

DIAGNOSIS OF FUNGAL AND PARASITIC DERMATOPATHIES IN DOGS AND CATS OF PARAÍBA STATE, BRAZIL

DIAGNÓSTICO DE DERMATOPATIAS FÚNGICAS E PARASITÁRIAS EM CÃES E GATOS NA PARAÍBA, BRASIL

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SUMMARY

This study aimed to diagnose fungal and parasitic dermatopathies, describing its casuistry in dogs and cats at the Veterinary Hospital (VH) of the Instituto Federal da Paraíba (IFPB), Sousa, Paraíba. The study was carried out at the Laboratory of Immunology and Infectious Diseases (LIID) and at the Small Animal Medical Clinic (SAMC), VH/IFPB, Sousa, Paraíba, Brazil. Fifty-eight animals with skin lesions, including 41 dogs and 17 cats, were evaluated. Samples from the lesions were processed, resulting in 12.2% (5/41) of dogs testing positive for dermatophytes; 60% (3/5) of those cases were confirmed with *Microsporium canis* infections. For scabies, 24.4% (10/41) of dogs tested positive; of these, 80% (8/10, $p \leq 0.05$) had *Demodex canis* infections. In cats, 17.6% (3/17) were positive for dermatophytes; of these, 67% (2/3) were confirmed to have *Microsporium gypseum* infections. The positive testing rate for scabies in cats was 17.6% (3/17); of these, 67% (2/3) were *Notoedres cati* infections. In one cat, a concomitant infection was found with a dermatophyte (*M. gypseum*) and scabies (*N. cati*). It was concluded that the occurrence of dermatopathies is high at the SAMC/VH/IFPB. The main dermatophytes found were *M. canis* in dogs and *M. gypseum* in cats, and the most frequent scabies were *D. canis* in dogs and *N. cati* in cats.

KEY-WORDS: *Demodex* spp.; dermatomycoses; *Microsporium* spp; *Notoedres* sp., scabies.

RESUMO

O objetivo desse trabalho foi diagnosticar as dermatopatias fúngicas e parasitárias, descrevendo a casuística dessas enfermidades em cães e gatos no Hospital Veterinário do Instituto Federal da Paraíba – IFPB, campus Sousa, Paraíba-PB. O experimento foi realizado no Laboratório de Imunologia e Doenças Infectocontagiosas – LIDIC e na Clínica Médica de Pequenos Animais - CMPA, HV/IFPB. Foram avaliados 58 animais, sendo 41 cães e 17 gatos. As amostras coletadas para as análises laboratoriais foram pelos e crostas das lesões. Obtiveram-se 12,2% (5/41) dos cães positivos para dermatófitos, destes, 60% (3/5) para *Microsporium canis*. Para sarnas, 24,4% (10/41) dos cães foram positivos, em 80% (8/10; $p \leq 0,05$) a infestação era por *Demodex canis*. Nos gatos, 17,6% (3/17) foram positivos para dermatófitos, destes, 67% (2/3) *Microsporium gypseum*. A positividade para sarnas em gatos foi 17,6% (3/17), destes, 67% (2/3) para *Notoedres cati*. Em apenas um felino foi encontrada infecção concomitante entre dermatófito (*M. gypseum*) e sarna (*N. cati*). Concluiu-se que é alta a casuística de dermatopatias na CMPA/HV/IFPB. O principal dermatófito encontrado em cães foi *M. canis* e em gatos *M. gypseum*. Dentre as sarnas *Demodex* spp. foi a mais frequente para cães e *Notoedres* sp. para gatos.

PALAVRAS-CHAVE: *Demodex* spp.; Dermatomicose; *Microsporium* spp.; *Notoedressp.*; sarnas.

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INTRODUCTION

Diseases of the integumentary system are the most frequent in small animal outpatient clinics, either as primary complaints or as secondary diseases (MEGID et al., 2016). The main dermatopathic diseases are scabies, dermatophytosis, and pyoderma (MORIELLO & DEBOER, 2012).

Dermatophytosis presents signs similar to other dermatopathies, such as alopecia and desquamation especially on the face, ears, limbs, and tail (MEGID et al., 2016). The majority of the diagnoses are made only through the animal's history and epidemiological data, which increases the chances of erroneous results and does not identify the pathogen in order to direct treatment decisions (BOND, 2010). Considered zoonotic, dermatophytosis of pet animals deserves special attention, since these animals maintain contact with humans, particularly children. According to Moriello & Deboer (2012), dermatophytosis is most frequently caused by pathogenic fungi of the genera *Microsporum*, *Trichophyton* and *Epidermophyton*. These dermatophytes infect dogs and cats of all ages; however, old and immunosuppressed animals are more susceptible.

Traditional fungal culture is the method used to confirm the diagnosis of dermatophytosis, and it can be performed in test tubes, microscopic slides, and Petri dishes containing culture media for dermatophytes (SIDRIM & ROCHA, 2004). The fungal culture Dermatobac® is a culture slide containing three culture media, D.T.M., Sabouraud Selective Glucose, and BIGGY, for isolating dermatophytosis-producing fungi. It is an easy test to perform, is selective for fungi, and promotes the multiplication of dermatophytes, while inhibiting the growth of saprophytic fungi. At 72 hours of incubation, it indicates that the animal has the disease through observed alteration in the coloration of the culture medium. After 21 days of incubation, observing the fungal structures can determine the pathogenic species of fungus causing dermatophytosis, making it a reliable method for diagnosis and directing the correct treatment.

Scabies cause inflammation with intense itching, which then causes the appearance of wounds through bites, hemorrhagic crusts, and loss of hair (PICCININ et al., 2008). The scabies mites that cause this disease are *Sarcoptes scabiei*, *Notoedres cati*, *Otodectes cynotis*, and *Demodex canis*, which occurs frequently in dogs and cats (NEUWALD et al., 2004).

The most commonly used diagnostic method for scabies is the Direct Microscope Exam (DME), since adult mites and their eggs can be observed through the optical microscope in samples from skin scraping of the lesions. Besides being easy to perform, this test has a low cost and high sensitivity (BENSIGNOR, 2003).

Therefore, the objective of this study was to evaluate the casuistry of scabies and dermatophytosis in dogs and cats at the Veterinary Hospital (VH) of Instituto Federal da Paraíba (IFPB), Sousa-PB campus,

using as the diagnostic methods of DME for scabies and Dermatobac® for Dermatophytosis.

MATERIAL E MÉTODOS

This study was approved by the Research Ethics Committee of Universidade Federal de Campina Grande under protocol number 118/2016 CEP.

The study was carried out at the Laboratory of Immunology and Infectious Diseases (LIID) and at the Small Animal Medical Clinic (SAMC), VH/IFPB, Sousa-PB.

For this study, 41 dogs and 17 cats that had consultations at the SAMC with signs suggestive of dermatophytosis between April and December 2016 were selected. Biopsy was performed at the lesion sites hair and crusts were collected for laboratory analysis by scraping the borders of the lesions with a sterile blade (SANTAREM, 2007).

After the collection, the samples were placed in threaded, sterilized collecting tubes, properly identified, and sent to LIID for processing. All samples were first submitted to DME, according to Silva et al. (2008), and then seeded in the Dermatobac® cultures. After 72 h of incubation in B.O.D. at 28°C in the dark, a color change in the D.T.M medium occurred in the positive samples. After 21 days of incubation, the fungal structures were identified in Sabouraud Selective Glucose medium for the diagnosis of the pathogenic species (MORIELLO, 2014).

Data were collected from the clinical files of the animals, which were comprised of the cases along with the results of the analyses from the SAMC/VH/IFPB. The data collected included the location of the lesions, any differences in susceptibility between species (dogs and cats), sexes, ages, breed, any concurrent diseases, and the main causative agents of the disease.

The analysis of occurrence distribution was performed using the chi-square test, with $p \leq 0.05$ indicating statistical significance (STREINER & NORMAN, 1994).

RESULTS AND DISCUSSION

Were examined 359 animals at the SAMC/VH, including 245 dogs and 105 cats. Of these, 16% (41/254) of dogs and 16.2% (17/105) of cats presented clinical signs suggestive of dermatopathies. This percentage is in agreement with reports in the literature that animals with dermatological afflictions represent between 15–25% of the visits to veterinary clinics (HIIL et al., 2006). Among the animals with signs suggestive of dermatopathies, 53.7% (22/41) of the dogs were male and 46.3% female; and 53% (9/17) of cats were male and 47% (8/17) female.

Of the dogs with dermatopathies, only 12.2% (5/41) were positive for dermatophytes. Of these, 60% (3/5) tested positive for *Microsporum canis*, 20% (1/5) for *Microsporum gypseum*, and 20% (1/5) for *Trichophyton mentagrophytes*. A higher prevalence of *M. canis* was observed by (NEVES et al., 2011), who evaluated the pathogens related to dermatophytosis in dogs and cats treated at the VH at the Universidade

Federal de Mato Grosso, where 96.78% (270/279) of the dogs presented *M. canis*.

Among the cats with dermatopathies, 17.6% (3/17) were positive for dermatophytes. Of these, 67% (2/3) tested positive for *M. gypseum*, and 33% (1/3) for *Epidermophyton* sp. These results do not agree with those presented by Nweze (2011), who evaluated 47 cats, and 53.2% were positive for *M. canis*. The data may be divergent due to the reduced number of animals evaluated in both studies.

On DME, 24.4% (10/41) of dogs were positive for scabies. Of these, 80% (8/10; $p \leq 0.05$) were diagnosed with *D. canis* and 20% (2/10) with *S. scabiei*. Demodicosis was also more prevalent in a study conducted by Rocha et al. (2008), who evaluated 412 dogs from the VH of the Universidade Federal Rural do Semiárido, Mossoró-RN. They observed an 18.6% (77/412) positivity for scabies, with 90.9% (70/77) of these positive for *D. canis* and 9% (7/77) positive for *S. scabiei*.

The positivity for scabies in cats in this study was 17.6% (3/17). Of these, 67% (2/3) were positive

for *N. cati* and 33% for *D. cati* (1/3). These values are in agreement with (ROCHA et al., 2008), who evaluated 26 cats positive at the VH/UFERSA, and 69.2% (18/26) were positive for *N. cati*.

Of the 58 dogs and cats whose samples were evaluated, only one 2-year-old female cat, domiciled, of an unspecified breed, with crusts in the head region, had a concomitant infection with both scabies (*N. cati*) and a dermatophyte (*M. gypseum*). To our knowledge, this is the first report of such a co-infection, as we were unable to find other cases in the consulted literature. The scarce reports of associated infection between scabies and fungi describe co-infections with malasseziosis and demodicosis in dogs (NOBRE et al., 1998; MACHADO et al., 2004); sporotrichosis and demodicosis in dogs (MATOS et al., 2012); and sporotrichosis, demodicosis, and pediculosis in cats (PEREIRA et al., 2005).

Table 1 shows the relationship between the age groups and the frequencies of fungal and parasitic infections.

Table 1 - Relation between age groups and occurrence of fungal and parasitic dermatological infection in animals treated at SAMC/VH/IFPB, Sousa, State of Paraíba, Brazil

	Dogs			Cats		
	Attended	Dermatophytes Positives (%)	Scabies Positives (%)	Attended	Dermatophytes Positives (%)	Scabies Positives (%)
0 - 6 months	4	-	1 (25)	4	1 (25)	-
6 months - 1 year	7	1 (14,3)	2 (28,6)	2	-	-
1 - 3 years	9	-	4 (44,4)	6	1 (16,7)	1 (16,7)
3 - 5 years	6	1 (16,7)	2 (33,3)	3	1 (33,3)	1 (33,3)
>5 years	15	3 (20)	1 (6,7)	2	-	1 (50)
Total	41	5 (12,2)	10 (24,4)	17	3 (16,7)	3 (16,7)

Of the dogs that tested positive for dermatophytes, 20% (3/15) were ≥ 5 years old. Among cats, 33.3% (1/3) were 3-5 years old. These data do not agree with other studies showing that young dogs and cats, especially animals up to 12 months old, are more susceptible to developing dermatophytosis (CAFARCHIA et al., 2004). Among dogs that were positive for scabies, 44.4% (4/9) had an age range of 1-3 years. Among cats positive for scabies, 50% (1/2) were ≥ 5 years old. In this study, the reduced number of animals positive for fungi and scabies may have influenced this information.

As stated above, 53.5% (22/41) of the dogs in the study were male and 46.3% (19/41) were female. Of the dogs positive for dermatophytosis, 80% (4/5; $p \leq 0.05$) were male and 20% (1/5) were female. These data do not corroborate with those of Neves et al. (2011), who did not find any sex-related predisposition in a study carried out in VH at the Universidade Federal de Mato Grosso. The possible predisposing

factor for the higher percentage of males may be the free open access to the street, since it exists for 77.3% (17/22) of males and only 31.6% (6/19) of females evaluated.

Among the cats evaluated, 53% (9/17) were male and 43% (8/17) were female. Among those positive for dermatophytosis, 67% (2/3) were male and 33% (1/3) were female. No sexual predisposition was found, which supports a finding already described in the literature by Lima (2016).

Table 2 describes the relationship between breed pattern and occurrence of fungal and parasitic infections.

The most frequent agent causing dermatophytosis of dogs was *M. canis*, with 7.3% (3/41). This finding corroborates with Palumbo et al. (2010), who observed 79.7% (102/128) of *M. canis* positive cases among the animals treated at the Department of Dermatology of the Faculdade de Medicina Veterinária of UNESP, Botucatu-SP.

Table 2 - Breed pattern of dogs evaluated at SAMC/VH/IFPB with positive diagnoses for fungal or parasitic dermatological infections, Sousa, State of Paraíba, Brazil.

Breed pattern	Attended	Fungi Dermatophytes			Scabies	
		<i>M. canis</i> Positives (%)	<i>M. gypseum</i> Positives (%)	<i>T. mentagrophytes</i> Positives (%)	<i>S. scabiei</i> Positives (%)	<i>D. canis</i> Positives (%)
Pit Bull	5	-	-	-	-	2 (40)
Unspecified	17	-	-	-	1 (5,9)	3 (17,6)
Pinscher	4	-	-	-	-	2 (50)
Poodle	5	1 (20)	-	-	1(20)	-
Labrador	3	-	-	1 (33,3)	-	-
Yorkshire	3	2 (66,7)	-	-	-	-
Bulldog	4	-	1 (25)	-	-	1 (25)
Total	41	3 (7,3)	1 (2,4)	1 (2,4)	2 (4,8) ^a	8 (19,5) ^b

Values followed by different letters differ statistically from each other (*p≤0.05).

Concerning dog breed data in this study, 50% (2/4) were Pinschers and 40% (2/5) were Pit Bulls, corroborating with Rocha et al. (2008), who observed prevalences of demodicosis in the Pinscher and Pit Bull breeds of 17.6% and 40.5%, respectively. According to Scott et al. (2001), demodicosis presents a predisposition in brachycephalic animals, such as English Bulldog, Boxer and Pittbull Terriers, it is believed that these animals present a genetic defect in the specific immune response against *D. canis*. In

addition, hyperadrenocorticism, hypothyroidism, diabetes mellitus, malignant neoplasms and leishmaniasis are other diseases that may be associated with demodicosis (MEDLEAU & HILICICA, 2006). All of the felines used in the research were unspecified breeds, so there was no way to relate the incidence of fungal and parasitic infections to breed traits.

Table 3 shows the clinical signs presented by the animals in this study and their relation with the incidence of fungal and parasitic infections.

Table 3 - Clinical signs observed in animals evaluated at SAMC/ VH/IFPB with positive diagnoses of fungal and parasitic dermatological infections, Sousa, State of Paraíba, Brazil.

Clinical signs	Attended	Dogs Dermatophytes		Cats Dermatophytes		Cats Scabies	
		Positives (%)	Positives (%)	Positives (%)	Positives (%)		
Alopecia/hypotrichosis	3	-	2 (66,7)	3	-	1 (33,3)	
Alopecia + desquamation	10	2 (20)	1 (10)	4	1 (25)	-	
Alopecia + pruritus	12	1 (8,3)	2 (16,7)	5	1 (20)	1 (20)	
Alopecia + desquamation + itching	8	2 (25)	3 (37,5)	2	-	-	
Alopecia + pruritus + ectoparasites	2	-	1 (50)	-	-	-	
Hyperkeratosis	6	-	1 (16,7)	-	-	-	
Crusts	-	-	-	3	1 (33,3)	1 (33,3)	
Total	41	5 (12,2)	10 (24,4)	17	3 (17,6)	3 (17,6)	

Among the dogs that tested positive for dermatophytes, 20% (2/10) had alopecia and desquamation. Regarding the three felines positive for dermatophytosis, 20% (1/5) had alopecia and pruritus. Alopecia was the most common clinical sign in dermatophytosis, as was also described by Neves et al. (2011), who reported alopecia in all dermatophyte-positive animals that were treated at the VH of the Universidade Estadual de Londrina, Paraná.

For dogs that were positive for scabies, 37.5% (3/8) had alopecia, pruritus, and desquamation, and

33.3% (1/3) had crusts. Of the total scabies lesions, 30% (3/10) presented in the trunk region in dogs. For cats, lesion locations for both dermatophytosis and scabies were the same (Table 4).

No significant difference (p>0.05) was observed regarding the location of lesions for dermatophytosis in dogs and cats. For male dogs, however, the most affected sites (p≤0.05) were the trunk or a generalized presentation. Similar data were found by Palumbo et al. (2010), who observed 43% of the dogs presenting generalized lesions.

Table 4 - Localization of lesions found in dogs and cats diagnosed with fungal and parasitic dermatological infections at the SAMC/ VH/ IFPB, Sousa, State of Paraíba, Brazil.

Location of the lesion	Dogs			Cats		
	Attended	Dermatophytes Positives (%)	Scabies Positives (%)	Attended	Dermatophytes Positives (%)	Scabies Positives (%)
Head	5	-	2 (40) ^a	3	1 (33,3)	1 (33,3)
Snout	5	1 (20)	-	3	-	-
Trunk	6	1 (16,7)	3 (50) ^b	4	1 (25)	1 (25)
View Profile	6	1 (16,7)	-	-	-	-
Head + muzzle	4	-	1 (25) ^a	-	-	-
Trunk + muzzle	9	-	1 (11,1) ^a	4	-	-
Generalized	6	2 (33,3)	3 (50) ^b	3	1 (33,3)	1 (33,3)
Total	41	5 (12,2)	10 (24,4)	17	3 (17,6)	3 (17,6)

Values followed by different letters differ statistically from each other (*p≤0,05).

CONCLUSION

Based on these data, we conclude that the occurrence of fungal and parasitic dermatopathies is high in the Small Animal Medical Clinic, Veterinary Hospital of the Instituto Federal da Paraíba – IFPB. The main dermatophytes found were *M. canis* in dogs and *M. gypseum* in cats. Among the parasitic diseases, *D. canis* was the most frequent pathogen for dogs, and *N. cati* was the most frequent for cats.

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