

## Clinical and epidemiological investigation of bovine dermatophytosis in Diyala Province

W. I. Jalil

Dep. of Medicine- College of Veterinary Medicine/ Diyala University

### Abstract

Dermatophytosis (ringworm) is a zoonotic skin infection of keratinized tissues caused by a specialized group of fungi called dermatophytes. It is a major public and veterinary health problem reported in different parts of the world including Iraq and causes major economic loss through skin injuries and body weight loss. This study was carried out on 100 clinically infected cattle in different locations at Diyala Governorate were subjected for clinical examination during the period from December 2015 to June 2016. Case history for each animal was reported as sex, breed and age groups which classified into (2- 6) months, (7-12) months, (1-3) years and more than 3 years. The total infected animals was 94 (94%), in age (2- 6) month was 100%, in age (7-12) month was 96.77%, in age (1-3) year was 85.71% and more of 3 years was 70%. The number of infected animals according to the sex was 56 male 96.55% and 38 female was 90.47%. The percentage of clinically diagnosed cattle with ring worm was 97.91% at Al Maqdadia, AlKalis 95.45%, Bahqubah 90% and Baladruse 80%. Also the result reported no effect of breed on ring worm infection, In microscopic examination the Ectothrix was 40 (42.55%) and the Endothrix 54 (57.44%).

Key word: Dermatophytes, Ring worm, Cattle.

e-mail: waleed\_opel@yahoo.com

### الدراسة السريرية والوبائية لمرض القراع في الأبقار لمحافظة ديالى

وليد إبراهيم جليل

فرع الطب الباطني والوقائي - كلية الطب البيطري / جامعة ديالى

### الخلاصة

الإصابة بمرض القراع في الحيوانات وذلك بواسطة العديد من الفطريات. وهذا المرض له دور هام في صحة كلا من الإنسان والحيوان على السواء في مختلف أنحاء العالم ومن ضمنها العراق وبسبب خسارة اقتصادية كبيرة حيث يؤدي إلى انخفاض الوزن وجروح في الجلد وسقوط الشعر. تناولت هذه الدراسة 100 بقرة مصابة سريريا تم اختيارهم من مواقع مختلفة من محافظة ديالى من شهر كانون الأول عام 2015 ولغاية حزيران عام 2016 وكان عدد الحيوانات المصابة 94 تم فحصهم سريريا. وتم اخذ تاريخ الحالة المرضية للأبقار في مراحل عمرية وأجناس وسلالات مختلفة. تم تصنيفها عمريا حيث كانت نسبة الإصابة 100% من (2- 6) اشهر وكانت 96.77% بعمر (7- 12) شهر وكانت 85.71% بعمر (1- 3) سنة وكانت 70% لأكثر من 3 سنوات. وصنفت الحيوانات المصابة تبعا للجنس حيث للذكور 56 حالة بنسبة 96.51% وبالنسبة للإناث 38 بنسبة 90.47%. وكانت نسبة الإصابة لناحية المقدادية 91.97% وناحية الخالص 95.45% وناحية بعقوبة 90% وكذلك ناحية بلدروز 80%. كذلك أثبتت الدراسة ان سلالة الحيوان ليس لها تأثير في الإصابة بمرض القراع. واثبت الفحص المجهرى وجود نوعين هما الاكتوثريكس 40 بنسبة 42.55% وكذلك الاندوتريكس 54 بنسبة 57.44%.

الكلمات المفتاحية: القراع، الدودة الحلقيه، الأبقار.

### Introduction

Dermatophytosis (ringworm, tinea) is a zoonotic skin disease of keratinized tissues caused by a specialized group of fungi called dermatophytes. The disease has universal distribution and it has been careful as a public health trouble all over the world (1). Animal dermatophytosis is dependable for high economical losses especially in cattle farming caused by skin

damages and reduces in milk and meat production (2). Cattle of all ages can be affected and the disease is more common in calves and yearlings. Although it causes minimal discomfort to the animal, ringworm is an unsightly disease that may lessen the value of affected animals, prevent them from being exhibited at shows and can be transmitted to humans (3). Affected animals initially develop characteristically discrete, scaling patches of hair loss with grey white crust that later become thickly suppurred crust whose location is highly variable (4). Most of the lesions observed on the affected calves, these lesion commonly affected the head, neck, dewlap and chest area (5). Although various parts of human body may be, involve by the fungus, the face and the body is mainly affected during the fungal infection. Different antifungal agents such as azoles have successfully treated human cases of *Trichophyton verrucosum* infection, but therapy for cattle is more difficult (6). The aim of this study is a study of clinical and epidemiological aspects of ringworm in cattle some regions of Diyala Governorate.

### Materials and Methods

- **Animals:** One hundred cattle in different locations at Diyala Governorate were subjected for clinical examination during the period from December 2015 to June 2016. Case history for each animal was reported as sex, breed and age groups which classified into (2- 6) months and (7-12) months and (1-3) years and more 3 years.
- **Clinical Examination:** The skin of all animals was examined clinically, the affected animals were subjected to general health examination, as body temperature, pulse rate, respiratory rate, appetite, and morbidity rates were recorded. The shape, size, position, distribution and time of the appearance of skin lesions were also reported.
- **Samples and Microscopically Examination:** The surface of the animal of the affected area was first rubbed with a cotton swab fertile with 70% ethyl alcohol to remove surface adhering organism. Skin scales were collected by scraping of the margin of the lesion using a sterile scalpel blade into sterile Petri dish. Hairs were collected by removing dull broken hairs from the margin of the lesion using sterile tweezers as described (7). Each sample collected was divided into two portions.
- **Direct microscopic examination:** One portion was used for direct microscopic examination, all samples were examined for detection of fungal elements. Some scales and hair tufts were treated with 10% potassium hydroxide solution for 10 minutes then examined under microscopic for fungal spores and hyphae under 100× and 400× magnifications (8).
- **Culturing:** The second portion was cultured on Sabarouds dextrose agar supplied with Cycloheximide, which was employed because saprophytic fungi and yeasts normally present as contaminants were inhibited by cycloheximide, incubated at 28°C for 2-6 weeks. Microscopic examination for positive fungi cultures was done using the Lacto phenol cotton blue wet mount method (9).
- **Statistical Analysis:** The Statistical Analysis System- SAS (10) program was used to effect of difference factors in study percentage. Chi-square test was used to significant compare between percentage in this study.

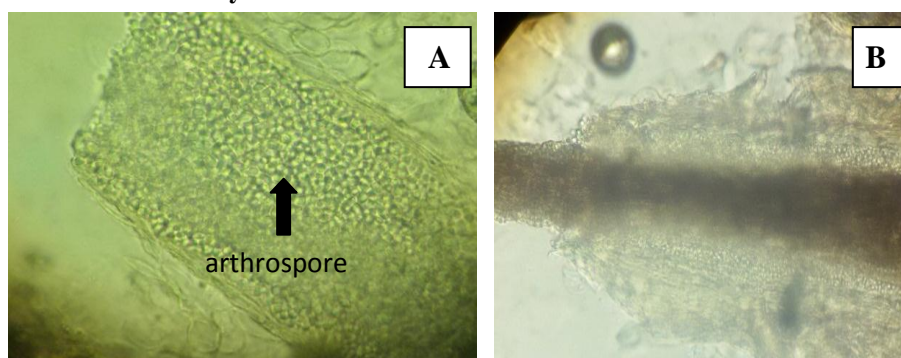
### Results

**Clinical examination:** The main clinical signs presented were gray-white, crusty lesion. and regular hairless areas at tail, head and around of eye as in fig (1). **Laboratory examination:** The microscopic examination of skin scraping lesion from animals of study show two type of ringworm infection according to arrangement of arthrospore ectothrix and endotherix. The ectotherix was detected in 40 case 42.55% and Endothrix in 54(57.44%) as shown in table (1) and figure (2: A, B). On the other hand, the result of skin scraping lesion culture incubated at 28°C for 2-6 weeks show *Trichophyton verrucosum* characterized by being fig.(3: A) flat, white/cream color, having an

occasional dome. While, under a microscope characterized by being chains of chlamydo spores (B) and Macronidia are rare, and have a rat-tail or string bean shape (C). The prevalence study: The total number of animals examined were (100). Ninety four of total number were infected by ringworm. The results of infected animals in age 2-6 month was 100%, in age 7-12 month was 96.77%, in age 1-3 year was 85.71% and more than 3 years was 70% as shown in table (2). Frequency of distribution of ringworm infection in different age of animals was higher in small age (2- 6 months) and lower in adult age (More of 3 years) as in table (2). Table (3) show sex of animal in the study. The number of male to female animal was (58 to 42). The positive case in male sex was 56 (96.55%) and the positive case in female sex was 38 (90.47%) out of total 94 positive case. The present study show no significant difference at sex of animals as in table (3). Table (4) shows the relation between the breed and mobility rate, which revealed that 56 out of 60 native breed 93.33% and 38 out of 40 Freisian breed 95% were infected, respectively. The prevalence of infection appear no significant difference at breed of animals. As in table (4). As shown in table (5), in Al Mukdadyia, the infected cases were 47/48 (97.91%), in AlKhalis, the infected animals were 21/22 (95.45%), in Baqubah was 18/20 (90%), in Baladruse was 8/10 (80%). Distribution of infection according to area of study show high infection in Al Mukdadyia, (97.91%) and lower infection in Baladruse 80% with significant difference as in table (5).



**Fig. (1 A, B): A: Adult Cow show regular hairless areas at tail. B: Calf showing circular hairless area at head and around of eye**



**Fig. (2) Microscopic examination of infected hair :(A) Endothrix arrangement of arthrospore and (B) Ectothrix arrangement of arthrospore**

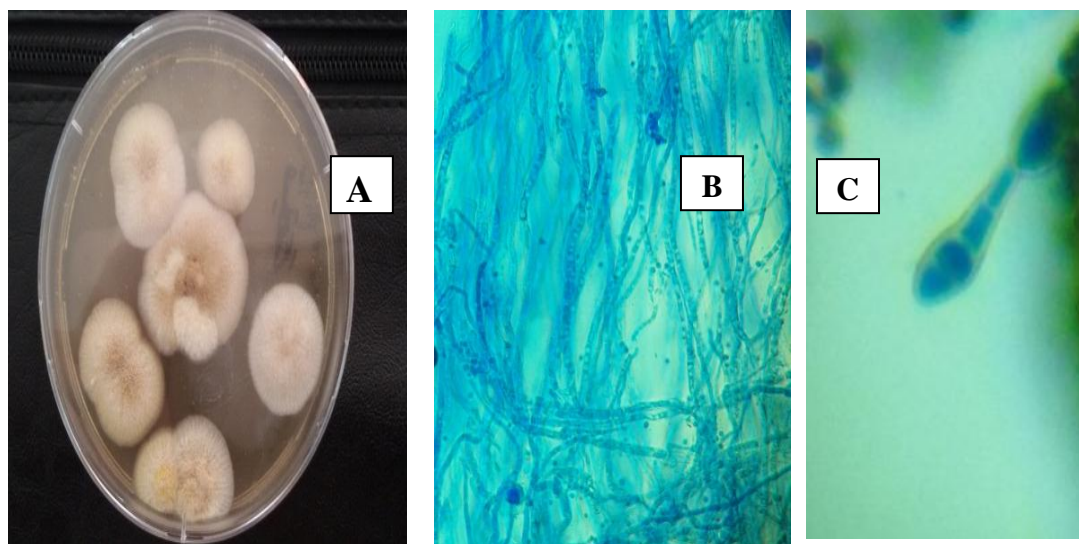


Fig. (3:A,B,C): A: flat, white/ cream color, having an occasional dome (B) chains of chlamydospores, (c) Macronidia have a rat-tail or string bean shape

**Table (1) Percentage of infection according to Endothrix and Ectothrix arrangement of Dermatophytes**

No. of examined animals	No. of infected animals	Ectothrix and percentage of infection %	Endothrix and percentage of infection%
100	94	40 (42.55)	54(57.44)
Chi-Square- $\chi^2$	---	6.109 **	

\*\* (P<0.01).

**Table (2) Distribution of ringworm infection in different age of animals**

Age of animal	No. examined animal	No. of infected animals	Prevalence rate%
2- 6 months	45	45	100
7- 12 months	31	30	96.77
1 -3 year	14	12	85.71
More of 3 years	10	7	70.0
Total	100	94	94.0
Chi-Square- $\chi^2$	---	---	6.174 **

\*\* (P<0.01). SD Significant difference

**Table (3) Percentage of ringworm infection in different sex of animals**

Sex of animal	No. Examined Animal	No. infected animals	Prevalence rate%
Male	58	56	96.55
Female	42	38	90.47
Total	100	94	94.0
Chi-Square- $\chi^2$	---	---	2.319 NS

NS: Non-Significant.

**Table (4) Percentage of ringworm infection in different breed of animals**

Breed of animal	No. Examined Animal	No. of infected animals	Prevalence rate %
Native (Local breed)	60	56	93.33
Friesian breed	40	38	95.0
Total	100	94	94.0
Chi-Square- $\chi^2$	---	---	0.783 NS

NS: Non-Significant.

**Table (5) Prevalence of bovine Dermatophytosis according to area of study**

Area of study	No. Examined Animal	No. of infected animals	Prevalence rate%
Al Mukdadyia	48	47	97.91
Al Khakis	22	21	95.45
Baqubah	20	18	90.0
Baladruze	10	8	80.0
Total	100	94	94.0
Chi-Square- $\chi^2$	---	---	7.263 **

\*\* (P<0.01).

### Discussion

The results of this study clearly demonstrate that dermatophytosis is a major problem in cattle farms in Diyala province especially in young animals. Samples were collected from 100 cattle which expected suffering ringworm, 94 (94%) animals had clinical lesions of ringworm with varied from place to place this finding agreement other author (11, 12). Generally, affected animals had normal body temperature, pulse and respiration, other body systems were also normal. The skin of affected animal showed circular, circumscribed, grayish-white and crusty raised lesions and focal area of alopecia was also observed. The lesions were most commonly found on the head, neck, around eyes and dewlap This finding agreed with (11, 13, 14, 15) who described the clinical signs of the ringworm on the affected calves as suffered from alopecia and/or circular circumscribed grayish-white, crusty, raised lesions, which were most commonly found on the head, neck, dewlap, and the chest area. As (16) found that the major lesions observed on the affected calves and cattle were circumscribed, thick, hairless, gray-white skin patches affecting the head and neck. The clinical signs observed in the present outbreak were similar to those reported for dermatophytosis in cattle this finding agreement with (17). The disease mainly affected young animals in the 2-6 months age group (100%) followed by the age groups 7-12 months (96.77%), in age (1-3) year was (85.71%) and more of (3) years was (70%). There was variation in infection between the calves and cattle. The lower morbidity of ringworm in cattle compared to calves may be attributed to the development of cell-mediated immune response elicited by the *T. verrucosum*, which results in resistance in adults. Our results were in consistent with those of (16) who reported that affected young animals in the 3-6 months age group (31.5%) followed by the age groups 7-12 months (15.9%) and >12 months (1.1%). There was significant difference between the frequency of ringworm in calves (<12 month, 26.9%) and cattle (>12 month, 1.1%). (11) reported that higher prevalence of infection was found amongst calves under the age of 6 month (18.7%) in comparison with age more than 6 month (14.5%). This result showed that infection decreased with increase animal age. This result agreed with that stated by (19) who reported that dermatophytosis is more common when animals are immunosuppressed, have poor nutrition or are kept in high density populations and infections can be more persistent or widespread in young or sick animals. Young animals are more likely to have symptomatic infections (2). Several outbreaks of disease have been reported in cattle herds especially in young animals (15, 20, 21). The prevalence of ringworm in infected calves 30.6% (22), and more than that recorded by (3) who found the prevalence of ringworm in infected calves 7.7%. The present study found that the percentages of infection of ringworm in male (96.55%) were higher than that in female (90.47%) (Tables 3), the results showed frequency changes between the sexes, where it was the highest in male and female was the lowest, and could not be attributed to any reason for these results because there is no relationship between the sex and incidence of disease, while (11) found that sex distribution of ringworm infection in males (28.3%) more than female (8.0%). This result may be attributed to animals housed in

close proximity to each other for long periods in the fattening period and the presence of infected one leads to spreading spores of fungus between animals so leads to greater infection rate in males than females. Concerning to animal breed, the prevalence of ringworm infection was higher in foreign breed (Friesian breed; 28.0%) in comparison with native breed (8.3%) and this result may be attributed to locally born animal has more resistant to infection than imported animal species (18). The prevalence of ringworm infection was higher in cross breed (Friesian breed; 95.0%) in comparison with native breed (93.33%), this result may be attributed to locally born animal has more resistant to infection than imported animal species. There for, this finding agreement with other authors' (11, 18). There was significant difference in geographic distribution of disease in Diyala Province, this finding no agreed with (16). Ectothrix and Endothrix of dermatophytes define according to arrangement of aurospore outside and inside of hair shaft respectively, this agreement with (23).

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