



Isolation and Identification of *Dermatophilus* spp in Cattle from An Institutional Farm in Zaria, Nigeria

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ABSTRACT

*Dermatophilosis is an infectious disease of domestic and wild animals, and to a certain extent man. This paper presents a naturally acquired infection of cattle with *Dermatophilus* specie in an institutional farm in Zaria, Nigeria. The infection which occurred in a herd of 67 cattle involved 10.4% (7/67) showing crust lesions. Crust samples were taken from each of the seven infected animals and cultured on blood agar for the isolation of *Dermatophilus* specie. The isolates obtained were subjected to biochemical test and also antibiotic sensitivity test. All the seven isolates were found positive with Gram stain and β -hemolysis. They did not produce gas with sucrose, mannitol and maltose but were positive with catalase and urease, and negative for indole. The isolates were sensitive to Amikacin (80%), Ciprofloxacin (80%), Doxycycline (60%), Ceftriaxone (60%), Chloramphenicol (40%) and Colistin sulphate (20%). In conclusion all the seven infected cattle were confirmed positive for *Dermatophilus congolensis* and were found to be highly sensitive to Amikacin and Ciprofloxacin. It is hereby recommended that the infected cattle should be treated with Amikacin or Ciprofloxacin. Regular ectoparasite control should be carried during raining season in the farm.*

Keywords: *Dermatophilus specie, cattle, crust, isolation, identification*

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INTRODUCTION

Dermatophilosis is an important disease of livestock that is highly devastating in cattle and susceptibility to the disease seems to be highest among *Bos Taurus* cattle than *Bos indicus* [1]. The disease is referred to as cutaneous streptothrichosis in cattle and goats, and lumpy wool disease in sheep when the wooly areas of the body are affected [2]. Bovine Dermatophilosis is caused by a gram positive facultative anaerobic actinomycete *Dermatophilus congolensis*. Morphologically they are gram positive with filaments and spores. They appear as fine branching multiseptate hyphae with transverse and longitudinal arranged cocci (railroad track appearance) [12]. The colonies of the organism are dirty white to yellowish orange that stick to media [1]. The disease is characterized by loss of skin integrity, reduction in skin market value, reduced carcass quality and drop in milk production. Several vectors such as mites, ticks, and lice played role in the transmission of the disease with its chronic form associated with (*Amblyomma variegatum*) tick (1). The disease is commonly observed during the raining season and in persistently wet cattle pens (3), with highest prevalence seen in the month of May to October in Nigeria (1). This study was carried out in order to investigate the cause of a naturally acquired infection of cattle suspected to be dermatophilosis in an institutional farm in Samaru, Zaria and also recommend appropriate treatment, control, and preventive measures.

MATERIALS AND METHODS

Study area

The study was carried out in an Institutional farm in Samaru, Zaria, Nigeria situated at latitude 11° 12' N, and longitude 07° 37' E at an altitude of 550-700 meters above sea level. The farm constituted of cattle, sheep, goats, fisheries, and poultry. The ruminants (cattle, sheep, and goats) were managed semi-intensively.

Sample Collection

Marked crustations were observed on the body (dorsum) of seven out of the sixty-seven cattle

in an Institutional farm in Samaru, Zaria, Nigeria. The crusts samples were collected aseptically from the seven cattle suspected to be infected with dermatophilosis, according to [4]. The samples were transported in plastic bags at room temperature to bacterial zoonosis laboratory for further processing.

Culturing of Samples

The crusts samples were inoculated on nutrient broth and also sub cultured on blood agar according to [5].

Isolation and Identification

The samples inoculated in the nutrient broth were incubated at 37°C for 24 hours before being further sub-cultured on blood agar and incubated at 37°C overnight. The identification of the organisms was performed by the tests as described by [6] [7], [5] and [8]. Based on morphological and staining characteristics, hemolytic activities on blood agar, biochemical characteristics and antibiotic sensitivity test, the bacteria were isolated and identified.

Fermentation Reaction with Basic Sugars

The carbohydrate fermentation test was performed by inoculating a loopful of nutrient broth culture into the test tubes containing basic sugars (sucrose, maltose, lactose and mannitol) and incubated at 37°C for 24 hours [6]. Acid production was indicated by the change of colour of media from pink to yellow and gas production was indicated by the appearance of gas bubbles in the inverted Durham's tubes [6].

Catalase Test

The catalase test was performed according to [7] where a loopful of bacterial growth was mixed with a drop of 30% hydrogen peroxide on a glass slide to observe bubbles formations. .

Urease Production Test

Loopful of bacterial growth were inoculated in urea agar slant and incubated at 37°C for four hours. After the incubation, the test tubes were examined for any change or reaction in the media. The samples having no change in the slant was considered as negative for urease production by the organisms [9].

Indole Production Test

The organism was grown in peptone water for 48 hours according to [9]. Half a milliliter of Kovac's reagent was added to 2 ml of the culture, mixed thoroughly, and examined after 1 minute. The appearance of red layer either on the surface or in any part or whole of the medium was considered as positive test with the observation of no red colour indicating negative result.

Antibiotic Sensitivity Test

In vitro antibiotic sensitivity test were done using disc diffusion test [6]. Depending on the area of the zone diameter for individual antibiotic disc, it was recorded as sensitive, intermediate and resistant. The following were the antibiotics tested against the organism with their disc concentrations.

Table 1 Antibiotic disc with concentration

Name of the antibiotics	Disc concentration (µg / disc)
Amikacin (AK)	30
Ciprofloxacin (CP)	5
Doxycycline (DX)	30
Ceftriaxone (CF)	30
Chloramphenicol (CI)	05
Colistin sulphate (CS)	10

RESULTS

All the isolates grew well aerobically within 24 hours at 37°C on blood agar plates typically showing tiny, round raised, very rough granular colonies. The colonies became yellowish with further incubation and later developed orange colour in the more crowded areas where β-hemolysis occurred typical of *Dermatophilus Congolensis* [6] and [8]

Distribution of dermatophilosis in the herd showed bulls (0%), cows (33.3%), heifers (9.5%), heifer calves (5.5%) and bull calves (0%). Table 2

Table 2 Percentage distribution of cattle infected with dermatophilosis in the Institutional farm, Samaru, Zaria, Nigeria

S/N	Category of Animal	Number Examine	Number Infected	Percentage
1	Bulls	4	0	0
2	Cows	12	4	33.3
3	Heifers	21	2	9.5
4	Heifer calves	18	1	5.5
5	Bull calves	12	0	0
6	Total	67	7	10.4%

Biochemical Test

Results of the biochemical test showed all the isolates did not produce gas with sucrose, mannitol and maltose but were positive with catalase and urease but indole negative as indicated in Table 3

Table 3 Results of biochemical characteristics of the isolates

Basic Sugars						
Reaction	Sucrose	Mannitol	Maltose	Catalase	Urease	Indole
Sugar fermentation	-	-	-			
Bubbles				+		
Change in colour of media					+	-

+ = Positive - =Negative

Antibiotic Sensitivity Test

Antibiotic sensitivity and resistance patterns were conducted according to (10). The *Dermatophilus* species were (80%) sensitive to Amikacin (AK) and Ciprofloxacin (CP) followed by (60%) sensitive to Doxycycline (DX) and Ceftriaxone (CF) (60%) resistant to Chloramphenicol (CI) and (80%) resistant to Colistin sulphate (CS) as shown in Table 4.

Table 4. Results of antibiotic sensitivity and resistant pattern

%	AK	CP	DX	CF	CL	CS
Sensitive	80	80	60	60	20	10
Intermediate	10	10	30	30	20	10
Resistant	10	10	10	10	60	80

Key: Amikacin (AK) Ciprofloxacin (CP) Doxycycline (DX) Ceftriaxone (CF)
Chloramphenicol (CI) Colistin sulphate (CS)

DISCUSSION

In this study, seven cattle representing 10.4% of the cattle in the farm were confirmed to be infected with *Dermatophilus congolensis* the organism causing dermatophilosis otherwise known as “Kirchi” in Hausa (local language). These findings differ from the results obtained by [11] who reported 69.2%, 38% and 57.3% prevalence in three different farms in Zaria Nigeria, which could be attributed to variation in management practice in the different farms. Among the categories of cattle screened, cows presented the highest prevalence compared to heifers, heifer calves and bull calves. Similar findings were reported by [11]. The older the animal the likely risk of acquiring the infection. [1]. This finding also differs from the report of [12] that showed higher prevalence in young animals in an institutional farm in Mymensingh District in Bangladesh.

The isolates did not produce acid and gas from lactose, mannitol, maltose, and sucrose sugars. They were catalase positive with bubble and

also positive to urease test by changing the colour of media, and also indole negative [9].

The variation of antibiotic sensitivity and resistance patterns against the isolated isolates observed in this study might be owing to genomic variations, chromosomal or plasmid mutation of the organisms [12], [13] and [14]. It also could be attributed to overuse or misuse of the antibiotics, poor infection control and use of poor quality antibiotics [15].

Conclusions and Recommendation

In conclusion, *Dermatophilus congolensis* has been confirmed in this study and was found to be highly sensitive to Amikacin or Ciprofloxacin. It is hereby recommended that the seven infected animals should be isolated and treated using Amikacin or Ciprofloxacin. Ectoparasite control should be carried out in the farm regularly. The farm should also improve its biosecurity and hygienic measures.

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