

## Mycozoonosis Associated with Ringworm of Calves in Erzurum Province, Turkey

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### Summary

Eight calves, raised in a farm in Erzurum province during winter season, were referred to the clinic with complaints of skin lesions of ringworm. Additionally, the owner had the tinea corporis of the arm with an erythematous, scurfy, crusty and pruritic lesion. The samples collected from lesions of calves and their owner were analyzed in laboratory of veterinary microbiology. The isolated agents were identified as *Trichophyton verrucosum* by microscopic and cultural examinations. The identical strain isolated was verified in both samples of calves and the owner. The affected calves were treated by inoculation of vaccine. In conclusion, it is determined that the ringworm of calves presented in this study is zoonosis. Both farmers and breeders with a close contact of animals with ringworm should be informed regarding zoonotic properties of the disease.

**Keywords:** *Mycozoonosis, Ringworm, Trichophyton verrucosum*

## Türkiye Erzurum Yöresinde Buzağı Trikofitozisine Bağlı Mikozoonozis

### Özet

Erzurum yöresinde, kış sezonunda, bir çiftlikte yetiştirilen 8 buzağı trikofitozis'in deri lezyonları şikayeti ile kliniğe getirildi. Ayrıca, hayvan sahibi kolunda eritematöz, kepekli, kabuklu ve kaşıntılı tinea corporis'e sahipti. Buzağular ve sahibinin lezyonlarından alınan numuneler veteriner mikrobiyoloji laboratuvarında incelendi. Mikroskopik ve kültür incelemelerinde, izole edilen etkenler *Trichophyton verrucosum* olarak tanımlandı. Hem buzağuların hem de sahibinin örneklerinden izole edilen türlerin aynı olduğu belirlendi. Hasta buzağular aşı uygulaması ile sağaltıldı. Sonuç olarak, bu çalışmada bildirilen buzağılardaki trikofitozis'in zoonoz olduğu belirlendi. Trikofitozisli buzağular ile sıkı temasta olan çiftçi ve yetiştiricilerin hastalığın zoonotik özellikleri yönünden bilgilendirilmesi gerektiği kanısına varıldı.

**Anahtar sözcükler:** *Mycozoonosis, Trikofitozis, Trichophyton verrucosum*

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## INTRODUCTION

Ringworm of cattle, known as trichophytosis or dermatophytosis, is characterized by circle shaped alopecia, scurfy and crusty skin lesions and causes enzootic infections in young and immunosuppressive animals exaggerated with conditions of predisposed factors. Additionally, the disease has been shown for its zoonotic property with a gradual increase in the man who works as breeders/farmers<sup>1,2</sup>. The zoophilic species such as *Trichophyton verrucosum* (cattle), *T. mentagrophytes* (rodent), *Microsporum canis* (carnivores) induce skin lesions mainly in animals while they can be transmitted to human beings with close contact of the affected animal. Placzek et al.<sup>3</sup> evaluated that tinea corporis caused by *T. verrucosum* in three men associated with frequent exposure to cold and contact with animals. The disease caused an outbreak in cattle during summer with a 30 per cent rate of transmissions to the workers. Ringworm has already been detected in cattle and currently being treated by vaccines throughout the country. To the authors' knowledge, the affected animals and the tinea corporis of the man have not yet been evaluated together demonstrating the same isolation of fungal agent and possible predisposing factors of mycozoonosis in Turkey.

In a farm in Erzurum known as the coldest city of Turkey, the case of mycozoonosis, occurred between calves with ringworm and their owner during winter season, has been aimed to report and relevant aspects have been discussed.

## CASE REPORT

Eight calves aging 2-4 months were suffering from circle-shaped alopecia and scurf around the area of head and neck, and malnutrition. Additionally, the farmer (owner) was also having similar lesions on his shoulder and he was rearing the animals by himself with a very close contact. After the affected area of skin was cleaned with sterile water and disinfected with 70% alcohol, the lesions of the calves and the farmer were scraped with a sterile lancet and then sufficient specimen for microscopic and mycological examinations were collected in sterile petri dishes.

Native preparations were performed with a solution of 10% potassium hydroxide (KOH) for

direct microscopic examination of specimens from hair and skin scrapings of cattle and cattle handler. Each sample was placed on a slide and a drop of KOH was added. After 5 min, the preparation was examined by light microscope - with x100 and x400 magnifications -for the presence of fungal elements such as arthroconidia and spores<sup>4</sup>.

In culture examination, samples collected from patients with suspected dermatomycosis were digested in 20% KOH and each specimen was cultured on two Sabouraud glucose agar (SGA; Difco, Detroit, MI, USA) added with chloramphenicol and cycloheximide to inhibit bacterial and saprofitic fungal contamination. Cultures on primary isolation medium (SGA) were incubated for up to 4 weeks at room temperature (28 to 30°C) and at 37°C. Growth of colonies was detected in 3 weeks. After dermatophytes were initially isolated, a sub-culture was made on SGA and potato glucose agar plates (PGA; Difco, Detroit, MI, USA) for further identification. The isolates were examined microscopically in lactophenol cotton blue (LCB) staining. Identification was based on colony characteristics such as the growth rates, the colors of the surface and underside pigment of the colonies, and the texture of the surface of the colonies on SGA, PGA and microscopic morphology<sup>4</sup>.

A lyophilisate vaccine (Trichoben®, Interhas) containing *T. verrucosum* strain was inoculated to each calf with ringworm as directed by the manufacturer. Additionally, the affected owner was advised to apply to the department of dermatology of a human hospital.

In the clinical examinations of the calves, scurfy, alopecic, circle-shaped and slightly erythematous lesions were observed around the body, mostly on head and neck region (*Figure 1*). A similar lesion was also present on the one arm of the owner who reared the calves (*Figure 2*). In the calves, apathy, anorexia and malnutrition were prominent findings. Additionally, it is detected that the barn of the calves was poorly aerated and the floor was badly wet without having sufficient litter.

In the direct microscopic examination, hyphae and spores were seen around the infected hair and skin scrapings sampled. Any scabies was not observed. The isolated dermatophytes were slowly reproduced in medium having zoophilic and colony characteristics, chains of chlamyospores

in LCB staining and the ability of colonies to grow at 37°C. The color surface of the colonies reproduced in mediums was yellowish-brownish or salmon-colored while the texture of surface was slightly velvety (Figure 3). Both dermatophytes from the samples of the animals and the handler (owner) were identified as *T. verrucosum* by the microbiologic analyses. The results of microscopic and cultural examinations were summarized in Table 1. It is also observed that the lesions of all calves were totally cured at the end of fourth week after initiation of the trichoben inoculation.



**Fig 1.** Appearance of the lesion of ringworm in a calf  
**Şekil 1.** Bir buzağıda trikofitozis lezyonunun görünümü



**Fig 2.** Appearance of the ringworm (tinea corporis of the arm) in the owner of the calves

**Şekil 2.** Buzağuların sahibinde trikofitozis'in (kolda tinea corporis) görünümü



**Fig 3.** Macroscopic appearance of the *T. verrucosum* colonies  
**Şekil 3.** *T. verrucosum* kolonilerinin makroskopik görünümü

**Table 1.** Findings of direct microscopic and cultural analyzes of the samples

**Tablo 1.** Numunelerin direk mikroskopik ve kültür analiz bulguları

Organisms (n)	Direct microscopy Number (%)		Culture Number (%)	
	negative	positive	negative	positive
<i>T. verrucosum</i> (8)	3 (37.5%)	5 (62.5%)	0	8 (100%)

## DISCUSSION

There are more than 30 dermatophilic and keratinophilic fungal agents that affect skin, nail and hair in mammals. While antropophilic dermatophytes are responsible for causing dermatophytosis in human beings, zoophilic and geophilic agents have also been reported<sup>5</sup>. Ringworm is one of the important skin disorders seen in calves in Turkey and the world<sup>6-10</sup>. Predisposing factors may increase the incidence of the disease in immune-depressive young animals reared in crowded barns. Although the infection is superficial, zoonotic aspect is very important in management of cases. Farming in the province of Erzurum, in eastern Turkey, is traditionally being performed by farmers who are poorly educated. Recently, it is detected that the occurrence of ringworm infection in cattle has been referred with an increasing rate from traditional farms to the clinics of faculty of veterinary medicine in the region.

The same isolation of *T. verrucosum* was determined both in the calves and their owner in the present report. The zoophylic dermatophytes are causing severe lesions in humans<sup>11,12</sup> and the contamination risks of *T. verrucosum* are highly increased who are working in cold conditions. The ringworm infection with a zoonotic characteristic has been determined in men working cold situations<sup>3</sup>. The zoonotic properties of the disease may increase the occurrence during long winter season. The calves with ringworm were referred to the clinics from a farm managed by traditional farming in Erzurum province known as the coldest area of Turkey in winter. Traditional farming during winter in the region contains some major management defects which are poor aeration, humid ambience, wet floor, insufficient litter, crowded rearing, malnutrition and immune depression etc. The authors also noted that presence of cattle ringworm and mycozoonosis

are relatively common in the province managed by traditional farming (unpublished data, protocol book of the clinic).

Dermatophytosis may result from direct contact with the affected animal or infected fomites. Oborilova and Rybnikar<sup>13</sup> reported that 1000 higher dose of inoculation of microconidia is necessary to conduct dermatophytosis in the case of the non-sheared and non-scarified skin versus the case of sheared and scarified skin in calves showing the important protective role of the hair and the skin. The lesions were mostly around the regions of head and neck and rarely around less hairy body parts in the calves in this study. The owner was raising the affected calves by himself with traditional ways using his arms and hands. It is also detected that he had very close contact with the affected calves having scarified skin of arms when raising the animals.

The protective efficacy of the vaccines against bovine *T. verrucosum* infection has been established<sup>14</sup>. The affected calves, causing mycozoonosis, were treated by the administered inoculation in this study. Vaccination can be a giant step forward to prevent the occurrence of mycozoonosis between the calf with ringworm and susceptible man particularly in regions having predisposing factors. Besides, Weber et al.<sup>1</sup> emphasized the importance of vaccination and hygiene on preventive measures against the cattle ringworm causing mycozoonosis. The findings of this study point out the case of mycozoonosis in a farm with some of the predisposing factors such as close contact with the animal, traditional farming and cold winter season in a rural area of eastern Turkey and indicate some of the preventive measures such as vaccination of animals and improving of sanitary condition of the farmer.

Tinea corporis of the arm was detected in the man rearing calves with ringworm induced by *T. verrucosum* in this study. Metintas et al.<sup>15</sup> reported *T. rubrum* was the most frequent isolation and *T. verrucosum* was accounting for 7% of isolations of dermatophytosis in human beings. Tinea pedis was the most frequent clinic form of dermatophytosis followed by tinea corporis in that study. Borman et al.<sup>5</sup> surveyed dermatophyte fungi species in 15.333 isolations throughout the British isles and found that prevalence of *T. verrucosum*, *T. mentagrophytes*, *M. canis* decreased while *T. tonsurans* and *T. violaceum* increased over the

same period. Unfortunately, there is not enough report about the prevalence of the dermatophytes transmitted from cattle to the human beings in Turkey. Zoonotic properties of ringworm infection from cattle to man need to be further evaluation.

As a result, mycozoonosis was detected in a region having predisposing factors such as traditional farming and cold winter season and the raisers—both farmers and breeders—with a close contact of an affected animal should be informed regarding zoonotic properties of the ringworm in such regions.

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