanism is triggered by phagocytes, which destroy fungi by means of the secretions of NO (nitric oxide) and other components they produce. IFN- γ (interferon gamma) is also involved, increasing the function of neutrophils and macrophages, without evidence of cytotoxic activity by CD8+ T lymphocytes. When a cat is immunodeficient, it presents a concomitant disease or its immune system is underdeveloped, preventing the production of sufficient defense cells to control fungi (ROMANI, 2004).

Albeit not the focus of this study, other important causative agents of dermatomycosis were isolated, such as *Candida* spp., *Curvularia* spp., *Aspergillus* spp. and *Penicillium* spp. These fungi cause lesions mainly in immunocompromised individuals (PAIXÃO et al., 2001). In addition to these microorganisms, Yamada et al. (2000) include *Malassezia* spp. as a microorganism with zoonotic potential, which causes lesions in immunosuppressed patients.

This paper reported that cats without apparent clinical signs can be dermatophyte carriers, thus underscoring the importance of sanitary control of catteries and fomites.

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