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Prevalence Rate of Malassezia Fungus in Sheep Dogs and Sheep Owners

[1]Mansoor Khakpoor, [2]Saeid Safarmashaei and [3]Alimohammad Attari

[1]Department of Pathobiology, Tabriz Branch, Islamic Azad University, Tabriz, Iran
[2]Young Researchers Club, Tabriz Branch, Islamic Azad University, Tabriz, Iran
[3]Post graduated of Veterinary Medicine, Tabriz Branch, Islamic Azad University, Tabriz, Iran

Abstract: Opportunist ferments genus *Malassezia* belong to Bazidiomycots and criptococase family normally reside on the skin of human and animals. These ferments can produce diseases such as pityriasis versicolor (PV), dandruff, seborrheic dermatitis, etc. and even systemic infections. Therefore, considering importance of this issue, the present research has dealt with determining the rate of infection by *Malassezia pachydermatis* in sheep dogs and sheep owners in Tabriz region. For this purpose, after sampling 50 dogs and 25 sheep owners, the samples were sent to microbiology laboratory of veterinary faculty. Then, fungus isolates were identified with genus and species. According to obtained results, the frequencies of positive samples of sheep dogs belonging to *Malassezia japonica* 46%, *Malassezia globosa* 24% *and Malassezia pachydermatis* were 46, 24 and 12%, respectively. In sheep owners the isolates were *Malassezia globosa* 20% and *Malassezia japonica* 12%. Considering the results and zoonotic importance of this disease and its specific epidemiology, prevention of the disease in infected sheep dogs seems to be important and complementary studies in the field will be necessary n the future.

Key words: Malassezia Pachydermatis · Sheep Dog · Tabriz · Iran

INTRODUCTION

Malassezia pachydermatis (*Pytirosporum canis*) is commensal lipophilic yeast which is frequently isolated from the external ear canal and from the skin of healthy dogs. Cutaneous or immunological factors enhance its multiplication and the development of its pathogenicity. This has been recognized since the late seventies [1,2]. The genus *Malassezia* includes 6 species of lipodependent yeasts and Malassezia pachydermatis which is lipophilic but not lipodependent. The reproduction of *Malassezia* is asexual with a unipolar budding. This gives a typical shape (resembling a footprint or a peanut). Their size is small (2 to 7 µm). They do not form pseudomycelium. Round, convex and yellowish cultures develop on Sabouraud's dextrose agar. Many studies have shown that *Malassezia pachydermatis* is a component of the normal cutaneous flora of the dog, using various techniques [3-10]. Around 50 % of healthy dogs are carriers of this yeast which can be found in the external ear canal, the skin (particularly the anal area which could be a carriage zone, the lips and extremities) and the hair coat [6]. The response of the host to the yeast includes non-specific defense mechanism (phagocytosis by neutrophils) as well as cell-mediated specific defense mechanism. In the latter Langerhans cells present the antigen which activates T-cells. These T-cells multiply and produce lymphokines which stimulate phagocytosis by macrophages and multiplication of epidermal basal cells. This leads to the destruction of the yeasts or to their mechanical removal with scaling [7-9]. *Malassezia pachydermatis* is saprophytic yeast commonly found on normal and abnormal skin of dogs. *Malassezia pachydermatis* and staphylococci play a significant role in seborrheic dermatitis. Malassezia dermatitis (MD) is common and should be considered in any case exhibiting erythematous, oily and pruritic dermatitis [11]. Specialty dermatology practices may see two or more cases of MD a week. Malassezia dermatitis is often the reason for therapeutic or diagnostic failures. When there is a lack of response to glucocorticoids, antibiotics, antiseborrheic shampoos, insecticides, or

Corresponding Author: Mansoor Khakpoor, Department of Pathobiology, Tabriz Branch, Islamic Azad University, Tabriz, Iran.

miticides, one should consider a diagnosis of MD [12]. Some atopic patients that have failed to respond to desensitization have subsequently been diagnosed as having MD and, then, have responded well to desensitization after the MD was successfully treated [13-15]. Malassezia is an opportunistic organism. This means the yeast takes advantage of any opportunity to grow when the conditions are right. Malassezia infections often appear during the high-humidity months of summer and they may persist into the fall [16]. Any hereditary or infectious disease that weakens the skin's immune system can allow a Malassezia infection to begin. For example, dogs that suffer from a bacterial dermatitis (skin infection), allergies, or seborrhea can have irritated skin that is then susceptible to becoming infected with this yeast. In addition, increased levels of sebum (oils in the skin) or cerumen (ear wax) can lead to an infection. The prolonged use of certain medications, such as glucocorticoids (e.g. prednisone) or antibiotics, can predispose the dog to an infection with this yeast [17]. Yeasts of the genus *Malassezia*, part of the normal cutaneous microflora of mammals, can cause life-threatening fungemia and other nosocomial infections in immunocompromised humans, especially in preterm neonates [18]. While disease in humans is most commonly caused by *Malassezia furfur*, a commensal of human skin [19], it has also resulted from *M. pachydermatis*, for which dogs are a natural host [20]. In some cases, the sources of human infections have been traced to pet dogs owned by healthcare workers. In normal dogs with healthy skin, *M. pachydermatis* colonizes the stratum corneum in very low numbers. In dogs with allergic skin disease, however, the numbers of *M. pachydermatis* may increase dramatically on the skin and within the ear canals [16-20]. Yeasts belonging to the *Malassezia* genus have been associated with various dermatological diseases: pityriasis versicolor (PV), dandruff, seborrheic dermatitis (SD), atopic dermatitis, folliculitis, psoriasis, onychomycosis and blepharitis. The pathogenic role of Malassezia in PV has now been universally accepted although authors disagree about which species is most widely associated with the disease. Some of them suggest that *M. globosa* is the causal agent of PV [18-20]. As well as these diseases, cases of fungemia caused by *M. pachydermatis* and *M. furfur* have been reported in premature newborns and immunocompromised patients artificially fed with lipid emulsions [20]. Therefore the aim of this study was to determine the prevalence rate of *Malassezia pachydermatis* in sheep dogs and sheep owners of Tabriz region (center of East Azerbaijan province), Iran.

MATERIALS AND METHODS

Mycological examinations were performed to confirm the diagnosis of *Malassezia* fungus in sheep dogs and sheep owners. Samples from 50 sheep dog and 25 sheep owners were taken by scraping the lesions with a scalpel. Direct microscopy with KOH 20% and methylene blue staining was carried out in the PV lesions as well as normal samples. All samples were also inoculated in plates containing modified Dixon medium. The plates were incubated at 37°C for one week and examined at frequent intervals for the developing colonies. *Malassezia* species were identified according to their morphological features and physiological properties. Isolated colonies on modified Dixon agar were used for identification. Among Malassezia species, only M. pachydermatitis is able to grow on Sabouraud's agar .However, further tests are essential for identification of other Malassezia species Mayser *et al.* [21]. Results of this study were analyzed by the non parametric correlation test.

RESULTS AND DISCUSSION

By reviewing the results of the present study and comparing them with similar researches, some points will be clear. In the present study all sampled sheep dogs were male dogs. Similar researches demonstrate a meaningful relationship between infection incidence of various species of *Malassezia* and the age, especially in human [22]. Leo *et al.* in 2006 in a study demonstrated that dominant species in adult humans (above 50 years old) is *Malassezia globosa* while in younger ones is *Malassezia restrica* [23]. Also some studies revealed the existence of breeding allergy to various species of *Malassezia* infection in dogs. In a study conducted by Nardoni *et al.* in 2004 it was cleared that in hound breeding the incidence of infection is near the zero [22]. With regard to the fact that in the present study all of obtained samples from dogs were of identical age and breeding range, there is no possibility of evaluating the relationship between age and breeding with infection. In a study conducted by zomorodian *et al.* in Tehran in 2007, on the psoriatic patients and probability of relationship between the severity of the disease with various species of *Malassezia*, it was reported that which conforms to the results of the present study [24]. In another study by Huan *et al.* in 1998 proved that skin infection of the personnel was transferred from house-dogs; finally they have proved by polymorphic examinations that the infection was related to nine cases of infants' infections

Table 1: Prevalence rate of *Malassezia* in sheep dogs.

	Dogs infection	Percent	Valid Percent	Cumulative Percent
Valid	Not infected	9	18.0	18.0
	M. Pachydermatics	6	12.0	30.0
	M. Japoinca	23	46.0	76.0
	M. globosa	12	24.0	100.0
	Total	50	100.0	

Table 2: Prevalence rate of *Malassezia* in sheep owners.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not infected	17	34.0	68.0	68.0
	M. Japoinca	3	6.0	12.0	80.0
	M. globosa	5	10.0	20.0	100.0
	Total	25	50.0	100.0	
Missing	System	25	50.0		
Total		50	100.0		

Table 3: Correlation between kind of infection and host.

Correlations				
			Kined of infection	Host
Spearmans rho	Kined of infection	Correlation Coefficient	1.000	-.143
		Sig. (2-tailed)		.221
		N	75	75
	Host	Correlation Coefficient	-.143	1.000
		Sig. (2-tailed)	.221	
		N	75	75

Nonparametric Correlations

Table 3: Continue

Correlations				
			Kined of infection	Host
Spearmans rho	Kined of infection	Correlation Coefficient	1.000	-.171
		Sig. (2-tailed)		.143
		N	75	75
	Host	Correlation Coefficient	-.171	1.000
		Sig. (2-tailed)	.143	
		N	75	75

Nonparametric Correlations

[25]. Ming Fan *et al.* in another study in 2006 in China, reported the isolation of *Malassezia pakidermatis* as a common fungal agent from samples obtained from women's skin tuberosities and house-dogs of these women [26]. In the present study fungal culturing was done in 50 samples obtained from dogs and 82% was reported positively which conforms with the results of Nardoni *et al.* study in 2003, who reported 63.4% of samples were positive [24]. In the study conducted by Zomorodian *et al.* in 2007 *Malassezia globosa* was reported as the dominant species in human being [24]. In another study which was conducted by Khosravi *et al.* in 2009 on human being the main isolated species was *Malassezia globosa* with the rate of 42.85% [27]. Kafarchia *et al.* in 2005, reported that Malassezia *pachydermatis* was reported as the main fungus isolated from infected dogs [28].

CONCLUSIONS

Zoonotic importance of this disease and its specific epidemiology, prevention of the disease in infected sheep dogs seems to be important and complementary studies in the field will be necessary n the future.

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