



PATHOLOGICAL LESIONS IN BOVINE SKIN NATURALLY INFECTED WITH *DERMATOPHILUS CONGOLENSIS* IN ZARIA, NIGERIA.

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SUMMARY

Dermatophilosis is a contagious zoonotic skin disease caused by a Gram-positive actinomycete, *Dermatophilus congolensis*. The effect of the disease on the production and sales of hides are considerable. Lack of concrete establishment of the etiologic agent and producing the natural disease experimentally in laboratory animals or ideal susceptible hosts have limited the control of *Dermatophilus* infection. Understanding the pathogenesis of the disease by pathological studies would provide an in-sight into the ways of controlling the disease. The objective of this work is to study the pathological lesions of dermatophilosis in naturally infected bovine skin. One thousand, one hundred and twenty (1,120) cattle slaughtered in Zaria abattoir from June to October, 2007 were examined for skin lesions suspected to be dermatophilosis. Skin samples were obtained from 150 (13.4%) animals with skin lesions for bacteriology and histopathology. Those for bacteriology were collected aseptically in sterile containers and stored at 4°C while those for histopathology were fixed in 10% neutral buffered formalin. Out of one hundred and fifty samples processed for bacteriology, 65 (5.8%) were positive for *D. congolensis*. Histopathology of infected bovine skin revealed hyperplasia of the epidermis, parakeratosis, necrosis, cellular infiltration of the hair follicles and papillary dermis. Diffuse cellular infiltration of the reticular dermis and folliculitis were also observed in some sections. Hyphae of *D. congolensis* were detected in the superficial hyperplastic and hyperkeratotic epidermis. It was concluded that the pathological lesions observed were mainly proliferative and inflammatory in the epidermis.

INTRODUCTION

Dermatophilosis is a contagious zoonotic skin disease caused by a Gram-positive actinomycete, *Dermatophilus congolensis*. The disease in cattle is characterized by acute or chronic, local or progressive and sometimes fatal exudative dermatitis, which starts as an erythema, progressing through serous exudation, drying to form characteristic matting of the hair (1, 8, 11). Hides and skin contribute significantly to the economy of developing countries (12). Bourn *et al.* (5) put the total Nigerian cattle population at 19.9million. The effect of the disease on the production and sales of hides are considerable.

The losses of skin due to downgrading have been estimated to be approximately ₦19.1 million annually because of *Dermatophilus congolensis* infection in sheep and goats (12), while Abdullahi (1) described the losses due to dermatophilosis in Nigeria as grossly underestimated.

The primary effect of dermatophilosis results in areas of weakness in the hides and skin which, after tanning, appears as gross distortion of the grain enamel in which holes, pitting and cracks are present (7). The control of dermatophilosis in developing countries especially those in the tropical and sub-tropical region remains a great problem. This is because of the serious outbreaks of acute infection which occur during the rainy season and also the insidious nature of the disease during the dry weather. Lack of concrete establishment of the etiologic agent and producing the natural disease experimentally in laboratory animals or ideal susceptible hosts have limited the control of *Dermatophilus* infection (12). Understanding the pathogenesis and pathology of the disease would provide an in-sight into the ways of controlling dermatophilosis. This paper describes the pathology of dermatophilosis in naturally infected bovine skin.

MATERIALS AND METHODS

One thousand, one hundred and twenty cattle slaughtered in Zaria abattoir from June to October, 2006 were examined for skin lesions suspected to be dermatophilosis. Paired skin samples were collected aseptically in sterile containers from 150 animals with skin lesions for bacteriology and histopathology. Skin samples for histopathology were fixed in 10% buffered formalin.

Direct examination of skin using standard techniques were carried out involving a drop of sterile water placed on a clean glass slide with the suspected skin scab held with a pair of forceps and mixed with the sterile water to make a smear. The smear was allowed to dry in air, heat-fixed and Gram-stained. The slides were examined with high power (x100) objective of the microscope for the presence of *D. congolensis*. Isolation of *D. congolensis* was carried out using the method described by Van Breuseghem et al. (10) in order to confirm infection. Skin lesions that were positive for *D. congolensis* were separated, cut at 5-6 microns after embedding in paraffin wax and stained with haematoxylin and eosin.

RESULTS

Out of one hundred and fifty samples processed for bacteriology, 65 (5.8%) were positive for *D. congolensis*. A variety of lesions were observed. Some of the cattle examined had few papules, together with some hard, dry, crusty lesions which were confined to certain areas of the body particularly the back (plate 1). In others, the lesions were generalized and covered the whole body especially the back, neck, the perineal region, lower limbs, tail, mouth and ears of the affected animals (plate 2).

Histopathology of infected bovine skin revealed hyperplasia of the epidermis, parakeratosis, necrosis, cellular infiltration of the hair follicles and papillary dermis (Plate 3). Diffuse cellular infiltration of the reticular dermis and folliculitis were also observed in some sections (Plate 4). Hyphae of *D. congolensis* were detected in the superficial hyperplastic and hyperkeratotic epidermis (Plate 5).

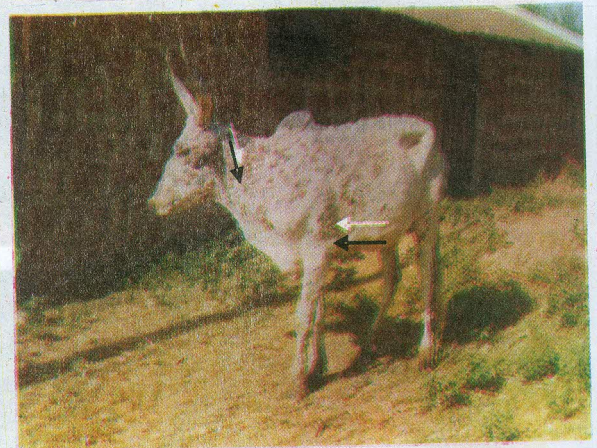


Plate 1: A group of cattle with Dermatophilosis Plate 2: A cow with generalized dermatophilosis lesions (arrow).

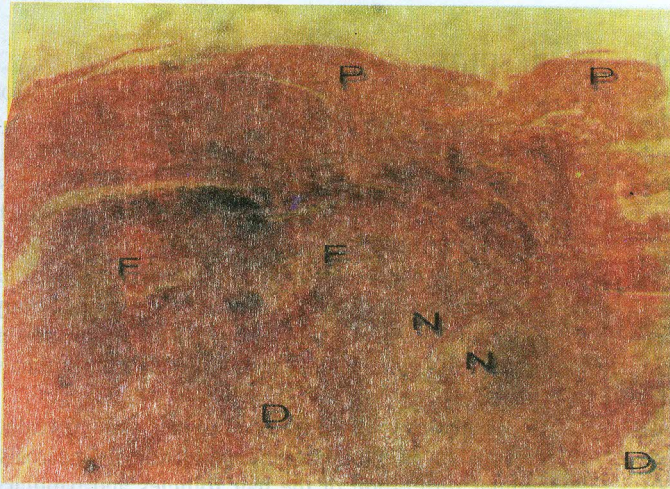


Plate 3. Photomicrograph of the skin of a cow naturally infected by *Dermatophilus congolensis* showing the epidermis. Note hyperplasia of the epidermis, parakeratosis, hyperkeratosis (P), area of necrosis (N) with cellular infiltration in the hair follicles (F) and papillary dermis (D). H & E x 305.

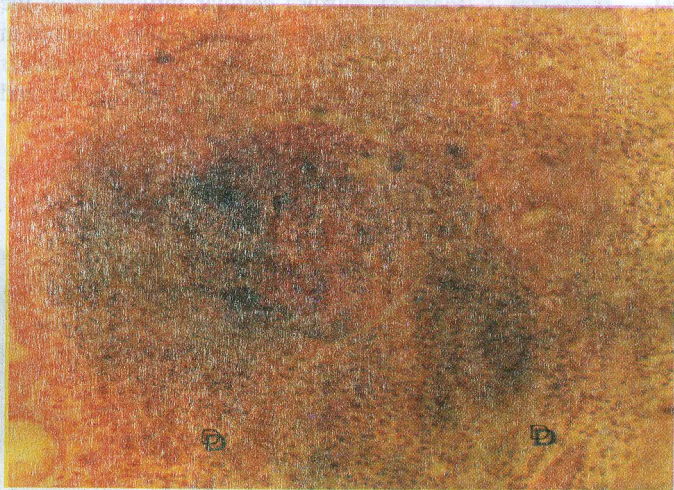


Plate 4. Photomicrograph of the skin of a cow naturally infected by *Dermatophilus congolensis*. Note diffuse cellular infiltration of the reticular dermis (D) and hair folliculitis (F). H & E x 476

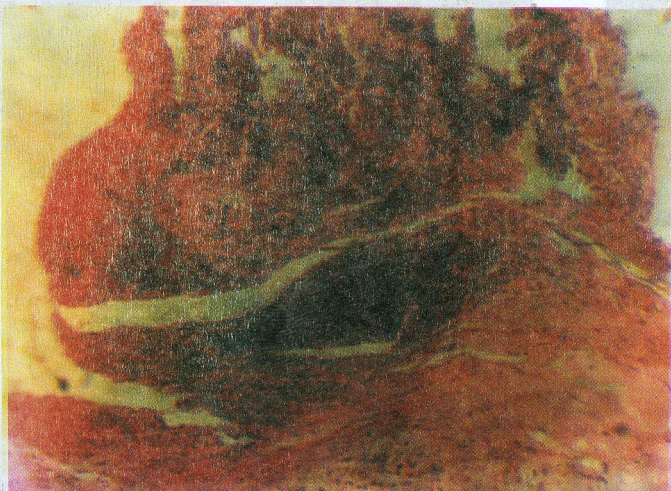


Plate 5: Photomicrograph of the skin of a bull naturally infected by *Dermatophilus congolensis*. Note bacterial hyphae (arrow) in the superficial hyperplastic and hyperkeratotic epidermis. H & E x 305



DISCUSSION

The 5.8% prevalence of bovine dermatophilosis observed in this investigation is similar to the report of Oduye and Lloyd (9) who observed a prevalence of 5.6% when they examined 1,198 cattle. It is however, different from the 12% prevalence reported by Bida and Kelly (4). This difference could be attributed to the fact that not all cases of cattle dermatophilosis were taken to the abattoir for slaughter. Some severely affected animals either died of the disease or were culled by the owners elsewhere, whereas mild cases either respond to treatment or show spontaneous healing (12).

Histopathological findings in this report agree with previous reports (2; 3). However, the diffuse cellular infiltration of the reticular dermis and folliculitis observed in this report even though not reported by Amakiri (2); Ambrose (3) was consistent with the findings of Zaria (12). This could be due to secondary bacterial infection of the lesions produced by *D. congolensis*. Several bacterial agents have been isolated from skin lesions of cattle with clinical dermatophilosis (1, 6, 12). The observation of *D. congolensis* in the epidermis agrees with the report of Amakiri (2), who observed *D. congolensis* most frequently in the stratum corneum especially between the disjunctum and conjunctum. This could be due to the presence of the basement membrane (dermo-epidermal junction) together with the stratum basale which might act as barrier to dermal entry of *D. congolensis*.

It was concluded that the histopathological lesions observed could be due to *D. congolensis* complicated by secondary bacterial infection.

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