MICROMORPHOLOGY OF *DERMATOPHILUS CONGOLENSIS* IN CLINICAL SPECIMENS*

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Abstract

The present study documents the different morphological forms of D. congolensis in clinical specimens from naturally occurring dermatophilosis. Skin scabs and impression smears from the lesions were subjected to direct microscopic examination after staining with Giemsa stain. Typical tram- track appearance with parallel rows of coccoid organisms was clearly evident only in scabs from fresh active lesions. In chronic and healing lesions the branching filaments had undergone disintegration and clumps of zoospores were seen. The organisms were observed in different forms depending on the stage of development varying from long thin filaments branching at right angles, branching filaments with septations, filaments packed with zoospores, filaments with parallel rows of zoospores and mature free zoospores. Present knowledge on appearance of different stages of the organism in clinical materials will be useful for making a rapid and definite diagnosis.

Key words: *Dermatophilosis, cattle, micromorphology*

Diagnosis of dermatophilosis depends largely on the appearance of lesions in clinically diseased animals and demonstration of *Dermatophilus congolensis* in stained smears or histological sections from scabs. A definite diagnosis is made by culture and identification, which is laborious and time consuming. The characteristic morphological appearance of *D. congolensis* is diagnostic, provided that cocci are found in transverse rows of two or more and readily seen in stained preparations (OIE, 2008). Direct smear of skin swabs from infected areas stained with Gram's or Giemsa's staining demonstrates the morphology of the organism (Quinn *et al*., 2011). Knowledge on appearance of different stages of the organism in clinical materials will be useful for making a rapid and definite diagnosis. The present study describes the different stages in the life cycle of *D.congolensis* observed in infected scabs from various stages in the course of naturally occurring dermatophilosis.

Materials and Methods

Cattle with clinical signs of dermatophilosis such as pustules, matting of hairs and scab formation on different parts were included for the study. Skin swabs, scabs and scrapings and impression smears were collected from the lesions of 82 animals and subjected to direct microscopic examination and cultural isolation. Small pieces of skin were also taken from the underside of the scabs and softened with few drops of distilled water on a clean microscopic slide, a smear was made with this and stained with Giemsa's and Gram's stains (Quinn *et al*., 1994). The impression smears taken from the lesions were also stained with Giemsa's stain and Gram's

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stain and examined under the oil immersion objective of the microscope. The different forms of *D. congolensis* observed in these clinical specimens were documented. Dermatophilosis was confirmed in these cases by cultural isolation and identification of the organism from the scabs.

Results and Discussion

Microscopical examination of Giemsa or Gram stained smears of the scab material from the lesions revealed characteristic Gram positive septate branching filaments which were longitudinally as well as transversely divided to form spherical or ovoid cocci in multiple rows, with typical 'tram- track appearance' suggestive of *D. Congolensis* (Fig. 1). This distinctive morphology of the organism was demonstrated by most of the workers as the most practical diagnostic method for dermatophilosis (Quinn *et al.,* 1994; Kahn, 2005).The organisms were

Figures

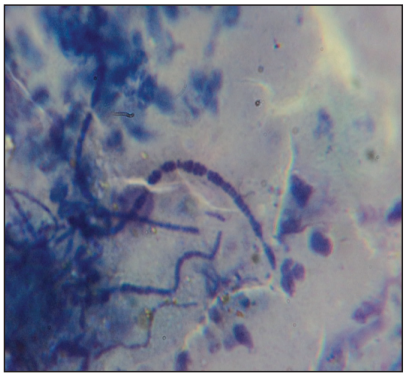

Fig. 1. Tram track appearance of *D. congolensis*

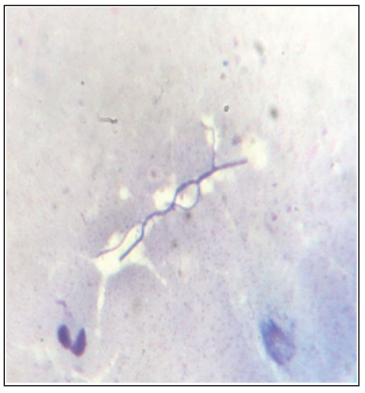

Fig. 2. Thin branching filaments of *D. congolensis* without septations

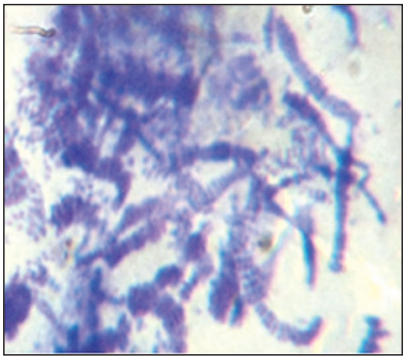

Fig. 3. Branching filaments with septations

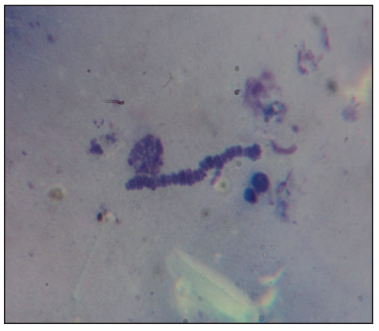

Fig. 4. Broad filaments packed with zoospores

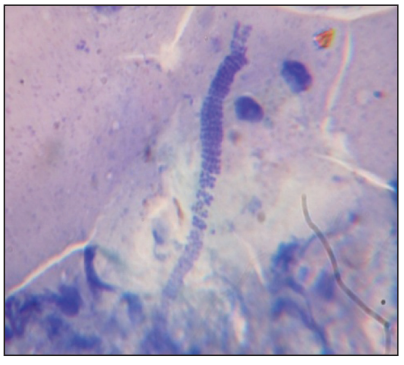

Fig. 5. Filaments with eight rows of zoospores

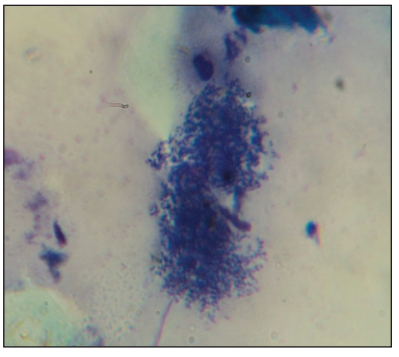

Fig. 6. Clumps of zoospores

observed in different forms depending on the stage of development varying from long thin filaments branching at right angles (Fig. 2), branching filaments with septations (Fig. 3), broad filaments packed with zoospores (Fig. 4), filaments with two to eight parallel rows of zoospores (Fig. 5) and mature free zoospores released from the filaments. Similar stages were also observed by Gram's staining. Typical tram- track appearance was clearly evident only in scabs from fresh active lesions. But, in chronic and healing lesions the branching filaments had undergone disintegration and clumps of zoospores were seen (Fig. 6). This might be due to the collection of specimens during chronic or healing stage of the disease as suggested by Award *et al*. (2008) or due to rough treatment of the scabs during smear preparation which resulted in disintegration of the filaments into coccoid form as suggested by Quinn *et al*. (1994). Hyslop (1980) described pleomorphic nature of *D. congolensis* in stained smears of scabs and stated that the organism might be seen in any form of the various stages of its lifecycle. In some specimens, the empty Gram negative branching capsular sheath after release of the zoospores, referred to as ghost forms were evident. The morphological characteristics of the organisms were clearer with Giemsa stain than Gram's stain.

In some specimens, only clumps of zoospores were seen packed within the scabs. Released zoospores, often arranged as they were observed within the septed hyphae were visible in some specimens. Similar observations were also made by Skalka and Pospisil (1994). In some specimens the bacteria appeared as Gram negative branching filaments because of the presence of older less actively dividing organism in which Gram positive cell walls may lose their ability to retain crystal violet dye as suggested by Bernis *et al.* (1999). During the recovery or acute phase, diagnosis of *D. congolensis* based on direct smears may be rarely positive as suggested by Tabar *et al*. (2004). Award *et al*. (2008) also described similar situation where the stained smears taken from dried scabs collected from chronic cases showed less numbers of bacteria and the characteristic appearance of the organism was not obvious.

The characteristic morphological appearance of *D. congolensis* in stained smears of scabs is diagnostic and can be used as a very effective and low cost method of diagnosis which can be employed even in field laboratories with minimal facilities as suggested by Pal (1995), Kahn (2005) and OIE (2008).

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