

*Full Length Research Paper*

# The prevalence of cattle ringworm in native dairy farms of Sarab city (East Azarbayjan province), Iran

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Ringworm is a fungal and zoonotic infectious disease, caused by different species of dermatophytes. Lesions of ringworm are usually found on the head, muzzle, ears, neck, and particularly, around the eyes of the infected animals. This study was conducted to determine the prevalence of cattle ringworm in native farms of Sarab city in Iran. A total number of 1150 cattle in native dairy farms of Sarab city were examined in this study from July 2007 till June 2008. The animals were classified into two age groups of less than 2 years and more than 2 years. Each animal was thoroughly examined for skin ringworm lesions, then, microscopic and culture examinations were carried out on samples obtained from ringworm lesions of infected animals. According to the results of this study among 1150 cattle, 188 of them (16.34%) were clinically positive for skin ringworm lesions. After microscopic and culture examinations, 150 animals (13.04%) were confirmed for dermatophyte infections. *Trichophyton verrucosum* was isolated in 100% of positive samples. The prevalence of ringworm among cattle less than 2 years and more than 2 years were 15 and 9% respectively, which showed significant difference between them. This study is the first research on the prevalence of cattle ringworm in Sarab city which indicated the relatively high prevalence of the disease and revealed the dominant role of *T. verrucosum* in cattle ringworm.

**Key words:** Ringworm, dermatophyte, cattle, Sarab.

## INTRODUCTION

Ringworm is a fungal and zoonotic infectious disease caused by different species of dermatophytes. These microorganisms are a group of closely related fungi which utilize keratin and tend to be confined to the superficial integument, including skin, nails, claws and hair of both animals and humans (Aala et al., 2010). Dermatophytes can be divided into three groups of anthropophilic, zoophilic and geophilic, depending on their natural habits and host preferences (Dehghan et al., 2009). The geophilic dermatophytes inhabit the soil, and can exist there as free-living saprophytes. *Microsporum gypseum* and *M. nanum* are examples of geophilic dermatophytes. The zoophilic dermatophytes are primarily parasites of animals, although they can cause infection in humans. Zoophilic species of dermatophytes including, *M. canis*, *Trichophyton Verrucosum*, and *T. mentagrophytes* are associated with dermatophytosis in wild and domestic animals. These species are the most common dermatophytes as causative agents of tinea in rural areas in Iran (Mahmoudabadi, 2010). Humans are the main

host for anthropophilic dermatophytes. Most of the dermatophytes causing lesion in animals, are also capable of producing ringworm in humans (Quinn et al., 1994). Cattle ringworm has worldwide distribution and has been considered a major public and veterinary health problem in the world (Al-ani et al., 2002). The disease is responsible for great economic losses due to skin injuries and many casualties in animal products (wool, meat, etc.). Cattle of all ages may be affected but the disease mainly occurs in young animals (Shams et al., 2009). Ringworm is more commonly seen during the winter months in stabled animals but may occur at any time. *T. verrucosum* is the most frequent cause of ringworm in cattle however, *T. mentagrophytes* is occasionally isolated. The fungus is resistant and may survive for a long time in dry scales shed by the infected animals (Quinn et al., 1994). Infection is transmitted readily from animal to animal and from animal to man by direct or indirect contact. The human infection with zoophilic dermatophytes has been reported from different



**Figure 1.** 15-months-old calf from dairy farm of Sarab city with lesions of ringworm around the eyes and muzzle (infected by *T. verrucosum*).

provinces in Iran (Khosravi et al., 1994; Mahmoudabad, 2010). However, very limited studies on cattle ringworm have been published in Iran and the disease is considered to be common in most dairy farms of this country (Shams et al., 2009; Aghamirian et al., 2009). In the present study, the prevalence of cattle ringworm in native dairy farms of Sarab city, which is located in East Azarbaijan province in Iran, were determined by microscopic and culture examinations. With this research, it may be possible to reach effective program for preventing the disease and eliminating the causative fungi.

## MATERIALS AND METHODS

A total number of 1150 cattle from 50 different dairy farms which were selected randomly in Sarab city were examined in this study from July 2007 till June 2008. The animals were classified into two age groups (less than 2 years and more than 2 years) and subjected for clinical and laboratory examinations. The skin of each animal was thoroughly examined for evidence of ringworm lesions including hair loss and crusting. Clinical lesions in affected animals were first rubbed with a cotton swab impregnated with 70% ethyl alcohol to remove surface adhering microorganisms and then, skin scales were collected by scraping of the lesion using a sterile scalpel. The skin scrapings were collected into sterile Petri dish and transferred to laboratory for culture and microscopic examinations. For each sample, the age of animal, date of sampling and the name of dairy farm were also recorded. Microscopic examination was performed using KOH wet mount method described by Queen et al. (1994). According to this method, 1 to 2 drops of 20% KOH (potassium hydroxide) were placed on a microscopic slide and a

small amount of the specimen was added and then, the slide was gently passed through a low flame and covered by a cover slip. After 2 h, the specimen was examined for the presence of arthrospores and hyphae under a light microscope. For isolation and identification of pathogenic fungi, a portion of each sample was inoculated on sabouraud dextrose agar (Merck), supplied with cyclohexamide and chloramphenicol, and then, incubated at, 28°C for, 2 to 6 weeks. The ringworm dermatophytes were identified by considerations of the rate of growth, texture and pigmentation of the obverse and reverse side of the colony and microscopic features of macroconidium which are pencil shaped and divided by septa into 3 to 8 cells in *Trichophyton* spp. Moreover, *T. verrucosum* produce chains, forming chlamydospores, which are characteristic of this species.

## RESULTS

Out of 1150 animals examined from 50 dairy farms of Sarab city, 188 of them (16.34%) showed clinical signs of ringworm (circumscribed, circular, grayish and crusty lesions) as demonstrated in Figure 1. Most of the lesions were found on the neck, head and around the eye of the affected animals. According to Table 1, out of 750 cattle examined in age group of less than 2 years, 145 (19.33%) of them were clinically positive for ringworm lesions. While in the age group of more than 2 years, out of 400 animals, 43 (10.75%) of them showed clinical signs of the disease. The results of direct microscopic examinations showed that 15.2% of cattle in age group of less than 2 years and 9% of those in age group of more than 2 years were positive for dermatophytosis. In

**Table 1.** The prevalence of cattle ringworm in 2 age groups of cattle in native dairy farms of Sarab city-Iran.

Age group	No. of examined animals	No. of positive case (clinical signs)		No. of positive case (DME)	
		Number	%	Number	%
Less than 2 years	750	145	19.33	114	15.2
More than 2 years	400	43	10.75	36	9
Total	1150	188	16.34	150	13.04

DME= direct microscopic examination.

overall, out of 1150 animals examined in this study, 150 (13.04%) animals had positive results in direct microscopic examinations. All of the KOH positive samples were culture positive on sabouraud dextrose agar. According to the results of microscopic examinations, after growing the pathogenic fungi on agar media, *T. verrucosum* was isolated from all culture positive samples (100%).

## DISCUSSION

Ringworm is a contagious fungal infection of the skin and superficial integument, which is worldwide in distribution. In this study, 13.04% of examined cattle were positive for dermatophyte in direct microscopic examinations. Based on culture examination, *T. verrucosum* was found in all of the positive DME cases. The results of this research showed that, *T. verrucosum* was the most dominant dermatophyte caused cattle ringworm in native dairy farms of Sarab city. As Table 1 shows, there was significant difference between the prevalence of ringworm among cattle less than 2 years (15.2%) and the age group of more than 2 years (9%). The lower prevalence rate of ringworm infection in adults may be due to development of immunity system by increasing age. Several researchers have reported the occurrence of dermatophytosis in different areas in Iran. According to the research of Shams et al. (2009) which was carried out in dairy farms of Mashhad city, *T. verrucosum* and *T. mentagrophytes* were isolated from the skin lesions of affected animals where *T. verrucosum* with frequency of 99% was the most frequent dermatophyte. In the present study, no *T. mentagrophytes* was isolated, which showed that the prevalence of this dermatophyte may differ in different geographic area.

Another study which was carried out by Aghamirian et al. (2009), *T. verrucosum* was reported as an exclusive fungus isolated from cattle in Iran. Authors in different countries have reported different prevalence rate of *T. verrucosum* among cattle herds. According to the research of Papini et al. (2009) which was done in 20 farms in Italy, *T. verrucosum* was the most dominant fungi species which isolated. Al-ani (2002) isolated *Trichophyton* spp. from 69.01% of infected animals in

Jordan. He also reported that, *T. verrucosum* was the most frequent fungi species which identified. All of the above studies agree with our results in the present study and revealed the dominant role of *T. verrucosum* in cattle ringworm. Zoophilic dermatophytosis is a major public health problem. *T. verrucosum* is able to survive in skin lesions of the infected animals for several months and can be easily transmitted to human. Many researches have reported the transmission of dermatophytes among animals and humans (Aghamirian et al., 2009; Ming et al., 2006; Ameh et al., 2004).

The human infection with *T. verrucosum* has been reported in different regions in Iran. According to the research of Chadeganipour et al. (1997) which was carried out in Isfahan city in Iran, *T. verrucosum* was reported as the most frequent dermatophyte isolated from patients. They also found a relationship between the spread of dermatophytosis and livestock infected with dermatophytes. The same results have been reported by several authors in different provinces in Iran (Dehghan et al., 2009; Khosravi et al., 1994; Sepahvand et al., 2009; Bassiri-Jahromi et al., 2009; Falahati et al., 2003; Pakshir et al., 2006). Finally, this study showed the importance of cattle ringworm in Sarab city and revealed the dominant role of *T. verrucosum* in cattle dermatophytosis. Therefore, routine and regular inspection of animals, isolation of infected animals, disinfection of contaminated stables and other effective control program should be highly recommended.

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