

Epidemiological, clinical and therapeutic aspects of the infestation with *Trichophyton* spp. (Fungi: Eurotiomycetes: Arthrodermataceae)

Florin Ș. Hora¹✉, Gheorghe Dărăbuș¹, Corina Badea¹, Ovidiu Mederle², Narcisa Mederle¹

1 - Department of Parasitology and Parasitic Diseases, Faculty of Veterinary Medicine, Banat's University of Agricultural Sciences and Veterinary Medicine "King Michael I of Romania" Timișoara, Calea Aradului 119, 300645 Timișoara, Romania.

2 - "Victor Babeș" University of Medicine and Pharmacy, Department of Histology, Angiogenesis Research Center, Piața Eftimie Murgu 2, 300041 Timișoara, Romania.

Correspondence: Tel. +40256-277008, Fax +40256-277118, E-mail florin.hora19@yahoo.com

Abstract. Cattle ringworm with symptomatic or asymptomatic evolution is an important source of infection for humans. The study was conducted over a period of two years, from November 2010 to December 2012, on a total count of 320 cattle (youth and adults) from 110 households in Arad. In the present study, were examined also the people who have had contact with the infected animals (milkers, cattlemen, staff veterinarian). Of 320 cattle examined, 105 (32.81%) were diagnosed with ringworm; 72 (68.6%) were 3-6 months old, and 33 (31.4%) were adults. 11 people who have had contact with animals (cattlemen, milkers) were diagnosed with ringworm. Cattle ringworm is more frequent in calves with an evolution from a small nodule, covered with whitish crust formation to a ringworm placards. The cattle were treated with the products Imaverol 10% and Sporyl, a better efficacy was registered using Imaverol 10%.

Keywords: *Trichophyton verrucosum*; Ringworm placards; Cattle; Humans.

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Introduction

Increased incidence of dermatophytes, both in humans and in susceptible animals, is noticed in recent years by a significant number of researchers (Cosoroabă, 2005; Warycha et al., 2011; Ming et al., 2006; Radbea and Dărăbuș, 2006; Șuteu and Dulceanu, 2001).

Cattle ringworm usually evolves in animals with poor maintenance condition, but it can

also be found in cattle with good maintenance condition. Cattle ringworm is the main skin disease, with benign evolution and with important health and economical consequences often ignored. In addition to economic losses a great importance shows the transmission to humans. People (cattlemen, milkers, veterinarians, childrens) get sick more often with severe clinical forms than cattle, which makes the ringworm an important

zoonosis that must concern both veterinarian and human doctors.

The aim of the study is to:

- determine the prevalence of cattle ringworm from Sofronea (County Arad);
- describe the clinical lesions, their location and aspects;
- assess the effectiveness of various therapeutic protocols on cattle ringworm.

Materials and methods

The study was conducted over a period of two years, from November 2010 to December 2012, on a total count of 320 cattle (youth and adults) from 110 households in Sofronea, County Arad.

Out of 320 cattle examined:

- 180 were calves (3-12 months old);
- 140 cattle (4-15 years old) belonging to different breeds: Romanian Spotted, Belgian Blue, Montbéliarde, Red Holstein, Limousin, Holstein Friesian.

Were examined also those who came in contact with infected animals (milkers, cattlemen, veterinarians).

Were performed:

- epidemiological investigation (food, hygiene, epizootological factors, the prevalence of ringworm in the context of skin diseases);
- clinical exams on cattle;
- corroborating all the information and establishing diagnosis;
- application of different therapeutic protocols.

Were established three groups:

- Group 1 (36 cattle) has been treated with the ointment Sporyl (clove oil, eugenol 2.0 g, cetrimide 1.2 g), due to its strong fungicidal and disinfectant actions, was administered daily – topically to the lesions.

- Group 2 (43 cattle) has been treated with Imaverol 10% (enilconazole 100 mg/ml), once at every 3 days, topically to the lesions.
- Both groups were treated for 6 weeks.
- Group 3 (26 cattle), control group was not treated.

The lesions were: dried, located on the head, neck and body. For all three groups was improved the microclimatic conditions and were accordingly fed, eliminating negative factors (humidity, food deficiencies).

Results

Epidemiological aspects

Cattle ringworm was identified at 105 animals out of 320 examined, in 110 households from Sofronea, County Arad, having a prevalence of 32.8%.

Out of 105 cattle with ringworm, 72 were with the age between 3-6 months old and had the prevalence 68.6%, and 33 cattle were adult with the prevalence 31.4%.

In the present study, cattle ringworm was diagnosed in private households, where maintenance conditions were favorable for the development and to maintain this dermatophytosis. During the year, cattle ringworm lesions were present in all four seasons, without a higher incidence in any given season.

The prevalence by breed was:

- Romanian Spotted 47.2%;
- Belgian Blue 10.5%;
- Montbéliarde 26.2%;
- Red Holstein 5.2%;
- Limousin 10.5%.

Clinical aspects

Clinical exam on infected cattle with *Trichophyton* spp. have revealed the presence of a small nodule covered with small whitish crust – ringworm nodule.

The lesion is directly proportioned with the disease evolution, thereby the lesion is going to be wider, covered with a white to gray layered crust. Near the lesion the hair was depigmented, friable, dull forming the ringworm placard.

These ringworm placards were located on the head (periorbital, periorally, forehead), neck and tail (figure 1). The lesions have remained dry during the evolution of the disease.



Figure 1. Ringworm lesions on the head, ears, neck at adult cattle (original)

The most frequent lesions in young cattle under 12 months old were located in the head and neck regions; in calves the lesions are located around the eyes, mandibular, intermandibular and cervical regions.

Clinical exam of the people who came in contact with the infected cattle showed the presence of lesions, especially on their hands: ringworm placards with circular form, like a bumpy patch.

11 people who had contact with animals (cattlemen, milkers) were diagnosed with ringworm (figures 2, 3).

The diagnosis was based on corroborating the clinical and epidemiological aspects.

Therapeutic aspects

Treatment - applied to infected animals showed encouraging results with the Sporyl ointment and good results by applying the product Imaverol 10%.

Clinical and parasitological cure occurred in a shorter time when it was used the product Imaverol compared the other product Sporyl ointment (figure 4).



Figure 2. Lesions at a milker, on the hand (original)



Figure 3. The cured hand of the milker, without lesions (original)



Figure 4. The cured cattle after the treatment (original)

Discussion

Epidemiological aspects

The disease is more prevalent in large, overcrowded herd of cattle and can be transmitted either by direct contact (between infected and healthy cattle) or indirect contact (through crusts, scales, spores resulted from scratching in the environment) (Coman and Mareş, 2000; Cosoroabă et al., 2002).

The receptivity is influenced by: breed, age, sex, hormonal status, integrity of the skin, nutrition, health status, high humidity, overcrowded cattle in shelters, season.

Winter in shelters, animal concentration per unit area and humidity is increased, making the cattle ringworm epidemics to be more frequent and harder to control. However, the prevalence of the disease is also high in summer in animals infected with *T. verrucosum* poorly maintained, grown in unhygienic, unventilated shelters (Cosoroabă et al., 2002; Dărăbuş et al., 2006).

In Romania other authors have found a high prevalence at the breeds Romanian Spotted, Brună de Maramureş, Friesian and Holstein Friesian (Guillot, 1981; Iacobiciu et al., 2003).

Cattle ringworm affects cattle regardless of age. Over the age of three, the ringworm is rarely evolving, with mild forms, which often heal spontaneously (Lungu et al., 1975; Mackenzie et al., 1986).

A research performed by Placzek et al. (2006) in Munich, Germany, has shown that *T. verrucosum* is responsible for 98% of cattle dermatophytosis on winter and an important zoonosis. *T. verrucosum* had been identified at three persons, two persons work in cattle farms and one person work into a butcher's shop, like assistant.

Papini and Mardoni (2009), in Italy, have conducted a study on 294 calves from 20 farms in Central Italy, that showed the prevalence rate of *T. verrucosum* is 87.7%. The prevalence rates classification were based on:

- breed: 88.5% true breed, 81.8% crossbreed calves;

- farming system: 88.2% in semi-intensive farming system, 87.2% in intensive farming system;
- production type: 91.1% for meat production, 84.9% for milk production;
- sex gender: 91.6% female, 84% males.

Clinical aspects

The lesions are conditioned by the growth system, or due to mechanical microtrauma resulted by chain friction, hitting the head on the stalls, bails, paddock fence or other surface, including nearby animals (Bussieras, 1987). Cattle ringworm can also manifest atypical: head alopecia and a shallow furfur, without being circumscribed, often located on the latero-inferior region of the thorax and abdomen. Cattle ringworm with atypical lesions and asymptomatic evolution represent sources of infection for calves (Chermette and Bussieras, 1993; Cojocaru, 1979).

The dermatophyte transmission from cattle to humans (cattlemen, milkers, veterinarian) appears in a numerous references (Palmer et al., 2005; Radbea and Dărăbuş, 2006).

Blömer et al. (2012) has showed that *Trichophyton verrucosum* was found at one 28 months old boy, that lived in a cattle farm, where this dermatophyte was present. The boy had cutaneous and subcutaneous lesions on the head, with alopecia and a five cm erythematous area, edematous covered with yellow crust and the hair was friable.

A study made in 2000 in the mycology laboratory from Melbourne University in Victoria, Australia, showed that 32 strains of *T. verrucosum* were isolated from the people who had contact with cattle (cattlemen, veterinarian, kids raised there, workers from slaughterhouse) (Maslen, 2000).

In Iran, Aghamirian and Ghiasian (2009) conducted an epidemiological study that highlights the presence of zoophilic dermatophytes in lesions found in cattle and humans. Were examined 6789 cattle and 130 cattlemen. The study has showed that cattle ringworm is transmitted to cattlemen.

The researchers from the children's hospital Chacha Nehru, India, have found *Trichophyton tonsurans* in a 9 months old child. The predisposing factors were: stress, systemic diseases, trauma (Khanna and Goel, 2012).

In China, Ming et al. (2006) have realized a study on 1000 milk cows from a farm, 20% has been diagnosed with *T. verrucosum*. The disease was transmitted at 30 workers out of 100 from the farm.

Therapeutic aspects

Decun (1997) has evaluated the efficiency of the ointment Tricosan in the infestation with *Trichophyton* spp., and had been registered a 100% efficiency.

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